



**WATTLE CREEK ENERGY HUB
BATTERY ENERGY STORAGE SYSTEM**

Scoping Report

FINAL

September 2023



WATTLE CREEK ENERGY HUB BATTERY ENERGY STORAGE SYSTEM

Scoping Report

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Spark Renewables Pty Limited

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Report No. 22949/R01
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QMS Certification Services

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Acknowledgement of Country

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Abbreviations

Abbreviation	Definition
ABS	Australian Bureau of Statistics
AC	Alternating current
ACHA	Aboriginal Cultural Heritage Assessment
AEMO	Australian Energy Market Operator
Associated dwelling	A dwelling owned by an associated landholder
Associated landholder	A landholder who has reached an agreement with Spark Renewables in relation to the Project but will not host Project-related infrastructure on their land
BAM	Biodiversity Assessment Method
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BCD	Biodiversity and Conservation Division
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BOM	Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land
CCC	Community Consultative Committee
CEEC	Critically Endangered Ecological Community
CLM Act	NSW <i>Contaminated Land Management Act 1997</i>
Crown Land Act	NSW <i>Crown Land Management Act 2016</i>
CSEP	Communications and Stakeholder Engagement Plan
dB(A)	A-weighted noise or sound power level in decibels
DC	Direct current
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment [current]
DPIE	NSW Department of Planning, Industry and Environment [former]
EEAP	NSW Energy Efficiency Action Plan
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EL	Exploration License
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EnergyCo NSW	Energy Corporation of NSW
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>

Abbreviation	Definition
EPL	Environment Protection Licence
GHG	Greenhouse Gas
GIS	Geographic Information System
GW	Gigawatts
Ha	Hectares
Host dwelling	A dwelling owned by a host landholder
Host landholder	A landholder who will (subject to finalisation of an agreement with Spark Renewables) host Project-related infrastructure on their land, also referred to as 'involved' landholders
HHA	Historical Heritage Assessment
IAIA	International Association for Impact Assessment
Illawarra REZ	Illawarra Renewable Energy Zone
KV	Kilovolt
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LIB	Lithium-ion battery
LVIA	Landscape and Visual Impact Assessment
MNES	Matter of National Environmental Significance
MP	Member of Parliament
MW	Megawatt
MWh	Megawatt Hour
NDC	Nationally Determined Contributions
NEM	National Electricity Market
Non-associated dwelling	A dwelling owned by a non-associated landholder
Non-associated landholder	A landholder who has not reached an agreement with Spark Renewables in relation to the Project, also referred to as 'non-involved' landholders
NPfi	NSW Noise Policy for Industry 2017
NSW	New South Wales
NSW EPA	NSW Environment Protection Authority
NSW REAP	NSW Renewable Energy Action Plan
OSOM	Over-size over-mass, in relation to the size of vehicles
PA	Planning Agreement
PCT	Plant Community Type
POEO Act	Protection of the Environment Operations Act 1997
REZ	Renewable Energy Zone
RFS	NSW Rural Fire Service

Abbreviation	Definition
Roads Act	NSW <i>Roads Act 1993</i>
SAT	Spot Assessment Technique
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SISR	Social Impact Scoping Report
SSD	State Significant Development
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
TTIA	Traffic and Transport Impact Assessment
Umwelt	Umwelt (Australia) Pty Ltd
WM Act	NSW <i>Water Management Act 2000</i>
WRIA	Water Resources Impact Assessment
WSP	Water Sharing Plan
WTG	Wind Turbine Generator

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Appendix 4	Wattle Creek Energy Hub Solar and BESS – Biodiversity Constraints Assessment
Appendix 5	Wattle Creek Energy Hub Solar Project – Preliminary Heritage Constraints Assessment
Appendix 6	Wattle Creek Energy Hub Solar Project – Preliminary Visual Impact Assessment

1.0 Introduction

Spark Renewables propose to develop the Wattle Creek Energy Hub to provide a reliable and affordable source of energy for the people of NSW and contribute to reducing greenhouse gas (GHG) emissions associated with energy generation and to enhance national energy security. The Wattle Creek Energy Hub is located on Arthursleigh Farm (Lot 3 of DP 1120270), approximately 80 kilometres (km) west of Wollongong and 15 km northwest of Marulan within the Upper Lachlan Shire Council Local Government Area (LGA) and abuts the Wingecarribee Shire LGA to the east, and Goulburn Mulwaree Shire Council LGA to the south, refer to **Figure 1.1**.

The Wattle Creek Energy Hub Project includes both large-scale solar PV generation facility (265 MW(AC)) and battery energy storage system (BESS) with 800 MW capacity (AC or DC coupled), and project-related infrastructure. The solar and BESS components will be progressed through separate approval processes, this scoping report relates to the BESS component only.

1.1 The Proponent

Spark Renewables is a wholly owned business within the Spark Infrastructure Group (Spark Infrastructure), however it is currently in the late stages of a change of ownership by Tenaga Nasional Berhad, a large Malaysian utility.

Spark Renewables is a leading developer, long-term owner, and operator of renewable energy projects. The company’s portfolio comprises the Bomen Solar Farm, operational since 2020, and Spark Renewables is currently developing more than 7 GW of solar, wind, and renewable storage projects across the NEM, including the Dinawan Energy Hub, Mallee Wind Farm and Mates Gully Solar Farm, within NSW.

Key details of the Proponent are provided in **Table 1.1**.

Table 1.1 Proponent Details

Requirement	Details
Full Name/s	Spark Renewables Pty Limited
Postal Address	Level 4, 1A Rialto Lane, Manly, NSW 2095
Street Address (Project Site)	‘Arthursleigh Farm’ – 1001 Canyonleigh Road Brayton NSW 2579
ABN	90 632 860 023
Nominated Contact	Daniel Leahy

Spark Renewables is committed to supporting the communities in which they develop and operate, and focus on providing employment opportunities for local residents wherever possible. Spark Renewables gives back to the local community by establishing community funds that seek to provide a long-term benefit to the community.

Spark Renewables is also a member of the Clean Energy Council (CEC) and a signatory to the CEC Best Practice Charter for Renewable Developments (CEC, 2021), and as such is committed to:

- Engaging respectfully with the communities in which it plans and operates projects.

- Being sensitive to the environment and cultural values in developing projects.
- Making positive contributions to the local and broader communities and regions in which Spark Renewables operates.

1.2 Project Overview

The Wattle Creek Energy Hub Project Area (i.e. the Project Area) is approximately 6,200 hectares (ha) and is proposed to include standalone solar and battery storage facilities, with project-related infrastructure proposed to occupy approximately 1,680 ha across all proposed technologies. Each renewable energy component will be progressed through separate approval processes. This scoping report relates to the battery storage component only.

The Wattle Creek Battery Energy Storage System (BESS) (i.e. the Project) includes the installation, operation, maintenance and decommissioning of a large-scale BESS facility, ancillary infrastructure and temporary facilities within the broader Wattle Creek Energy Hub. The current design includes two proposed BESS sites which have been assessed within this Scoping Report, to allow for greater flexibility in the design of the Project. However, the final design of the Project would allow for the installation of a BESS at one site, as described further in **Section 3.1**. Current design of the BESS allows for a capacity of approximately 800 megawatt (MW) (alternating current (AC) or direct current (DC) coupled) and provision for up to two hours of storage (1600 MW/h).

The Project was created with early consideration of environmental and social matters and revised during the Scoping Report stage to incorporate community and stakeholder feedback towards maximising positive social, economic and environmental outcomes and minimising adverse impacts. Spark Renewables has established a community and stakeholder engagement plan (CSEP) for the Project and has undertaken extensive engagement with the local community and other valued stakeholders. This community and stakeholder engagement will continue throughout the Project planning and approvals process.

The key strategies implemented by Spark Renewables during the Scoping stage to avoid and minimise impacts includes revising the indicative Project layout to:

- Locating proposed infrastructure within existing areas of cleared land to avoid native vegetation clearing as far as reasonably practicable.
- Locating proposed infrastructure to avoid sensitive archaeological areas where possible and ensure an appropriate buffer is applied.
- Aligning the Development Corridor to maximise the use of existing roads to reduce associated disturbance and avoid areas of remnant vegetation.

The decision to investigate two BESS locations but proceed to develop at one location was made to fully understand key constraints that may be present across both locations. Once investigations are complete and each BESS site and key constraints are fully understood, one site will be determined based on the identified constraints and detailed assessment.

The Project is State Significant Development (SSD) as defined under *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and will require development consent under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act).

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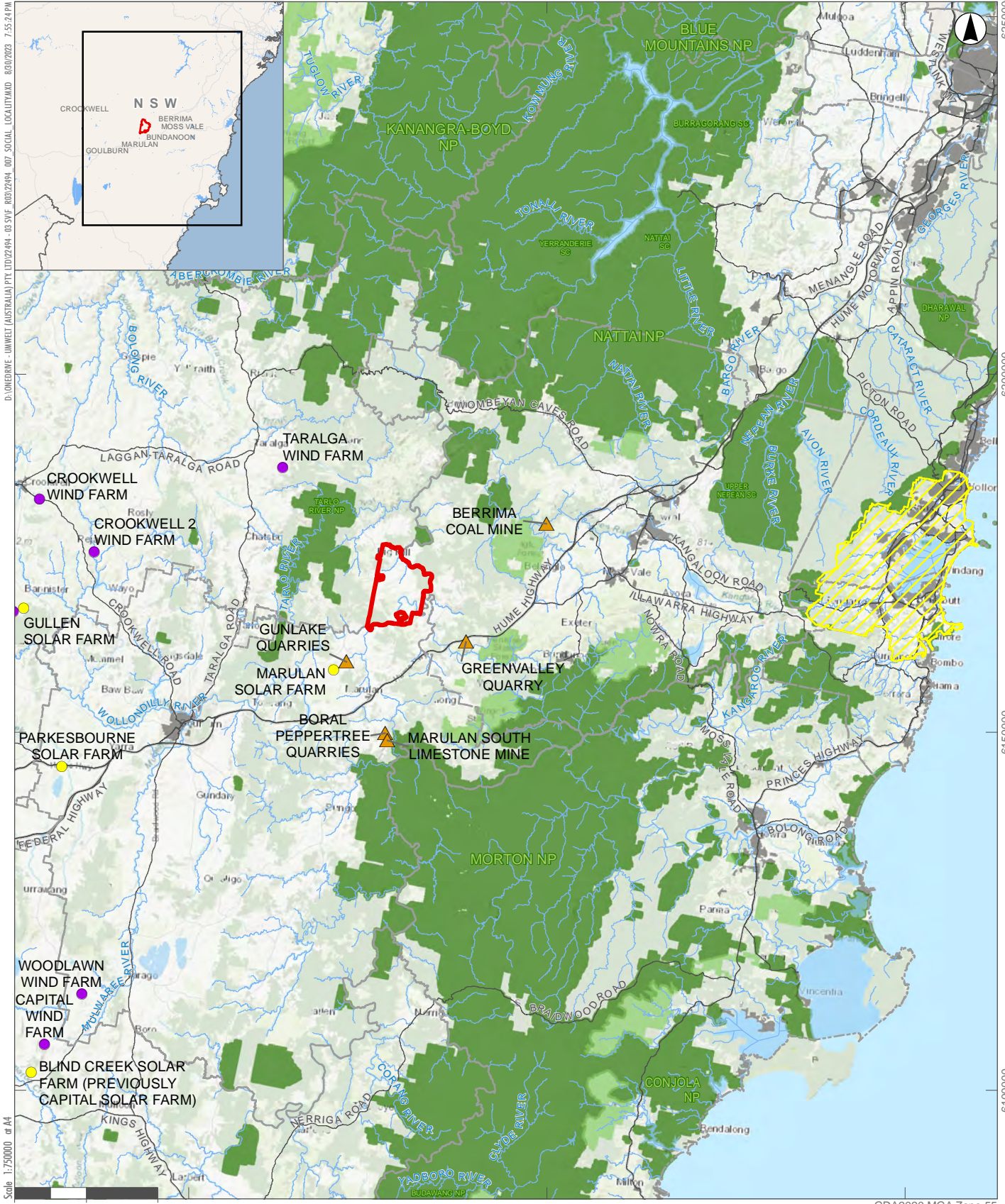
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- Legend**
- Project Area
 - Major Roads
 - Watercourses
 - Wind Farms
 - Solar Farms
 - ▲ Mines/Quarries
 - Local Government Areas
 - State Forest
 - NPWS Estate
 - Built Up Areas
 - Illawarra REZ Boundary
 - Native Vegetation Areas
 - ☪ Hydro Areas

FIGURE 1.1
Regional Context

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)

1.2.1 Project Background

Spark Renewables was selected by the University of Sydney to investigate and develop a hybrid renewable energy facility on the University's Arthursleigh property. As part of this process, a high-level investigation area was initially identified for the Project in 2021 to inform the preliminary design. Several studies were undertaken within this investigation area to assess the feasibility of the Project and identify key environmental constraints, including biodiversity and heritage. Preliminary biodiversity assessments commenced in March 2021 for the Project, which identified key biodiversity constraints within the investigation area (ARCADIS, 2021). The investigation area was confirmed in February 2023 to become the current Project Area (as identified in this Scoping Report), following the signed agreement between Spark Renewables and the University of Sydney (UoS) to undertake this partnership.

Spark Renewables publicly announced the plans to develop the Project in February 2023. Community consultation commenced following the public announcement, with drop-in sessions occurring on 9 and 23 March 2023. The outcomes of the community consultation undertaken to date is discussed in **Section 5.0** below.

1.2.2 Project Objectives

The objectives of the Project are to:

- Contribute to and support the National Energy Market (NEM) by providing renewable energy storage capacity and improving the security, stability, and resilience of the NEM.
- Supporting Australia's transition towards clean and renewable sources of energy.
- Facilitate the shift away from coal-fired power generation and traditional fossil fuel firming assets.
- Facilitate research initiatives focused on supporting renewable energy transition through the development and installation of a Test-bed Facility within the broader Wattle Creek Energy Hub, promoting the recommendations in the NSW Advisory Council *Turning ideas into jobs: Accelerating R&D in NSW Action Plan (2021)* and NSW Chief Scientist & Engineers *20-year Research and Development Road Map*.
- Avoid, minimise, and mitigate adverse impacts on the environment and community during construction and operation.
- Establish a strong network of positive and long-term relationships within the local community and contribute to economic and social growth within the Upper Lachlan Shire Council LGA and surrounds.
- Make efficient use of existing transmission electrical infrastructure, notably the capacity of Marulan substation to support to new connections.

1.3 Related Development

Related development, as outlined in the NSW Government State Significant Development Guidelines (DPIE, 2021), refers to any existing or approved development that would be incorporated into, or operated in conjunction with the Project. Related development can also include development by a Proponent that is required for a Project, but is subject to a separate development approval process.

The Wattle Creek Energy Hub will be comprised of the Wattle Creek BESS (the Project), as well as the Wattle Creek Solar Farm. A short description of these related developments is provided below. Separate Development Applications (Das) will be submitted for each component and would be accompanied by detailed Environmental Impact Statements (EISs). Each EIS would include comprehensive assessments identifying the potential impacts of the related development and how to best manage these impacts. Separating the Wattle Creek Solar Farm Project and the BESS Project (i.e. this Project) has been proposed by Spark Renewables to allow for greater flexibility in the design of both projects.

1.3.1 Wattle Creek Solar Farm

The proposed Wattle Creek Solar Farm comprises a large-scale solar PV generation facility and BESS, supported by associated infrastructure located in the south-east of the Project Area. The Wattle Creek Solar Farm project would occupy an area of approximately 1,550 ha and will have a generation capacity of up to approximately 265 MW(AC).

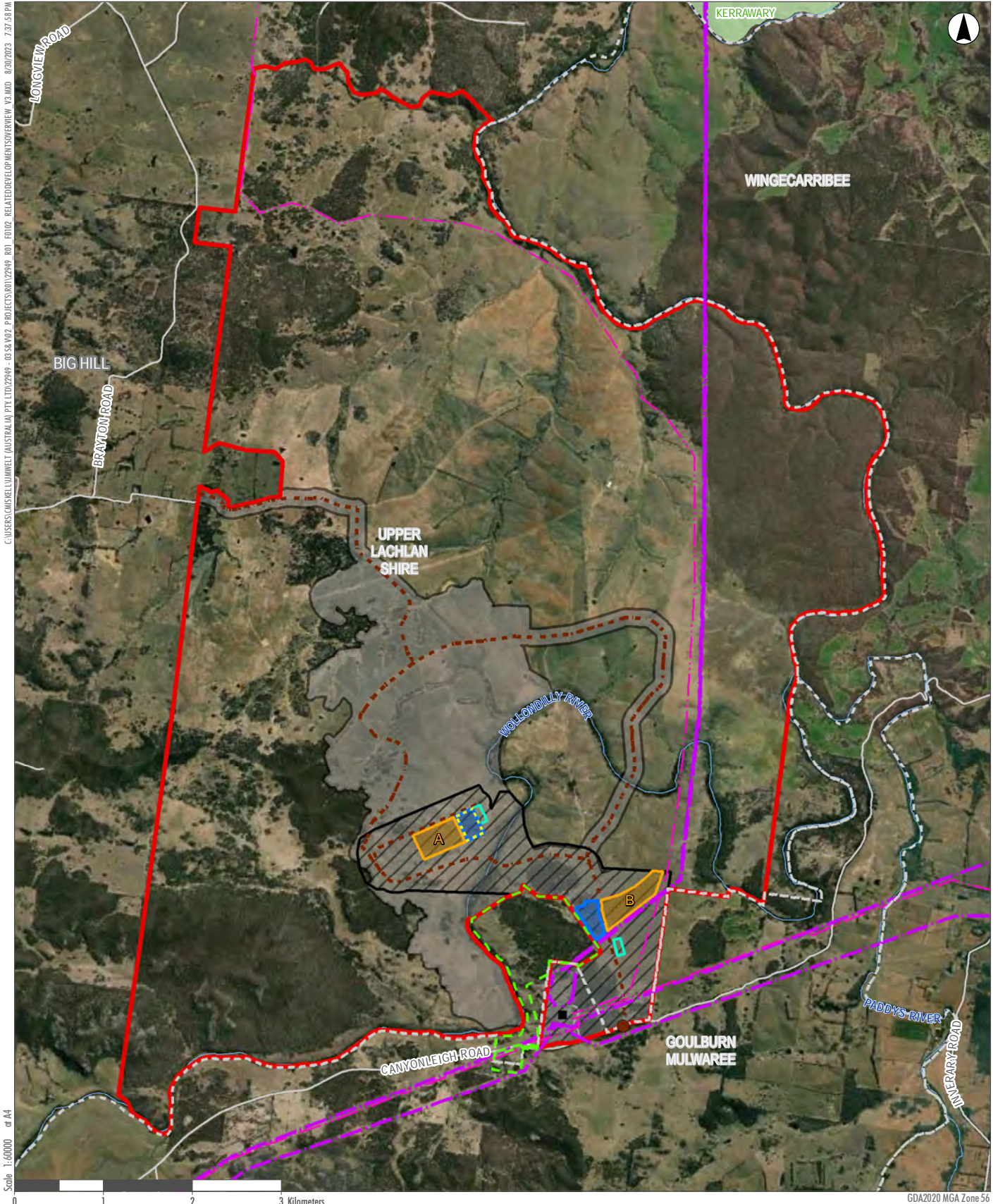
As noted above, a separate DA is being sought for the Wattle Creek Energy Hub Solar project.

1.3.2 Marulan Gas Fired Power Station

There is an existing planning approval for the Marulan Gas Fired Power Station on land adjacent to the project area which is not a part of the Wattle Creek Energy Hub. This development received planning approval in 2009 and construction has not yet commenced. The cumulative environmental impacts of this facility have been considered and included in the technical assessments for the preparation of this scoping report.

Areas relating to the separate applications for the solar and BESS projects that form the Wattle Creek Energy Hub, and the Marulan Gas Fired Power Station, are shown in **Figure 1.2**.

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|-----------------------|--|-----------------------------|------------------------------|
| Project Area | Marulan Gas Fired Power Station Project Area | BESS | Solar |
| Local Government Area | Existing Transmission Lines | Development Corridor - BESS | Development Corridor - Solar |
| NPWS Estate | 330kV | BESS Site Option | Solar Farm Substations |
| Roads | 132kV | BESS Substation | |
| Watercourses | Existing Substation | Test Bed Area | |
| | | Proposed Internal Tracks | |
| | | Access Point | |

FIGURE 1.2

Related Developments Overview

1.4 Purpose of this Scoping Report

This Scoping Report has been prepared as part of the scoping process associated with the standard SSD approvals pathway. It aims to:

- Describe the Project in simple terms.
- Include an analysis of feasible alternatives considered having regard to the objectives of the development and identify the alternatives that will be investigated further in the EIS.
- Give an early indication of community views on the Project and provide an overview of the community engagement that will be carried out during the preparation of the EIS.
- Identify the key matters requiring further assessment in the EIS and the proposed approach to assessing each of these matters, having regard to any relevant Government legislation, plans, policies, or guidelines.

This Scoping Report also aims to provide a description of the Project to key regulatory agencies and to identify the key environmental, social, and economic matters of relevance to the Project to inform the preparation of the Secretary's Environmental Assessment Requirements (SEARs). Under the provisions of Clause 4.12(8) of the EP&A Act, an EIS is required (and will be prepared) to accompany the SSD application for the Project, to be lodged with the NSW Department of Planning and Environment (DPE) on behalf of the Planning Secretary. The SEARs will identify specific assessment considerations relevant to the Project that must be addressed in the EIS.

The following terms are used throughout this Scoping Report:

- **Wattle Creek Energy Hub Project Area (the Project Area)**, relates to the entire Wattle Creek Energy Hub (i.e. Lot 3 of DP 1120270). A separate DA is proposed within the Project Area for the Wattle Creek Solar Farm project, which is noted throughout but not assessed within this Scoping Report.
- **Development Corridor**, which relates to the area which contains all project-related infrastructure required to construct and operate the Project. This area is expanded for the purposes of the Scoping Report to provide the necessary flexibility for the detailed design of the Project, and will be the focus of future detailed environmental assessment to be completed in the EIS phase.
- **BESS Sites**, which relates to the specific BESS sites described in this Scoping Report, which are located within the Development Corridor (i.e. BESS Site A and BESS Site B).
- **Disturbance Footprint**, which is the area that is likely to be impacted during construction and operation of the Project. The Disturbance Footprint is contained within the Development Corridor. which will be subject to further refinement throughout the EIS phase.

1.4.1 State Significant Development Guidelines

This Scoping Report has been prepared in consideration of the NSW Government – Department of Planning, Industry and Environment (DPIE, now DPE) – State Significant Development Guidelines (SSD Guideline), dated November 2021 (DPIE, 2021a), including where relevant:

- NSW Government – DPIE – State Significant Development Guidelines – Preparing a Scoping Report – Appendix A (SSD Guideline: Appendix A), dated November 2021 (DPIE, 2021b), referred to hereafter as the SSD Scoping Report Guideline.
- NSW Government – DPIE – State Significant Development Guidelines – Preparing an Environmental Impact Statement – Appendix B (SSD Guideline: Appendix B), dated December 2021 (DPIE, 2021c).
- NSW Government – DPIE – State Significant Development Guidelines – Preparing a Submissions Report – Appendix C (SSD Guideline: Appendix C), dated November 2021 (DPIE, 2021d).
- NSW Government – DPIE – State Significant Development Guidelines – Preparing an Amendment Report – Appendix D (SSD Guideline: Appendix D), dated November 2021 (DPIE, 2021e).
- NSW Government – DPIE – Social Impact Assessment Guideline for State Significant Projects (the SIA Guideline), dated November 2021 (DPIE, 2021f).
- NSW Government – DPIE – Undertaking Engagement Guidelines for State Significant Projects (the Engagement guidelines), dated November 2021 (DPIE, 2021g).
- NSW Government – DPIE – Cumulative Impact Assessment Guidelines for State Significant Projects (the CIA Guidelines), dated November 2021 (DPIE, 2021h).

Additionally, Spark Renewables will have regard to any relevant Electricity Infrastructure Roadmap guidelines published by EnergyCo NSW during the development of the Project. Including but not limited to the NSW Government Office of Energy and Climate Change – First Nations Guidelines (Office of Energy and Climate Change, 2022) and any subsequent region-specific guideline(s).

1.5 Structure of this Report

As per the SSD Scoping Report Guideline, this report has the following sections:

- **Section 1.0 (Introduction):** introduces the Project, the Proponent and provides an outline of the structure of the document.
- **Section 2.0 (Strategic Context):** outlines the strategic context for the Project, including the justification for the Project, a summary of the locality in which the Project is undertaken and an overview of the environmental, social, and economic context.
- **Section 3.0 (Project):** contains a description of the Project, including an overview of alternatives considered and strategies to avoid and minimise environmental impacts.
- **Section 4.0 (Statutory Context):** summarises the relevant State and Commonwealth statutory context applicable to the approval process for the Project.

- **Section 5.0 (Engagement):** describes the stakeholder engagement program for the Project and identifies the environmental, social, and economic matters identified during the scoping phase for further consideration in the EIS.
- **Section 6.0 (Proposed Assessment of Impacts):** contains analysis of the environmental, social, and economic matters relevant to the Project and the assessments proposed to be completed for the EIS.
- **Section 7.0:** References.
- **Appendix 1:** Scoping Summary Table.
- **Appendix 2:** Wattle Creek Energy Hub Solar Farm and BESS – Social Impact Scoping Report.
- **Appendix 3:** Wattle Creek Energy Hub BESS – Preliminary Noise Impact Assessment.
- **Appendix 4:** Wattle Creek Energy Hub Solar Farm and BESS – Biodiversity Constraints Assessment.
- **Appendix 5:** Wattle Creek Energy Hub Solar Farm and BESS – Preliminary Heritage Constraints Assessment.
- **Appendix 6:** Wattle Creek Energy Hub Solar Farm – Preliminary Visual Impact Assessment.

2.0 Strategic Context

2.1 Project Justification

The development of renewable energy projects aligns with both Commonwealth and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australian economies. In particular, the NSW Government is taking action to lead investment in new renewable generation to ensure an orderly transition away from coal (EnergyCo NSW, 2022), with the State's five existing coal-fired power stations scheduled for progressive closure from 2022–2023.

As demonstrated in **Section 2.1.1** below, the Project will contribute to meeting the Commonwealth and NSW Government objectives and will provide significant renewable energy generation storage to stabilise the power system against rapid movements in the supply-demand balance. Furthermore, the Project will contribute capital investment, generate jobs during the construction and operational phases, provide indirect benefits to local services throughout the life of the Project, deliver additional income to Host landholders, and provide benefits to the local community through the implementation of a proposed community benefit fund.

Further details regarding Project benefits are provided in **Section 2.5**.

2.1.1 Strategic and Regional Context

2.1.1.1 Commonwealth Policy

Australia is one of the 192 countries from around the world signed to the international climate change agreement (i.e. the Paris Agreement). The Paris Agreement aims to:

- Hold the increase in the global average temperature to below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
- Increase the ability (of nations) to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emissions development, in a manner that does not threaten food production.
- Make finance flows consistent with a pathway towards low GHG emissions and climate resilient development.

The Paris Agreement seeks to meet its objectives by developing programs and mechanisms that:

- Require participating Parties to prepare and communicate GHG mitigation contributions. Parties were expected to set mitigation targets for 2020, and then develop new targets every five years. Each successive target is expected to represent a larger mitigation effort than the previous target.
- Promote climate change resilience and adaptation.
- Provide mitigation and adaptation funding to developing countries.
- Foster mitigation and adaptation technology transfer between Parties.
- Require participating Parties to report progress towards their mitigation contributions on an annual basis.

Australia signed the Paris Agreement on 22 April 2016. The obligations under the Paris Agreement are driving national GHG policy between 2020 and 2030. Australia's commitment to the Paris Agreement includes reducing GHG emissions by 26% to 28% on 2005 levels by 2030 (Commonwealth of Australia, 2021). Australia's Nationally Determined Contribution (NDC) prescribes an unconditional economy-wide target to reduce GHG emissions, and states that future policies will target emissions generated from energy use, industrial processes, agriculture, land-use, land-use change, forestry and waste.

The Project, as a large-scale renewable energy storage facility, will contribute to achieving Australia's GHG emission reduction targets through reducing emissions from energy production in NSW.

2.1.1.2 NSW Policy

NSW Climate Change Policy Framework

The NSW Government has developed its NSW Climate Change Policy Framework, which aims to deliver net zero emissions by 2050, and a State that is more resilient and responsive to climate change (NSW Government, 2016). Under the NSW Climate Change Policy Framework, NSW has committed to both follow the Paris Agreement and to work to complement national action.

The policy framework is being delivered through:

- The Climate Change Fund.
- Developing an economic appraisal methodology to value GHG emissions mitigation.
- Embedding climate change mitigation and adaptation across government operations.
- Building on NSW's expansion of renewable energy.
- Developing action plans and strategies.

In 2013 the NSW Government released the Renewable Energy Action Plan (REAP) and the NSW Energy Efficiency Action Plan (EEAP). The REAP aimed to increase the generation, storage, and use of renewable energy in NSW, at least cost to customers and with maximum benefits to NSW. The three core goals of the REAP were to attract renewable energy investment, build community support for renewable energy and attract and grow expertise in renewable energy. Based on the implementation of the REAP, renewable energy is now well-placed to play a leading role in meeting NSW's energy needs into the future.

The Project is consistent with the overarching aim of the REAP as it is development for the purposes of renewable energy storage, assisting NSW to respond to consumer electricity needs by promoting investment in renewable energy and improving the reliability of the State's electricity network.

NSW Electricity Strategy

The NSW Electricity Strategy (i.e. the Strategy) was developed by the NSW Government to deliver better outcomes for energy consumers in NSW, and to outline a plan for a reliable, affordable and sustainable electricity future, which supports the growing economy of NSW (NSW Government, 2019).

A multi-layered approach was developed to achieve this plan:

- Supporting the electricity market to deliver reliable electricity at the lowest price, while protecting the environment.
- Setting an energy security target to ensure that NSW has sufficient generation capacity to cope with unexpected generator outages during periods of peak demand.
- If required, ensuring NSW has sufficient powers to deal with an electricity emergency.

The framework set out in the Electricity Strategy outlines an integrated approach to all demand and supply options, including action by households and small businesses, demand management and investment in large-scale, affordable and reliable generation. The Strategy also notes that firmed renewables (including batteries) are now the cheapest form of new, reliable energy generation and cost less than the current wholesale electricity price.

The Project is consistent with the objectives of the Strategy as it will help ensure a cheap and reliable electricity supply which minimises harm to the environment, assist NSW to meet periods of peak energy demand, and provide network security to unexpected generator outages.

The project is strategically located to provide essential network support services to critical Sydney ring electrical infrastructure, being located ~130 km from Sydney West substation.

NSW Electricity Infrastructure Roadmap

The NSW Electricity Infrastructure Roadmap (i.e. the Roadmap) is a 20-year plan to transform the NSW electricity system into one that is cheap, clean and reliable, laying the foundations for future generations to enjoy more secure, reliable and affordable electricity (NSW Government 2020a). The Roadmap utilises a coordinated framework to modernise the electricity system, underpinned by three key principles:

1. New generation to replace retiring coal-fired power stations.
2. New network infrastructure to deliver energy to consumers.
3. New storage and firming to better respond to electricity needs and improve the reliability of the grid.

The electricity market is moving towards more sources of generation that rely on variable weather conditions. As such, energy generators are increasingly reliant on long duration storage infrastructure, to ensure power is readily available. Such energy storage infrastructure, such as batteries, allow renewable energy to be stored and then released when required, assisting in the transition to a more secure and reliable electricity system.

The Project is consistent with the principles of the Roadmap by promoting development for the purposes of renewable energy storage and firming, assisting NSW to respond to consumer electricity needs and in turn improving the reliability of the grid.

Network Infrastructure Strategy

EnergyCo NSW has prepared the NSW Network Infrastructure Strategy (NIS) (EnergyCo NSW, 2023) as an important new element of NSW's Electricity Infrastructure Roadmap framework. The NIS provides further information about the delivery and coordination of NSW REZ transmission network infrastructure, downstream network augmentations and network connections for large-scale renewable energy and storage projects.

The NIS is an important new component of the NSW-wide system planning process that in turn sits within the National Energy Market (NEM) and its processes. Going forward, future editions of the NIS will be prepared every two years to support the Infrastructure Investment Objectives (IIO) Report and to ensure continuous improvement that reflects changes in the market.

The NIS has been developed to fulfill three key objectives:

1. Coordinated NSW-wide electricity infrastructure development.
2. Investor guidance.
3. Meaningful engagement.

The NIS provides a clear vision of renewable energy development options in the wider context of a rapidly changing, and at times uncertain, evolution of generation mix and demand.

While the Project is not located within a proposed REZ, there is an existing connection to the network which will be considered as part of connection associated with the NIS. Consideration of the NIS will be undertaken during preparation of the EIS, as required.

2.1.2 Regional and Local Plans

2.1.2.1 South East and Tablelands Regional Plan 2036

The South East and Tablelands Regional Plan 2036 (SETRP 2036) is the NSW Government's strategy for guiding land use planning decisions over the next 14 years. The vision of the SETRP 2036 is to create 'a borderless region in Australia's most geographically diverse natural environment with the nation's capital at its heart' (DPE, 2017). The supporting goals of the SETRP 2036 are to create:

- A connected and prosperous economy.
- A diverse environment interconnected by biodiversity corridors.
- Healthy and connected communities.
- Environmentally sustainable housing choices.

The SETRP 2036 promotes the development of renewable energy across the region through Direction 6, being '*Position the region as a hub of renewable energy excellence*'. The region is identified as having significant potential for renewable energy industries with vast open spaces and higher altitude tablelands with natural advantages for wind, hydro and solar energy generation. The SETRP 2036 indicates that renewable energy generation will also create a more sustainable energy future for the region.

The Project is consistent with the vision of the SETRP 2036 and will assist to create a more sustainable energy future through the storage and firming of renewable energy.

2.1.2.2 Draft South East and Tablelands Regional Plan 2041

The SETRP 2036 (discussed above) is undergoing its first five-year review to reset its priorities and extend its reach to 2041, in the form of a revised regional plan for the SET region. The Draft South East and Tablelands Regional Plan 2041 (Draft SETRP 2041) (DPE, 2022) is the revised regional plan which will supersede the existing SET Regional Plan 2036, once finalised.

The vision of the Draft SETRP 2041 is ‘By 2041, the South East and Tablelands will be recognised as a region of collaboration and innovation. Sustainable agriculture, tourism and renewable energy are key industries, and Country is recognised as a foundation for the region’s future.’ This vision is underpinned by five key themes, each containing specific strategies and goals to achieve the overarching vision of the plan. The five key themes are summarised below:

1. Recognising Country, people, and place.
2. Enhancing sustainable and resilient environments.
3. Leveraging diverse economic identities.
4. Planning for fit for purpose housing and services.
5. Supporting a connected and active region.

Development and investment in renewable energy generation is incorporated into numerous themes of the Draft SETRP 2041. Specifically, Part 2, Objective 8 specifically relates to the role renewable energy development will play in achieving net zero by 2050, stating ‘Plan for a net zero region by 2050’. Further, Part 2 Objective 12 ‘Realise economic benefits from a connected regional economy’ aims to build the economic potential of renewable energy throughout the region.

Key objectives for the Project including the storage and firming of renewable energy to assist in achieving NSW renewable energy targets whilst promoting economic growth for the region assists in demonstrating the Projects alignment with the objectives of the Draft SETRP 2041.

2.1.2.3 The Tablelands Regional Community Strategic Plan 2016-2036

The Tablelands Regional Community Strategic Plan 2016–2036 (Tablelands Regional CSP) (Goulburn Mulwaree Council, Upper Lachlan Shire Council, Yass Valley Council, 2016) is the first ever regional community strategic plan in NSW local government. The Tablelands Regional CSP consolidates councils’ existing CSPs and pulls together common visions and strategies, whilst recognising the unique characteristics and challenges belonging to each individual Council. All three councils share a similar vision centred around balancing future growth with the need to protect and enhance social and environmental values, a vision which is upheld by five key pillars, including:

- Community (life and welfare in the community).
- Environment (conditions and influences in the area and sustainability).
- Economy (generation, distribution, use of income, and business development).

- Infrastructure (facilities, transport, and systems serving the area).
- Civic Leadership (system of government or management).

Each pillar includes a range of goals and specific strategies to be implemented by the three local councils with the aim of achieving the overarching vision of the Tablelands Regional CSP. Specifically, Strategy EN5 is *'To investigate and implement approaches to reduce our carbon footprint'*, which sees councils in the region *'support the development of renewable energy facilities where appropriate in the region'*.

The Project is consistent with the goals, strategies, and overarching vision of the Tablelands Regional CSP through the development of a renewable energy storage facility to ultimately reduce the regions carbon footprint.

2.1.2.4 Upper Lachlan Community Strategic Plan 2042

The Upper Lachlan Community Strategic Plan 2042 (Upper Lachlan CSP) (Upper Lachlan Shire Council, 2021) is the shared vision for the future of the Upper Lachlan community. Informed by community input, it sets out a long-term vision for the region to 2042. The Upper Lachlan CSP shares the same strategic priorities of the Tablelands Regional CSP in **Section 2.1.2.3** above and aims to achieve the same overarching goals at a community level.

The Upper Lachlan CSP includes strategic objectives against each key themes above, with the aim to achieve a desired outcome in line with the overarching vision of the plan. Strategy C.6 of the Upper Lachlan CSP is to *'Maintain a balance between growth, development, environmental protection and agriculture through sensible planning'*, which is of particular relevance to the Project.

The plan also refers to the United Nations Sustainable Development Goals (UNSDGs) which were considered during preparation of the plan in relation to each key theme above. The plan notes the importance of SDG #7 'Clean Energy' under the Environment theme, which specifically relates to the storage of energy through renewable sources.

2.1.2.5 Southern Tablelands Regional Economic Development Strategy

The Southern Tablelands Regional Economic Development Strategy 2018–2022 (Southern Tablelands REDS) (Department of Premier and Cabinet, 2018) sets out a long term economic vision and associated strategy for the three LGAs in the Southern Tablelands region, including Goulburn-Mulwaree, Upper Lachlan Shire and Yass Valley. The overarching vision of the Southern Tablelands REDS is *'To grow the region's core strengths in agriculture, energy, extractive industries, aged care, transport, and tourism and deliver a highly liveable community which attracts and rewards residents and visitors'*.

The second key element of the Southern Tablelands REDS is to *'Build on the Region's core strength in energy generation and natural resource extraction'*. The region is noted as a powerhouse for renewable energy generation in the 21st century, including large scale and commercial energy from waste projects, solar farms, and wind turbines. Building on the regions strengths in renewable energy storage can be achieved through the development of the Project, which will ultimately help achieve the overarching vision of the Southern Tablelands REDS.

2.1.2.6 Upper Lachlan Shire Local Strategic Planning Statement

The Upper Lachlan Shire Local Strategic Planning Statement (LSPS) (Lachlan Shire Council, 2020) is a 20-year vision for land use planning for Upper Lachlan area and provides an overarching strategic direction for future land use planning in the Upper Lachlan Shire LGA.

Planning priorities and principles of the Upper Lachlan Shire LSPS relate to business development, growth and sustainability, as well as productivity and collaborative diversity. Specifically, Upper Lachlan Shire Council aims to utilise the natural topography of the region, combined with increased investment in renewable energy (including wind, solar, hydro, geothermal) to bring new economic opportunities to the Upper Lachlan region.

As such, the Project is consistent with the priorities and principles of the Upper Lachlan Shire LSPS, specifically in relation to the proposed development of renewable energy storage and firming to increase economic and business development in the region.

2.1.2.7 Draft Upper Lachlan Shire Council Energy Masterplan

The national consultancy 100% Renewables was commissioned by the former DPIE under the Sustainable Council and Communities Program to develop an Energy Masterplan for Upper Lachlan Shire Council (100% Renewables, 2019). The Energy Masterplan aims to increase the proportion of Council's energy supplied from renewables and energy efficiency, through the development of a strategic plan that is aligned with Upper Lachlan's Community Strategic Plan and capable of being integrated into future Delivery Program and Operational Plans.

The proposed Project aligns with the findings of the Energy Masterplan by providing an effective option for Upper Lachlan Shire Council to increase renewable energy storage and firming within the LGA and ultimately helps contribute to the regions efforts to mitigate the effects of climate change, in line with the broader Upper Lachlan CSP and Tablelands Regional CSP.

2.2 Site Context

The Project Area is zoned as RU2 Rural Landscape within the Upper Lachlan LEP 2010 (refer to **Section 4.1.2**). Lands surrounding the Project Area are generally consistent with that of a rural residential setting, and include land use zones RU1 Primary Production and RU2 Rural Landscape under the Upper Lachlan LEP 2010. The Tarlo River National Park and Kerrawary Nature Reserve (zoned C1 National Parks and Reserves) are located 4 km north west and 7 km north of the Project Area, respectively.

Additional contextual features of the BESS Project Area are presented in **Figure 2.1** and summarised below. These features are further described in subsequent sections of this Scoping Report, where necessary:

- **Crown Lands:** Wollondilly River, which passes though the proposed Development Corridor is identified as a Crown waterway. It is envisaged that Crown Land leases will be required to construct the proposed internal tracks and transmission lines that cross the Crown waterway. There are also Crown Land Reserves adjacent to the southeast and northwest portions of the Project Area, however no works are proposed within these Crown Land Reserves.

- **Community:** The Project Area is currently operated commercially and is used for a range of research initiatives including agricultural science and pasture agronomy. There are approximately 47 non-associated dwellings within 4 km of the Project Area. The land surrounding the Project is largely used for agricultural purposes. The township of Big Hill is directly north-west of the Project Area and is the closest town in the Upper Lachlan Shire LGA to the Project Area. The township of Marulan is the nearest population centre (population 819) to the Project Area. Further discussion regarding local community and other stakeholders is provided in **Section 5.0** and the Social Impact Scoping Report (SISR), refer to **Appendix 2**.
- **Land Use:** Agricultural land uses are prevalent within and surrounding the Project Area. There are no areas of mapped Biophysical Strategic Agricultural Land (BSAL) and there are no current mining and/or exploration licence applications within the Project Area.
- **Biodiversity:** The Project Area comprises of agricultural land, including cropping land and grazed land, as well as uncleared remnant vegetation. The remnant woodland is predominantly comprised of grassy woodland communities, with smaller patches of shrubby open forest and riparian forests along the waterways. The proposed BESS Sites were selected to largely avoid these vegetated areas. Further discussion around biodiversity values across the BESS Sites is provided in **Section 6.2.2**.
- **Traffic and Access:** Canyonleigh Road is the primary access road to the Project Area, which deviates from the Hume Highway approximately 18 km east of the Project Area. Ambrose Road and Brayton Road are also being considered as secondary access roads to the Project Area. The Hume Highway acts as primary connection between Sydney and the Southern Tablelands region, and would facilitate the transportation of Project-related components. Further discussion around traffic, transport and access is provided in **Section 6.2.5**.
- **Topography:** The topography of the Project Area is relatively hilly and encompassing valley floor, hillslopes, and ridges, ranging from between 50–130 m Australian Height Datum (AHD). The topography at the proposed BESS Sites is generally flat however, which supports the future construction of the BESS at either of the proposed sites.
- **Hydrology:** The Project Area contains a number of larger waterways including Dead Mans, Wattle and Sandy Creeks in the north, Island Creek in the centre, and the Wollondilly River in the south. Wollondilly River is in proximity to both proposed BESS Sites and is discussed further in **Section 6.2.8**, along with other water and soil resources relevant to the Project.
- **Hazards:** With areas of remnant or plantation vegetation, bushfire presents a potential hazard for the broader Project Area. Additionally, the introduction of lithium-ion batteries as a component of the BESS presents a hazard to the Project and broader Wattle Creek Energy Hub. Accordingly the EIS will include an assessment of potential hazards associated with the Project. Further discussion around hazards and safety is provided in **Section 6.2.7**.

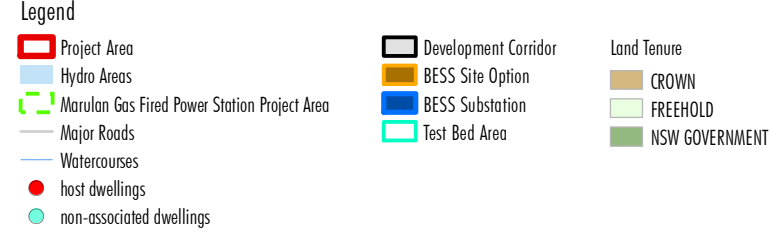
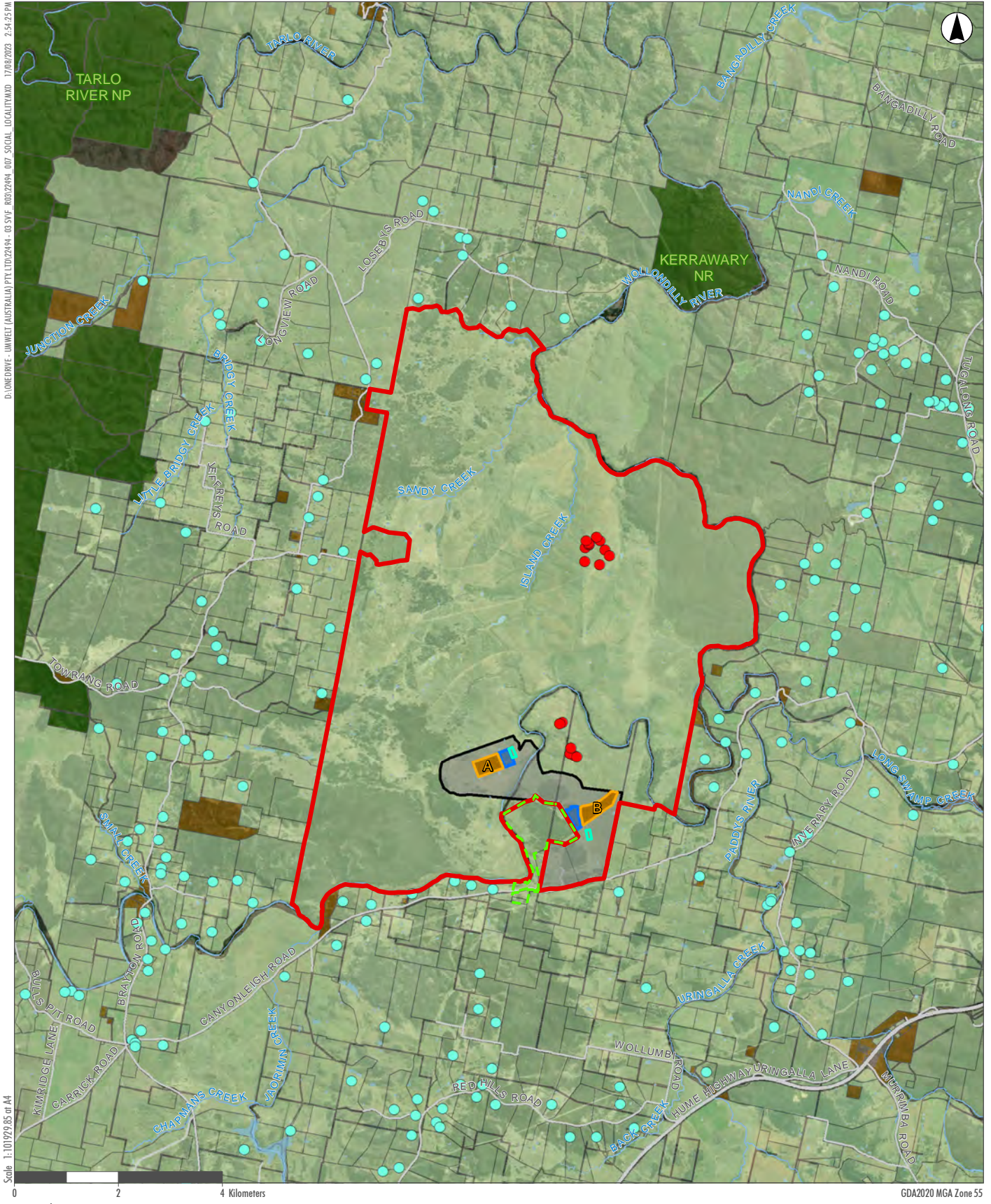


FIGURE 2.1
Project Locality

2.2.1 Land Categorisation under the Land Management Framework

Under the NSW DPE Land Management Framework, the categorisation of land determines the native vegetation management options available to landholders. Category 1 – exempt land is defined under Part 5A, Division 2 of the *Local Land Services Act 2013* (LLS Act) and is broadly defined as being:

- Land cleared of native vegetation as of 1 January 1990, or lawfully cleared after 1 January 1990 (but before 25 August 2017).
- Low conservation grasslands.
- Land containing only low conservation groundcover (not being grassland).
- Native vegetation identified as regrowth in a Property Vegetation Plan under the repealed *Native Vegetation Act 2003*.
- Land bio-certified under the NSW *Biodiversity Conservation Act 2016*.

Category 2 – regulated land is divided into two sub-categories being:

- Regulated land which is any category 2 land that is not vulnerable or sensitive regulated land.
- Vulnerable regulated land (as defined under clause 108 of the *Local Land Services Regulation 2014*), which is land where clearing of native vegetation may not be permitted under the *Land Management (Native Vegetation) Code 2018*.

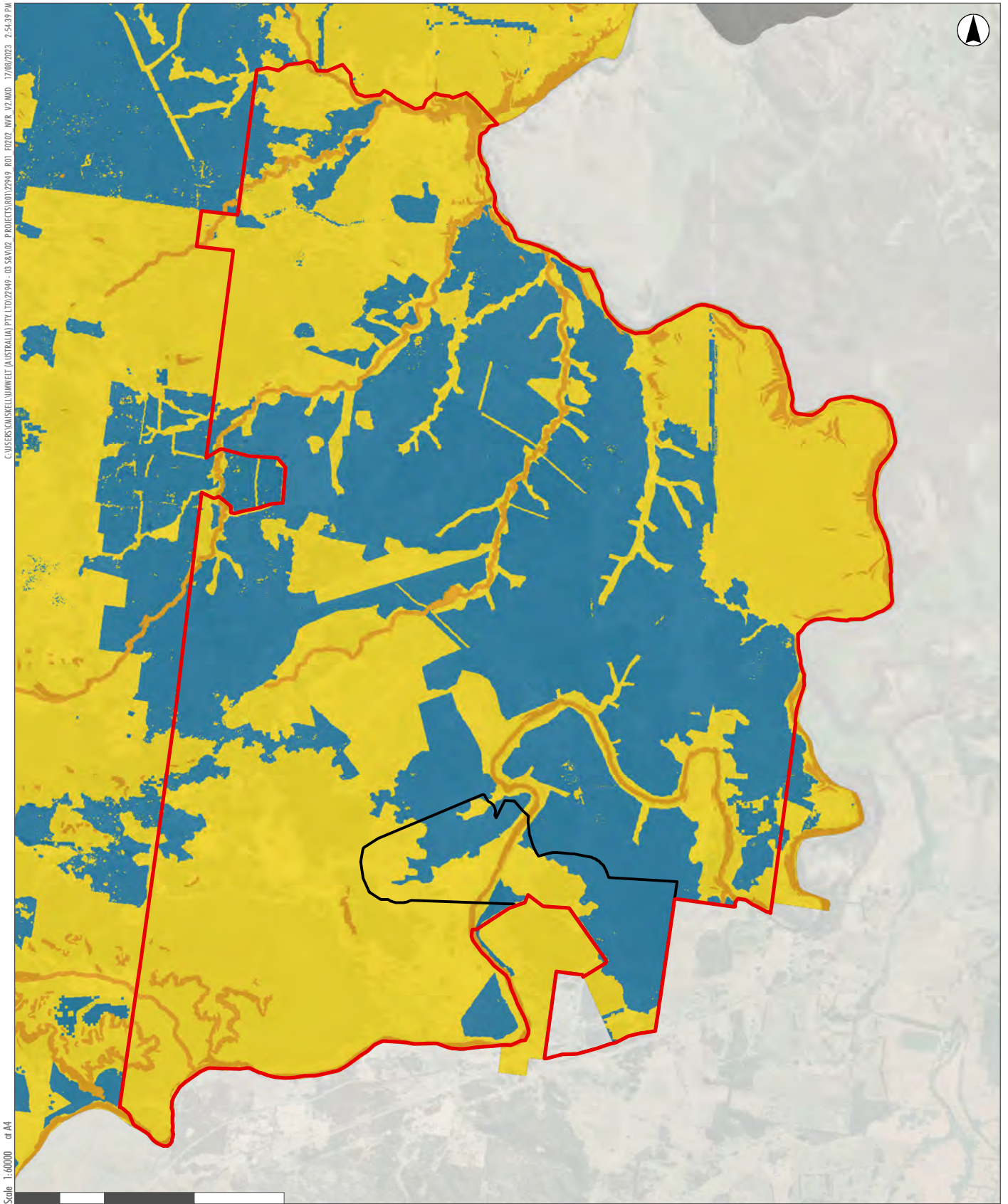
The draft Native Vegetation Regulatory map (DPE, 2023) was reviewed to identify land mapped as Category 1 – exempt land and Category 2 – regulated land within the Upper Lachlan Shire LGA. Field surveys undertaken as part of the initial phases of the Biodiversity Constraints Assessment (BCA) for the Project Area have informed detailed vegetation mapping across the disturbance area to assist with confirmation of land categorisation. The detailed land categorisation methodology and results of the vegetation surveys is currently being prepared for submission to the Biodiversity Conservation Division (BCD) as part of the preparation of Biodiversity Development Assessment Reports (BDAR) for each separate application.

A review of the draft native Vegetation Regulatory map (DPE, 2023) and results from the BCA indicate that the proposed Development Corridor is largely within category 1 – exempt land, as outlined in **Figure 2.2** below. Further detail and vegetation mapping is provided in **Section 6.2.2**. The BCA prepared for the Wattle Creek Energy Hub is included as **Appendix 4** of this Scoping Report.



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Scale 1:60000 at A4



- Legend**
- Project Area
 - Development Corridor
- Draft native vegetation regulatory map**
- Category 1-exempt land (draft)
 - Category 2-regulated land (draft)
 - Category 2-vulnerable regulated land (in-force)
 - Category 2-sensitive regulated land (in-force)
 - Category 2-sensitive and vulnerable regulated lands areas of overlap (in-force)
 - Land excluded from the LLS Act
 - Draft native vegetation regulatory map not yet published

FIGURE 2.2

Native Vegetation Regulatory Mapping

2.3 Cumulative Impact Considerations

A key component of the proposed environmental impact assessment will be the consideration of cumulative impacts. The Project will be assessed in accordance with the requirements of the Cumulative Impact Assessment Guidelines for State Significant Project (CIA Guidelines) (DPIE, 2021h), which sets clear expectations and requirements for assessing project-level cumulative impacts related to SSD projects. The EIS will consider other relevant construction, industrial and employment-generating projects within the locality.

2.3.1 Renewable Energy Projects

There are a number of renewable energy projects within and in the vicinity of the Project, at different stages of the approval process (refer to **Figure 1.1** and **Table 2.1**). It is anticipated that there will be additional renewable energy projects proposed in the vicinity of the Project that are not publicly known at the time of preparing this report. At the time this Scoping Report was prepared the closest renewable energy developments to the Project are:

- Marulan Solar Farm, approximately 18 km south west of the Project.
- Crookwell Wind Farm, approximately 40 km west of the Project.
- Gullen Range Wind Farm and Gullen Solar Farm, approximately 50 km west of the Project.

Given the strategic importance of emerging renewable energy projects for the NSW Electricity Infrastructure Roadmap and the number of approved and proposed renewable energy projects in the region, the potential for cumulative environmental, social and economic impacts will require detailed consideration during the EIS phase of the Project, in line with the CIA Guidelines.

2.3.2 Other State Significant Developments

2.3.2.1 Marulan Gas Fired Power Station

The approved (but not constructed) Marulan Gas Fired Power Station (the Power Station) is located directly south of the Project Area, adjacent to the existing Transgrid Marulan 330 kV/132 kV Switchyard site (refer to **Figure 1.2**). The Power Station as proposed by Energy Australia was originally approved to be developed in 2009 however, construction is yet to commence and a modification to extend the lapse date of the development consent was submitted and approved in 2020.

Currently, Energy Australia has until 26 October 2024 to physically commence development of the Project. As per the Modification Report (Energy Australia, 2020), Energy Australia expects construction to commence by October 2024 with a 24-month construction duration. There is potential for the construction of the Project and the Power Station to overlap. However, this is considered unlikely due to the ongoing delays in the construction of the Power Station.

Cumulative impact from overlapping construction activities will be assessed and primarily focus on construction impacts such as noise, increased traffic and access, and air quality. In relation to operations the cumulative impact assessment of potential hazards will also be of particular focus due to the proximity of both projects.

2.3.2.2 Extractive Industry Projects

At the time this Scoping Report was prepared (September 2023) the closest extractive industry developments to the Project Area are:

- Gunlake Quarry, approximately 5 km south-west of the Project Area.
- Green Valley Quarry, approximately 6 km south-east of the Project Area.
- Berrima Coal Mine, approximately 12 km north-east of the Project Area.
- Marulan South Limestone Mine, approximately 16 km south of the Project Area.
- Peppertree Quarry (formerly known as Marulan South Quarry), approximately 16 km south of the Project Area.

The potential for cumulative environmental, social, and economic impacts related to the extractive industry projects in the area will require consideration during the EIS phase of the Project, in line with the CIA Guidelines.

2.3.3 Summary of Cumulative Impact Considerations

A summary of the SSD Projects in the area which require cumulative impact considerations is provided in **Table 2.1** below. From the Scoping Assessment undertaken for this Project in **Appendix 1**, the following key matters will require consideration of CIA:

- Visual amenity.
- Noise and vibration.
- Biodiversity.
- Traffic and transport.
- Socio-economic.

Further information is provided in **Section 6.2.10**.

Table 2.1 State Significant Developments Surrounding the Project

Project	Status	Generation Capacity (MW)	Potential Construction Start Date	Potential Cumulative Impacts
Marulan Gas Fired Power Station	Approved	350	2024	Yes
Marulan Solar Farm	Proposed	100	Unknown	Yes
Gundry Solar Farm	Proposed	400	2024	Yes
Taralga Wind Farm	Approved	107	Operating	Yes
Gullen Range Wind Farm	Approved	165	Operating	Yes
Crookwell 3 Wind Farm	Approved	58	Operating	Yes
Crookwell 2 Wind Farm	Approved	91	Operating	Yes

Project	Status	Generation Capacity (MW)	Potential Construction Start Date	Potential Cumulative Impacts
Biala Wind Farm	Approved	110	Operating	No
Western Range Solar Farm	Proposed	175	Unknown	No
Gullerin Wind Farm	Approved	30	Operating	No
Collector Wind Farm	Approved	160	Operating	No
Yass Solar Farm	Proposed	80	Unknown	No
Rye Park Wind Farm	Approved	396	Currently underway	No
Bango Wind Farm	Approved	244	Currently underway	No
Paling Yards Wind Farm	Proposed	310	2023	No
Gunlake Quarry	Approved	-	Operating	Yes
Green Valley Quarry	Approved	-	Unknown	Yes
Berrima Coal Mine	Approved	-	Undergoing Closure	Yes
Marulan South Limestone Mine	Approved	-	Operating	Yes
Peppertree Quarry	Approved	-	Operating	Yes

2.4 Planning and Other Agreements

Should the Project be approved, Spark will enter into a planning agreement (PA) in accordance with the requirements of the EP&A Act. The PA will be negotiated with the relevant Council(s) for the provision of infrastructure or other items to support local communities.

Spark Renewables has commenced consultation with Upper Lachlan Shire Council and the adjoining Goulburn Mulwaree and Wingecarribee Shire Council's, this consultation will continue through the EIS phase.

Spark Renewables also propose the implementation of a community fund and a neighbour benefit fund associated with the broader Wattle Creek Energy Hub Project, that meets the unique needs of the wider community. At this stage no negotiated agreements have been initiated.

2.5 Project Benefits

The Project will provide long-term, strategic benefits to the state of NSW, including:

- Contribute to and support the NEM by providing renewable energy generation and storage capacity and improving the security, stability, and resilience of the NEM.
- Facilitate the shift away from coal-fired power generation, supporting Australia's transition towards clean and renewable sources of energy.
- Avoid, minimise and mitigate adverse impacts on the environment and community during construction and operation.

- Establish a strong network of positive and long-term relationships within the local community and contribute to economic and social growth with a community fund and a neighbour benefit fund that meets the unique needs of the wider community, and delivers long-lasting social, economic, and environmental benefits for decades to come.
- Provide energy storage for sustainable renewable energy to enable continuous and reliable electricity output as part of a rapidly expanding industry in NSW.
- Make efficient use of existing transmission electrical infrastructure, notably the capacity of Marulan substation to support to new connections.

The Project will also provide direct and indirect financial benefits to the regional and local community, including:

- The development of a Project community benefit program, co-designed with proximal neighbours, community and other key stakeholders which will include a community and neighbour benefit fund, and opportunities to provide goods and services for the construction and operational phases.
- Employment generation creating approximately 150 jobs during the construction phase and approximately 10 jobs during the operational phase, and flow on economic benefits to local services through the construction and operation phases.
- Economic empowerment of First Nations people from implementation of an Aboriginal Participation Plan that will be developed following (and in line with) the NSW Electricity Infrastructure Roadmap – First Nations Guidelines (NSW Government, 2022).
- Enabling continued research on new and emerging technologies in partnership with UoS, through the establishment of a dedicated onsite testbed facility.

3.0 Project

3.1 Project Summary

The Project comprises the installation, operation, maintenance and decommissioning of a large-scale BESS, supported by associated infrastructure. The Project will have a capacity of up to approximately 800 MW (AC or DC coupled) and will have provision for up to two (2) hours of storage (1600 MWh), with the aim of providing both storage as well as firming capacity to the NEM and assisting in grid stability by providing frequency control ancillary services. The design of the BESS will allow for the storage and exportation of renewable energy within the network so that it can be used during times of peak demand.

This Scoping Report assesses two proposed BESS sites within the Project Area to allow for greater flexibility in the design of the Project. However, only one BESS would be constructed and operated upon Project approval. Both BESS options would have a capacity of 800 MW/1600 MWh, and would consist of the same components. As such, representative components which would be applicable to either of the BESS sites are outlined in **Table 3.1** below.

The indicative Project layout inclusive of both BESS Sites is shown on **Figure 3.1** and represents an area of approximately 23 ha at BESS Site A, and 25 ha at BESS Site B, which includes associated ancillary infrastructure (i.e. substations, the operations and maintenance facility, and test bed) but excludes internal tracks and easements. The indicative Project components are provided in **Table 3.1** noting that these will be subject to further refinement as part of ongoing design development and the planning and approvals process.

Table 3.1 Indicative Project Components and Appropriate Dimensions/Capacity

Project component(s) / infrastructure	Approximate dimensions and/or capacity	Quantity
BESS Modules		
Maximum height	3 m	-
Minimum height	1.5 m	
Containers	Approximately 3.85 MWh per container (subject to final BESS provider selection)	415
Ancillary Infrastructure		
Collector (on-site) substation	6 ha	1
High voltage Transformers	300 megavolt amperes (MVA) high voltage transformers within substation (subject to detailed design)	3
Inverters and medium voltage transformers	4200 kVA inverters, with one medium voltage per transformer (subject to final inverter selection)	248
Overhead transmission lines (high to low voltage)	Internal overhead cables i.e. high voltage transmission lines from the BESS to the grid connection point.	n/a

Project component(s) / infrastructure	Approximate dimensions and/or capacity	Quantity
Underground cables (medium to low voltage)	2 km	n/a
Internal access tracks	Approximately 7 km of internal roads that connect to the broader internal Wattle Creek Energy Hub road network	n/a
Primary site access point(s)	Canyonleigh Road and Arthursleigh Road, however subject to further intersection design during the EIS.	2
Operations and maintenance facility	100 m x 80 m	1
Temporary Construction Facilities		
Construction compound, including: <ul style="list-style-type: none"> • construction laydown areas for equipment and supplies, • stockpile and material storage areas • concrete batching plants, as required • construction compounds, site office, etc. 	~ 2 ha	1

The proposed Project infrastructure (as summarised in **Table 3.1** above) would be contained within the BESS Project Boundary. The proposed Development Corridor allows for micro-siting and will be subject to further detailed design as the environmental, social, and economic impact assessments progress.

3.1.1 Key Project Components

The key components of the Project include:

- 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).
- Transformers – skid-mounted transformers will be installed adjacent to each inverter to step up the voltage to the internal reticulation voltage of the plant.
- Substation and transmission connection – on-site collector substation and overhead powerlines to connect the solar farm and BESS to the electricity transmission network via Marulan Substation. A substation communication mast of up to 80 m in height is also included at the substation location.
- Electrical connections – a combination of underground cables and overhead powerlines connecting solar facility to the on-site collector substation.
- Operations and maintenance (O&M) facility – including control rooms, O&M buildings, amenities, equipment sheds, storage, a hardstand and bench, and parking areas.
- Minor upgrades to the existing site access point from Canyonleigh Road and internal access roads.

- Temporary construction infrastructure – to facilitate construction and likely to include laydown and storage areas and site offices.
- Security fencing – to prevent unauthorised access to the Project and guard high voltage or dangerous equipment.

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, with the racks wired together in strings, and strings of batteries then connected to the inverter stations.

The batteries will either be containerised in self-contained steel enclosures resembling shipping containers or alternatively within a building resembling a large industrial shed. 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.

Although adjacent to each other, the solar farm and BESS could be registered as separate generating units in the NEM and will be developed and operated independently. The solar energy generated may be exported to the grid or used to charge the BESS. When discharging, the BESS would export its electricity to the grid. As such, all components are independent but related uses of the broader Wattle Creek Energy Hub.

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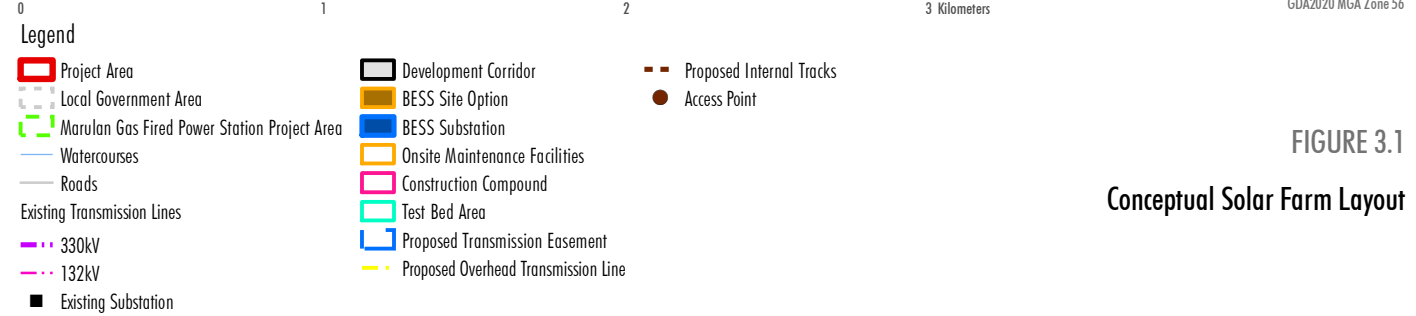
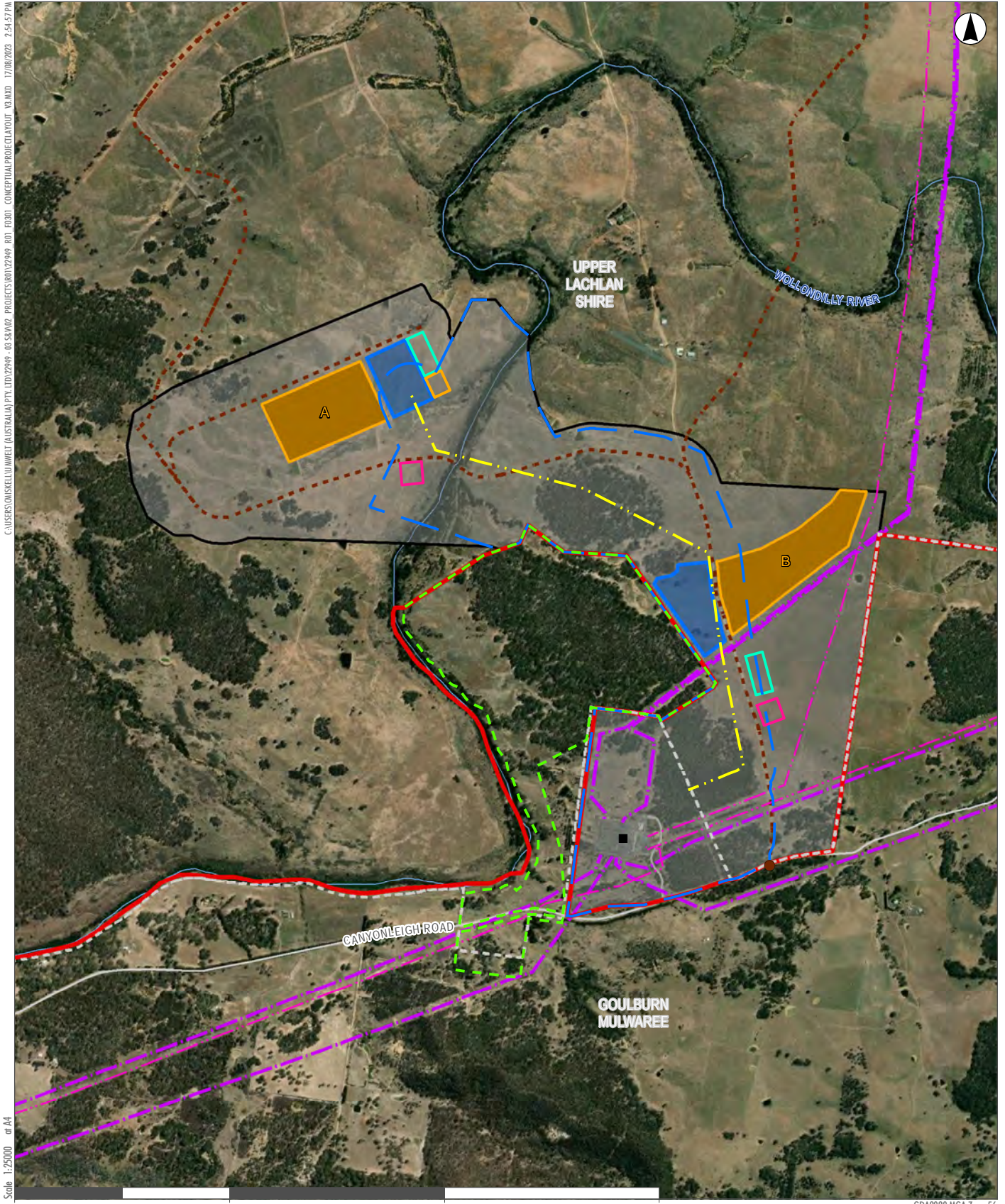


FIGURE 3.1

Conceptual Solar Farm Layout

3.1.2 Anticipated Timeframes

Construction works will commence as soon as practical following Project approval. The timing of construction will be driven by additional permits and authorisations, detailed design, grid agreements and procurement and financing processes, and a final investment decision. The construction phase of the Project is anticipated to be 18 months (peak approximately 6 months). The Project has an estimated operational life of 30 years after which it may be decommissioned or re-powered. In summary the anticipated timeframes for the Project are:

- Planning and approvals: in progress and aiming to be completed in late 2024.
- Construction and Commissioning: planned to commence in late 2025, for approximately 18 months.
- Operation: planned to commence in 2026 with full scale operations planned for 2027, with an estimated operational life of 30 years.

As is typical for projects of this scale and nature, construction and operation could be undertaken in stages. Spark Renewables aim to construct the Project as a single stage of development, however, is also seeking flexibility to construct the Project in stages with consideration of the other components of the Wattle Creek Energy Hub, if required and depending on factors such as grid connection capacity and the outcomes of competitive Long-Term Energy Service Agreements and Access Rights tenders.

3.2 Electrical collection system and substation

Groups of batteries located within battery enclosures will be linked together to collect the total energy being produced. Underground or above ground cables will run from the BESS containers to the on-site substation.

Power, earthing, and communications cables will also be installed across the development footprint between electrical devices. Cabling may be underground or above ground depending on geotechnical conditions.

The onsite collector substation will be constructed within the development footprint to convert the on-site AC reticulated electricity to 132 kV or 330 kV for export to the grid. The electrical infrastructure components within the development footprint are generally expected to be between 5–10 m tall, with the exception of the 132 kV or 300 kV line to connect the project to the Marulan Substation and associated lightning protection, gantries and a communication mast (up to 80 m in height) at the on-site substation.

Electricity generated by the project will be exported to the grid via an overhead line network connection.

3.3 Ancillary Infrastructure

Ancillary infrastructure required to support the construction and operation of the Project is presented in **Table 3.1** above and includes, but is not limited to:

- Temporary construction facilities, including:
 - construction compound(s)

- site office buildings
- laydown areas
- construction materials storage.
- Permanent site office and O&M buildings (including offices, amenities, maintenance shed and equipment storage sheds) with parking during operations; including:
 - hardstands
 - new access tracks
 - upgrades to existing access tracks
 - access points from the public road network.
 - Project signage at the main site entrance on Canyonleigh Road.

Indicative locations for temporary construction compounds and the O&M facility are shown on **Figure 3.1**.

Security fencing will be installed around the perimeter of the site office and O&M buildings, as well as around high voltage electrical equipment including the collector substation and BESS. Signage will be clearly displayed identifying hazards present within the development corridor. Lighting, security cameras and weather stations will be installed where necessary for safety, maintenance, and security purposes.

Landscaping may also be implemented within the Development Corridor to reduce the visibility of Project infrastructure, which will be considered further and refined during the later stages of Project development.

3.4 Access

Access to the Project Area by trucks or overmass vehicles is expected to be facilitated via Red Hills Road, Ambrose Road, Brayton Road and Canyonleigh Road. Arthursleigh Road would only be used by exception by light passenger vehicles in the event the access route via Canyonleigh road is not possible (i.e. in the event of flood or fire etc.) as depicted in **Figure 3.2**. The local access road connections and approach routes to the Project will require further investigations during preparation of the EIS, developed in combination with site planning. **Figure 3.2** depicts the indicative location of the existing site access point which will be subject to minor upgrade works to facilitate the construction of the Project, the access point will be gated and secured, and appropriate warning signs erected.

The transport route to the Project Area will be confirmed through the EIS. Oversize/overmass (OSOM) movements along the Hume Highway from both Port Kembla and Port Botany are being considered as part of the Project.

The Project will seek to allow heavy and light vehicles to use other public roads not discussed above, but only to:

- undertake pre-construction minor works
- construct intersection upgrades, if necessary

- undertake dust suppression
- utilise the secondary intersections and cross overs identified above to facilitate construction and operational vehicles
- procure resources from licensed operators which are located along these roads.

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

- a perimeter track around the BESS within the Project Area up to six (6) m wide
- internal access tracks for manoeuvring between the module sections between two (2) and five (5) m wide.

All internal access tracks will be unsealed. The internal tracks will serve both as access for servicing and maintaining project infrastructure as well as fire trails and Asset Protection Zones (APZs).

3.4.1 Over-sized, over-mass Vehicle Transport Routes

Over-size, over-mass (OSOM) vehicles will require access to the Project Area and the proposed route is the subject of ongoing route analysis. This includes an assessment of larger project components to the Project Area from Port Kembla and/or Port Botany, as depicted on **Figure 3.2**.



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GDA2020 MGA Zone 56

Legend







-  Project Area
-  Access Point
-  Shared Route
-  Wollongong Port
-  Sydney Port
-  Major Roads

Image Source: ESRI Basemap (2022) Data source: NSW DFSI (2021), VIC DELWP (2022)

FIGURE 3.2
Project Area Access and
Indicative Travel Routes

3.5 Activities

3.5.1 Construction

Construction of the project is expected to be completed in 18 months, as outlined in **Section 3.1.2**.

Temporary infrastructure required during construction will include temporary construction compounds, site offices, concrete batching plants, rock crushing facilities, material storage/stockpile and laydown areas, and internal access tracks, as outlined in **Section 3.3**.

Earthworks will be required for BESS foundation excavation, hardstand and access track formation and drainage works. Where required, additional or improved drainage channels, sediment control ponds and dust control measures will be implemented. Laydown areas, waste handling, fuel and chemical storage areas will be strategically placed to minimise potential environmental impacts during construction.

3.5.1.1 Construction Workforce

A workforce of approximately 150 personnel will be required on-site during peak construction. Councils and local business owners will be consulted throughout the development and assessment of the Project, particularly relating to the management of potential impacts and opportunities for accommodation of the Project's construction workforce.

The construction workforce will be sourced from the local area as far as practicable. Accommodation for non-local construction staff will likely be sourced through available rental properties, hotels/motels, and other forms of accommodation in surrounding townships and regional centres including (but not limited to) Marulan, Goulburn, Moss Vale, Bowral and Crookwell.

Potential cumulative impacts on accommodation, infrastructure, and services will be considered in the EIS as part of the social impact assessment, as discussed in **Section 6.2.10**.

3.5.2 Operations

The operational lifespan of the project is expected to be more than 30 years.

Key activities during operations will be energy generation and energy storage. Once operational, the project will require up to 7 full-time employees. Project operations will be supported by contractor roles for vegetation, weed and pest management, annual module cleaning and equipment calibration, internal road maintenance and facility cleaning.

Regular maintenance will be required throughout operations. Site maintenance activities will include management of internal roads, drainage, fencing and vegetation. Additional maintenance of key infrastructure will also be required and will include service, repair or replacement of PV modules, inverters, transformers or components of the BESS, substation, or switchyard. Sheep grazing will also occur on-site throughout operations.

Light vehicle access will be required throughout operations and occasional heavy vehicles may also be required.

3.5.2.1 Research Test-Bed Facility

In addition to the Solar and BESS components, a Research Test-Bed Facility is also being proposed as part of the Wattle Creek Energy Hub. The facility will be used in the development and research of novel clean energy technologies, such as innovative battery systems developed by Gelion, a company started by researchers from UoS in 2015. The research facility will contribute to the research objectives of the Research and Development Roadmap by the NSW Chief Scientist & Engineering (2022).

Approval for the Research Test-Bed Facility is sought in both the Solar Farm DA and the BESS DA.

3.5.3 Decommissioning/Re-Powering

Once the project reaches the end of its operational life, a decision will be made to either decommission or re-power the facility, subject to approval requirements.

If the project is decommissioned, all aboveground structures built as part of the project will be removed and the site rehabilitated generally to its pre-existing land use, as far as practicable. The disposal and recycling of project infrastructure will be done in accordance with waste management legislation at the time of decommissioning. Whenever possible, efforts will be made to reduce the amount going to landfill in line with best-practice sustainability principles.

If re-powering is proposed, an appropriate stakeholder consultation process will be undertaken, and all necessary approvals will be sought.

3.5.4 Development Corridor

The Project Boundary is the maximum spatial extent of the Project defined by all current land access available to Spark Renewables. It includes the Lot and DP for the Arthursleigh Property and encompasses all aspects of the Project except for the off-site transport route. The Project Area for the Wattle Creek Energy Hub encompasses all land within and including the Project Boundary and covers approximately 6,200 ha, with the proposed solar and BESS infrastructure footprint occupying approximately 1,680 ha.

The indicative Development Corridor for the BESS Project is shown in **Figure 3.1**. The Development Corridor is defined as the area within which all the BESS and associated infrastructure will be placed, providing the necessary flexibility for the detailed design of the Project whilst also allowing a detailed environmental assessment process to be completed.

The Development Corridor is of variable width (to avoid key site constraints) however it generally comprises:

- A variable (typically 100 m) buffer around access tracks.
- A variable (typically 50 m) buffer measured from the edge of all other infrastructure, including the proposed BESS locations.

The proposed Development Corridor associated with the Project is approximately 390 ha based on the current indicative Project layout (inclusive of the two BESS location options), which will be subject to further design refinement and revision as the Project progresses. A single BESS option represents ~9% of the indicative Development Corridor, and ~2.5% of the Project Area.

The proposed Disturbance Footprint for the Project will be within the Development Corridor and is subject to further detailed design as the environmental assessment process progresses. The proposed Development Corridor is a conservative area for early assessment purposes and the Disturbance Footprint will likely be substantially smaller, subject to further detailed assessments and design.

3.6 Project Alternatives

The Project location was selected due to:

- Its position and proximity to the existing Marulan substation and associated transmission infrastructure.
- Generally positive feedback on the BESS component received from preliminary community and stakeholder engagement with Host landholders, neighbouring landholders and other key stakeholder groups in the region.
- Much of the Project Area being historically cleared for agricultural use, resulting in generally homogenous agricultural land within and surrounding the Project Area.
- The Project being compatible with existing pastoral land uses, with minimal impact to current agricultural activities being anticipated during both construction and operation of the Project.
- Proximity to the existing public road network and access to several existing internal roads.
- Potential to avoid crossing watercourses (creeks, rivers etc.) via the use of the existing public road network and existing internal roads.
- Consideration of other important social and environmental values.

The indicative Project layout documented in this Scoping Report (refer **Figure 3.1**), informed by discussions with local neighbours, has been subject to several design iterations to incorporate feedback received during this stage of the Project.

A number of alternative Project options have been considered to date by Spark Renewables, including:

- A 'do nothing' approach. This option does not meet Spark Renewables commercial objectives to develop renewable energy projects in NSW; and does not assist to support the strategic context outlined in **Section 2.0** or achieve the Project Objectives outlined in **Section 1.2**. Accordingly, it has not been considered any further.
- The option to only pursue the Solar Farm components of the Wattle Creek Energy Hub Project has been noted however, as with the 'do-nothing' approach this option would not meet the energy generation capacity which is a key objective for Spark Renewables.
- Multiple design changes to the BESS Sites to avoid vegetation and impacts to neighbouring residences.
- Options to develop a BESS:
 - Within other areas of the Project Area.
 - Within the BESS Site A or BESS Site B Development Area identified in **Figure 3.1** were considered and would result in achieving the Project Benefits described in **Section 1.2**.

The option to develop a BESS within the Development Area (summarised in **Section 3.6** and identified in **Figure 3.1**) is currently preferred as it:

- Incorporates the objectives of UoS as selected through the market selection process.
- Maximises the energy storage capacity to support the Energy Hub.
- Optimises the layout with respect to other key environmental matters (e.g. visual, noise, biodiversity and heritage constraints), whilst maintaining a feasible project that can contribute to both Commonwealth and NSW commitments to increase renewable energy generation and storage, and reduce carbon emissions across the NSW and Australian economies.

This option to develop a BESS at Site A or Site B is that which is proposed to be progressed to the EIS stage following receipt of the SEARs, noting that only one BESS Site would ultimately be developed, and that the Project layout will be subject to further refinement during that EIS and ongoing design development to minimise impacts on the environment and community. This will be informed by the further technical and environmental studies and continued community and stakeholder engagement.

At time of lodgement of the EIS, the specific technology provider for the BESS may not have been selected and may change during future stages of development. As such, reasonable worst-case assumptions will be used to facilitate impact assessment in the EIS.

3.7 Strategies to Avoid or Minimise Impacts

The key impact avoidance and minimisation strategies implemented by Spark Renewables during the early stages of design development included establishing a 'buildable area'. This was an area defined by Spark Renewables beyond which Project solar farm PV modules and ancillary infrastructure would not occur. It was established based on:

- General avoidance of vegetation onsite including significant vegetation areas on the north-east and south west of project land (i.e. proposing the BESS Sites within predominantly Category 1 land).
- A variable buffer (minimum 700 m) to all Host landholder dwellings.
- A 50 m buffer to all waterbodies.
- A 100 m buffer either side of the existing 330 kV/132 kV transmission line alignments (200 m total).
- A 100 m buffer to road reserves.
- Avoidance of any land with 15 degree or greater gradient.
- Avoidance of any land that is used for irrigation cropping.
- BESS components being placed in locations that are compatible with existing land uses.

The key strategies implemented by Spark Renewables during the Scoping stage to avoid and minimise impacts includes revising the indicative Project layout to:

- Locating proposed infrastructure within existing areas of cleared land to avoid native vegetation clearing as far as reasonably practicable.

- Locating proposed infrastructure to avoid sensitive archaeological areas where possible and ensure an appropriate buffer is applied.
- Aligning the Development Corridor to maximise the use of existing roads to reduce associated disturbance and avoid areas of remnant vegetation.

The decision to investigate two BESS locations but proceed to develop at one location was made to fully understand key constraints that may be present across both locations. Once investigations are complete and each BESS site and key constraints are fully understood, one site will be determined based on the identified constraints and detailed assessment.

3.7.1 Summary of Avoidance/Minimisation and Next Steps

The Project layout will be subject to further refinement during the EIS and further design development to minimise impacts on the environment and community. It will be revised as more social and environmental information is received, constraints are identified, further technical studies and environmental assessments occur and further feedback from stakeholder and community engagement is received.

At time of lodgement of the EIS, the specific technology provider for the BESS may not have been selected and may change during future stages of development. As such, reasonable worst-case assumptions will be used to facilitate impact assessment in the EIS.

4.0 Statutory Context

4.1 NSW Approval Pathway

The EP&A Act is the primary instrument which regulates the environmental impact assessment and approval process for development in NSW. The Project will require development consent under Part 4 of the EP&A Act. Being development for the purpose of electricity generation with a capital investment value of more than \$30 million, the Project is declared to be SSD under the provisions of the Planning Systems SEPP. The development application will be lodged with DPE. Currently the Project has a CIV estimated at \$960 million dollars, which has been estimated on the basis of ~\$1.2 M per MW of energy.

Section 4.15 of the EP&A Act describes the matters for consideration in assessing SSD, which includes the provisions of relevant environmental planning instruments (EPIs), proposed instruments that have been the subject of public consultation, development control plans, planning agreements and statutory regulations. The assessment of SSD must also consider the likely impacts of the development, suitability of the site, any submissions received and the public interest.

4.1.1 Consent Authority

Under Section 4.5(a) of the EP&A Act the consent authority for SSD is the Independent Planning Commission (IPC) (if the development is of a kind for which the Commission is declared the consent authority by an environmental planning instrument) or the Minister (if the development is not of that kind). In accordance with clause 2.7(1) of the Planning Systems SEPP if any of the criteria identified below are exceeded the IPC is the consent authority:

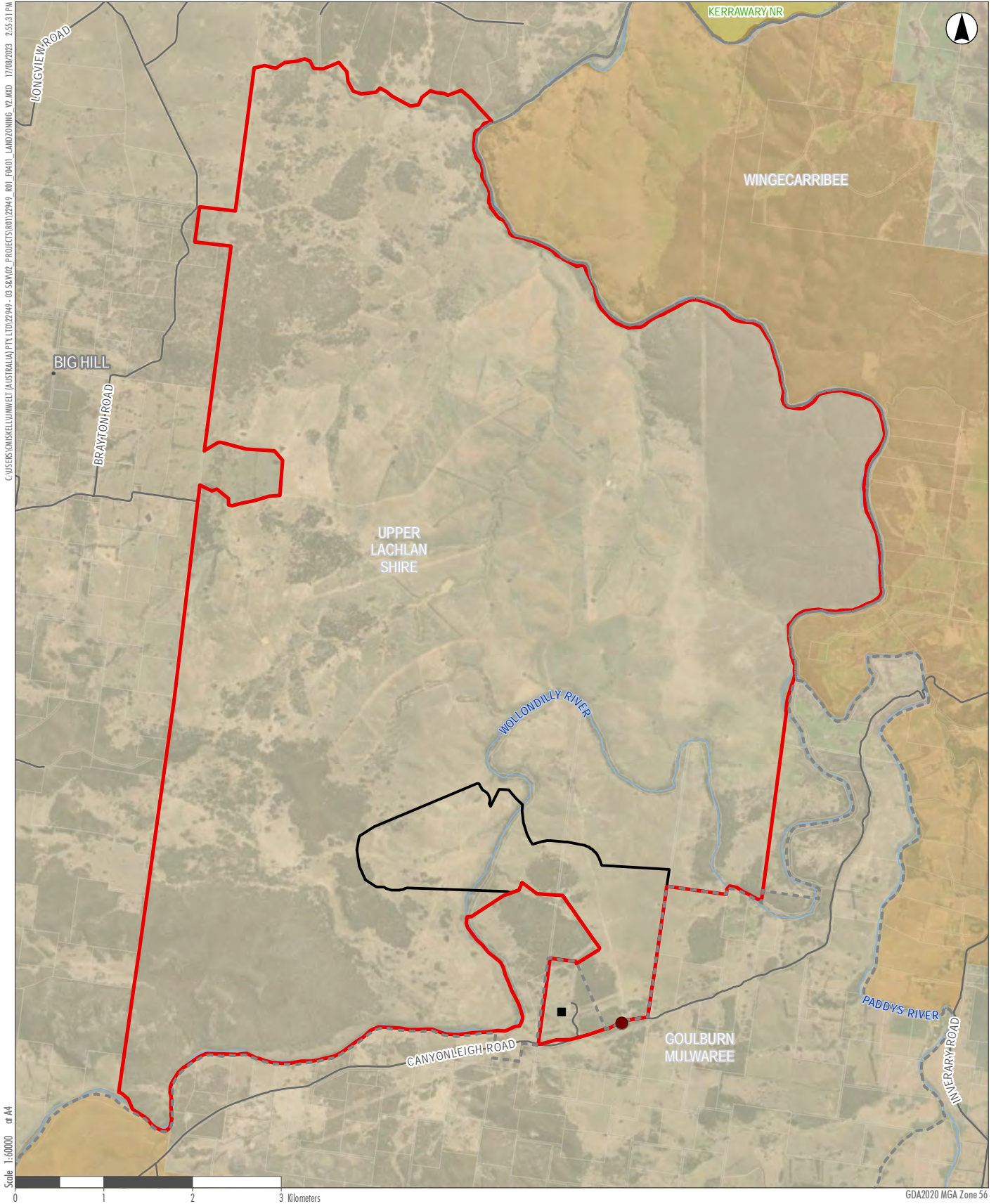
- Upper Lachlan Shire Council object to the application.
- 50 submissions (other than from the Councils noted above) are made objecting to the Project.
- Spark Renewables discloses a reportable political donation.

If none of the above criteria are triggered, DPE will determine the development application on behalf of the Minister.

4.1.2 Permissibility

As outlined in **Section 2.2**, the Project Area is situated within the Upper Lachlan Shire LGA. The Project Area is zoned as RU2 Rural Landscape within the Upper Lachlan LEP 2010 (refer to **Figure 4.1** below). Development for the purposes of electricity generating works is not included in the list of permissible developments within the RU2 land use table under the Upper Lachlan LEP.

Clause 2.36(1)(b) of *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TI SEPP) states that development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. Under Clause 2.7(1) of the TI SEPP, the provisions prevail where there are inconsistencies with any other EPIs, including LEPs. Due to the operation of Clause 2.36(1)(b) of the TI SEPP the Project is permissible with development consent.



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Legend

- | | |
|-----------------------|---|
| Project Area | Land Use Zoning |
| Development Corridor | C1 - National Parks and Nature Reserves |
| Local Government Area | C2 - Environmental Conservation |
| Lot Boundary | RU1 - Primary Production |
| NPWS Estate | RU2 - Rural Landscape |
| Roads | |
| Watercourses | |
| Access Point | |
| Existing Substation | |

FIGURE 4.1
Land Use Zoning

4.1.3 Other Approvals

In addition to development consent under the EP&A Act, several other NSW Acts or planning policies are applicable or potentially applicable to the Project. **Table 4.1** identifies the other NSW legislation and policies and their applicability to the Project.

Table 4.1 NSW Legislation

State Legislation	Description
<i>Biodiversity Conservation Act 2016</i> (BC Act)	Under the BC Act, biodiversity assessment in accordance with the NSW Biodiversity Assessment Method (BAM) is required for any SSD project. The Project (as SSD) triggers the requirement to prepare a Biodiversity Development Assessment Report (BDAR) in accordance with the BAM. The EIS will include a BDAR.
<i>Protection of the Environment Operations Act 1997</i> (POEO Act)	The POEO Act regulates pollution to the environment and requires licences for environment protection including waste, air, water, and noise pollution control. Energy storage is not listed as a scheduled activity under Schedule 1 of the POEO Act and as such an Environment Protection Licence (EPL) would not be required.
<i>Water Management Act 2000</i> (WM Act)	Any water extractions from water sources (i.e. surface and groundwater) regulated by a Water Sharing Plan (WSP) required for construction or operational purposes will require licensing under the WM Act. The potential water requirements during construction and operation will be assessed as part of the Water and Soil Impact Assessment prepared as part of the EIS. Any necessary licences would be obtained for the Project.
<i>Roads Act 1993</i> (Roads Act)	A consent is required under section 138 to work on or above a road or to connect a road to a classified road. Consents under section 138 will be required for proposed road works.
<i>Crown Land Management Act 2016</i> (Crown Land Act)	The Crown Land Act provides for the administration and management of Crown Land in NSW. Crown land may not be occupied, used, sold, leased, licensed, dedicated, reserved, or otherwise dealt with unless authorised by the Crown Land Act. There are some areas of Crown Land (e.g. Crown reserves) adjacent to the Project Area. Should any works have potential to directly or indirectly impact these areas, further consideration, consultation and possible approval may be required.
<i>Contaminated Land Management Act 1997</i> (CLM Act)	The CLM Act establishes the process for investigating and if required, remediating land that the NSW EPA considers to be contaminated significantly enough to require regulation. The Project Area does not contain land listed on the Contaminated Lands Register. Relevant mitigation and management measures would be incorporated as part of the Project to address any potential contamination issues.

4.2 Commonwealth Legislation

4.2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a framework for protection of the Australian environment, including its biodiversity and its natural and culturally significant places.

Any action which will or is likely to have a significant impact on a matter of national environmental significance (MNES) must be referred to the Minister for the Environment. MNES includes:

- World heritage properties.
- National heritage places.
- Wetlands of international importance (listed under the Ramsar Convention).
- Listed threatened species and ecological communities.
- Migratory species protected under international agreements.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mines).
- A water resource, in relation to coal seam gas development and large coal mining development.

The Project Area is not within a world heritage property or place, does not have wetlands of international importance, is not within either a Commonwealth marine area or the Great Barrier Reef Marine Park, and does not relate to a nuclear action, coal seam gas or coal mining development.

There is potential for the Project to impact on listed threatened species and ecological communities, migratory species, and endangered and critically endangered fauna species under the BC Act and EPBC Act, respectively. Further discussion around impact to threatened species is provided in **Section 6.2.2**.

A EPBC Act Referral will be lodged to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEE) to determine whether the Project requires formal assessment and approval under the EPBC Act as a Controlled Action. If deemed a Controlled Action, it is proposed that the Project would be assessed under the bilateral agreement between the NSW and Commonwealth Governments.

4.2.1.2 Heavy Vehicle National Law

Approvals may be required for the transport of BESS components and associated infrastructure by oversized, over-mass (OSOM) vehicles. The requirements for such OSOM transport will be assessed via a route analysis study as part of the EIS.

4.3 Statutory Requirements Summary

This section provides an overview of the key statutory requirements for the Project. The statutory requirements addressed in **Table 4.2** are categorised as per the SSD Scoping Report Guideline.

Table 4.2 Statutory Requirements Summary

Matter	Detail	Comment
Power to grant consent	The legal pathway under which consent is to be sought, why the pathway applies, and who the consent authority is likely to be.	As outlined in Section 4.1.1 , the Project requires approval under Part 4 of the EP&A Act being SSD. The consent authority will be the IPC or DPE based on the number and type of any objections to the Project, or any political donations made by Spark Renewables or related entities.
Permissibility	The relevant provisions affecting the permissibility of the Project, including any land use zones. Any provisions or actions being taken that would allow the Project to be considered on its merits, where the Project would otherwise be partly or wholly prohibited.	As outlined in Section 4.1.2 , the Project Area is zoned RU2 Rural Landscape within the Upper Lachlan LEP 2010. Electricity generating works are not permitted within the RU2 zoning under the Upper Lachlan LEP. Clause 2.36(1)(b) of the TI SEPP states that development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial, or special use zone. Under Clause 2.7(1) of the TI SEPP, the provisions prevail where there are inconsistencies with any other EPs, including LEPs. Therefore, the Project is permissible with development consent.
Other approvals	Other approvals that are required to carry out the Project and why they are required.	Section 4.1.3 provides a list of other NSW approvals required or that may be required for the Project. Section 4.2 discusses potential Commonwealth approvals that may be required for the Project.
Pre-conditions to exercising the power to grant consent	Pre-conditions to exercising the power to grant consent for the Project that may be relevant to setting the SEARs.	An EIS will be prepared in accordance with relevant legislative requirements and guidelines. No pre-conditions to exercising the power to grant consent for the Project are currently envisaged.
Mandatory matters for consideration	Matters that the consent authority is required to consider in deciding whether to grant consent to any development application for the Project that may be relevant to setting the SEARs.	As outlined in Section 4.1 , Section 4.15 of the EP&A Act describes the matters for consideration in assessing SSD, which includes the provisions of relevant environmental planning instruments, proposed instruments that have been the subject of public consultation, development control plans, planning agreements and statutory regulations. The assessment of SSD must also consider the likely impacts of the development, suitability of the Project site, any submissions received and the public interest. All relevant matters will be addressed in the EIS based on the outcomes of environmental assessments to be undertaken (refer to Section 6.0).

5.0 Engagement

Spark Renewables recognise that respectful, inclusive, and meaningful engagement is fundamental to the development of all projects, and that effective engagement is a key component of the SSD process, in line with the NSW Government's Engagement Guidelines (DPIE, 2021f).

Spark Renewables acknowledges that effective engagement requires everyone involved to do their part, at the appropriate stage in the process. Spark Renewables aims to provide engagement that is meaningful, proportionate and tailored to the needs of the community, councils and government agencies as well as outlining the statutory context that ensures the community can participate in planning and assessment.

Accordingly, Umwelt (on behalf of Spark Renewables) has prepared a CSEP for the Project to outline the objectives and approach to community engagement throughout the life of the Project from development through construction and operation. This CSEP is provided as an attachment of **Appendix 2**.

The following section provides a summary of the CSEP, the public and agency consultation undertaken to date and key issues raised, and the outcomes of specific visual consultation undertaken with proximal neighbours.

5.1 Community and Stakeholder Engagement Plan

The CSEP identifies the stakeholder engagement approach and objectives for the Project and the surrounding communities, namely it aims to:

- Identify effective methods to inform the community of Project information and updates, which foster trust and build positive long-term relationships with community stakeholders.
- Ensure delivery of an honest, innovative, flexible and transparent community engagement process.
- Identify ways to facilitate engagement and collaborate with relevant community organisations, including for input into the social and environmental assessment of the Project and ongoing project design and planning including the development of community benefit sharing programs.
- Ensure the broader community and stakeholders are kept informed about benefits, potential impacts, and activities of the Project.
- Identify effective avenues for community members to communicate any concerns and provide valuable feedback with Project personnel.
- Ensure means of community involvement are known and distributed consistently.
- Ensure the commitments made to the community during the Project development stage are being met.

The CSEP provides an overview of Spark Renewables approach to stakeholder engagement throughout all stages of the Project, outlines the Project and the relevant stakeholders, outlines the key messages of the Project, and outlines the approach to monitoring and evaluating the effectiveness of the engagement program.

5.2 Stakeholder Engagement

Engagement with local community commenced in February 2023 and has predominantly been undertaken by the Wattle Creek Energy Hub Project team of two Spark Renewables staff, supported by Umwelt. The Project team have engaged in a range of activities, including hosting a community drop-in session and meeting with neighbouring landholders and local stakeholders in-person and online to build and maintain genuine, trusting relationships. The overall approach to consultation with local community is to be flexible, inclusive, open and responsive.

Stakeholder and community engagement has been undertaken early in the Scoping phase to:

- Proactively inform Project design and development.
- Identify perceived issues/impacts to be addressed in the assessment process.
- Establish stakeholder relationships with Host landholders, near neighbours and key stakeholders for the Project.

The key stakeholders identified for the Project within each stakeholder group are outlined in **Table 5.1**.

Table 5.1 Identified Stakeholders

Stakeholder Group	Stakeholder
Host landholders	<ul style="list-style-type: none"> • Landholders within the Project being the University of Sydney (UoS).
Neighbouring landholders	<ul style="list-style-type: none"> • Landholders adjacent to the Project.
Wider community of the Project	Including communities within the nearby LGAs: <ul style="list-style-type: none"> • Upper Lachlan Council. • Wingecarribee Council. • Goulburn-Mulwaree Council.
Other community organisations:	<ul style="list-style-type: none"> • Landcare branches. • Progress Associations. • Lion’s Club branches. • Rotary branches. • Local action groups.
Traditional owners	<ul style="list-style-type: none"> • Pejar Local Aboriginal Land Council representative of Gundungurra Traditional Owners. • Other Aboriginal corporations: <ul style="list-style-type: none"> ○ Gundungurra Aboriginal Group. ○ Mulwaree Aboriginal Community Inc.
Industry	<ul style="list-style-type: none"> • Clean Energy Council (CEC). • Australian Energy Market Operator (AEMO). • Australian Energy Market Commission (AEMC). • NSW Farmers Association. • National Farmers Federation. • PV Industries.

Stakeholder Group	Stakeholder
Business and service providers	<ul style="list-style-type: none"> • Marulan Chamber of Commerce. • Regional Development Australia and Industry Capability Network. • Accommodation and housing providers. • Education providers. • Health care providers.
Federal government	<ul style="list-style-type: none"> • Clean Energy Regulator (CER). • Australian Energy Regulator (AER). • Minister for, Energy and Emissions Reduction (Department of Industry, Science, and Resources). • Member for Hume: Angus Taylor.
NSW state government	<ul style="list-style-type: none"> • Member for Goulburn: Wendy Tuckerman. • Minister for Planning and Homes. • Minister for the Environment and Heritage. • Treasurer and Minister for Energy. • NSW Environmental Protection Agency (EPA). • NSW Department of Planning and Environment (DPE). • Heritage NSW. • NSW Department of Industry. • Department of Regional NSW. • Transport for NSW. • Fire and Rescue NSW and NSW Rural Fire Service. • SafeWork NSW. • Independent Planning Commission.
Local government	<ul style="list-style-type: none"> • Upper Lachlan Council: Mayor Pam Kensit. • Wingecarribee Council: Council Administrator, Mr Viv May. • Goulburn-Mulwaree Council: Mayor Peter Walker.
Utilities	<ul style="list-style-type: none"> • Transgrid. • Essential Energy. • Telstra. • National Broadband Network (NBN). • WaterNSW.
Emergency services	<ul style="list-style-type: none"> • NSW Rural Fire Service. • Fire and Rescue NSW. • NSW Police. • NSW Ambulance. • NSW State Emergency Service (Goulburn Unit).

Stakeholder Group	Stakeholder
Education	<ul style="list-style-type: none"> • TAFE NSW Goulburn. • Charles Sturt University. • University of Sydney. • Big Hill Public School. • Marulan Public School.
Media	Local and regional radio and TV stations: <ul style="list-style-type: none"> • ABC. • Social media groups. • Regional newspapers and magazines including the Goulburn Post. • Metropolitan newspapers including The Guardian Australia. • Industry online news including Renew Economy. • National and financial publications including the Australian Financial Review.

5.2.1 Community Engagement

Spark Renewables and Umwelt have commenced stakeholder engagement as part of the Scoping phase. The community consultation undertaken to date is summarised in **Table 5.2**.

Table 5.2 Community Engagement

Mechanism	Targeted Stakeholder	Engagement Objective	Description	First Round of Consultation	Second Round of Consultation
Website	<ul style="list-style-type: none"> Traditional Owners. Host landholders. Community groups. Broader community. Local businesses and service providers. Local media. 	Inform	A website dedicated to the Project including a description and overview of the Project, development application process, company information, responses to key concerns, risk management plans, maps, media releases and contact information.	A Project website and email address were established in February 2023 introducing the Project. Updates have been made throughout the reparation period.	The email address will be monitored, and the website updated when required across subsequent phases.
Media release	<ul style="list-style-type: none"> Local Government. Traditional Owners. Host landholders. Neighbouring/proximal landholders. Community groups. Wider community. Local businesses and service providers. Local media. 	Inform	To introduce the Project to the broader community through local and regional media channels.	Advertising in local newspapers and radio stations in February 2023 to advise of upcoming consultation opportunities and provide Project updates.	Subsequent media releases will be developed when required during the EIS phase.
Community Newsletters	<ul style="list-style-type: none"> Broader community. 	Inform	Project information sheets to distribute information about the Project to the broader community and targeted stakeholders.	No. 1 – Project overview and invitation to drop-in session was distributed in February 2023 to proximal landholders.	<p>No. 2 – To provide a Project update and share notes and feedback received from the community during the scoping phase.</p> <p>No. 3 – To provide a Project update and present the draft findings of EIS & SIA and inform the community of the exhibition process.</p>

Mechanism	Targeted Stakeholder	Engagement Objective	Description	First Round of Consultation	Second Round of Consultation
Drop-in session	<ul style="list-style-type: none"> • Broader community. • Community groups. • Local businesses and service providers. 	Consult	Multi-hour time periods when stakeholders can drop in to speak to the Project team and experts, view documents and plans and ask questions of the Project team.	Two drop-in sessions held on 9 and 22 March 2023 at the Marulan War Memorial Hall and Canyonleigh Community Hall.	A session to summarise the draft results of the technical studies and gain feedback for the SIA will be held in the EIS phase.
Online Survey	<ul style="list-style-type: none"> • Broader community. 	Consult	Online or offline surveys to obtain input and feedback on Project decision-making, as well as specific information about the needs, desires and impacts on stakeholders related to the Project.	Established in March 2023, with all feedback until 28 April 2023 considered in the SISR.	The survey will be updated and distributed in the second phase to provide opportunity for the community to provide further feedback and validate impacts from the scoping phase. Also used to understand potential mitigation and enhancement measures
Personal Meetings or Interviews	<ul style="list-style-type: none"> • Proximal landholders. • Local Government. • Community groups. • Traditional Owners. 	Involve	Introductions to the Project, semi-structured interview discussions to listen to individual concerns, interests, and issues to gather preliminary feedback, including sensitivities, understanding of information needs and future engagement preferences.	One on one meetings held throughout the months of March and April 2023 with members of the Spark Renewables Project team.	Follow up interviews and meetings will occur during the preparation of the SIA and EIS Interviews with local businesses and services providers will occur during the preparation of the SIA and EIS.
Project briefings	<ul style="list-style-type: none"> • State Government. • Local Government. • Traditional Owners. • Community groups. 	Involve	Formal briefings to key stakeholders and government agencies, with Project Information Sheets and/or slide decks to formally introduce the Projects.	Initial Project briefings undertaken in March and April 2023.	Further Project briefings will be undertaken across subsequent phases of the Project as required.

Table 5.3 outlines the stakeholders that have participated in the scoping phase of the Project’s planning and assessment process to date, as well as those who have informed the development of this report. All identified stakeholder groups have been contacted a minimum of three times to offer participation through a range of mechanisms, as outlined in **Table 5.2**.

Table 5.3 Stakeholders consulted during the scoping phase

Stakeholder group	Mechanism used	Number contacted	Number engaged
Proximal Landholders	Personal meetings.	113	26
Broader Community Residents	Media release.	25	50%
	Project website – new users visiting the website for the first time.	NA	249 new users (1 Apr-16 Aug 2023)
	Community newsletter.	113	NA
	Drop-in session.	NA	42 ¹
	Canyonleigh community meeting briefing.	NA	56 ²
	Online survey.	NA	19
Local Government	Project briefing and interview.	3	2 ³
Traditional Owners	Project briefing and interview.	2	1
Local Community, Environmental and Special Interest Groups	Project briefing and interview.	5	2
Total⁴			148

It is noted that the formal notification process for the Aboriginal Cultural Heritage Assessment will commence following submission of the Scoping Report to DPE. Once commenced, detailed consultation will be undertaken with the Registered Aboriginal Parties (RAPs) for the Project. Consultation will be undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a). Further detail on the proposed EIS stage heritage assessment is provided in **Section 6.2.3**.

5.2.1.1 Community Views

As discussed in the Social Impact Scoping Report (SISR) (refer to **Appendix 2**), the following key community views were identified in engagement conducted for the social scoping phase. When stakeholders and community members were asked directly about potential negative impacts of the Project, the top issues raised included:

- impacts to visual amenity from windfarm components

¹ Some attendees at the drop-in session were also engaged by alternate methods, such as personal meetings and online surveys.

² Some attendees at the community meeting were also engaged by alternate methods.

³ Refers to number of Councils, rather than number of meetings held.

⁴ Noting some stakeholders may be double counted if they were engaged via multiple mechanisms.

- impacts on flora and fauna
- decreased social amenity during construction due to noise
- access to and use of the natural environment
- safety
- changes to general mobility in the area
- access to use and of local infrastructure
- decline of property values from being located near wind turbines.

When community members were asked directly to identify potential positive impacts of the Project, the most frequently cited responses relate to:

- training opportunities
- increased employment opportunities
- access to a renewable energy source
- local road improvements
- improved access to local services and infrastructure.

5.2.1.2 Community Consultation for Visual Impacts

In accordance with the Visual Assessment Bulletin, community consultation was undertaken by Spark Renewables (supported by Umwelt and Moir) to establish key landscape features, define areas of scenic quality and identify key public viewpoints valued by the community.

As of June 2023, a total of nineteen (19) community engagement surveys have been completed for visual impacts, which were incorporated into the Preliminary Visual Impact Assessment (PVIA) (attached as **Appendix 6**). Further discussion on preliminary visual consultation is discussed in **Section 5.4**.

5.2.1.3 Continued Engagement

Spark will continue to implement the CSEP throughout the Project assessment phase. Key consultation mechanisms and activities will include:

- one-on-one meetings and phone calls
- email/letter updates and Project newsletters
- the maintenance of a Project website
- community information sessions
- community surveys.

Further detail on the planned consultation mechanisms is provided in the CSEP (Appendix A of **Appendix 2**).

5.3 Agency and Elected Official Stakeholder Engagement

Agency and elected official consultation undertaken to-date in relation to the Project is provided in **Table 5.4** below.

Table 5.4 Agency Consultation

Agency	Date	Mechanism	Key points
DPE	March & August 2023	Scoping Meeting	<p>Cumulative impact relating to approved Marulan Gas Fired Power Station.</p> <p>Demonstrated engagement.</p> <p>Project design and avoidance and minimisation of impacts particularly in relation to biodiversity impacts.</p> <p>Assessment approach and clear distinction between project components.</p> <p>Road upgrades.</p> <p>Community benefit fund and progressing agreements early (if required).</p> <p>Scoping Report submission strategy on different technologies and timing.</p>
Biodiversity Conservation and Science (BCS)	March 2023	Project Briefing Meeting	<p>Demonstrating avoidance and minimisation of impacts in project design.</p> <p>BDAR methodology.</p> <p>Category 1 and 2 land.</p>
Upper Lachlan Shire Council	April 2023	Project Briefing Meeting	<p>Key discussion:</p> <ul style="list-style-type: none"> • Community engagement. • Voluntary Planning agreement and community benefit schemes. • Impact to biodiversity.
Goulburn Mulwaree Council	February 2023	Project Briefing Meeting	<p>Discussion focused on the transport route which predominately sites within the Goulburn Mulwaree Council LGA.</p> <p>Council is currently reviewing the local roads strategy with considers the transport route relevant to the Project.</p> <p>Council indicated a number of proponents have contacted Council in relation to potential renewable development projects in the region.</p> <p>Spark Renewables will continue to consult with Council through the preparation of the transport and traffic assessment and route analysis including discussion with Councils traffic engineers.</p>
Wingecarribee Shire Council	May 2023	Project Briefing	General Project Briefing.
NSW Minister for Goulburn Office (Wendy Tuckerman)	February 2023	Project Briefing Meeting	<p>Council and community engagement.</p> <p>Recent community concern and complaint in relation to wind farms and issues with aviation and lighting.</p>

Agency	Date	Mechanism	Key points
Rural Fire Service (RFS) – Marulan	April 2023	Project Briefing Meeting	Project Briefing Meeting – RFS advised all RFS agencies in the area (known as Group 6) will require familiarisation with the Project and site should the Project be approved.
Rural Fire Service (RFS) – Big Hill	March 2023	Email and Phone correspondence	Project briefing, advised required consultation across all RFS areas.

Consultation with agencies and elected officials to date has been primarily to commence engagement, introduce the Project and key Project team members.

As outlined in **Section 2.2**, the Project Area is situated entirely within the Upper Lachlan Shire LGA, however it is also in close proximity to the Goulburn Mulwaree and Wingecarribee LGAs. Consultation with these Councils has occurred with briefings provided by Spark and council personnel also attending the community drop in sessions.

Consultation with State Government Agencies to date includes DPE and BCE only, all relevant Government Agencies will be consulted throughout the assessment process, in accordance with the SEARs for the Project and the Engagement Guidelines (DPIE, 2021g).

5.4 Preliminary Visual Consultation

A key component of the Scoping phase consultation conducted for the Project was gaining an understanding of community opinions and views regarding visual and landscape values. Consultation with proximal neighbours included targeted questions relating to visual aspects of the development. To avoid known issues with consultation fatigue these questions were incorporated into the broader community and stakeholder engagement that occurred for the Project.

In summary, the format of this visual consultation included an online survey where participants were asked targeted questions relating to visual and landscape features, including:

What are the landscape characteristics of your local area that make it distinct? What words would you use to describe how this place looks and feels to a friend?

What are the best lookouts/ public viewing areas in the area? If you have a visitor, where do you take them to showcase your local area?

Are there any areas or landscape features surrounding or within the proposed Project site that are of significant value to yourself, your business, or your community?

Are there things Spark Renewables could do to reduce the visual impact of the project to make it more visually appealing?

Attendees at both the information session and the Canyonleigh community meeting raised concerns around visual impacts associated with the no longer proposed windfarm component and some aspects of the proposed solar farm. There was minimal concern raised for the Project specifically however, as the BESS is proposed to be located in the vicinity of the proposed solar farm footprint, consideration to visual impacts from the solar and BESS components will be considered concurrently.

When asked to consider approaches that Spark Renewables could take to reduce the visual impact of the Project, one stakeholder suggested the use of landscaping as a visual screen.

There were nineteen (19) online surveys completed at the time of preparation of this report. Additional methods for broader community engagement as described in **Section 5.2.1**. The verbatim responses to the general visual questions are outlined in **Table 5.5** below.

Ongoing consultation on these matters will occur during the EIS and incorporated into the detailed Landscape Visual Impact Assessment (LVIA) that is to be prepared in accordance with the requirements of the Visual Bulletin. This ongoing consultation represents the first step in the detailed LVIA process which relates to the preparation of visual baseline study inputs, including consulting the community on aspects of the baseline study. The detailed LVIA is a key component of the EIS, as described further in **Section 6.2.4** below.

Table 5.5 Themes of Responses to General Visual Questions

Question	Theme of Answers	Quotes of Response
<p>What are the landscape characteristics of your local area that make it distinct? What words would you use to describe how this place looks and feels to a friend?</p>	<ul style="list-style-type: none"> • Natural Landscapes. • Countryside Vistas. • Low levels of Development. 	<ul style="list-style-type: none"> • Peaceful, unspoilt, pristine, quiet, environmentally beautiful, full of precious and rare flora and fauna. • Beautiful rolling countryside with outstanding views. Abundant local flora and fauna. Stunning escapements and wonderful bushwalks. • Untouched natural Australian flora and fauna with beautiful birdlife and native animals. • The most magnificent views, offering far reaching and uninterrupted vistas to the west and south/south west, for as far as you can see.
<p>What are the best lookouts/ public viewing areas in the area? If you have a visitor, where do you take them to showcase your local area?</p>	<ul style="list-style-type: none"> • Private residential views. • Natural lookouts. 	<ul style="list-style-type: none"> • Straight out our back doors or windows. • The Guula Ngurra National Park is spectacular. • Mount Penang walk. • Baldy Billy (which looks across to Big Hill).
<p>Are there any areas or landscape features surrounding or within the proposed Project site that are of significant value to yourself, your business, or your community?</p>	<ul style="list-style-type: none"> • Untouched fields. • Open vistas. 	<ul style="list-style-type: none"> • The open hills and sky. • The views are very important and valuable financially, mentally, and physically. • Gibraltar Rocks. • Open fields, mountains.

6.0 Proposed Assessment of Impacts

6.1 Key Environmental, Social and Economic Matters

A review of the environmental, social, and economic matters relevant to the Project have been conducted to determine which issues need to be assessed as part of the EIS and the level of assessment that is required. This review has been undertaken with reference to the categories of assessment matters identified in the SSD Scoping Report Guideline (DPIE, 2021b), with the key issues and the proposed level and scope of assessments discussed in the following sections.

The environmental and social matters relevant to the Project are identified and have been characterised (in accordance with the SSD Scoping Report Guideline) as follows:

- matters requiring further assessment in the EIS (refer to **Section 6.2**)
- matters requiring no further assessment in the EIS (refer to **Section 6.3**).

For the matters requiring further assessment in the EIS, **Section 6.2** identifies whether detailed or standard assessment is required (as defined by Appendix D of SSD Scoping Report Guideline). **Appendix 1** presents a Scoping Summary Table showing the outcome of the scoping stage review of matters as required under the SSD Scoping Report Guidelines.

6.2 Matters Requiring Further Assessment in the EIS

The environmental, social, and economic matters discussed in this section have been identified as key issues requiring further assessment as part of the EIS to fully understand the potential impacts and identify project-specific mitigation measures and/or alternatives.

6.2.1 Amenity – Noise and Vibration

A Preliminary Noise Impact Assessment (PNIA) has been undertaken by Marshall Day Acoustics Pty Ltd (Marshall Day) to support this Scoping Report. The results of the PNIA are summarised below, with the full report provided in **Appendix 3**.

6.2.1.1 Noise and Vibration Impact Assessment Methodology

Detailed information with respect to Project design and operation has not yet been developed by Spark Renewables at this stage. For the purposes of demonstrating acoustic feasibility of the Project, a conceptual BESS layout was prepared by Spark Renewables, which included the two proposed BESS Sites and all associated infrastructure proposed at this stage. Based on these conceptual layout designs, a preliminary environmental noise assessment was prepared, which considered:

- Sound power levels for representative equipment such as inverters, battery packs and transformers.
- Project noise trigger levels developed per the NSW EPA *Noise Policy for Industry* (Npfi) (EPA, 2017) procedures.
- Noise modelling of each investigation area and the surrounding environment, implementing the method described in ISO 9613.

6.2.1.2 Potential Noise and Vibration Impacts

Minimum background noise levels and associated noise limits were adopted as per the procedures detailed in the Npfl, in the absence of background noise levels. As the Project is proposed to be operated over a 24-hr period, the predicted noise levels have been compared to the more stringent evening and night period project noise trigger level of 35 Laeq, 15min dB for an assessment of compliance.

The results of the PNIA as summarised in **Table 6.1** below indicate that predicted noise levels associated with BESS Site A comply with the evening and night-time project noise trigger levels at all relevant noise sensitive receivers. Predicted noise levels associated with BESS Site B are below the evening and night-time project noise trigger levels at all relevant noise sensitive receivers, with the exception of R079.

Predicted noise level contours for each BESS Site are shown in **Figure 6.1** and **Figure 6.2**.

Table 6.1 Noise Sensitive Receptors and Predicted Noise Levels

Receiver ID	Approximate distance to BESS Site A (km)	Approximate distance to BESS Site B (km)	Predicted noise level at BESS Site A (dB Laeq, 15 min)	Predicted noise level at BESS Site B (dB Laeq, 15 min)
R0011	1.6	1.8	35	31
R003	3.5	1.7	23	31
R004	4.6	2.4	19	29
R008	2.3	3.1	27	26
R010	2.9	3.9	25	23
R040	4.5	2.9	19	24
R041	4.6	2.8	19	25
R042	4.2	2.3	21	29
R043	4.4	2.3	20	29
R0791	1.7	1.1	33	38
R270	2.4	2.6	27	28
R271	2.3	2.8	27	27

¹ Host landowner dwellings.

It is noted that receivers R001 and R079 are located within the Project Area. The properties are understood to be used infrequently as temporary accommodation by research staff and students of UoS. On this basis these receivers are specially identified as being related to the Project landowner, and are considered as Host landowner dwellings. On the basis that R079 is a Host landowner dwelling it is expected that the relationship between noise from the Project and these Project landowner properties may be managed internally by UoS and Spark Renewables.

It is noted that the outcomes of the PNIA are specific to the conceptual Project designs currently available, including equipment positions, selections, and associated noise data, and that further detailed assessment and consideration of reasonable and feasible noise mitigation measures will still be required to support the DA for the Project.

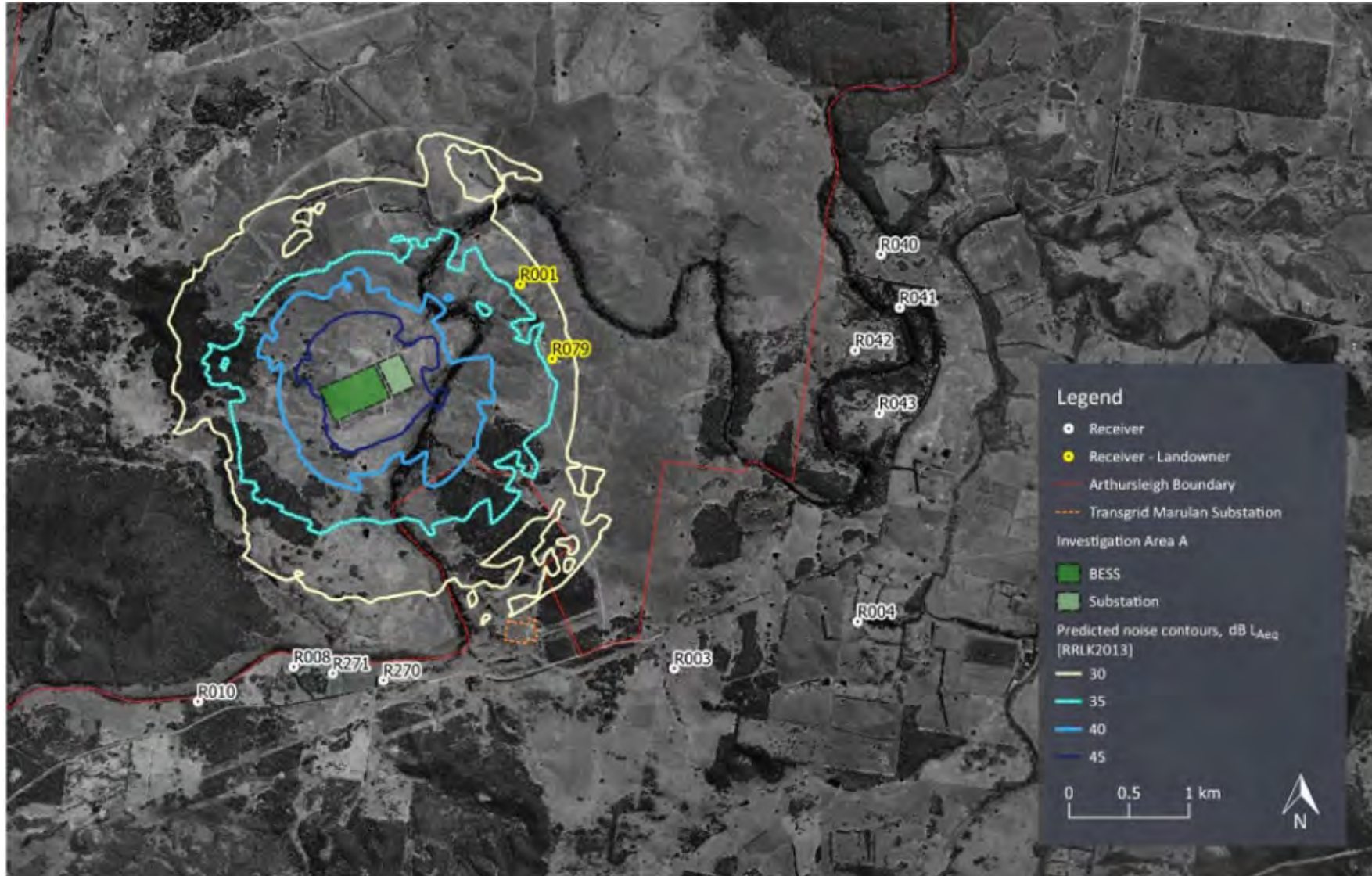


Figure 6.1 Predicted Noise Level Contour at BESS Site A

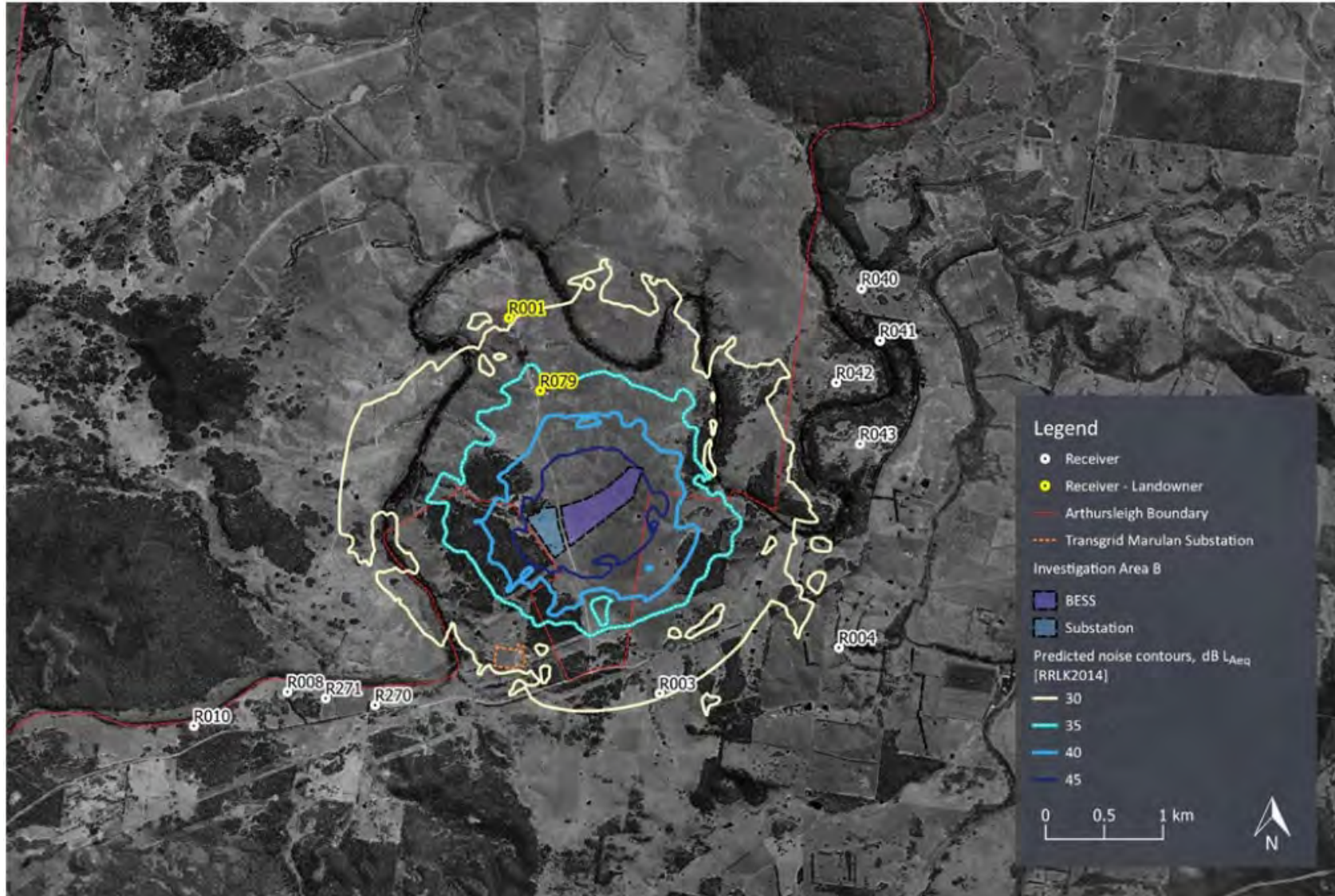


Figure 6.2 Predicted Noise Level Contour at BESS Site B

6.2.1.3 Further Assessment of Noise and Vibration Impacts

The potential noise and vibration impact of the construction and operation of the Project on nearby sensitive receivers would be further considered as part of a detailed Noise and Vibration Impact Assessment (NVIA), prepared to support the EIS for the Project. The NVIA will be prepared in accordance with the NPfI, the Interim Construction Noise Guideline (DECC, 2009), the NSW Road Noise Policy (DECCW, 2011) and Assessment Vibration: A Technical Guideline (DECC, 2006). The NVIA will:

- establish the relevant level of background noise
- provide predictive noise modelling of the Project's construction and operational activities
- assess the road traffic noise during construction and operational activities
- assess any vibration impacts at sensitive receivers
- identify any reasonable and feasible mitigation and management measures.

Reasonable and feasible mitigation and management measures for noise will be considered as part of the NVIA process and may include, but will not necessarily be limited to:

- Application of noise control packages to the proposed inverters to provide additional noise mitigation performance (specifically at R079).
- Fixed construction noise sources such as concrete batching plant, generators and compressors being located at the maximum practicable distance to the nearest non-associated dwellings, where practicable.
- Investigate alternative construction processes where feasible and reasonable to reduce noise.
- Implement a Construction Environmental Management Plan (CEMP), including regular updates to the local community.
- Entering into negotiated agreements with impacted landholders, as required.

6.2.2 Biodiversity

A Biodiversity Constraints Assessment (BCA) Report was prepared to understand potential biodiversity constraints that may be present across the Project Area, and includes recommendations for further consideration and assessment during preparation of the EIS. Any features of the BCA relevant to the proposed BESS sites have been summarised below. Although the BCA was not prepared specifically for the proposed BESS sites, it has been included in **Appendix 4** to support this Scoping Report.

Two rounds of surveys have currently been completed to inform the biodiversity constraints across the Project Area, including a preliminary desktop search undertaken by Arcadis in March 2021 (Arcadis, 2021), as well as a nine-day site visit undertaken by Umwelt in September 2022. These surveys included general habitat assessments, Plant Community Type (PCT) data collection and vegetation mapping. Additional field survey effort is continuing throughout the design of the Project to ensure threatened species survey requirements are continuing to be met, in line with the NSW BAM requirements.

6.2.2.1 Desktop Searches

A review of relevant public databases and literature was undertaken as part of the BCA to identify threatened and migratory species, endangered populations, TECs and their habitats that have previously been recorded within the locality (i.e. a 10 km radius around the Project Area). Threatened species, migratory species, endangered populations and TECs (listed under the BC Act and EPBC Act) that have the potential to occur within the locality were also considered based on the type of habitat present and the NSW bioregion within which the Project area occurs.

Databases and literature reviewed as part of this ecological assessment include:

- a search of the DPE BioNet Atlas based on a 10 km radius around the Project Area
- a search of the DCCEEW Protected Matters Search Tool (PMST) based on a 10 km radius around the Project Area
- BioNet Threatened Biodiversity Data Collection (TBDC)
- BioNet Vegetation Classification
- the Biodiversity Values Map Threshold Tool (BVMTT)
- DPE’s Important Habitat Mapping.

Desktop searches identified six TECs with a moderate or higher likelihood of occurring within a 10 km radius of the Project Area. Within the BESS Development Corridor, three of the six TECs have a moderate to high likelihood of occurring. The TECs identified in the desktop assessment as potentially occurring within the Development Corridor are detailed in **Table 6.2** and shown in **Figure 6.4**.

Table 6.2 Threatened Ecological Communities Potentially Occurring in the Project Area

Threatened Ecological Community	Status – BC Act	Status – EPBC Act	Area (Ha)	Likelihood of Occurrence
Natural Temperate Grassland of the South Eastern Highlands.	Not Listed	Critically Endangered	2.79	Moderate
White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	Critically Endangered	Not Listed	130.38	High
White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland.	Not Listed	Critically Endangered	130.38	High

6.2.2.2 Continued Survey Effort Undertaken to Date

Seasonal field surveys commenced for the Project in October 2022 in accordance with NSW BAM survey requirements, and are ongoing throughout the design of the Project into the EIS phase. A summary of the field effort conducted to date is provided in **Table 6.3** below.

Table 6.3 Survey Effort Conducted to Date

Survey Period	Surveys Conducted	Duration and Survey Effort
Spring 2022	Bird and bat utilisation surveys (BBUS) ¹	Two (2) weeks with two (2) ecologists throughout the Spring period.
	Spring threatened flora	One (1) week with two (2) ecologists.
Summer 2022	BBUS1	One (1) week with two (2) ecologists.
	Summer threatened fauna	One (1) week with two (2) ecologists.
	Summer threatened flora	One (1) week with three (3) ecologists.
Winter 2023	Winter fauna surveys	One (1) week with two (2) ecologists.

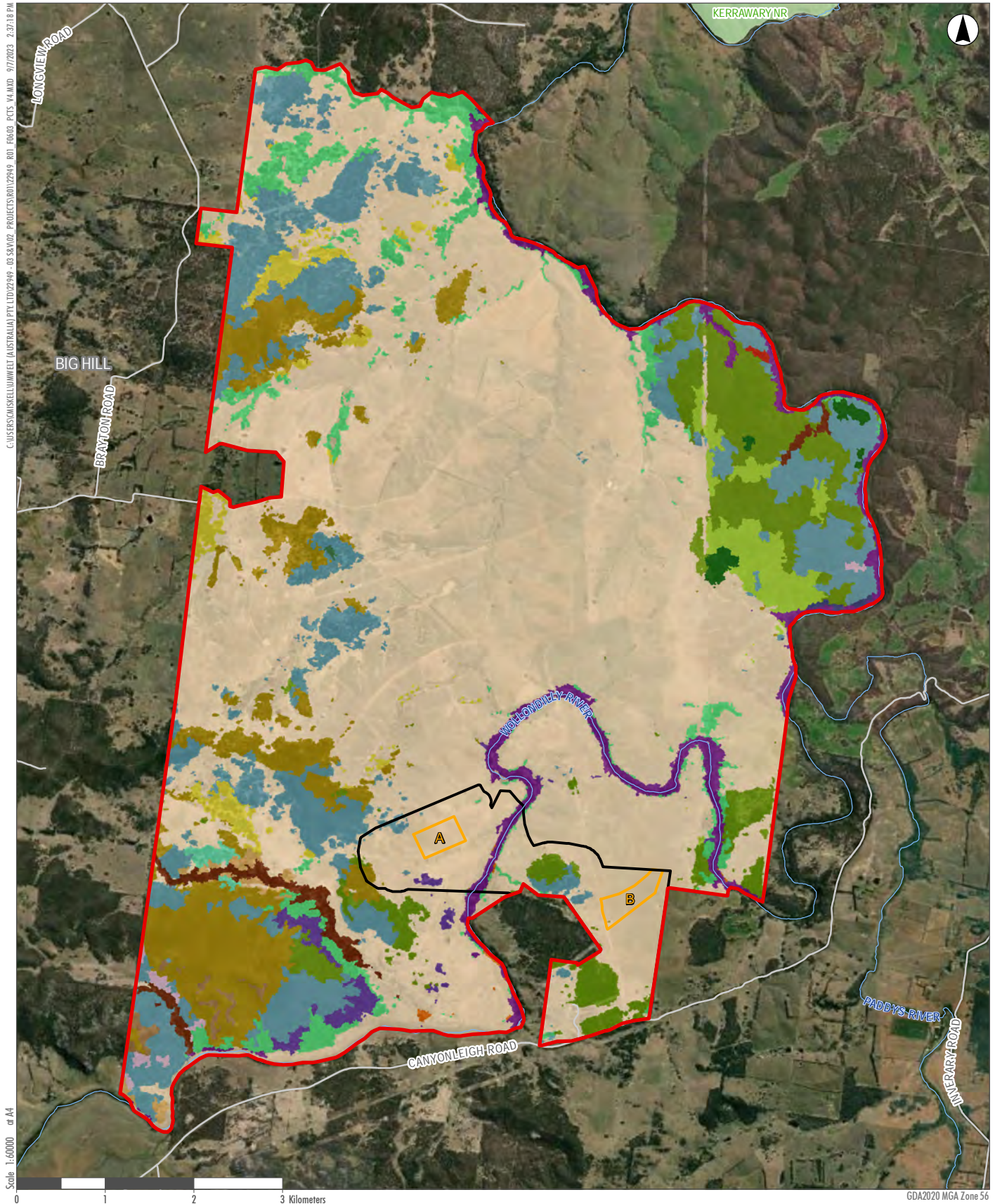
¹ During these survey periods, the wind farm component of the Wattle Creek Energy Hub was still proposed.

6.2.2.3 Preliminary Vegetation Mapping

A preliminary vegetation map of the Project Area has been prepared utilising the available regional vegetation mapping (Western SVTM) (DPIE, 2016b) (refer to **Figure 6.3**), which provides valuable information at the landscape scale of the PCTs and associated TECs in the Project Area.

A total of 20 native PCTs have been mapped across the Project Area. Rapid site assessments carried out during the site visit confirmed that the majority of the grassland present within the Project Area is dominated by exotic species, however, areas of natural or derived native grassland may be present. The woody vegetation is predominantly comprised of grassy woodland communities, with smaller patches of shrubby open forest and riparian forests along the waterways. It should be noted that this mapping is preliminary and would require further surveys as part of any biodiversity assessment carried out in the EIS.

Potential TECs listed under the BC Act and EPBC Act are shown on **Figure 6.4**. As stated, Umwelt identified six TECs with a moderate or higher likelihood of occurring within a 10 km radius of the Project Area, with three with a moderate or higher likelihood of occurring within the Development Corridor. Further surveys and data analysis will be completed to confirm if the vegetation meet the final determination of TECs under the BC Act and/or EPBC Act.



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Legend

- Project Area
- Development Corridor
- BESS Site Option
- NPWS Estate
- Roads
- Watercourses

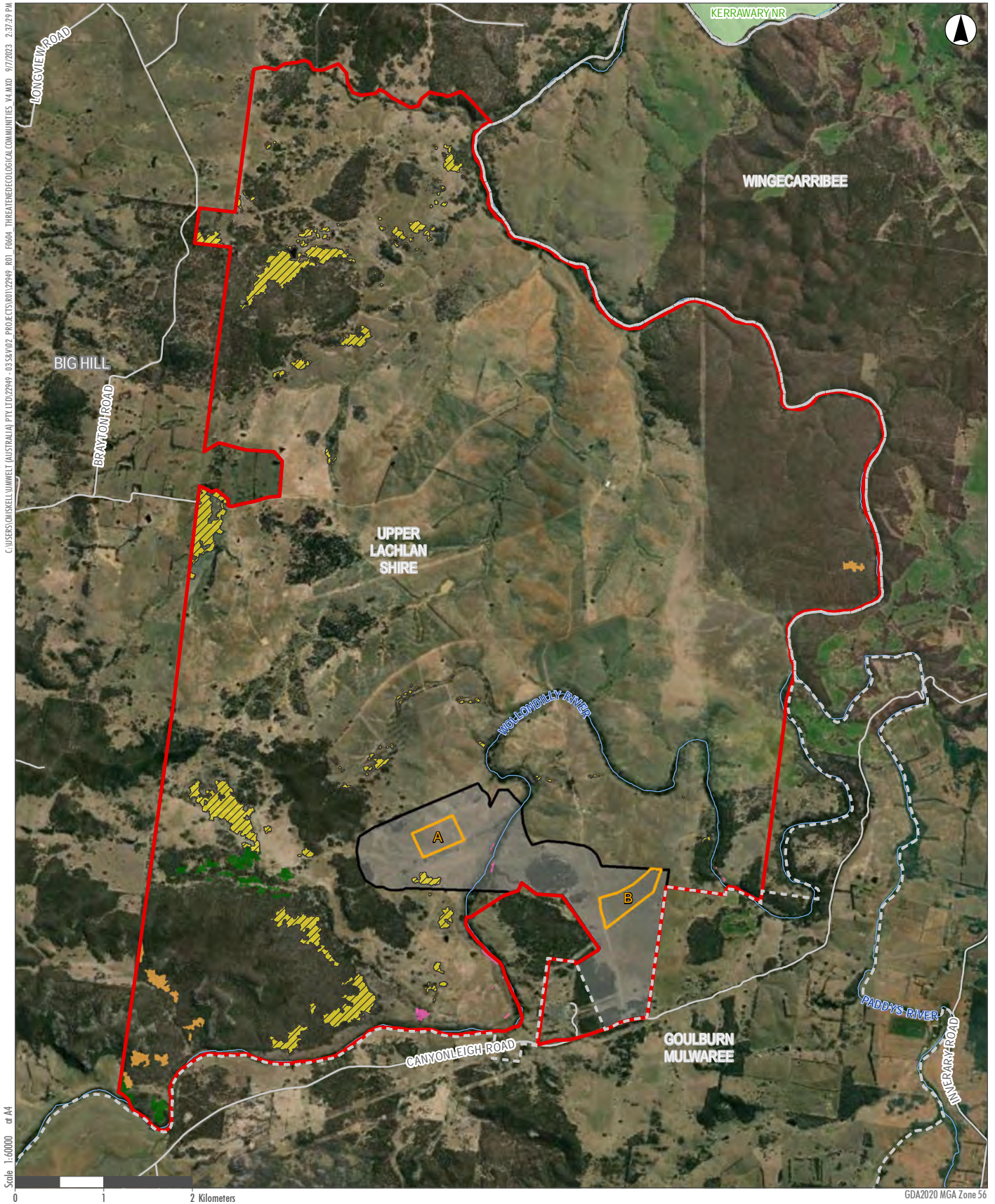
Plant Community Type

- | | |
|--|---|
| <ul style="list-style-type: none"> PCT : 0, Not native vegetation PCT : 3037, Sydney Basin Warm Temperate Rainforest PCT : 3110, Greater Sydney Enriched Grey Myrtle Dry Rainforest PCT : 3303, Central Tableland Ribbon Gum Sheltered Forest PCT : 3338, Goulburn Tableland Frost Hollow Grassy Woodland PCT : 3347, Southern Tableland Creekflat Ribbon Gum Forest PCT : 3348, Southern Tableland Granites Ribbon Gum Grassy Forest PCT : 3373, Goulburn Tableland Box-Gum Grassy Forest PCT : 3376, Southern Tableland Grassy Box Woodland PCT : 3416, Southern Tableland Valley Flats Damp Grassland | <ul style="list-style-type: none"> PCT : 3481, Burrigorang Gorges Felcic Stringybark Forest PCT : 3483, Central Gorges Box-Red Gum Grassy Forest PCT : 3486, Wollombilly-Shoalhaven Slopes Grassy Open Forest PCT : 3492, Wollombilly-Shoalhaven Quartz Hills Forest PCT : 3498, Wingecaribee Gorges Stringybark-Grey Gum Forest PCT : 3643, Bungonia Tableland Silvertop Ash-Stringybark Forest PCT : 3737, Bungonia Tableland Scribbly Gum Shrub Forest PCT : 3738, Goulburn-Lithgow Tableland Hills Grassy Forest PCT : 3746, Southern Tableland Snow Gum-Candlebark Shrub Forest PCT : 3869, Southern Escarpment Montane Heath PCT : 4063, Central and Southern Tableland River Oak Forest |
|--|---|

FIGURE 6.3

Plant Community Types within the Project Area

Image Source: ESRI Basemap 2020 Data source: NSW DFSI(2020)



Legend

- Project Area
 - Development Corridor
 - BESS Site Option
 - Local Government Area
 - NPWS Estate
 - Roads
 - Watercourses
-
- BC Act Threatened Ecological Communities**
- Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregion,
 - Mt Canobolas Xanthoparmelia Lichen Community
 - Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South Eastern C
 - White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW..
- EPBC Act Threatened Ecological Communities**
- Natural Temperate Grassland of the South Eastern Highlands
 - White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland

FIGURE 6.4

Threatened Ecological Communities within the Project Area

6.2.2.4 Threatened Species

The NSW BioNet Wildlife Atlas search and Commonwealth PMST search identified records for 37 threatened flora species within a 10 km radius of the Project Area. Of these, 22 threatened flora species are assessed as having a moderate or higher likelihood of occurrence in the Project Area, as identified in below. These species were also assessed based on the potential serious and irreversible impacts (SAII) under section 6.5 of the BC Act.

Table 6.4 Threatened Flora Species Potentially Occurring in the Project Area

Scientific Name	Common Name	BC Act	EPBC Act	Entity with the potential for SAII	Likelihood of occurrence
1 <i>Acacia bynoeana</i>	Bynoe's Wattle, Tiny Wattle	Endangered	Vulnerable	No	Moderate
2 <i>Baloskion longipes</i>	Dense Cord-rush	Vulnerable	Vulnerable	No	Moderate
3 <i>Bossiaea oligosperma</i>	Few-seeded Bossiaea	Vulnerable	Vulnerable	No	Low
4 <i>Caladenia tessellata</i>	Thick-lipped Spider-orchid, Daddy Long-legs	Endangered	Vulnerable	Yes	Moderate
5 <i>Commersonia prostrata</i>	Dwarf Kerrawang	Endangered	Endangered	No	Moderate
6 <i>Dodonaea procumbens</i>	Trailing Hop-bush	Vulnerable	Vulnerable	No	Low
7 <i>Diuris aequalis</i>	Buttercup Doubletail	Vulnerable	Vulnerable	No	Moderate
8 <i>Diuris tricolor</i>	Pine Donkey Orchid	Not Listed	Not Listed	No	Moderate
9 <i>Eucalyptus aggregata</i>	Black Gum	Vulnerable	Vulnerable	No	Moderate
10 <i>Eucalyptus aquatica</i>	Mountain Swamp Gum, Broad-leaved Sallee, Broad-leaved Sally	Vulnerable	Vulnerable	Yes	Moderate
11 <i>Eucalyptus macarthurii</i>	Camden Woollybutt, Paddys River Box	Endangered	Endangered	No	Moderate
12 <i>Genoplesium baueri</i>	Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid	Endangered	Endangered	Yes	Low
13 <i>Gentiana wingecarribiensis</i>	Wingecarribee Gentian	Critically Endangered	Endangered	Yes	Moderate
14 <i>Grevillea molyneuxii</i>	Wingello Grevillea	Vulnerable	Endangered	Yes	Low
15 <i>Grevillea raybrownii</i>	-	Vulnerable	Not listed	No	Moderate
16 <i>Haloragis exalata subsp exalata</i>	Wingless raspwort	Vulnerable	Vulnerable	No	Low
17 <i>Helichrysum calvertianum</i>	-	Vulnerable	Not listed	No	Moderate

Scientific Name	Common Name	BC Act	EPBC Act	Entity with the potential for SAI	Likelihood of occurrence	
18	<i>Kunzea cambagei</i>	-	Vulnerable	Vulnerable	No	Moderate
19	<i>Leucochrysum albicans subsp. tricolor</i>	Hoary Sunray, Grassland Paper-daisy	Not listed	Endangered	No	Moderate
20	<i>Persicaria elatior</i>	Knotweed, Tall Knotweed	Vulnerable	Vulnerable	No	Moderate
21	<i>Persoonia hirsuta</i>	Hairy geebung	Endangered	Endangered	Yes	Low
22	<i>Persoonia mollis subsp. revoluta</i>	null	Vulnerable	Not listed	No	Moderate
23	<i>Persoonia oxycoccoides</i>	-	Endangered	Endangered	No	Low
24	<i>Phyllota humifusa</i>	Dwarf Phyllota	Vulnerable	Vulnerable	No	Moderate
25	<i>Pomaderris brunnea</i>	Rufous Pomaderris, Brown Pomaderris	Endangered	Vulnerable	No	Moderate
26	<i>Pomaderris cotoneaster</i>	Cotoneaster Pomaderris	Endangered	Endangered	No	Moderate
27	<i>Pomaderris pallida</i>	Pale Pomaderris	Vulnerable	Vulnerable	Yes	Moderate
28	<i>Pultenaea elusa</i>	Elusive bush-pea	Critically Endangered	Endangered	Yes	Low
29	<i>Rhizanthella slateri</i>	Eastern Underground Orchid	Vulnerable	Endangered	Yes	Moderate
30	<i>Rutidosis leptorhynchoides</i>	Button Wrinklewort	Endangered	Endangered	No	Low
31	<i>Solanum armourense</i>	Solanum armourense	Not Listed	Not Listed	Yes	Low
32	<i>Solanum celatum</i>	Solanum celatum	Not Listed	Not Listed	No	Low
33	<i>Swainsona sericea</i>	Silky Swainson-pea	Not Listed	Not Listed	No	Low
34	<i>Thelymitra kangaloonica</i>	Kangaloon Sun Orchid	Critically Endangered	Critically Endangered	Yes	Low
35	<i>Thesium australe</i>	Austral Toadflax, Toadflax	Vulnerable	Vulnerable	No	Moderate
36	<i>Xerochrysum palustre</i>	Swamp Everlasting, Swamp Paper Daisy	Not listed	Vulnerable	No	Low
37	<i>Zieria murphyi</i>	Velvet Zieria	Vulnerable	Vulnerable	No	Low

The NSW BioNet Wildlife Atlas search and Commonwealth PMST search identified records for 48 threatened fauna species within a 10 km radius of the Project Area. Of these, one threatened reptile species, one insect species, 12 mammal species and 17 threatened bird species are assessed as having a moderate or higher likelihood of occurrence in the Project Area, as identified in **Table 6.5** below.

Threatened fauna species observed during field surveys have also been recorded in the table below. These species were also assessed based on the potential SAIL under section 6.5 of the BC Act.

Table 6.5 Threatened Fauna Species Potentially Occurring in the Project Area

Scientific Name	Common Name	BC Act	EPBC Act	Entity with the potential for SAIL	Likelihood of occurrence	
Amphibians						
1	<i>Heleioporus australiacus</i>	Giant burrowing frog	Vulnerable	Vulnerable	No	Moderate
2	<i>Litoria watsoni</i>	Watson's Tree Frog	Not listed	Endangered	No	Low
Birds						
3	<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered	Critically Endangered	Yes	Moderate
4	<i>Aphelocephala leucopsis</i>	Southern whiteface	Not Listed	Vulnerable	No	Low
5	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	Vulnerable	Not listed	No	Recorded
6	<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered	Endangered	No	Low
7	<i>Calidris ferruginea</i>	Curlew Sandpiper	Endangered	Critically Endangered	No	Low
8	<i>Collocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable	Endangered	No	Recorded
9	<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	Vulnerable	Vulnerable	No	Moderate
10	<i>Chthonicola sagittata</i>	Speckled Warbler	Vulnerable	Not listed	No	Moderate
11	<i>Climacteris picumnus victoriae</i>	Brown treecreeper (south-eastern)	Vulnerable	Vulnerable	No	Moderate
12	<i>Daphoenositta chrysoptera</i>	Varied Sittella	Vulnerable	Not listed	No	Recorded
13	<i>Falco hypoleucos</i>	Grey Falcon	Endangered	Vulnerable	No	Moderate
14	<i>Falco subniger</i>	Black Falcon	Vulnerable	Not listed	No	Moderate
15	<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable	Vulnerable	No	Moderate
16	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Vulnerable	Not listed	No	Moderate
17	<i>Hieraaetus morphnoides</i>	Little Eagle	Vulnerable	Not listed	No	Moderate
18	<i>Hirundapus caudacutus</i>	White-throated Needletail	Not listed	Vulnerable	No	Moderate

	Scientific Name	Common Name	BC Act	EPBC Act	Entity with the potential for SAIL	Likelihood of occurrence
19	<i>Lathamus discolor</i>	Swift Parrot	Endangered	Critically Endangered	Yes	Moderate
20	<i>Melodryas cucullata cucullata</i>	South-eastern hooded robin	Not listed	Endangered	No	Low
21	<i>Neophema chrysostoma</i>	Blue-winged parrot	Vulnerable	Vulnerable	No	Low
22	<i>Ninox strenua</i>	Powerful Owl	Vulnerable	Not listed	No	Moderate
23	<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Not listed	Critically Endangered	Yes	Low
24	<i>Petroica boodang</i>	Scarlet Robin	Vulnerable	Not listed	No	Moderate
25	<i>Petroica phoenicea</i>	Flame Robin	Vulnerable	Not listed	No	Moderate
26	<i>Polytelis swainsonii</i>	Superb Parrot	Vulnerable	Vulnerable	No	Low
27	<i>Pycnoptilus floccosus</i>	Pilotbird	Not listed	Vulnerable	No	Low
28	<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Endangered	No	Low
29	<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable	Vulnerable	No	Moderate
Fish						
30	<i>Macquaria australasica</i>	Macquarie Perch	Not listed	Endangered	No	Low
31	<i>Prototroctes maraena</i>	Australian grayling	Not listed	Vulnerable	No	Low
Mammals						
32	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Vulnerable	Yes	Moderate
33	<i>Dasyurus maculatus maculatus (SE mainland population)</i>	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Vulnerable	Endangered	No	Moderate
34	<i>Miniopterus australis</i>	Little Bent-winged Bat	Vulnerable	Not listed	Yes	Moderate
35	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Vulnerable	Not listed	Yes	Moderate
36	<i>Myotis macropus</i>	Southern Myotis	Vulnerable	Not listed	No	Moderate
37	<i>Petauroides volans</i>	Greater Glider (southern and central)	Not listed	Vulnerable	No	Moderate

Scientific Name	Common Name	BC Act	EPBC Act	Entity with the potential for SAIL	Likelihood of occurrence
38 <i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	Vulnerable	Not listed	No	Moderate
39 <i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	Endangered	Vulnerable	Yes	Moderate
40 <i>Phascolarctos cinereus</i>	Koala	Endangered	Endangered	No	Moderate
41 <i>Pseudomys novaehollandiae</i>	New Holland Mouse, Pookila	Not listed	Vulnerable	No	Low
42 <i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable	No	Moderate
43 <i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Vulnerable	Not listed	No	Moderate
44 <i>Petaurus norfolcensis</i>	Squirrel Glider	Vulnerable	Not listed	No	Recorded
Reptiles					
45 <i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	Vulnerable	Vulnerable	No	Moderate
46 <i>Delma impar</i>	Striped Legless Lizard, Striped Snake-lizard	Vulnerable	Vulnerable	No	Low
47 <i>Hoplocephalus bungaroides</i>	Broad-headed snake	Endangered	Vulnerable	Yes	Low
Insect					
48 <i>Keyacris scurra</i>	Key's matchstick grasshopper	Endangered	Endangered	No	Moderate

6.2.2.5 Matters of National Environmental Significance

A search of the Commonwealth PMST was undertaken on 1 September 2023. The search included a 10 km buffer from the Project Area. The PMST identified threatened ecological communities, and threatened species and migratory species which may occur within 10 km of the Project Area, and subsequently within the BESS Development Corridor. Surveys to determine the presence and likelihood of impacts to MNES would be undertaken during the preparation of the EIS.

6.2.2.6 Potential Impacts

The BAM requires the assessment of discrete types of impacts on biodiversity values resulting from proposed development during both construction and operational phases. The types of impacts requiring assessment are as follows:

- **Direct impacts:** impacts on biodiversity values and threatened species habitat that relate to clearing native vegetation and impacts on biodiversity values prescribed by the BC Regulation.
- **Indirect impacts:** impacts that occur when the proposal affects native vegetation and threatened species habitat beyond the development footprint or within retained areas (e.g. transporting weeds or pathogens, dumping rubbish).
- **Prescribed impacts:** means the prescribed impacts identified in clause 6.1 of the BC Regulation. Prescribed impacts can be direct or indirect impacts.
- **SAIL:** impacts likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct in accordance with the principles set out in clause 6.7(2) of the BC Regulation.

Project design has sought to minimise native vegetation clearing by utilising historically cleared areas that are presently subject to cropping and considered to be Category 1 – Exempt Land with minimal ecological value, as far as practicable. Disturbance activities associated with the Project have the potential to impact on biodiversity values through the removal of vegetation and associated fauna habitat. The survey effort proposed provides for survey of the entire Development Corridor in order to provide for flexibility in design and refinement during the preparation of the EIS to further avoid and minimise impacts to biodiversity.

Based on the nature of the Project and the biodiversity constraints of the Project Area, the potential impacts to biodiversity associated with the Project that will be assessed in the BDAR are outlined in **Table 6.6** below.

Table 6.6 Potential Biodiversity Impacts Requiring Further Assessment

Impact Type	Potential Impact	Description of potentially impacting process
Direct impact	Removal of native vegetation	<ul style="list-style-type: none"> • The Project may result in the removal of native vegetation, which may include TECs listed under both the BC Act and EPBC Act. Vegetation removal that may be required for the proposed works would likely contribute to further fragmentation of native vegetation communities within the locality. • Hollow-bearing trees provide habitat for threatened species such as forest owls, woodland and forest birds and microbats, which may occur within the Project Area. As such, the Project has the potential to remove these tree hollows impacting on threatened species that may utilise them as habitat. • Construction of the Project may clear logs and debris used by threatened flora and fauna species predicted to occur within the Project Area.
	Removal of threatened species and their habitat	
	Fauna mortality	
Indirect impact	Inadvertent impacts on adjacent habitat or vegetation	<ul style="list-style-type: none"> • Inadvertent disturbance to native vegetation and threatened species habitat may occur during construction and operational phases of the Project.
	Reduced viability of adjacent habitat due to edge effects	

Impact Type	Potential Impact	Description of potentially impacting process
	Reduced viability of adjacent habitat due to noise, dust, or light spill	<ul style="list-style-type: none"> Priority weeds are likely to occur in parts of the Project Area. Continued weed invasion and encroachment could have potentially severe consequences for the habitat of flora and fauna occurring in the area. Potential sediment, nutrient and pollutant run-off into adjacent vegetation and fauna habitat. Noise and vibration disturbances to fauna. Fire mitigation strategies may result in changes to fire regime across the Project Area.
	Transport of weeds and pathogens from the site to adjacent vegetation	
	Changed fire regimes	
Prescribed impacts	Impacts to water bodies, water quality and hydrological processes	<ul style="list-style-type: none"> The Project may create a barrier to movement across the landscape. The Project may create a barrier to movement longitudinally for some threatened bird species. Increased vehicle movement during construction may increase risk of vehicle strike on ground-dwelling species including protected species such as emus and kangaroos. Construction of the Project may require the removal of natural or man-made waterbodies or could alter subterranean or overland waterflows across the Project Area.
	Impacts to habitat connectivity	
	Impacts from vehicle strike	
SAII	As per examples listed above	<ul style="list-style-type: none"> A number of entities with the potential for SAII could be present within the Project Area. The BAM assessment may require an assessment of SAII on threatened species subject to confirmation through preparation of the BDAR.

6.2.2.7 Further Assessment Proposed

Further detailed biodiversity surveys will be undertaken across the entire development corridor including associated transmission connection and any road upgrade works required, to support the EIS phase for the Project. Following the completion of the surveys, a Biodiversity Development Assessment Report (BDAR) will be prepared. The BDAR will include the assessment of the all aspects of the Project including any associated infrastructure and road works, including:

- GIS mapping.
- Three rounds of seasonal flora and fauna surveys:
 - Spring threatened species surveys.
 - Summer threatened species surveys.
 - Vegetation integrity plot survey.
- Methods and results of vegetation surveys including a vegetation community map (based on PCTs and including TECs).
- Methods and results of surveys targeting species-credit species.

- Assessment of prescribed impacts.
- Outcomes of the calculator assessment identifying the credits generated by the PCTs (and ecosystem credit species) and species-credit species.
- Relevant data and mapping for agency submission including field data, figures and associated GIS files.

6.2.3 Heritage

A Preliminary Heritage Constraints Assessment (PHCA) has been undertaken by Austral Archaeology in accordance with the *National Parks and Wildlife Act 1974* (NPW Act), EPBC Act, *NSW Heritage Act 1977* (Heritage Act), Upper Lachlan LEP 2010, and *Upper Lachlan Development Control Plan 2010* (Upper Lachlan DCP). The PHCA was prepared to assess Aboriginal and historic heritage features that may be present across the Project Area. Any features of the PHCA relevant to the proposed BESS Sites have been summarised below. Although the PHCA was not prepared specifically for the proposed BESS Sites, it has been included in **Appendix 5** to support this Scoping Report.

6.2.3.1 Aboriginal Heritage

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 25 August 2023 (Client service ID: 813144). The search identified 68 Aboriginal archaeological sites within a 10 km search area centred on the Project Area. The results of the AHIMS search are shown in **Figure 6.5** and summarised below:

- Artefacts and PADs are the only archaeological features that have been identified within 10 km of the Project Area.
- Forty-five (45) open artefact sites.
- Fifteen (15) open artefact sites with PAD sites.
- Eight (8) PAD sites.

None of the Aboriginal sites indicated above are present within the proposed BESS Sites, as outlined on **Figure 6.5**.

Although no Aboriginal sites are currently mapped within the proposed BESS Sites, it is possible for additional Aboriginal sites and values to be identified during detailed investigations. As such, it is proposed that a detailed Aboriginal Cultural Heritage Assessment (ACHA) will be undertaken to assess potential for impacts to Aboriginal sites in consultation with the Registered Aboriginal Parties (RAPs) for the Project.

The ACHA will be undertaken in accordance with the following key guidelines:

- The Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011).
- The Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010a).

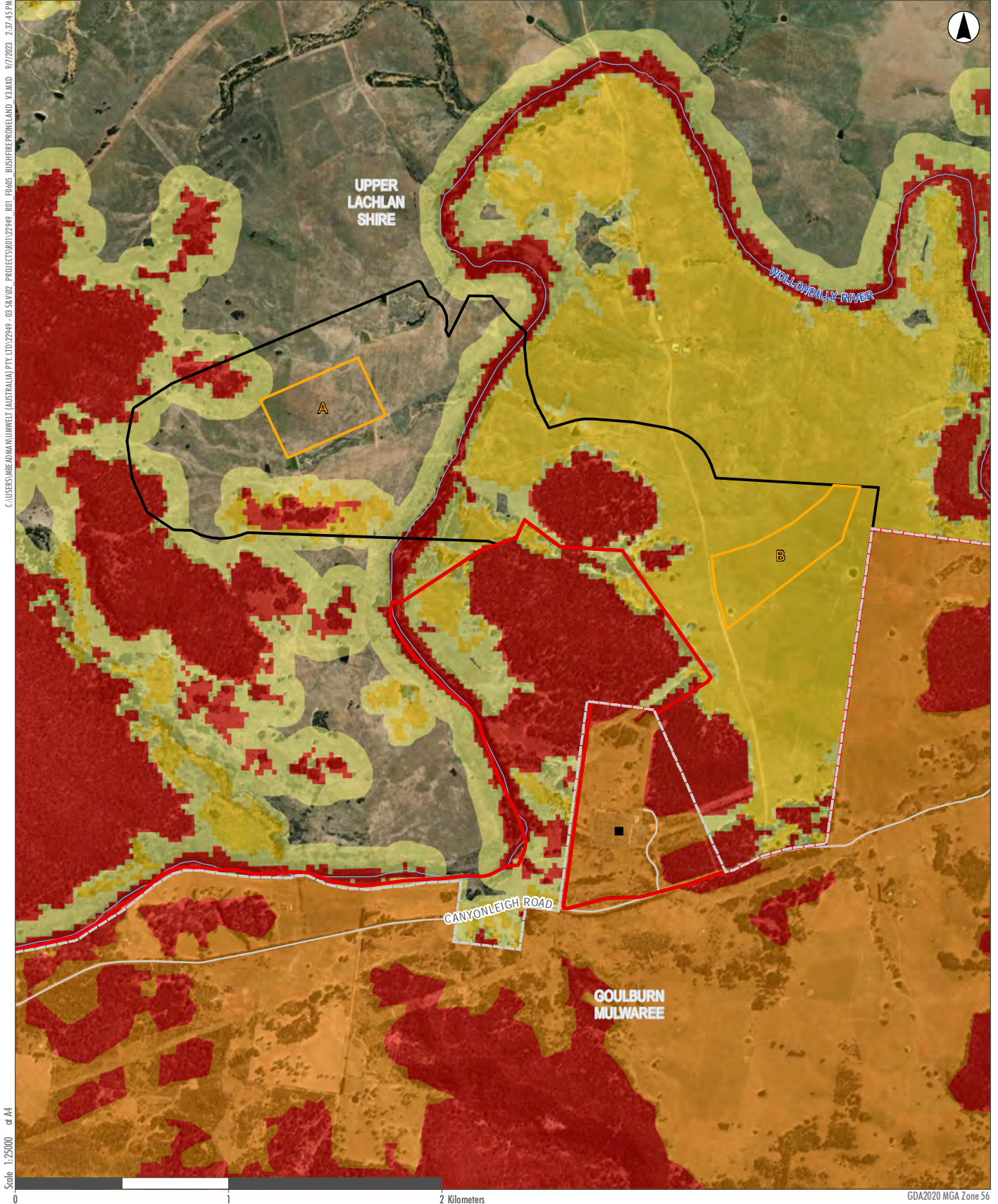
The ACHA will include the assessment of all aspects of the Project including any associated infrastructure and road works and include consultation with the RAPs for the Project in determining and assessing impacts, developing and selecting options and mitigation measures, having regard to the NSW government *Aboriginal Cultural Heritage Consultation Requirements for Proponents* guideline (DECCW, 2010b).

A range of management strategies may be available in relation to the Project that include varying levels of mitigation of identified sites or potential harm to Aboriginal cultural heritage. When impacts to sites or areas of archaeological potential are unavoidable, a strategy will be developed that involves implementing appropriate measures to manage and mitigate these impacts with reference to the archaeological and Aboriginal cultural significance of the sites/areas of potential.

6.2.3.2 Historic Heritage

The Register of the National Estate (RNE) and the State Heritage Register (SHR) were reviewed in August 2023 which did not identify any State listed heritage items, or items listed on the RNE, within the Project Area and proposed BESS Sites. Additionally, there are no heritage items listed on any Section 170 Heritage and Conservation registers, nor on Schedule 5 of the Upper Lachlan LEP.

Despite no registered non-Aboriginal heritage items being located within the Project Area and proposed BESS Sites, the EIS will be supported by a Historical Heritage Assessment (HHA) which will be prepared with regard to the NSW Heritage Manual, relevant Heritage Council of NSW guidelines and with consideration of the principles contained in *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance* (ICOMOS, 2013).



Legend

- | | |
|-----------------------|--------------------------------------|
| Project Area | Bushfire Prone Land - NSW RFS |
| Development Corridor | Vegetation Buffer |
| BESS Site Option | Category 1 Vegetation |
| Local Government Area | Category 2 Vegetation |
| Roads | Category 3 Vegetation |
| Watercourses | |
| Existing Substation | |

FIGURE 6.5

Bushfire Prone Land in relation to the BESS Development Corridor

6.2.4 Amenity – Visual

A Preliminary Visual Impact Assessment (PVIA) was prepared by Moir Landscape Architects (Moir) to understand locations or viewpoints with potential views of the solar farm component of the Wattle Creek Energy Hub, and to assist with the determination of preliminary landscape character zones and the level of detail that may be required to develop a baseline analysis for further assessment during preparation of the EIS. Any features of the PLVIA relevant to the proposed BESS sites have been summarised below. Although the PLVA was not prepared specifically for the proposed BESS sites, it has been included in **Appendix 6** to support this Scoping Report.

6.2.4.1 Existing Landscape and Visual Character

The development is situated in gently undulating terrain. The surrounding land parcels typically include modified land that support agricultural activities such as grazing over modified and native pastures. Hills with patchy vegetation that are predominantly used for grazing are visible to the north, east and west of the Project Area. Community consultation identified Gibraltar Rocks as a key landscape feature. The land encompassed by Gibraltar Rocks is currently categorised as RU2 - Rural Landscape as per the Upper Lachlan LEP 2010.

6.2.4.2 Potential Impacts

Potential impacts to surrounding sensitive receptors may include changes to existing views. An assessment of visual impacts would form part of the EIS identifying potential impacts along with necessary management and mitigation measures, and consideration of potential cumulative impacts with the proposed Marulan Solar Farm located approximately 13 km south-west. The solar farm PVIA notes that it is likely that there will not be any views of both project simultaneously and further assessment of the cumulative visual impact will be detailed in the EIS. In summary, the PVIA notes:

- A preliminary desktop assessment identified three (3) existing Landscape character zones (LCZs) within the 5 km of the Wattle Creek Energy Hub Solar project area. This will form a precursory baseline for character assessment to be assessed in detail in the EIS phase.
- 49 residences, including 42 non-associated residences and seven (7) associated residences were identified within 4 km of the Wattle Creek Energy Hub Solar project area.
- A preliminary viewshed map was prepared for the PVIA of the proposed solar farm and non-associated residences identified in the region located within 4 km of the nearest proposed solar panel. While the solar farm is not a component of this Project, this is relevant to the Project as it demonstrates that due to the gently undulating terrain within the Project Area and its surrounds, the Project has the potential to be visible, to varying degrees, in areas surrounding the Project.
- A preliminary reverse viewshed map was also prepared for the PVIA of the proposed solar farm for the region located within 4 km of the nearest proposed solar panel, based on a 4.7 m panel height. Again, while the solar farm is not a component of the Project being assessed herein, this is relevant as it found that the Project has the potential to be visible from non-associated residences.
- Application of Preliminary Assessment Tools indicated that 11 non-associated residences within 4 km and three (3) public viewpoints would require detailed assessment in the EIS phase for the solar farm and will be concurrently assessed (as required) for the Project.

6.2.4.3 Further Assessment Proposed

Currently, there are no Commonwealth, NSW or local government planning policies, guidelines or standards directly applicable to guide the visual assessment of BESS projects. However, adopting a best practice approach for the Project, a detailed Landscape Visual Impact Assessment (LVIA) would be prepared for the Wattle Creek Energy Hub and relevant findings will be included in the Project's EIS with reference to the requirements and procedures outlined in the following guidelines:

- NSW DPE – Large-Scale Solar Energy Guideline (DPE, 2022).
- NSW DPE – Technical Supplement Landscape and Visual Impact Assessment – Large-Scale Solar Energy Guideline (DPE, 2022).
- Landscape Institute and Institute of Environmental Management and Assessment – Guidelines for Landscape and Visual Impact Assessment Third Edition (2013).
- NSW DPE – Wind Energy: Visual Assessment Bulletin for State significant wind energy development (2016).

The LVIA will also include the following next steps:

- Further detailed assessment and ground-truthing will be undertaken in the EIS phase of the Project to confirm potential visual impacts from identified residences and viewpoint locations, where a detailed summary of the potential visual impacts will be provided as a part of the LVIA.
- Specialised modelling tools, visualisations (including photomontages, as required), public viewpoint analysis and dwelling assessments will be developed to illustrate potential visual impacts of the Project from key viewpoints identified through this report. Site inspections will be undertaken from key viewpoints identified as requiring further assessment in this PVIA.
- Community consultation will be ongoing to ensure and develop an understanding of the community's landscape values.
- The cumulative impacts of surrounding renewable energy projects will be assessed in the LVIA in order to identify impacts on the broader landscape character of the region.
- On-site and off-site visual landscape mitigation strategies will be developed in response to the assessment and community consultation. The purpose of the mitigation strategies will be to ensure the Project is integrated into the existing landscape.

6.2.5 Traffic and Transport

Access to the Project Area is proposed via the existing road network. Primary access will likely be via the Hume Highway, which provides connection to Sydney and Canberra, and to the project via Canyonleigh Road. The Hume Highway (travelling from Sydney to Canberra) is directly south of the Project Area approximately 5 km, and Canyonleigh Road traverses directly south of the Project Area in an east to west direction.

The preferred transport route of the BESS components and other Project-related materials will be confirmed via a port and transport route assessment, which will be prepared as part of the EIS. As noted in **Section 3.4**, a preferred port and transport route have not yet been established.

It is expected that upgrades to local roads (secondary access routes) may be required to allow access for heavy vehicles (where considered suitable) prior to any deliveries occurring as part of the construction phase of the Project. However, it is noted that several other renewable energy developments may also require these works being completed.

Access tracks will be constructed on site to provide access to the proposed BESS location (refer to **Section 3.0, Figure 3.1**). The proposed delivery route, access tracks and level of construction/maintenance required will be confirmed and assessed during the preparation of the EIS. All access tracks will be maintained during the construction phase of the Project.

The construction phase of the Project will result in increased traffic movements by both light vehicles transporting construction personnel and minor light construction materials, and heavy vehicle movements transporting the heavy-duty equipment required for construction purposes. Traffic increases associated with the operational phase of the Project will be minimal and will generally only involve the movement of light vehicles transporting operational staff around the site intermittently.

A Traffic and Transport Impact Assessment (TTIA) and route assessment will be undertaken as part of the EIS to assess the potential transport routes required for the construction of the Project and any potential impact to the road network. The assessments will be undertaken following relevant NSW Government guidelines and assessment standards, including Guide to Traffic Generating Developments (RTA, 2002), Road Design Guide and relevant Austroads Standards and Austroads Guide to Traffic Management guidelines. The TTIA will include:

- a review and assessment of the existing road network
- a review of any previous traffic impact assessments undertaken for the surrounding area
- traffic counts in selected areas along the proposed traffic routes (if data is not readily available)
- a detailed assessment of the likely Project-specific and cumulative traffic impacts during the construction and operational phases of the Project (including intersection performance, capacity, and safety)
- identification of any mitigation and management measures that may be required.

Potential mitigation measures to reduce traffic impacts may include, but will not necessarily be limited to:

- Preparation of a Construction Traffic Management Plan (CTMP) that will outline the controls required during the construction phase and will be prepared in consultation with relevant roads authorities.
- Undertaking any necessary road upgrade works to facilitate access to the site and along the proposed transport route.
- Undertake consultation with relevant Councils regarding an infrastructure or maintenance agreement to cover any required mitigation works to manage the expected pavement impacts of the Project on the lower order, local government-controlled road links.

It is reiterated that other approvals would be required for the transport of infrastructure by OSOM vehicles, under National Heavy Vehicle Law. These requirements will be assessed via a route analysis study as part of the EIS. Should a transportation route be selected that interacts with other States i.e. South Australia or Victoria, the TIA and EIS would only assess aspects associated with NSW portions of the route.

6.2.6 Socio-Economic Impacts

A Social Impact Scoping Report (SISR) has been undertaken by Umwelt in accordance with the scoping phase requirements of the SIA Guideline (DPIE, 2021f). The SISR has been provided in **Appendix 2** and is summarised in the subsequent section below.

6.2.6.1 Regional Setting

The Upper Lachlan Shire LGA is situated in the Central Tablelands of NSW and covers an area of approximately 7,200 km². The LGA has a population of 8,514 and is largely characterised by its regional character. The Shire has three main centres - Crookwell, Gunning and Taralga - and is in close proximity to regional cities of Goulburn and Bathurst, as well as both Canberra (130 km south) and Sydney (240 km northeast). The township of Big Hill is directly north-west of the Project Area and is the closest town in the Upper Lachlan Shire LGA to the Project Area. Big Hill is characterised by agricultural land use as well as National Parks such as Limeburners Creek and has a population of 78.

The Goulburn Mulwaree LGA borders the southern Project Area boundary. It covers a smaller area (3,223 km²) and has a much larger population than Upper Lachlan Shire, sitting at 32,053. The township of Goulburn is the most populous within this LGA, accounting for 24,565 people. The Council administers an area of 3,223 km² encompassing Goulburn, Marulan, Tarago and Towrang. The township of Marulan has a population of 819 and is especially relevant to the Project as it is the nearest population centre to the Project Area. The town is home to the Marulan Spring Festival, self-guided historic tours, gourmet coffee, food and boutique shops.

Wingecarribee LGA, bordering the eastern boundary of the Project Area is the most populous of the three LGAs, with a population of 52,709. The major townships within the LGA are Bowral, Moss Vale, Mittagong and Bundanoon. The LGA has a semi-rural landscape, characterised by small towns and villages.

The Canyonleigh township, that is directly north-east of the Project Area is known as the outback of the Southern Highlands due to the rural landholdings and location and has a population of 455. The rural landscape has made Canyonleigh a popular location for bed and breakfast style accommodation.

6.2.6.2 Perceived and Likely Social Impacts

Feedback from the community and other stakeholders' engagement activities outlined in **Section 5.0** above identified perceived social impacts from the Project. These social impact categories and perceived impacts are summarised in **Table 6.7** below and will be subject to assessment as part of the SIA, along with any other potential social impacts resulting from the Project.

A key part of addressing the perceived social impacts identified below will be the stakeholder engagement program. Spark Renewables, with the support of Umwelt, will continue to implement the stakeholder engagement program to engage the community throughout the environmental assessment and approval process, and the operational life of the Project. This early engagement will inform the assessment of the social and economic impacts associated with the Project. The program has been designed in line with the following objectives:

- keep the community informed about the Project, its likely impacts and likely benefits, through the provision of accurate and timely information
- provide multiple opportunities and mechanisms for meaningful information exchange with stakeholders

- ensure that the team developing the Project fully understands the local context, including any local impacts that it may have or opportunities that it could provide
- integrate feedback received into the Project planning and design as far as possible
- build and maintain positive, trust-based relationships with the local community.

Table 6.7 Perceived Social Impacts

Impact Categorisation		Impact	Frequency
Positive Identified Social Impacts	Livelihoods	Training Opportunities	2
		Increased Employment Opportunities	1
	Accessibility	Access to a Renewable Energy Source	8
		Changes to General Mobility in the Area through Local Road Upgrades	2
		Improved Access to Local Services and Infrastructure	1
Negative Identified Social Impacts	Surroundings	Decreased Visual Amenity due to presence of Solar	9
		Biodiversity Impacts	9
		Decreased Social Amenity because of Construction Noise	4
		Access to and Use of the Natural Environment	1
		Safety	1
	Accessibility	Changes to General Mobility in the Area	5
		Access to Use and of Local Infrastructure	3
	Livelihoods	Decline of Property Values	5

6.2.6.3 Further Assessment Proposed

A SIA will be submitted with the EIS and will be prepared in accordance with the NSW SIA Guideline (DPIE, 2021e). Subsequent phases of the SIA program will involve the following key activities:

- 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.
- Provision of feedback to those consulted during the scoping phase on the outcomes and issues raised and communication of the Project SEARs (once issued), including an outline of the next steps in the assessment process and opportunities for community input.
- Further engagement with a range of community and stakeholder groups, including but not limited to near neighbours, Host dwelling owners, local government, community members, interest groups, local businesses, and service providers. This consultation will focus on the detailed investigation into social impacts associated with the Project. Further, it will involve the provision of feedback on the outcomes of EIS technical studies and will provide opportunities for community input to the development of appropriate mitigation and enhancement measures to address impacts and residual effects.
- A comprehensive assessment and evaluation of social impacts against existing baseline conditions.

6.2.7 Hazards and Safety

The following section addresses the proposed approach to assessing potential hazards and safety impacts associated with the Project including electromagnetic fields (EMF), glint and glare, bushfire threat, and potential hazards associated with the introduction of BESS facilities.

6.2.7.1 Electromagnetic Fields

EMF are present where electric current flows, including overhead and underground transmission lines, substations and electrical appliances. The standard SEARs for wind farm developments require proponents to *“consider and document any health issues having regard to the latest advice of the National Health and Medical Research Council, and identify potential hazards and risks associated with electric and magnetic fields and demonstrate the application of the principles of prudent avoidance.”*

The EIS will consider potential health issues and risks associated with EMF produced by the BESS and associated electrical infrastructure within the Project Area in accordance with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for Limiting Exposure to Time-varying Electric, Magnetic and Electromagnetic Fields (ICNIRP, 1998).

6.2.7.2 Preliminary Risk Screening

The Project will result in the introduction of a limited number of hazardous materials that present potential risks to the environment and public safety. Hazardous materials that are likely to be transported to the Project Area, stored, and used at the Project Area and transported from the Project Area are presented in **Table 6.8** below.

Table 6.8 Project Hazardous Materials

Material	Dangerous Goods Class/Division and (Packing Group)	Phase(s) of Project
Unleaded Petrol	3 (II)	Operations
Diesel Fuel	C1	Construction, Operations and Decommissioning
Herbicides	9 (II)	Operations
Transformer Oil	-	Construction, Operations and Decommissioning
Aerosols	Class 2.1	Construction, Operations and Decommissioning
Solvents	3 (II)	Construction, Operations and Decommissioning

A preliminary risk screening for all hazardous materials and dangerous goods to be stored and transported to/from the Project will be undertaken during the EIS in accordance with Chapter 3 (Hazardous and Offensive Development) of *State Environment Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) to determine the requirement for a Preliminary Hazard Analysis (PHA). However, the quantities of hazardous materials to be stored at the Project will be limited and are not expected to exceed either storage or transport Resilience and Hazards SEPP screening thresholds.

6.2.7.3 Preliminary Hazard Analysis

Notwithstanding the preliminary risk screening process above, it is anticipated that a PHA incorporating a Level 1 Qualitative Risk Analysis and Level 2 Semi-quantitative will be required to estimate the level of risk posed to surrounding off-site land users due to the large capacity of the proposed BESS. During normal use, lithium-ion batteries (LIBs) are sealed and, unlike lead acid batteries, do not vent to the atmosphere during normal operation. However, if subject to abnormal heating (external or internal) or other abuse, flammable electrolyte and electrolyte decomposition products can vaporise, rupture the battery cell and be vented. Vented electrolyte and electrolyte decomposition products may ignite (resulting in fire or explosion) if exposed to an ignition source including sparks, open flames and LIB cells undergoing thermal runaway.

Thermal runaway occurs when the internal temperature of a LIB cell increases beyond its operating range leading to exothermic decomposition reactions generating additional heat. If the additional heat is not dissipated, the cell temperature is further elevated accelerating the process of decomposition and heat generation. LIBs are susceptible to thermal runaway which can be initiated by a range of mechanisms including electro-chemical abuse (e.g. from overcharging, over-discharging and over voltage charging), mechanical abuse (e.g. physical damage to cell causing a short circuit), thermal abuse (overheating from an external source), manufacturing defects (e.g. internal short circuits) and design faults (e.g. inadequate clearance between cells or modules to allow heat dissipation).

The vented gases from LIBs during thermal runaway can exceed 600°C and are likely to include flammable (alkyl-carbonates, methane, ethylene, ethane, hydrogen gas) and toxic species (carbon monoxide, hydrogen fluoride), soot and particulates containing oxides of nickel, aluminium, lithium, copper and cobalt.

The PHA will address these risks as well as other potential hazards by taking the following steps:

- A preliminary risk screening for all hazardous materials and dangerous goods to be stored and transported to/from the Project will be undertaken in accordance with Chapter 3 of the Resilience and Hazards SEPP.
- Risk classification and prioritisation and estimation of societal risk in accordance with Multi Level Risk Assessment (NSW Department of Planning, 2011).
- A qualitative risk assessment (for the Level 1 analysis) workshop to identify Project hazards that pose an off-site risk.
- Consequence (e.g. fire, explosion, toxic release) and frequency analysis (Level 2 analysis) for hazard scenarios identified as requiring further assessment in the qualitative risk assessment.
- Assessment of the Level 2 analysis results with respect to Hazardous Industry Planning and advisory Paper No 4 Risk Criteria for Land Use Planning (NSW Department of Planning, 2011).
- Consultation with Fire and Rescue NSW regarding fire and life safety systems as well as the unique challenges posed by BESSs during incident response.

The PHA will consider relevant contemporary standards and guidelines with respect to BESSs, including:

- UL 9540 Standard for Safety of Energy Storage Systems and Equipment, Underwriters Laboratory, 2020.
- UL 9540A Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems, Underwriters Laboratory, 2019.
- NFPA 855 Standard for the Installation of Stationary Energy Storage Systems, National Fire Protection Association, 2020.
- AS/NZS 5139:2019 Electrical Installations – Safety of battery systems for use with power conversion equipment, Standards Australia, 2019.
- Property Loss Prevention Data Sheet 5-33, Electrical Energy Storage Systems, FM Global, 2020.

6.2.7.4 Bushfire Hazard

Sections of the Project Area are identified as varying categories of bushfire prone land under the NSW RFS Bushfire Prone Land Mapping Tool, as identified in **Figure 6.6** below, including “Category 1” vegetation. Category 1 vegetation from a bushfire perspective is considered to be the highest risk for bushfire and generally consists of areas of forest, woodlands, heaths, and forested wetlands.

Although portions of the Project Area have been subject to extensive clearing associated with agricultural land use, there are areas of remnant vegetation throughout, which form a potentially significant fuel load capable of sustaining and spreading bushfire. Areas of vegetation within the Project Area also represent a potential linkage between vegetated areas within and adjoining the Project Area, with the potential to support the spread of bushfire.

A bushfire risk assessment will be undertaken to support the EIS in accordance with the requirements of Planning for Bushfire Protection 2019 (PBP) (NSW Rural Fire Service, 2019), which will include provision of adequate asset protection zones on the site layout to minimise the risk of fire through spatial separation of vegetation and battery infrastructure.

Consultation with the NSW RFS will also be undertaken during the preparation of the EIS.



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Scale 1:25000 at A4

- Legend**
- Project Area
 - Development Corridor
 - BESS Site Option
 - Local Government Area
 - Roads
 - Watercourses

- AHIMS**
- ▲ Artefact Site
 - ▲ PAD

FIGURE 6.6

Heritage Constraints in relation to the BESS Development Corridor

6.2.8 Water and Soil Resources

6.2.8.1 Surface Water

The Project Area is located within the Hawkesbury River basin, situated within the localised catchment of the Wollondilly River. The Project Area is located on undulating terrain, with the natural surface drainage generally from west to east across the Project Area through well-defined watercourses and drainage lines. Flow is conveyed towards the Wollondilly River, which flows along the eastern and southern boundaries of the Project Area. The lowest elevation of the Project Area is along the north-eastern boundary, at approximately 520 m AHD.

A ridgeline through the centre of the Project Area divides the northern region to discharge north, and the southern region to discharge south. Mapped watercourses are well-defined within the Project Area, and include Deadmans Creek along the northern boundary, Wattle Creek located within the north-western region, Sandy Creek and Island Creek which flows north-east from the western boundary through the area. There are a number of other unnamed watercourses and drainage lines, with all watercourses discharging into Wollondilly River.

The Wollondilly River is of particular relevance to the Project, being located approximately 200 m east of BESS Site A and approximately 1.1 km north west of BESS Site B. **Figure 6.7** below shows the hydrological and topographic context of the Project Area, including any potential hydrological constraints with respect to the Project Area.

6.2.8.2 Wetlands

A review of NSW Wetlands sourced from the Seed Dataset (DPE, 2011a) identified that there are no wetlands within the Project area or in the immediate surrounding environment.

6.2.8.3 Groundwater Dependent Ecosystems

A review of the Groundwater Dependent Ecosystems (GDEs) Atlas (BoM, 2017) indicated that the Project Area is located in proximity to a variety of aquatic and terrestrial GDEs. GDEs within the vicinity of the Project area are shown in **Figure 6.7**.

Aquatic GDEs are present within the watercourses that traverse the Project area and along the Project boundary, where the boundary following the surrounding watercourses. Within the Project area, high potential aquatic GDEs are present along Island Creek, Sandy Creek, Deadmans Creek and Wollondilly River. Regions of moderate potential GDEs are present within Wollondilly River, Sandy Creek and Wattle Creek.

Terrestrial GDEs are predominantly present within the southern region of the Project area. Majority of the terrestrial GDEs are low potential in the south-west, south-east and central west regions of the Project area. High and moderate potential GDEs are present within the south-west and south-east regions, as well as along the Wollondilly River channel in the south-east of the Project area. A large range of terrestrial GDEs surround the Project boundary.

6.2.8.4 Groundwater Vulnerability

A review of NSW Groundwater Vulnerability sourced from the Seed Dataset (DPE, 2014) identified that there are no groundwater vulnerability areas within the Project Area or in the immediate surrounding environment.

6.2.8.5 Water Storage and Usage

Water Sharing Plans (WSPs) have been developed under the *Water Management Act 2000* to protect the environmental health of water sources, whilst securing sustainable access to water for all users. The WSPs specify maximum water extractions and allocations and provide licenced and unlicensed water users with a clear picture of when and how water will be available for extraction. The Project area is located within the Hawksbury River catchment and is subject to the WSPs of the Greater Metropolitan Region.

The Project Area is located within the Greater Metropolitan Region Unregulated River Water Sources WSP, which commenced in 2011 (DPE, 2011b). The WSP is divided into 49 Management Zones corresponding to sub-catchment boundaries. The Project Area is managed under the Lower Wollondilly River Management Zone, within the Upper Nepean and Upstream Warragamba water source.

With respect to groundwater, the Project Area is located within the Goulburn Fractured Rock Groundwater Source which is regulated under the Greater Metropolitan Region Groundwater Sources WSP, which commenced in 2011 (DPE, 2011c).

6.2.8.6 Water Users

Licensed surface water users potentially impacted by the Project are located within the Upper Nepean and Upstream Warragamba Water Source and the Goulburn Fractured Rock Groundwater Source.

For surface water sources, a search of the NSW Water Register (WaterNSW, 2022b) indicated that for the 2021/2022 financial year there were 423 Water Access Licences (WALs) with a total of 668,696.34 unit shares allocated in the Upper Nepean and Upstream Warragamba Water Source. A majority of the unit shares are held for major utility water supply with 620,000 unit shares. For groundwater water sources, the NSW Water Register (WaterNSW, 2022b) indicated that for the 2021/2022 financial year there were 157 Water Access Licences (WALs) with a total of 7,636 unit shares allocated for the Goulburn Fractured Rock Groundwater Source.

There are no registered bores within the Project Area, with the closest bore located 280 m east of the Project Area used for irrigation purposes.

6.2.8.7 Neutral or Beneficial Effect on Water Quality

The Project is located within the Sydney drinking water catchment (i.e. Warragamba Catchment) and as such must have a Neutral or Beneficial Effects (NorBE) on water quality.

Neutral or Beneficial Effect on Water Quality Assessment Guideline (WaterNSW, 2022a) indicates that a development is considered to have a NorBE on water quality if the development:

- has no identifiable potential impact on water quality, or
- will contain any water quality impact on the development site and prevent it from reaching any watercourse, waterbody, or drainage depression on the site, or
- will transfer any water quality impact outside the site where it is treated and disposed of, to standards approved by the consent authority.

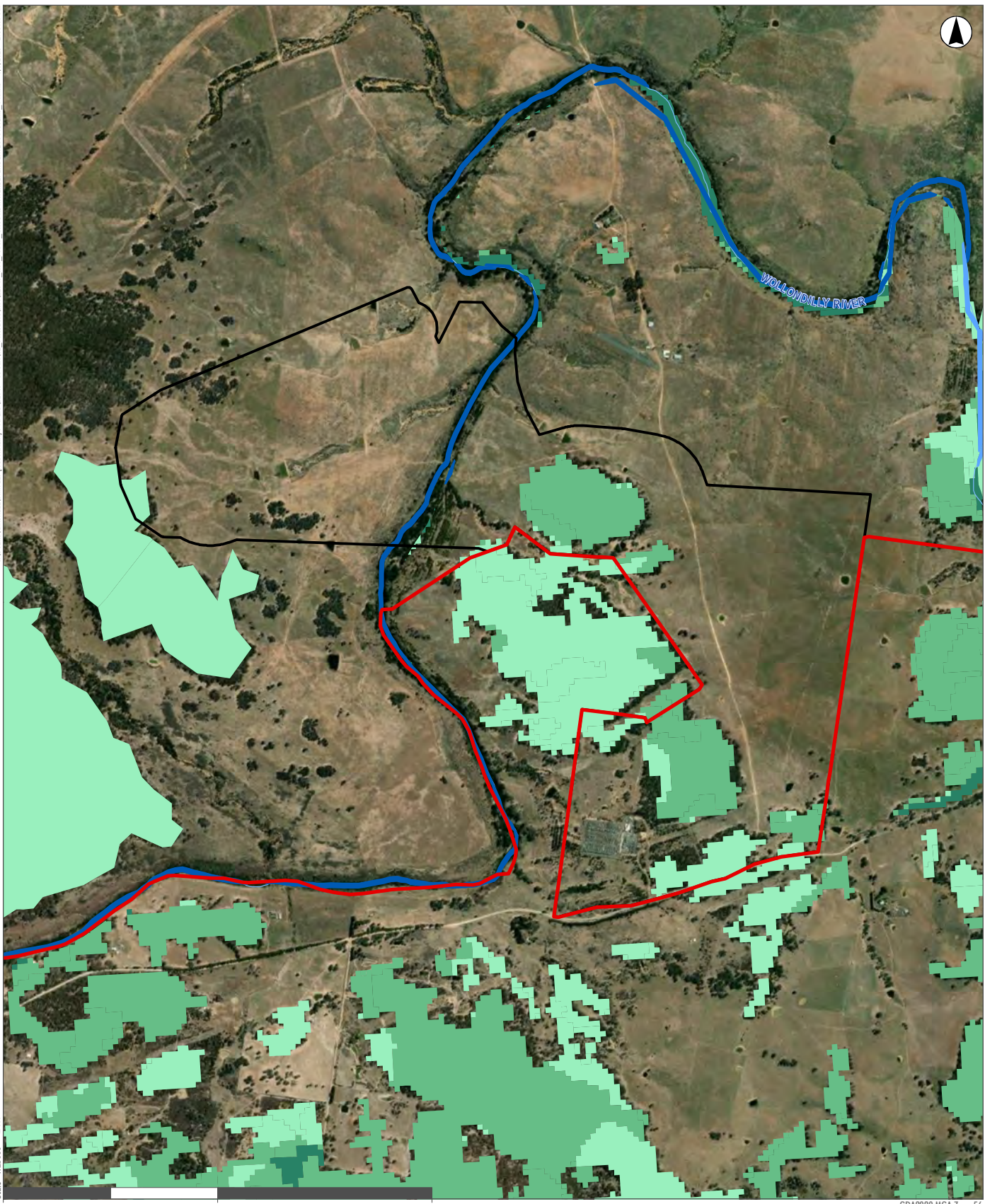
6.2.8.8 Flooding

The Project Area is located within the local catchment of the Wollondilly River and as such a review of available flood information was undertaken to identify potential flooding impacts on the Project. The Upper Lachlan Shire Council is responsible for the development of flood studies for the LGA in which the Project is located. A review of the Council's available plans identified that there are no existing flood studies, floodplain risk management plans or designated flood planning area for the Project area.

Project neighbours have shared flooding information on their properties during unprecedented rains in 2022, and flood modelling will be undertaken during the EIS phase of the Project to estimate design flood inundation across the Project area and the potential impact to receiving waterways.

Due to the extensive waterway network and topography of the Project Area, it is likely that the Project will experience flood inundation for both in channel and overland flow. Surrounding stream level gauges within the waterway network may assist to inform the potential flood inundation environment within the Project area, during the EIS phase.

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- Legend**
- | | |
|---|---|
| Project Area | Aquatic |
| Development Corridor | High potential GDE |
| Watercourses | Moderate potential GDE |
| | Terrestrial |
| | High potential GDE |
| | Moderate potential GDE |
| | Low potential GDE |

FIGURE 6.7

Hydrological Constraints in relation to the BESS Development Corridor

Image Source: ESRI Basemap 2020 Data source: NSW DFSI(2020)

6.2.8.9 Soils and Land Capability

A soil and land capability assessment scheme was developed in 2008 by DPE (formerly known as the Department of Infrastructure, Planning and Natural Resources), which aimed to assist in assessing the environmental impact of clearing native vegetation under the *Native Vegetation Act 2003*.

The land and soil capability classification identifies the capability of the land to sustain land use, ranging between Class 1 to Class 8. Class 1 is land capable of high soil impact and Class 8 represents land that is only capable of sustaining low impact. The capability classification is determined through:

the assessment of eight key soil and landscape limitations (water erosion, wind erosion, salinity, topsoil acidification, shallow soils/rockiness, soil structure decline, waterlogging and mass movement) - DPE, 2021.

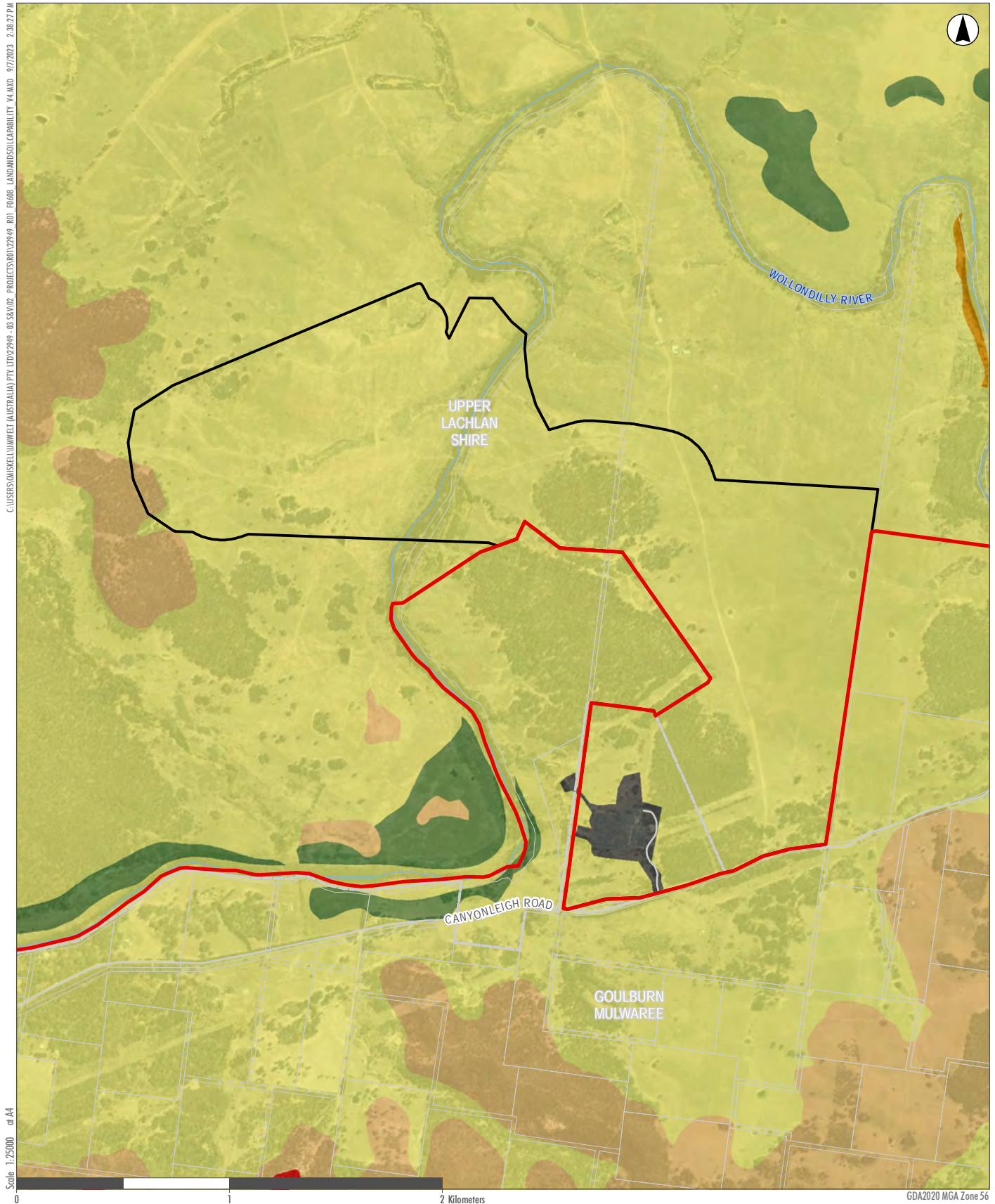
A review of the capability classifications identified that the Project Area is predominantly situated within Class 5, with small regions in Class 4 and Class 6, as identified on **Figure 6.8**. This classification has severe limitations and is unable to sustain high impact land uses, unless highly specialised land management practices are implemented (DPE, 2021).

The isolated areas of land and soil capability Class 6 are located within the western and eastern regions of the Project Area and are “incapable of sustaining many land use practices” with the land often used for low intensity land uses, such as low intensity grazing (DPE, 2021).

There is no BSAL present within or in the vicinity of the Project Area. Additionally, there are no mapped Class 1-3 soils under the Land and Soil Capability Assessment Scheme (LSC) present within the Project Area, as identified on **Figure 6.8**. Existing agricultural activities within the Host dwellings will continue and co-exist with the Project.

There are no mapped high-risk areas for acid sulfate soils within the Project Area.

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Scale 1:25000 or A4

GDA2020 MGA Zone 56

Legend

- Project Area
 - Development Corridor
 - Local Government Area
 - Lot Boundary
 - Roads
 - Watercourses
-
- Land and Soil Capability Mapping**
- 4 - Moderate to Severe Limitations
 - 5 - Severe Limitations
 - 6 - Very Severe Limitations
 - 7 - Extremely Severe Limitations
 - 8 - Extreme Limitations
 - Not Assessed

FIGURE 6.8

Land and Soil Constraints in relation to the BESS Development Corridor

6.2.8.10 Potential Water and Soil Impacts and Matters Requiring Further Assessment

The following observations are noted with respect to potential constraints on the Project:

- The mapped watercourse alignments within the Project Area may be impacted by the Project.
- Due to the undulating terrain and waterway network, flood inundation is likely to result in channel inundation and overland flow.
- Some areas of potential groundwater sensitivity are within and immediately outside of the Project Area, with the possibility to be affected by the Project.
- Soil types and profiles present within the Project Area may provide some issues with respect to potential erosion and sediment control which would be expected to be managed via appropriate design and construction management.
- There are a small number of registered groundwater bores in the vicinity of the Project Area. A detailed review of water users, project water use and supply will be required.

A full assessment will be undertaken as part of the Water Resources Impact Assessment (WRIA) as part of the EIS and is expected to consider further details available on the construction methodology and locations of infrastructure (i.e., the solar farm components and access tracks). The scope of the WRIA will include:

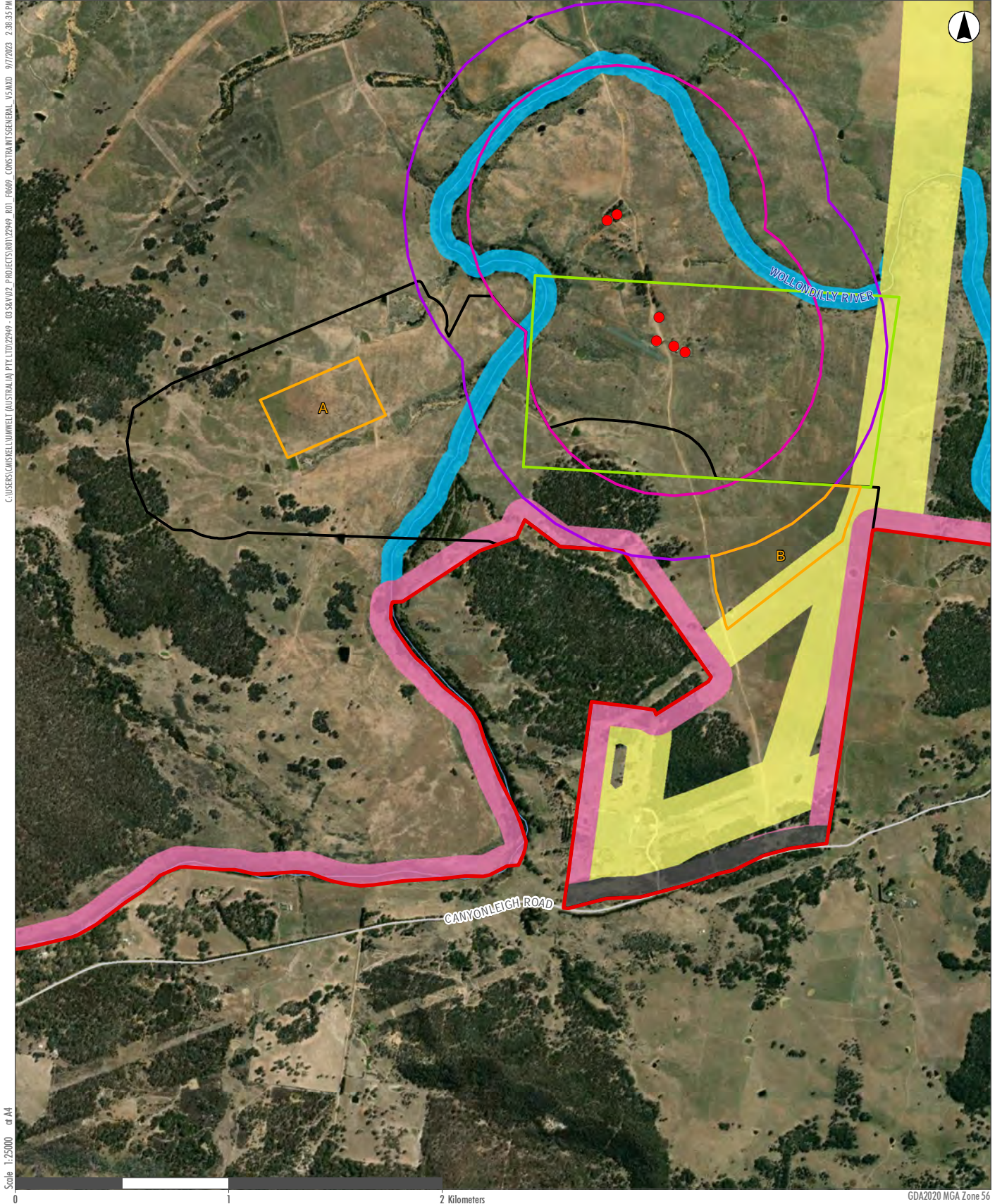
- Review of the Project Area catchments, topography, and drainage.
- Identify potentially impacted catchments and associated water sharing plans (surface water and groundwater).
- Review of watercourse mapping and riparian corridor requirements.
- Identify sensitive areas including wetlands, riparian areas, areas of groundwater vulnerability and groundwater dependent ecosystems that could be impacted by the Project.

6.2.9 Summary of Impact Avoidance

Project design through the scoping phase has sought to avoid and minimise impacts to the greatest extent practical. The project layout has been revised through several iterations to avoid key constraints identified in the preliminary environmental assessment. The key constraints considered throughout the scoping phase are presented in **Figure 6.9** below. They are based on the:

- existing strategies proposed by Spark Renewables to avoid and/or minimise impacts i.e. the ‘buildable area’ discussed in **Section 3.7** of this Scoping Report
- the environmental matters discussed in **Section 6.2** above.

Impact avoidance will remain an integral focus throughout the entirety of the EIS preparation process, ensuring that all potential impacts are thoroughly identified, assessed, and mitigated. The EIS will detail the further design iterations that will be undertaken to further enhance impact avoidance strategies.



Legend

- Project Area
- Development Corridor
- BESS Site Option
- Drone constraint area
- Dwelling 700 m Buffer - Solar Exclusion
- Dwelling 1 km Buffer BESS Exclusion
- Watercourses
- Roads
- host dwellings
- Wollondilly River Constraint Buffer (50m)
- Existing Transmission Line Constraint Buffer (100m)
- Road Corridor Constraint Buffer (100m)
- Internal Project Boundary Constraint Buffer (100m)

FIGURE 6.9

Key Environmental Constraints (General)

6.2.10 Cumulative Impacts

The Cumulative Impact Assessment Guidelines for State Significant Projects (the CIA Guidelines) (DPIE, 2021g) identifies the requirement to address cumulative impacts in relation to any other proposed, approved, or operating projects in the vicinity particularly with regard to landscape, noise, biodiversity and traffic impacts.

As discussed in **Section 2.3**, there are a number of renewable energy projects within and in the vicinity of the Project, at different stages of the approval process. It is anticipated that there will be additional renewable energy projects proposed in the vicinity of the Project that are not publicly known at the time of preparing this report. The relevant detailed environmental assessments will include an assessment of the potential cumulative impacts associated with the Project and will follow the relevant guidelines.

The scoping summary table provided in **Appendix 1** outlines where a CIA will be undertaken for the relevant matters including the level of assessment and engagement. From the Scoping Assessment undertaken for this Project in **Appendix 1**, the following key matters will require consideration of CIA:

- Visual amenity.
- Noise and vibration.
- Biodiversity.
- Traffic and transport.
- Socio-economic.

Table 6.9 below provides a summary of the key considerations in relation to CIA for the Project.

Table 6.9 Cumulative Impact Assessment Considerations

Scoping Cumulative Impact Assessment	Detail
What to assess?	As outlined in Appendix 1 , the following key matters will require consideration of CIA: <ul style="list-style-type: none"> • visual amenity • noise and vibration • biodiversity • traffic and transport • socio-economic.
What study area?	The study area will vary depending on the specific characteristics of the assessment matter and the scale and nature of the potential impacts on the matter resulting from the Project with other relevant future projects. Each CIA will be undertaken in accordance with the relevant guidelines, where applicable, and broad enough to capture all relevant cumulative impacts.
Over what time period?	Life of the Project including construction, operation, and decommissioning.

Scoping Cumulative Impact Assessment	Detail
What projects to include?	<p>The effects of past developments and actions, as well as currently operating projects will be captured in the baseline environmental studies for the Project.</p> <p>The CIA will consider the cumulative impacts of the Project on key matters with other proposed developments, including those outlined in Table 2.1, as relevant. This includes changes to existing projects, approved projects, or projects under assessment.</p>
What is the approach to assessment?	<p>All CIAs will be undertaken in accordance with approved assessment methods for relevant matters (e.g. the NPfI and the BAM).</p>
What are the key uncertainties?	<p>Key uncertainties to undertaking the CIAs will include availability and quality of data on proposed future projects at the time of preparation of assessments.</p> <p>Relevant CIAs will identify realistic development scenarios with the relevant future projects over the life of the Project.</p>

6.2.11 Other Matters

The EIS will also address other issues relating to:

- Land use – the EIS will assess the potential interactions of the Project with other land uses, including agricultural land uses. This assessment will draw on the findings of other related assessments including impacts on visual amenity, water, soil, noise, air quality, traffic, hazards, and safety.
- Waste – the EIS will describe the likely waste streams to be generated during construction and operation and describe measures to manage, reuse, recycle and dispose of this waste in accordance with relevant guidelines.
- Air quality – in accordance with relevant NSW guidelines in relation to construction via a qualitative assessment, including specifying relevant construction phase air quality controls.
- Decommissioning and rehabilitation.

Whilst these matters will be appropriately assessed in the EIS, detailed assessments are not proposed as the issues can be readily defined, assessed, and mitigated using well recognised approaches.

6.3 Matters Requiring No Further Assessment in the EIS

Table 6.10 outlines the matters that are considered to not require further assessment in the EIS based on the scoping phase assessment along with a comment justifying why no further assessment is required.

Table 6.10 Matters Requiring No Further Assessment in the EIS

Issue	Comment
Greenhouse gas and energy	As the Project will store renewable energy, the emissions resulting from the construction, operation or decommissioning will be readily offset by the reduction in energy generation emissions. GHG emissions will be addressed in the justification for the Project as part of the EIS.
Port and airport facilities	The Project does not result in any change to port or airport facilities. Other than the delivery of Project components to the port, the transportation of Project components to the Project Site will be assessed as part of the TIA.
Rail facilities	The Project does not propose to utilise any rail facilities.
Odour	The Project is not anticipated to cause any odour.
Coastal hazards	The Project is not located within a coastal zone and will not result in any impacts to coastal zones.
Dam safety	The Project does not require the construction or maintenance of a dam.
Land movement	The Project is not anticipated to result in any land movement. The Project results in relatively minor excavation works only.

7.0 References

100% Renewables (2019) *Draft Upper Lachlan Shire Council Energy Masterplan*.

ABS (2016) Community Profiles. Census Data 2016. Canberra: Australian Bureau of Statistics. Retrieved: <https://www.abs.gov.au/websitedbs/D3310114.nsf/Home/2016%20Census%20Community%20Profiles>

AusWea (2005) *Wind Farms and Birds: Interim Standards for Risk Assessment*. Prepared for the Australian Wind Energy Association by Brett Lane & Associates Pty Ltd in association with Aria Professional Services Pty Ltd, Carlton North, Victoria.

Commonwealth Bureau of Meteorology (BoM) (2017) *Groundwater Dependent Ecosystems Atlas*. Commonwealth of Australia, Canberra.

Commonwealth BoM (2021) *National Groundwater Information System*. Commonwealth of Australia, Canberra.

Commonwealth of Australia (2021) *International climate change commitments* (<https://www.industry.gov.au/policies-and-initiatives/australias-climate-change-strategies/international-climate-change-commitments>).

Department of Premier and Cabinet (2018) *Southern Tablelands Regional Economic Development Strategy 2018-2022*. Prepared June 2018. https://www.upperlachlan.nsw.gov.au/sites/upperlachlan/files/public/Southern-Tablelands_REDS-Final-Report.pdf

EnergyCo NSW (2022) *South-West Renewable Energy Zone Project Overview*.

EnergyCo NSW (2022) *Draft Network Infrastructure Strategy*. Published in September 2022. <https://www.energyco.nsw.gov.au/sites/default/files/2022-09/draft-network-infrastructure-strategy.pdf>

Environment Protection and Heritage Council (2010) *(Draft) National Wind Farm Development Guidelines*.

Goulburn Mulwaree Council, Upper Lachlan Shire Council, Yass Valley Council (2016) *The Tablelands Regional Community Strategic Plan 2016-2036*. <https://www.upperlachlan.nsw.gov.au/sites/upperlachlan/files/public/images/documents/upperlachlan/Council/IntegratedPlans/Tablelands%202016-2036%20Regional%20Community%20Strategic%20Plan%20Final%20Endorsed.pdf>

International Commission on Non-Ionizing Radiation Protection (ICNIRP) (1998) *Guidelines for Limiting Exposure to Time-varying Electric, Magnetic and Electromagnetic Fields*.

International Council on Monuments and Sites (ICOMOS) (2013) *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance*.

Landcom (2004) *Managing Urban Stormwater: Soils and Construction Volume 1*.

Marchant, S., & Higgins, P.J. (1993) *Handbook of Australian, New Zealand and Antarctic Birds. Volume 2: Raptors to Lapwings*. Oxford University Press, Melbourne.

NSW Department of Planning (2008) *Acid Sulphate Soils Assessment Guidelines*.

NSW Department of Environment and Climate Change (DECC) (2006) *Assessment Vibration: A technical Guideline*.

NSW DECC (2009) *Interim Construction Noise Guideline*.

NSW Department of Environment, Climate Change and Water (DECCW) (2009) *Waste Classification Guidelines*.

NSW DECCW (2010a) *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*.

NSW DECCW (2010b) *Aboriginal Cultural Heritage Consultation Requirements for Proponents*.

NSW DECCW (2011) *NSW Road Noise Policy*.

NSW Department of Planning and Environment (DPE) (2016) *Wind Energy Guideline* (the Wind Energy Guideline). December 2016.

NSW DPE (2016) *Wind Energy: Visual Assessment Bulletin* (the Visual Bulletin). December 2016.

NSW DPE (2016) *Wind Energy: Noise Assessment Bulletin* (the Noise Bulletin). December 2016.

NSW DPE (2017) *South East and Tablelands Regional Plan 2036*. July 2017.

NSW DPE (2022a) *Draft South East and Tablelands Regional Plan 2041*. August 2022.

NSW DPE (2023) *Draft Native Vegetation Regulatory Map*.

NSW Department of Planning, Industry and Environment (DPIE) (2016) *Wind Energy: Standard Secretary's Environmental Assessment Requirement* (standard SEARs). December 2016.

NSW DPIE (2016) *Wind Energy: Frequently Asked Questions* (FAQ). December 2016.

NSW DPIE (2021a) *State Significant Development Guidelines* (SSD Guideline). November 2021.

NSW DPIE (2021b) *State Significant Development Guidelines – Preparing a Scoping Report – Appendix A* (SSD Guideline: Appendix A). November 2021.

NSW DPIE (2021c) *State Significant Development Guidelines – Preparing an Environmental Impact Statement – Appendix B* (SSD Guideline: Appendix B). December 2021.

NSW DPIE (2021d) *State Significant Development Guidelines – Preparing a Submissions Report – Appendix C* (SSD Guideline: Appendix C). November 2021.

NSW DPIE (2021e) *State Significant Development Guidelines – Preparing an Amendment Report – Appendix D* (SSD Guideline: Appendix D). November 2021.

NSW DPIE (2021f) *Social Impact Assessment Guideline for State Significant Projects* (the SIA Guideline). November 2021.

NSW DPIE (2021g) *Undertaking Engagement Guidelines for State Significant Projects* (the Engagement guidelines). November 2021.

NSW DPIE (2021h) *Cumulative Impact Assessment Guidelines for State Significant Projects* (the CIA Guidelines). November 2021.

NSW DPIE (2022) *Threatened Biodiversity Data Collection, species profiles*. Accessed July 2023.
https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/Default.aspx

NSW Environment Protection Authority (EPA) (2016) *The Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*.

NSW EPA (2017) *NSW Noise Policy for Industry (NPfI)*.

NSW Government (2016) *NSW Climate Change Policy Framework*.

NSW Government (2019) *NSW Electricity Strategy*.

NSW Government (2020a) *NSW Electricity Infrastructure Roadmap*.

NSW Government (2020b) *Renewable Energy Zones: Frequently asked questions*.

NSW Government (2022) *NSW Electricity Infrastructure Roadmap First Nations Guidelines*. August 2022.

NSW Office of Environment and Heritage (OEH) (2011) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*.

NSW Office of Energy and Climate Change (2022) *First Nations Guidelines*. August 2022.
<https://www.energy.nsw.gov.au/sites/default/files/2022-08/first-nations-guidelines-increasing-income-and-employment-opportunities-from-electricity-infrastructure-projects.pdf>

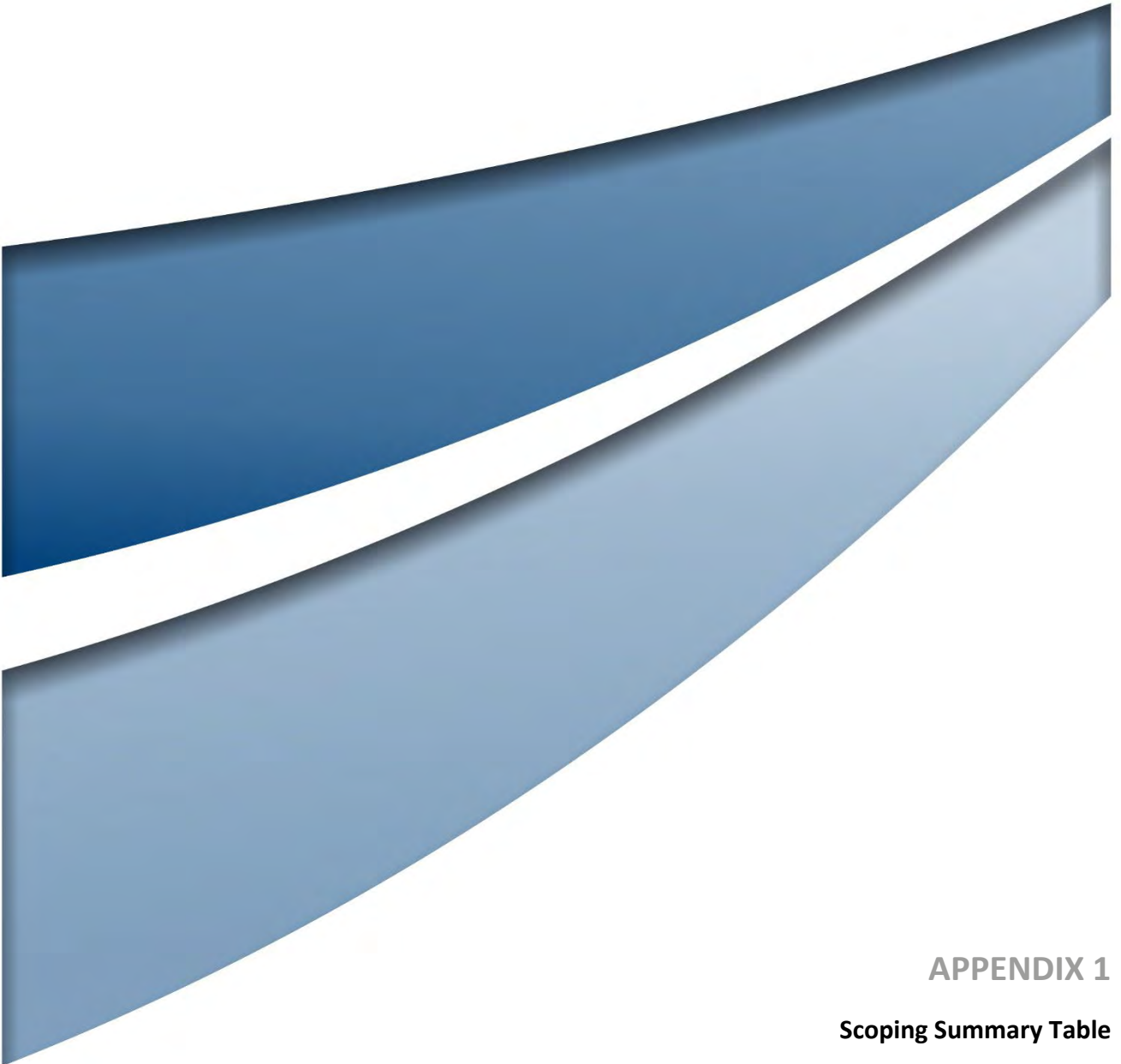
NSW Roads and Traffic Authority (RTA) (2002) *Guide to Traffic Generating Developments*.

NSW Rural Fire Service (RFS) (2019) *Planning for Bushfire Protection (PBP) 2019*.

Transgrid (2022) *EnergyConnect (NSW – Eastern Section) Environmental Impact Statement*. January 2022.

Upper Lachlan Shire Council (2020) *Upper Lachlan Shire Local Strategic Planning Statement*. Prepare June 2020.

Upper Lachlan Shire Council (2021) *Upper Lachlan Community Strategic Plan 2042*.
<https://www.upperlachlan.nsw.gov.au/sites/upperlachlan/files/public/documents/Upper%20Lachlan%20Community%20Strategic%20Plan%20%28CSP%29%202042%20-%2027%20pages%20copy.pdf>



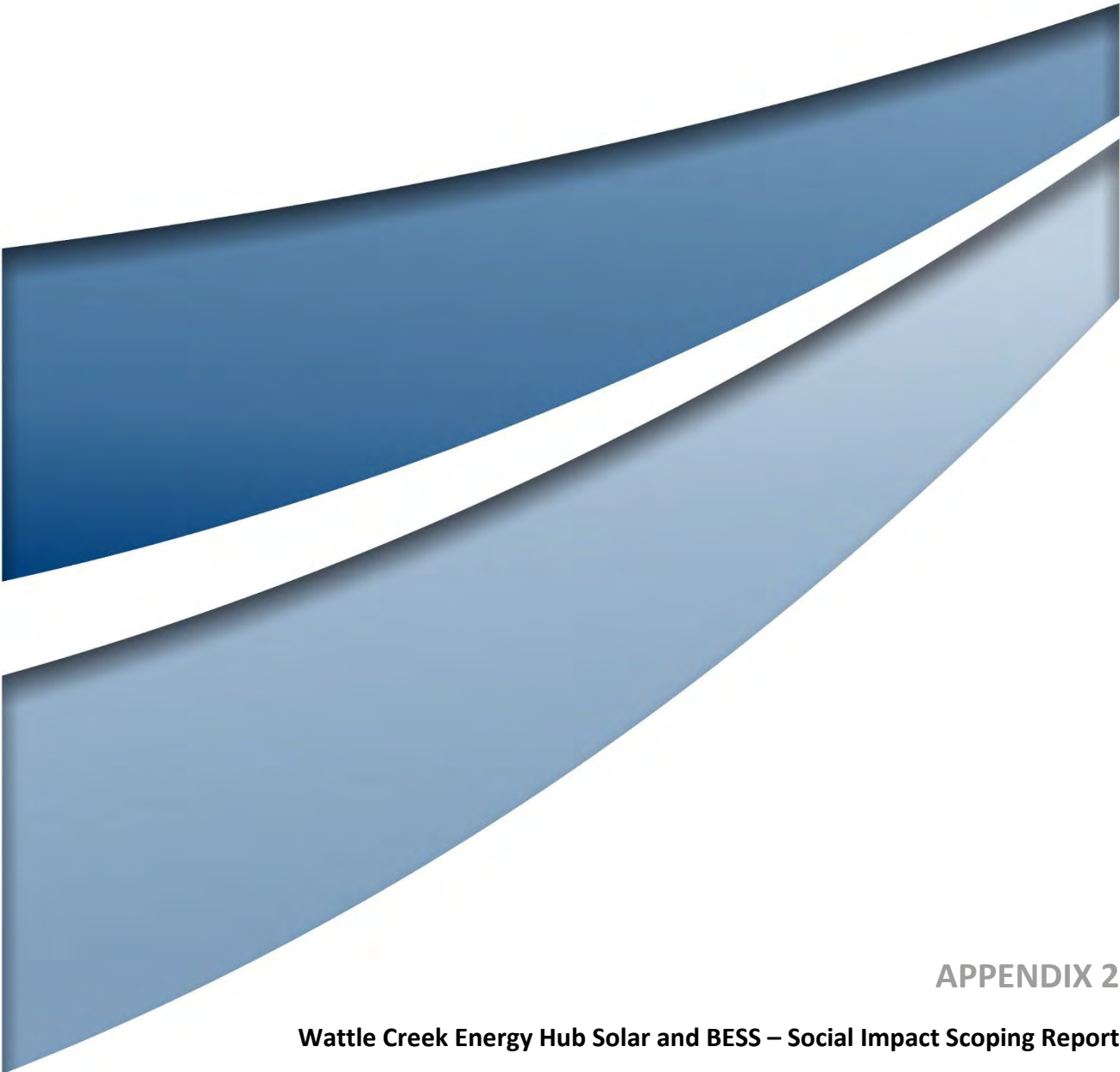
APPENDIX 1

Scoping Summary Table

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	Cumulative Impact Assessment Required?	Engagement	Relevant government plans, policies and guidelines	Section in Scoping Report
Access	Traffic	Moderate	Direct	Sensitive (change in road usage/ amenity, nearby dwellings, townships and land uses)	Detailed	Likely	Yes	Specific	<ul style="list-style-type: none"> Austrroads – Guide to Road Design (Austrroads) – Part 1 to 7. Austrroads - Guidelines for Traffic Management (Austrroads). Guide to Traffic Management – Part 3: Traffic Studies and Analysis (Austrroads, 2013). Guide to Traffic Management - Part 12: Integrated Transport Assessments for Developments (Austrroads, 2020). 	Section 3.4
	Port facilities		Indirect							
	Road facilities		Cumulative							
Air	Atmospheric emissions	Low	Direct	Sensitive (local and regional air quality)	Standard	Likely	No	General	<ul style="list-style-type: none"> NSW Climate Change Policy Framework – Office of Environment and Heritage (OEH), dated 2016. National Greenhouse Accounts Factors – Australian Government, dated 2021. 	Section 6.3
	Gases		Indirect							
	Particulate matter									
Amenity	Noise	Moderate	Direct	Sensitive (change in noise amenity, nearby dwellings, townships and land uses)	Detailed	Likely	Yes	Specific	<ul style="list-style-type: none"> NSW Government – Environment Protection Authority (EPA) – Noise Policy for Industry, dated 2017 (NPfi, 2017). NSW Government – Department of Environment, Climate Change – Interim Construction Noise Guidelines, dated 2009 (ICNG, 2009). NSW Government – Department of Environment, Climate Change and Water (DECCW) – Road Noise Policy, dated 2011 (RNP, 2011). NSW Government – Department of Environment and Conservation – Assessing Vibration: A Technical Guideline, dated 2006 (vibration guideline, 2006). 	Section 6.2.1
	Visual		Cumulative							
Biodiversity	Conservation areas	Moderate	Direct	Sensitive (potential high sensitivity for select flora and fauna species, some being endangered and critically endangered)	Detailed	Likely	Yes	Specific	<ul style="list-style-type: none"> NSW Biosecurity Strategy 2013-2021 – NSW Department of Primary Industries, dated 2013. Biodiversity Assessment Method (DPIE, 2020). 	Section 6.2.2
	Aquatic flora and fauna		Indirect							
	Terrestrial flora and fauna		Cumulative							
Economic	Livelihood	Low	Indirect	Sensitive (potential resource sterilisation, reduced agricultural land uses)	Standard	Likely	Yes	General	<ul style="list-style-type: none"> Social Impact Assessment Guidelines for State Significant Projects (DPIE, 2021b). Undertaking Engagement Guidelines for State Significant Projects (DPIE, 2021d). 	Section 6.2.6
Hazards and risks	Bushfire	Low	Direct	Sensitive (emergencies, safety)	Standard	Likely	No	Specific	<ul style="list-style-type: none"> Planning for Bushfire Protection – NSW Rural Fire Service, dated 2019. 	Section 6.2.7.4
	Flooding	Low	Direct	Sensitive (on-site activities, emergencies, safety)	Standard	Likely	No	General	<ul style="list-style-type: none"> Floodplain Risk Management Guidelines (OEH), dated 2019. Floodplain Development Manual: The management of flood liable land – NSW Government, dated 2005. 	Section 6.2.8
	Hazardous and offensive development	Moderate	Direct	Sensitive (emergencies, safety)	Detailed	Likely	No	General	<ul style="list-style-type: none"> State Environment Planning Policy (Resilience and Hazards), dated 2021. Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 – Department of Planning, dated 2011. Assessment Guideline: Multi-level Risk Assessment – Department of Planning and Infrastructure (DPI), dated 2011. Hazardous Industry Planning and advisory Paper No 4 Risk Criteria for Land Use Planning (NSW Department of Planning, 2011). 	Section 6.2.7.3

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	Cumulative Impact Assessment Required?	Engagement	Relevant government plans, policies and guidelines	Section in Scoping Report
									<ul style="list-style-type: none"> Hazardous Industry Planning Advisory Paper No 6: Hazard Analysis – Department of Planning, dated 2011. 	
	Waste	Low	Direct Indirect	Sensitive (safety, environment)	Standard	Likely	No	General	<ul style="list-style-type: none"> NSW Government – DECCW – Waste Classification Guidelines, dated 2009. 	Section 6.2.11
	EMF	Low	Direct Indirect Perceived	Sensitive (amenity of nearby residences, community concern)	Standard	Likely	No	General	<ul style="list-style-type: none"> National Health and Medical Research Council advice, as updated from time to time. 	Section 6.2.7.1
Heritage	Aboriginal, encompassing any natural heritage	Moderate	Direct Indirect Cumulative Perceived	Sensitive (Aboriginal cultural heritage value, Traditional Custodians)	Detailed	Likely	Yes	Specific	<ul style="list-style-type: none"> NSW Government – OEHL – Department of Premier and Cabinet – Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW, dated 2011. NSW Government – DECCW – Aboriginal Cultural Heritage Consultation Requirements for Proponents, dated 2010. NSW Government – DECCW – Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW, dated 2010. 	Section 6.2.3
	Historic	Low	Direct Indirect	Sensitive (potential heritage values)	Standard	Likely	No	General	<ul style="list-style-type: none"> Local and State heritage registers. Heritage Office – NSW Skeletal Remains: Guidelines for Management of Human Remains, dated 1998. 	Section 6.2.3
Land	Land capability	Low	Direct Indirect Perceived	Sensitive (existing local agricultural activity and economy)	Standard	Likely	No	General	<ul style="list-style-type: none"> DPI – Agricultural Land Use Mapping Resources in NSW, dated 2017. NSW Government – OEHL – The Land and Soil Capability Scheme, dated 2012. 	Section 6.2.8
	Soil chemistry Acid sulfate soils		Sensitive (erosion, contamination and fertility of soils)						<ul style="list-style-type: none"> NSW Government – OEHL – The Land and Soil Capability Scheme, dated 2012. Soil and Land Survey Handbooks. Landcom – Managing Urban Stormwater: Soils and Construction Volume 1, dated 2004. NSW Government – Department of Environment and Climate Change – Managing Urban Stormwater: Soils and Construction Volume 2, dated 2008. DPI – Agricultural Land Use Mapping Resources in NSW, dated 2017. Acid Sulfate Soils Assessment Guidelines (Acid Sulfate Soils Management Advisory Committee, 1998). 	
Social	Way of life	Moderate	Direct Indirect Cumulative Perceived	Sensitive (social, environmental and economic values of local community)	Detailed	Likely	Yes	Specific	<ul style="list-style-type: none"> Social Impact Assessment Guideline for State Significant Projects, dated 2021. Undertaking Engagement Guideline Guidelines for State Significant Projects, dated 2021. 	Section 6.2.6
	Community									
	Accessibility									
	Culture									
	Health and wellbeing									
	Surroundings									
	Livelihoods									
Decision-making systems										
Water	Surface Water	Moderate	Direct Indirect Cumulative	Sensitive (local hydrology, groundwater and water quality) + access to water (local community values)	Detailed	Likely	Yes	General	<ul style="list-style-type: none"> Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2018. NSW Government – NSW Water and River Flow Objectives, dated 2006. NSW Government – Department of Environment and Climate Change – Floodplain Risk Management Guidelines, dated 2016. NSW Government – Floodplain Development Manual: The management of flood liable land, dated 2005. 	Section 6.2.8
	Flooding									

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	Cumulative Impact Assessment Required?	Engagement	Relevant government plans, policies and guidelines	Section in Scoping Report
	Water Supply								<ul style="list-style-type: none"> Landcom – Managing Urban Stormwater: Soils and Construction Volume 1, dated 2004. NSW Government – Department of Environment and Climate Change – Managing Urban Stormwater: Soils and Construction Volume 2, dated 2008. Department of Land, Water and Climate – NSW State Groundwater Dependent Ecosystem Policy, dated 2002. 	
	Groundwater									
Cumulative Impacts	Overall cumulative impacts associated with the Project	Moderate	Direct Indirect Perceived	Sensitive (local and regional social, environment and economic values)	Detailed	Likely	Detailed	Specific	<ul style="list-style-type: none"> Cumulative Impact Assessment Guidelines for State Significant Projects, dated 2021. 	Section 6.2.10



APPENDIX 2

Wattle Creek Energy Hub Solar and BESS – Social Impact Scoping Report



**WATTLE CREEK ENERGY HUB –
SOLAR AND BESS –
SOCIAL IMPACT SCOPING REPORT**

FINAL

September 2023

WATTLE CREEK SOCIAL IMPACT SCOPING REPORT

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Spark Renewables

Project Director: Paul Douglas
Project Manager: Penelope Williams
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Technical Manager: Rhiannon Jaeger-Michael
Report No. Final
Date: September 2023



QMS Certification Services

This report was prepared using
Umwelt's ISO 9001 certified
Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

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1.0 Introduction

This Social Impact Scoping Report (SISR) documents the process and outcomes of the scoping phase of the social impact assessment (SIA) undertaken by Umwelt for the solar energy and battery storage components of the Wattle Creek Energy Hub (the Project). It forms part of the Project's Request for Secretary's Environmental Assessment Requirements (SEARs) lodged with the New South Wales (NSW) Department of Planning and Environment (DPE) by Spark Renewables, as part of the Project's State Significant Development application under Part 4 of the *NSW Environmental Planning and Assessment Act 1979 (EP&A Act)*.

This Report has been prepared in alignment with the DPE Social Impact Assessment Guideline (2023) or 'the Guideline' and represents the 'Phase 1 SIA' for the Project. The 'Phase 2 SIA' for the Project will form part of the detailed environmental impact assessment and will be incorporated in the Environmental Impact Statement (EIS) for the Project at that time.

1.1 Project Overview

Spark Renewables proposes to develop the Wattle Creek Energy Hub to provide a reliable and affordable source of energy for the people of NSW and contribute to reducing greenhouse gas emissions associated with energy generation.

The Wattle Creek Energy Hub is located approximately 80 kilometres (km) west of Wollongong and 15km north-west of Marulan within the Upper Lachlan Shire Council Local Government Area (LGA) and is next to the Wingecarribee Shire LGA to the east, and Goulburn Mulwaree Shire Council LGA to the south (refer to **Figure 1.1**). The Project Area covers approximately 6,200 hectares (ha).

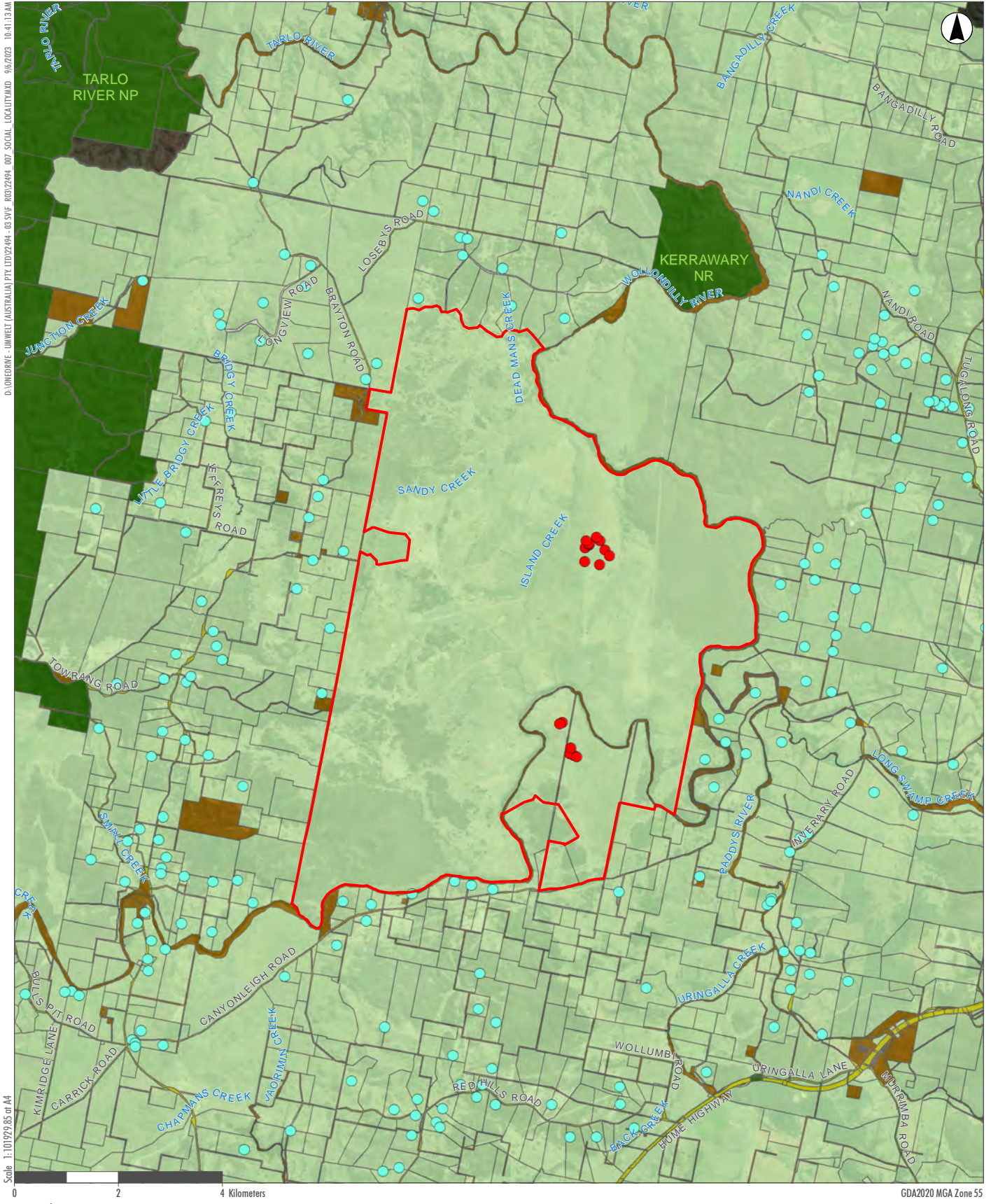
Initial investigations associated with the Wattle Creek Energy Hub included consideration of wind, solar and battery energy storage system (BESS) technology. The stakeholder consultation process undertaken throughout the scoping phase has covered all components of the Wattle Creek Energy Hub, however each component will follow separate approval pathways. Spark Renewables have decided not to proceed with the wind farm component of the Project, choosing instead to focus on developing the solar and BESS components only. This report covers the consultation process relevant to the solar and BESS components. Additionally, wind related stakeholder consultation results relevant to the solar and BESS components are also included. The solar and BESS components (refer to **Figure 1.2**) will be progressed through separate approval processes.

The Project is defined as a State Significant Development under the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) and will require development consent under Part 4 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act).

The Project includes the installation, operation, maintenance and decommissioning of a large-scale solar photovoltaic (PV) generation facility, battery energy storage system (BESS) facilities, ancillary infrastructure and temporary facilities associated with the construction of the Project. The current Spark Renewables development design incorporates approximately 490,000 PV modules to be mounted on single axis tracking systems within the development footprint, and an installed capacity of up to 265 megawatts (MW) once fully operational. The BESS will have a capacity of up to approximately 800 MW (alternating current (AC) and will have provision for up to two hours of storage (equal to 1,600 MWh).

The Project design has been informed by early consideration of environmental and social matters and has been revised during the Scoping Report stage to incorporate community and stakeholder feedback, in order to maximise positive social, economic and environmental outcomes and minimise adverse impacts. Spark Renewables has established a community and stakeholder engagement plan (CSEP) for the Project and has undertaken extensive engagement with the local community and other valued stakeholders. This community and stakeholder engagement will continue throughout the Project planning and approvals process.

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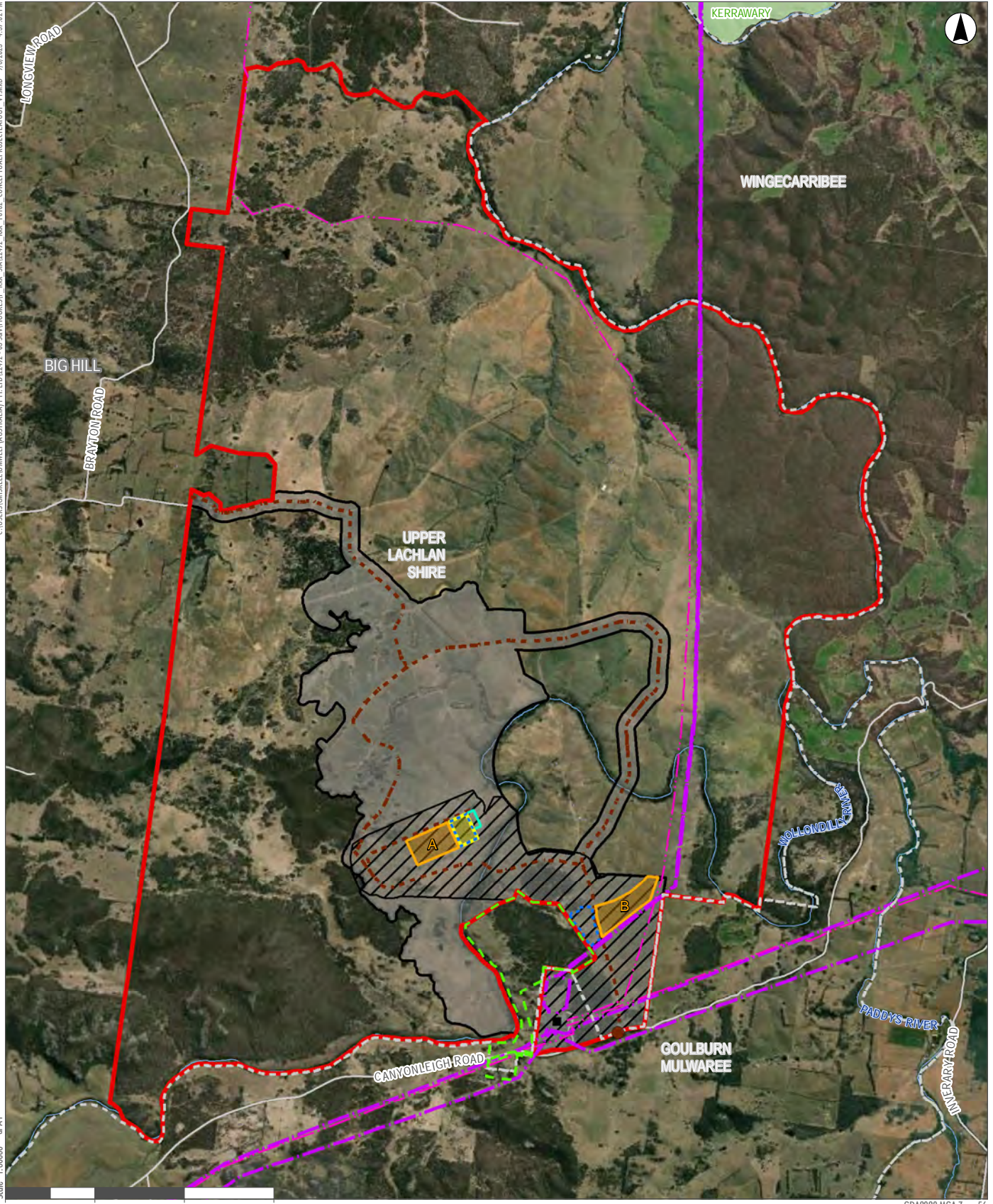
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GDA2020 MGA Zone 55

- Legend**
- Project Area
 - host dwellings
 - non-associated dwellings
- Land Tenure**
- UNKNOWN
 - FREEHOLD
 - CROWN
 - LOCAL GOVERNMENT AUTHORITY
 - SHARED CROWN / COUNCIL
 - NSW GOVERNMENT

FIGURE 1.1
Project Locality

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- | | | | |
|-----------------------|--|------------------------------|-----------------------------|
| Project Area | Marulan Gas Fired Power Station Project Area | Solar | BESS |
| Local Government Area | Existing Transmission Lines | Development Corridor - Solar | Development Corridor - BESS |
| NPWS Estate | 330kV | Solar Farm Substation | BESS Substations |
| Roads | 132kV | Test Bed Area | |
| Watercourses | Existing Substation | Proposed Internal Tracks | |
| | | Access Point | |

FIGURE 1.2
Conceptual Project Layout

1.2 Project Background

Spark Renewables was selected by the University of Sydney to investigate and develop a hybrid renewable energy facility on the University's Arthursleigh property. As part of this process, a high-level investigation area was initially identified for the Project in 2021 to inform the preliminary design. Several studies were undertaken within the investigation area to assess the feasibility of Project components and identify key environmental constraints, including biodiversity and heritage. Preliminary biodiversity assessments that commenced in March 2021 for the Project, have identified key biodiversity constraints within the investigation area (ARCADIS, 2021). The investigation area was confirmed (in February 2023) and now constitutes the Project Area (as identified in this Scoping Report), following a signed agreement between Spark Renewables and the University of Sydney to undertake this partnership.

Initial investigations associated with the Wattle Creek Energy Hub also included consideration of wind energy development. However, Spark Renewables have decided not to proceed with the wind farm component of the Project and will proceed with developing the solar farm and BESS components only.

2.0 Methodology

2.1 Social Impact Assessment Requirements

This SISR has been prepared in accordance with the NSW Government’s Social Impact Assessment Guideline (DPE 2023) as part of the Environmental Impact Assessment (EIS) process. An overview of the key SIA program phases (of which this report relates to the scoping phase) is provided below alongside the key phases of the EIA process (**Figure 2.1**). Further detail on the NSW planning framework can be found in the Scoping Report (Umwelt, 2023).



Figure 2.1 SIA and EIA Process

Source: DPE, 2023

It is a requirement of the SIA Guideline that the SIA Scoping be completed, and the findings incorporated into the proponent’s Scoping Report and Request for SEARs, and that the SIA Scoping Report includes the following:

- an understanding of the Project’s social locality
- initial analysis of the defining characteristics of the communities within the Project’s social locality, including any vulnerable groups (the social baseline)
- initial evaluation of likely social impacts for different groups in the social locality
- any Project refinements or approaches to Project development in the early phases of Project planning that will be undertaken in response to likely social impacts
- how the engagement strategy will help to identify and assess social impacts
- the proposed approach for undertaking the SIA process.

According to the SIA Guideline, and as outlined in **Figure 2.2**, social impacts can be grouped into several categories and may involve changes to people’s way of life, community, accessibility, culture, health and wellbeing, surroundings, livelihoods and decision-making systems.



Figure 2.2 Social Impact Categories

© Umwelt, 2021 (Derived from: DPE, 2023)

2.2 Defining the Social Locality

A baseline social profile gathers knowledge from both primary and secondary data sources to understand the existing social environment in which a project is proposed, and of potentially affected communities. The social baseline profile is a foundational component of SIA, as it provides the basis for assessing and predicting a project's social impacts.

The SIA Guideline (DPE, 2023) outlines the key components that should be considered in developing a social baseline, namely:

- the scale and nature of the Project
- who may be affected, including any vulnerable or marginalised groups
- any built or natural features on or near the Project
- relevant social, cultural, and demographic trends and other change processes
- the history of the proposed Project and/or development in the area, including community response to previous change.

In defining the social locality for the Project, statistical areas prescribed by the Australian Bureau of Statistics (ABS), as well as the land tenure composition of properties in, or nearby the Project Site have also been used to determine the social locality. The primary communities of interest that comprise the social locality are outlined in **Figure 2.3**.

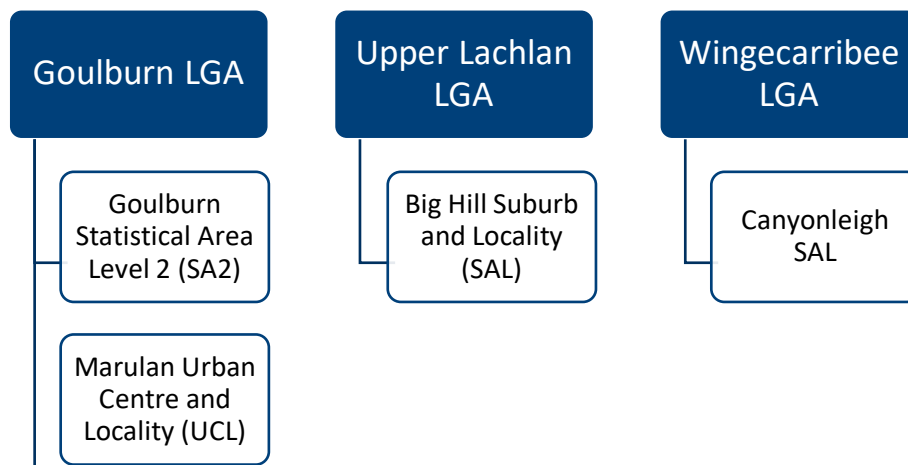
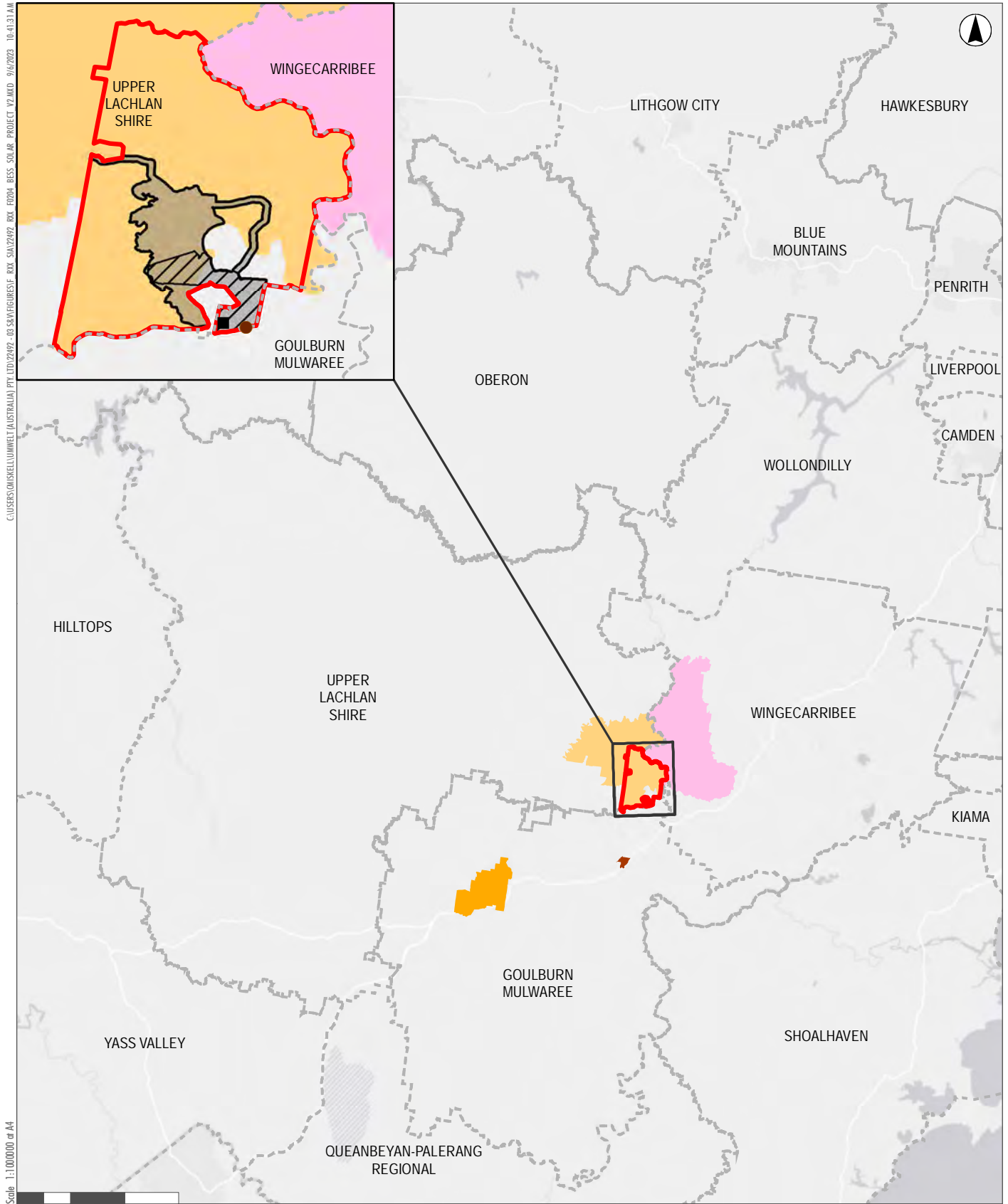


Figure 2.3 Social Locality

Figure 2.4 illustrates the Project Area and proximity of social localities.



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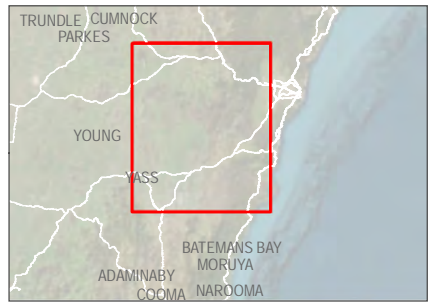
Scale 1:1000000 or A4

0 10 20 30 Kilometers

GDA2020 MGA Zone 56

- Legend**
- Project Area
 - Local Government Area
 - Development Corridor - Solar
 - Goulburn SA2
 - Development Corridor - BESS
 - Marulan UCL
 - Existing Substation
 - Big Hill SAL
 - Access Point
 - Canyonleigh SAL

FIGURE 2.4
BESS and Solar Project



2.3 Social Baseline Profile

The social baseline draws on a range of indicators and data sources to understand the socio-economic, cultural, and demographic characteristics of the communities within the social locality and is used to determine how the Project may affect different aspects of people’s lives.

Data to inform the baseline, has been gathered and summarised from publicly available secondary datasets, including the most recent Australian Census (2021) and Social Health Atlas of Australia (PHIDU, 2021), as well as through a review of local media, and local, regional, and State government plans and strategies relevant to the social locality.

Statistical and comparative analysis using ABS data has been undertaken at the community / suburb, LGA and state level to better capture key trends and themes relevant to the Project. LGA level data is also used to inform regional characteristics and trends relevant to the Project, including regional strategic planning priorities and directives.

Appendix B contains the community profile dataset that has been used to inform the social baseline. The data sources used and key indicators of interest, including a brief explanation of their relevance to the Project are outlined in **Table 2.1**.

Table 2.1 Social Baseline Indicators and Data Sources

Category	Indicator	Source
Political Capital Political representation Political identity Inclusion, voice, and power Democratisation Decision-making systems	Elected representatives and recent political history. Traditional Owners and Native Title Claims and Determinations. Community strategic planning and development priorities. Community perceptions of local governance systems. Community priorities and concerns.	State representative and electoral information (Parliament of New South Wales, n.d.). NSW Aboriginal Land Council (NSW LALC, 2022). Local and regional Strategic Planning Documents.
Natural Capital Natural resources (e.g., water, metals, energy) Ecosystems (fisheries, agricultural soils) Beauty of nature (marine reefs, National Parks)	Areas of Native Vegetation. Importance of National Parks. Water Resources. Prevalence of natural resources.	Regional Economic Profiles (Department of Primary Industries, 2021). Local and Regional Strategic Planning Documents. NSW National Parks and Wildlife Services (NSW National Parks and Wildlife Service, 2022).
Human Capital Workforce skills and abilities Education and health Vulnerable/at risk groups	Population and median ages. Population Projections. Post-secondary education attainment. Occupations. SEIFA Index of Education and Occupation.	ABS General Community Profiles (2021). DPE NSW Population Projections (2022). Social Health Atlas of Australia (PHIDU, 2021). Socio-Economic Indexes for Areas (SEIFA, 2022).

Category	Indicator	Source
Cultural Capital Worldview Language Traditions and customs Connection to Country Community identity Community values and perceptions of place	Place of Birth. Language spoken at home. Proportion of the population identifying as Aboriginal and/or Torres Strait Islander. Built heritage and tangible heritage items. Community perceptions and values.	ABS General Community Profiles, 2021. Native Title Tribunal (2020). Heritage Management Systems (Heritage NSW, 2021). Local and Regional Strategic Plans.
Social Capital Family and neighbours Community networks and inter-relationships Governance Sense of community History and heritage	Living at a different address one year ago & five years ago. Participation in volunteering. Population born overseas & in Australia. Family and household composition. Prevalence of major health issues. SEIFA Index of Socio-economic Disadvantage. Social cohesion.	ABS General Community Profiles, 2021. NSW Bureau of Crime Statistics and Research, 2021. Socio-Economic Indexes for Areas (SEIFA) (SEIFA, 2021). Social Health Atlas of Australia (PHIDU, 2021). Local Community Strategic Planning Documents.
Economic Capital Economic resources Key industry sectors Wealth of individuals, households, and organisations	Gross economic value of industry. Proportion (%) of the labour force that are: employed full-time, part-time, unemployed, and trends. Median household income. Median rental payment. Median mortgage repayments. Rental vacancy rate. Industries of Employment. Strategic economic planning. SEIFA Index of Economic Resources. Herfindahl Index Score.	Small Area Labour Markets (SALM), 2022. ABS General Community Profiles, 2021. Social Health Atlas of Australia (PHIDU, 2016). Socio-Economic Indexes for Areas SEIFA (2021). Local and regional strategic planning documents.
Physical Capital Built infrastructure Accessibility to key community services and infrastructure Information accessibility	Car ownership by households. Housing tenure characteristics. Financial housing stress. Dwellings with internet access. Strategic infrastructure planning and development. Access to health services and infrastructure. Access to accommodation.	ABS General Community Profiles (2021). Social Health Atlas of Australia (PHIDU, 2021). NSW Health (2022). Transport for NSW (2022). NSW Department of Education (2021). Local and regional strategic planning documents. Air DNA (2022). ATDW (2022).

2.4 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 directly affected by the Project.

Stakeholders for the Project were identified in the early stages of planning to inform the SIA and included the identification of any potentially vulnerable or marginalised groups. Stakeholders have been identified that relate to all components of the Project.

Key stakeholder groups that have been consulted or engaged during the scoping phase, and whose engagement outcomes have been incorporated in the SIA, are outlined in **Figure 2.5**. Subsequent phases of the SIA will seek broader involvement across each of the stakeholder groupings identified and will include consultation with community groups, service providers and residents more broadly.



Figure 2.5 Key Stakeholder Groups

2.5 Community Consultation

Spark Renewables have undertaken early community and stakeholder engagement with near neighbours and key stakeholders to inform Project design and development, and to establish and build ongoing relationships with key stakeholders. This early engagement has assisted in identifying and understanding stakeholder views and the perceived benefits, issues and impacts early in the planning and assessment process. Spark Renewables received opposition to wind farm technology (which was originally proposed but is no longer progressing) but has received a more positive consultation response on solar and BESS elements, as outlined in **Section 4.0**. A coordinated approach to community and stakeholder engagement for the Project across all components has been adopted that intends to streamline the consultation programs and integrate a common approach, aiming to:

- ensure the development and implementation of engagement that is transparent and provides clear and consistent information on all Project components
- reduce social risks associated with either Project, including stakeholder confusion with regards to what each of these include
- establish and develop trust with key stakeholders
- afford the opportunity for meaningful participation in the assessment phases for both Project components, and
- avoid engagement fatigue, particularly for stakeholders potentially affected, or with an interest, across both Project components.

Table 2.2 details the range of engagement mechanisms utilised to obtain input from various stakeholder groups for the SISR, as well as mechanisms currently proposed to be implemented in subsequent phases of the assessment program. The Community and Stakeholder Engagement Plan (CSEP) (**Appendix A**) outlines the engagement approach and strategy used to inform this report and the scoping phase of the SIA.

Table 2.2 Communication and Engagement Mechanisms

Mechanism	Targeted stakeholder	Engagement Objective	Description	First Round of Consultation	Second Round of Consultation
Website	Host landholders. Local businesses and service providers. Community groups. Traditional Owners. Broader community. Local media.	Inform	A website dedicated to the Project including a description and overview of the Project, development application process, company information, responses to key concerns, risk management plans, maps, media releases and contact; and subscription information.	A Project-dedicated website and email address were established in February 2023 introducing the Project. Updates have been made throughout the preparation period.	The email address will be monitored; and the website updated when required across subsequent phases.
Media Release	Local Government. Traditional Owners. Host landholders. Neighbouring/proximal landholders. Community groups. Wider community. Local businesses and service providers. Local media.	Inform	To introduce the Project to the broader community through local and regional media channels.	Advertising in the Goulburn Post and media features on ABC radio stations in March 2023 to advise of upcoming consultation opportunities and provide Project updates.	Subsequent media releases will be developed when required during the EIS phase.
Community Newsletters	Broader community.	Inform	Project information sheets to distribute information about the Project to the broader community and targeted stakeholders.	No. 1 – Project overview and invitation to drop-in session was distributed in March 2023 immediate project neighbours within 3km of proposed infrastructure.	No. 2 - To provide a Project update and share notes and feedback received from the community during the scoping phase. No. 3 - To provide a Project update and present the draft findings of EIS & SIA and inform the community of the exhibition process.

Mechanism	Targeted stakeholder	Engagement Objective	Description	First Round of Consultation	Second Round of Consultation
Drop-in Session	Broader community Community groups. Local businesses and service providers.	Consult	Multi-hour time periods when stakeholders can drop in to speak to the Project team and experts, view documents and plans and ask questions of the Project team.	One drop-in session held on 9 March 2023 at the Marulan War Memorial Hall.	A session to summarise the draft results of the technical studies and gain feedback for the SIA will be held in the EIS phase.
Online Survey	Broader community.	Consult	Online or offline surveys to obtain input and feedback on Project decision-making, as well as specific information about the needs, desires and impacts on stakeholders related to the Project.	Established in March 2023, with all feedback until 28 April, to be considered in this SISR.	The survey will be updated and distributed in the second phase to provide opportunity for the community to provide further feedback and validate impacts from the scoping phase. Also used to understand potential mitigation and enhancement measures.
Personal Meetings or Interviews	Proximal landholders. Local Government. Community groups. Traditional Owners.	Involve	Introductions to the Project, semi-structured interview discussions to listen to individual concerns, interests, and issues to gather preliminary feedback, including sensitivities, understanding of information needs; and future engagement preferences	One-on-one meetings held throughout the months of March and April 2023, with members of the Spark Renewables Project team.	Follow up interviews and meetings will occur during the preparation of the SIA and EIS Interviews with local businesses and services providers, will occur during the preparation of the SIA and EIS.

Mechanism	Targeted stakeholder	Engagement Objective	Description	First Round of Consultation	Second Round of Consultation
Project Briefings	State Government. Local Government. Traditional Owners. Community groups.	Involve	Formal briefings to key stakeholders and government agencies, with Project Information Sheets and/or slide decks, to formally introduce the Projects.	Initial Project briefings undertaken in March and April 2023. Included a briefing at the Canyonleigh Community Association meeting on 22 March 2023.	Further Project briefings will be undertaken across subsequent phases of the Project as required.

Table 2.3 outlines the stakeholders that have participated in the scoping phase of the Project’s planning and assessment process to date, as well as those who have informed the development of this report. All identified stakeholder groups have been contacted a minimum of three times to offer participation through a range of mechanisms.

Table 2.3 Stakeholders consulted during scoping phase

Stakeholder group	Mechanism used	Number contacted	Number engaged
Proximal Landholders	Personal meetings.	113	26
Broader Community Residents	Media release.	25	50%
	Project website – new users visiting the website for the first time.	NA	249 new users (1 Apr-16 Aug 2023)
	Community newsletter.	113	NA
	Drop-in session.	NA	42 ¹
	Canyonleigh community meeting briefing.	NA	56 ²
	Online survey.	NA	19
Local Government	Project briefing and interview.	3	2 ³
Traditional Owners	Project briefing and interview.	2	1
Local Community, Environmental and Special Interest Groups	Project briefing and interview.	5	2
Total⁴			148

¹ Some attendees at the drop-in session were also engaged by alternate methods, such as personal meetings and online surveys.

² Some attendees at the community meeting were also engaged by alternate methods.

³ Refers to number of Councils, rather than number of meetings held.

⁴ Noting some stakeholders may be double counted if they were engaged via multiple mechanisms.

Quantitative and qualitative information collected through the engagement activities in the scoping phase have been analysed to inform the preliminary analysis of social impacts associated with the Project, as outlined in **Section 4.0**.

2.6 Preliminary Impact Evaluation

As noted above, a preliminary evaluation of the issues and impacts identified during the scoping phase (outlined in **Section 4.0**) has been undertaken to understand the level of assessment required for each impact in the EIS/SIA-preparation phase, and to inform Project refinements, design, and planning.

The significance assessment has been undertaken using the risk matrix provided in the NSW DPE SIA Guideline (2023) (refer to **Figure 2.6**), which considers social impact likelihood, and magnitude through the assessment of key characteristics of impact (extent, duration, intensity or scale, sensitivity or importance and level of concern or interest).

Each project activity is assessed by its potential impacts on people, whether previous investigation of the impact has been undertaken, the potential for cumulative impacts, and possible mitigation or enhancement measures to reduce negative impacts and enhance positive impacts. Social impact characteristics that have been considered in this preliminary evaluation include:

- extent – geographical area and stakeholders identified that are affected directly, indirectly, or cumulatively by the impact
- duration – the timeframe over which the impact occurs
- severity or scale – likely scale or degree of change from the existing condition because of an impact (e.g., mild, moderate, severe)
- intensity or importance – sensitivity susceptibility or vulnerability of people, receivers or receiving environments to adverse changes caused by the impact, including value or importance to the community, the extent to which it is tied to their identity and their capacity to cope with or adapt to change.

Based on an assessment of these impact characteristics, the likelihood and magnitude of the potential impact (positive or negative) and its occurrence across differing stakeholder groups is determined making use of the impact significance matrix in the Guideline (DPE, 2023).

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

Figure 2.6 Social Impact Significance Matrix

Source: DPIE, 2023

This preliminary evaluation informs the level of assessment of each impact to be undertaken in the Phase 2 SIA, as outlined in the Technical Supplement (DPE, 2023) (refer to **Figure 2.7**).




		Secondary data	Primary data Consultation	Research
	Minor assessment	Required	Limited - if required (e.g local council)	Not required
	Standard assessment	Required	Targeted consultation	Potentially targeted research
	Detailed assessment	Required	Broad consultation	Targeted research

Figure 2.7 Level of Assessment

Source: DPIE, 2023

2.7 Assumptions or limitations

The following dot points outline assumptions of importance in the development of the SISR, and any limitations in approach at this stage of the Project. It is intended that these will be addressed in subsequent phases of the SIA.

- Consultation has been initiated with various Aboriginal stakeholders, including Traditional Owners and their representative groups; however, only early-phase consultation has been completed to date. There is a commitment to engage with Aboriginal stakeholders in the assessment phase of the SIA and in the Project’s CSEP as the Project progresses.
- Efforts have been made to consult relevant councils. Spark Renewables have had individual meetings with Upper Lachlan Shire, Goulburn Mulwaree Shire Council, and Wingecarribee Shire Council in May 2023. Outcomes of these initial meetings, and ongoing meetings with Councils throughout the planning and assessment process will be considered in the SIA.

3.0 Social Baseline Profile

This section describes the social baseline profile of the communities defined within the Project's social locality. It provides initial analysis of the defining characteristics of the communities, considering a range of demographic, social and economic indicators as outlined in **Table 2.1**. Further, it considers the natural and physical attributes of the social locality and an understanding of how people currently live, work and recreate in the area, and how they value the area in which they reside.

The following components have been considered in the development of the social baseline for this Project:

- **Development context** – a review of recent development history in the local community, including how people have felt or experienced these changes, and different issue trends or patterns.
- **Geographic and spatial** – identification of communities of interest and relevant stakeholders.
- **Socio-political setting** – an understanding of the relevant governance structures, including those of Traditional Owners and the Local Aboriginal Land Council, and government authorities.
- **Community capital/assets** – an assessment of the social, cultural, and demographic characteristics of the identified communities and their resilience and adaptive capacity.
- **Key community values, issues, and concerns** – documentation of current community issues and values, as identified in key strategic planning documents, regional plans and/or community studies, as well as through analysis of local and regional media sources.

3.1 Local and Regional Setting

As identified at **Section 2.2**, the Project is of relevance to three NSW LGAs.

The Project Area is approximately 6,200 hectares (ha) and is located within the LGA of **Upper Lachlan Shire**. The Shire is situated in the Central Tablelands of NSW and covers an area of approximately 7,200 km². The LGA has a population of 8,514 and is largely characterised by its regional character (Upper Lachlan Shire, 2013). The Shire has three main centres - Crookwell, Gunning and Taralga – and is in close proximity to regional cities of Goulburn and Bathurst, as well as both Canberra (130km south) and Sydney (240km north-east). The locality of Big Hill is directly north-west of the Project Area and is the closest town in the Upper Lachlan Shire LGA to the Project Area. Big Hill is characterised by agricultural land use as well as National Parks such as Limeburners Creek and has a population of 78 (NSW National Parks and Wildlife Service, 2023).

The **Goulburn Mulwaree LGA** borders the southern Project Area boundary. It covers a smaller area (3,223km²) and has a much larger population than Upper Lachlan Shire, sitting at 32,053. The township of Goulburn is the most populous within this LGA, accounting for 24,565 people (.id, 2021). The Council administers an area of 3,223 km² encompassing Goulburn, Marulan, Tarago and Towrang. The township of Marulan has a population of 819 and is especially relevant to the Project as it is the nearest population centre to the Project Area. The town is home to the Marulan Spring Festival, self-guided historic tours, gourmet coffee, food and boutique shops (Goulburn Australia, n.d.).

Wingecarribee LGA, bordering the eastern boundary of the Project Area is the most populous of the three LGAs, with a population of 52,709. The major townships within the LGA are Bowral, Moss Vale, Mittagong and Bundanoon. The LGA has a semi-rural landscape, characterised by small towns and villages (Wingecarribee Shire Council, 2022). The Canyonleigh township, that is directly north-east of the Project Area is known as the outback of the Southern Highlands due to the rural landholdings and location and has a population of 455 (Visit Southern Highlands, n.d.). The rural landscape has made Canyonleigh a popular location for bed and breakfast style accommodation, including homestays such as Airbnbs.

All land within the Project Area is owned by the University of Sydney. The Project Area is currently operated commercially and is used for a range of research initiatives including agricultural science, pasture agronomy and unmanned vehicle application. There are approximately 47 non-associated dwellings within 4km of the Project Area. The land surrounding the site is largely used for agricultural purposes.

3.2 Development Context

This section draws on several data sources to build an understanding of the development context within the region, and the social locality in which the Project Area is based. Understanding the locality's historical response to change assists in predicting how the Project may be perceived and accepted locally; and the degree to which the Project aligns with community values and local sentiment.

3.2.1 Energy Policy in NSW

Australia's commitment at the international level to the Paris Climate Accord has influenced the growth of and investment in the renewable energy sector across the country.

In 2013, the NSW Government released the NSW Renewable Energy Action Plan (the Plan) which consists of 24 actions under 3 goals outlining the State Government's intention to work with communities and the renewable energy industry to increase renewable energy generation in the state. The Plan was implemented alongside the Energy Efficiency Action Plan, and the successful implementation of the Plan was completed in December 2018 (NSW Government, Planning & Environment, 2017).

The Plan guides renewable energy development and aims to streamline negotiations between network service providers and investors to make timeframes for grid connections in NSW more competitive. The Action Plan also encourages early and effective community engagement in renewable energy projects (NSW Government, Planning & Environment, 2017).

In November 2020, the NSW Government announced its plans to invest \$32 billion into renewable energy over the next decade as part of its NSW Electricity Infrastructure Roadmap. The Government outlined that such investment would generate 6,300 construction jobs and 2,800 ongoing jobs, along with \$1.5 billion in lease payments for landowners, especially in regional NSW for wind and solar farms. The government also announced a Manufacturing Renewables Taskforce to "create local jobs and support local industry".

The NSW Government's current energy security policy and approach to a clean energy transition is being delivered through the strategic development of the renewable energy sector, as outlined through the NSW Government's Renewable Energy Action Plan (2013), Electricity Strategy (2019) and the Electricity Infrastructure Roadmap (2020). In 2020, the NSW Government announced their Net Zero Plan 2020-2030, aimed at cutting emissions by 70% by 2035. This plan highlights renewable energy as a key strategy in lowering the intensity of emissions.

A key action from the Roadmap is the creation of Renewable Energy Zones (REZ). Five REZs are at various stages of development including in the Central West-Orana, New England, South-West, Hunter-Central Coast, and Illawarra, selected based on the availability of resources and existing connecting infrastructure, and have a generation capacity limit set for each region. Whilst the Project Area is not located within any of the current REZs, the site is mapped under the Renewable Energy Map of New South Wales (NSW Government 2018) as receiving the same or higher level of average daily solar exposure (megajoules per square metre) as parts of the Illawarra REZ.

This Project aligns with the NSW Electricity Strategy and its objective to transform the NSW electricity system into one that is cheap, clean, and reliable.

Furthermore, in supporting the implementation of these projects, and in providing communities more certainty around the delivery of energy infrastructure, the Government has provided an opportunity for communities to participate more centrally in the Projects' development through the introduction of the NSW SIA Guideline (DPE, 2023) and updated guidelines relating to key assessment issues.

3.2.2 Development History

Renewable energy has been recognised within both local and regional plans as an area for future investment. The Upper Lachlan Shire LGA Regional Economic Development Strategy 2018-2022 recognises the need for a plan for renewable energy which benefits the community (Upper Lachlan Shire Council, 2018). The Wingecarribe 2040 Local Strategic Planning Statement outlines the move to reduce greenhouse gas emissions through an increased uptake in renewable energy and storage solutions (Wingecarribee Shire Council, 2020). The Goulburn Mulwaree Council Operational Plan 2020-2021 outlines renewable energy as the future of energy which will create sustainable outcomes for the community (Goulburn Mulwaree Council, 2020). Similarly, the *South East and Tablelands Regional Plan 2036* (NSW Planning and Environment, 2017) in which the three LGAs sit, has a clear direction to position the region as a hub for renewable energy to ensure a connected and prosperous economy.

3.2.2.1 Comparable Developments

This section draws on several data sources to build an understanding of the renewable energy development context of the region and to capture any ongoing social change processes, in the area of social influence.

Historically, the area has seen the development of wind farm projects with the Crookwell Wind Farm located approximately 50km to the northwest of the Project site, being the first wind farm to be developed in Australia, first commissioned in 1998 (Tilt Renewables, 2022). The Taralga Wind Farm located approximately 30km to the north was commissioned in 2015.

A media review has revealed that there is support for renewable energy in the community, with media reporting on positives associated with increased local spending (McCabe, 2021), and through supplementary income for property owners who host renewable infrastructure (Coote, 2017). Despite this, community concerns relating to perceived decreases in property value and visual impacts of renewable projects has also been heavily reported on (Koziol, 2022; Coote, 2017). There has also been clear opposition to renewable energy projects in the region, with community groups forming in response to proposed projects, including the Stop Gundry Solar Farm Action Group, and the HumeLink Action Group (Stop Gundry Solar Farm, 2023) (Goulburn Post, 2021).

A select number of comparable projects in the region have been reviewed to identify how relevant stakeholders and communities have responded to these proposed developments, to inform an understanding of the potential concerns and community perceptions in relation to the proposed Wattle Creek Energy Hub. These projects are outlined in **Table 3.1** and focus on other renewable energy projects.

Table 3.1 Comparable Renewable Energy Projects

Project	Location	Approximate Distance to Project	Status	Description	Cumulative Impact
Operational					
Crookwell 2 Wind Farm	Roslyn	43km	Operational.	Operational since 2018, the wind farm consists of 28 wind turbines.	Unlikely.
Taralga Wind Farm – Pacific Hydro	Taralga	30km	Operational.	A 51-turbine wind farm. The turbines can generate up to a total capacity of 107 MW for the life of the Project.	Visual amenity. Community investment.
Cullerin Range Wind Farm	Cullerin	64km	Operational.	Consists of 15 turbines and has been operational since 2019.	Visual amenity.
Woodlawn Wind Farm	Tarago	69km	Operational.	48.3 MW wind farm in operation since October 2011.	Unlikely.
Capital East Solar Farm	Tarago	78km	Operational.	500 kW solar farm, operational since January 2018. Linked to Capital Wind Farm substation.	Unlikely.
Capital Wind Farm	Tarago	78km	Operational.	140.7 MW wind farm, operational since January 2010.	Unlikely.
Approved/ Construction not yet commenced					
Crookwell 3 Wind Farm	Roslyn	43km	Working with local councils to acquire final permissions for construction. (GPG, n.d.)	The Project site will cover approximately 1,500ha. It includes two separate development parcels to the east and south of the existing Crookwell 1 and approved Crookwell 2 Wind Farms.	Visual amenity. Construction workforce may have a cumulative impact on access to accommodation, and an increase in traffic.
Springdale Solar Farm	Sutton	93km	Determination 2021. Construction timing TBC.	120MW of direct current (MW _{dc}) and 100 MWs of export capacity.	Unlikely.

Project	Location	Approximate Distance to Project	Status	Description	Cumulative Impact
Coppabella Wind farm (previously Yass Valley Wind Farm)	Yass	141km	Determination 2016. Construction to fully commence in late 2023.	Up to 284 MW. Construction of the wind farm, managed by Goldwind Australia.	Unlikely.
Proposed/ Under Assessment					
Marulan Solar Farm, Terrain Solar	Marulan	12km	Preparing a response to submissions.	150 MW solar farm.	Construction workforce may have a cumulative impact on access to accommodation, and an increase in traffic.
Merino Solar Farm, ITP	Tirrannaville	44km	Preparing scoping report.	450 MW solar farm with an associated Battery Energy Storage System.	Visual amenity. Community investment.
Parkebourne Solar Farm	Goulburn	51km	EIS currently in preparation.	600 MW solar farm.	Visual amenity. Community investment.
Western Range Solar Farm	Gunning	75km	EIS currently in preparation.	175 MW solar farm.	Visual amenity. Community investment.
Blind Creek Solar Farm	Bungendore	87km	Assessment.	350 MW solar farm with battery storage, transport route: Hume Highway, Braidwood Road, Bungendore (80 NGH Pty Ltd) (20-403 Final v1.1 Road and Tarago).	Unlikely.
Wallaroo Solar Farm	Wallaroo	116km	EIS currently in preparation.	100 MW solar farm. The solar farm has an estimated construction period of approximately 9-12 months, with peak around 6 months.	Unlikely.

Project	Location	Approximate Distance to Project	Status	Description	Cumulative Impact
Hume Link	Wagga Wagga City, Snowy Valleys, Cootamundra-Gundagai Regional, Yass Valley, Upper Lachlan Shire	149km (from Bannaby substation)	Prepare EIS.	Development of new transmission lines between the existing substations at Wagga Wagga and Bannaby and the proposed Maragle substation; and a new substation at Gugaa.	Unlikely.

Furthermore, **Table 3.2** outlines other major projects and operations occurring in other industries across the region and the potential cumulative impact these projects may have in relation to the Project.

Table 3.2 Other Developments

Project	Location	Approximate Distance to Project	Status	Description	Cumulative Impact
Gunlake Quarry	Marulan	10km	Operational	Opened in the early 2000's the quarry is consented for 2 million tonnes per annum. Based on current reserves, the quarry has an expected life of over 100 years (Gunlake, 2022).	Traffic. Community Investment.
Marulan Quarry	Marulan	10km	EIS currently in preparation	Global Quarries Australia are seeking to develop the proposed quarry to Extract up to 500,000 tonnes of hard rock per annum. The quarry has an expected life of 18 years.	Depending on project approval and timing, its construction workforce may have a cumulative impact on access to accommodation, and an increase in traffic.
Marulan gas fire station	Marulan	12km	Approved	Two gas-fired power stations with 350 MW open cycle gas-fired power station. Construction expected to commence in 2023.	Construction workforce may have a cumulative impact on access to accommodation, and an increase in traffic.
Lynwood Quarry	Marulan	14km	Operational	Hard rock quarry initially approved in 2005 with the consent since five times. The most recent modification (MOD 5) was approved in May 2017. The quarry produces up to 5 million tonnes per annum and was initially approved for a period of 30 years. The quarry has an expected life of over 50 years(Holcim, 2004).	Traffic. Community Investment.

Project	Location	Approximate Distance to Project	Status	Description	Cumulative Impact
Woodlawn Advanced Energy Recovery Centre (ARC)	Tarago	66km	Preparing EIS	Recovery facility that will turn un-recyclable waste into energy. It is estimated to produce electricity for 40,000 homes per annum and divert 380,000 tonnes of waste from landfill per annum. 3-year construction period. 300 jobs will be created during construction and 40 jobs will be created during operation.	Potential for cumulative impacts on accommodation, traffic and workforce access depending on timing of project approval and commencement of construction.
Wingecarribee-Goulburn Water Pipeline	Goulburn	75km (Wingecarribee Reservoir)	Determination	Approximately 83km of DN 300mm to DN 375mm diameter pipeline, a pump station at the Wingecarribee Reservoir, power and controls, a balance tank and a telemetry system.	Construction workforce may have a cumulative impact on access to accommodation, and an increase in traffic.

3.2.3 Community acceptance to solar and battery technology

The following sections consider state led surveys on renewable energy projects, community sentiment as represented by media and Project specific feedback.

Broader Community Sentiment

Energy NSW conducted a telephone survey of a representative sample of 2,000 people aged 18 years and over from across NSW from late August to mid-September 2014. The survey sought to understand the level of support for renewable energy projects, level of knowledge and perceived impacts from renewable energy projects. In regard to acceptance of solar and wind farms, solar farms presented a higher acceptance rate (Office of Environment & Heritage, 2015).

The key issues identified by survey respondents around solar farms were primarily related to the location of solar modules, the land use and their impact on the environment (Office of Environment & Heritage, 2015) (refer to **Figure 3.1**). There has also been community concern expressed regarding the loss of important agricultural land in the Central West; in particular, due to solar or wind farm development (Gulgong Residents for Responsible Renewables, 2019). This concern is echoed in the media, with residents arguing renewable energy should be developed in marginal country, not productive land, and holding concerns relating to food security and the environment (Calver, 2022).

Other solar farms have been called to help alleviate the social and financial costs to the community who will be impacted by the solar farms during construction through community benefit contributions (Peacock, 2022). The main benefit identified by survey respondents related to solar farms was the benefit to the overall environment of renewable energy production, the potential for decreased cost of electricity and local economic benefits (Office of Environment & Heritage, 2015).

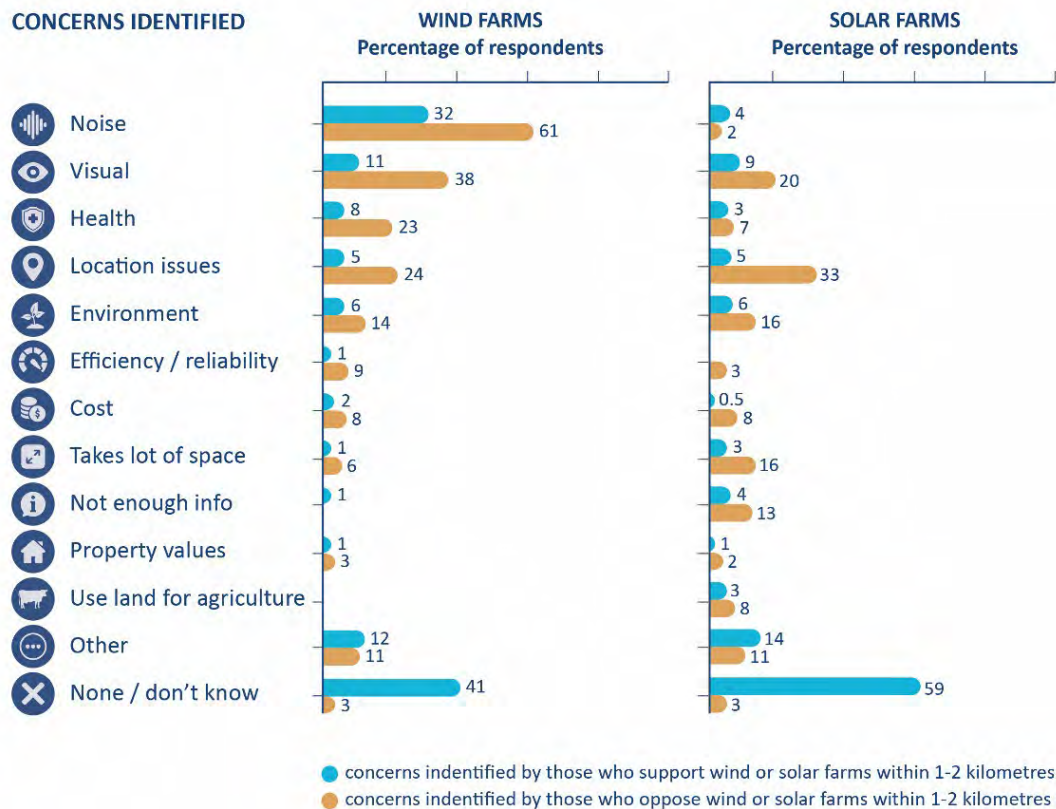


Figure 3.1 Concerns identified in relation to renewable energy projects in NSW

Source: Energy NSW Community Survey, 2015

Battery storage for renewable energy has been highlighted in the media as a benefit to the communities, as it has been identified by the Former NSW Energy and Environment Minister Matt Kean as a way to “keep costs down during peak energy periods and support more renewable energy to come online” (Hannam, 2021). Battery storage has provided solutions to barriers of acceptance to other renewable energy technologies due to its impact on renewable energy reliability and perceptions of feasibility of renewable energy projects, with battery energy storage being identified as a solution to the community question of “when the sun doesn’t shine or the wind doesn’t blow” (Smith, 2023).

Battery storage had also been found to be a cheaper option when compared to building new gas plants to support fossil fuel energy consumption demonstrating the benefits of renewable energy economically (Smith, 2023). The acceptance of the transition from coal-fired energy to renewable energy such as battery storage has caused concern from those employed in the coal-fired sector due to the potential loss of employment (Scott, 2023).

Project Specific Sentiment

Community consultation with stakeholders was conducted by Umwelt and Spark Renewables regarding the Wattle Creek Energy Hub to understand the level of community awareness and acceptance regarding renewable energy technology. There were 17 respondents to the questions in the online survey that have been analysed to inform the following averages. As demonstrated in **Figure 3.2**, there is an average level of awareness of battery energy technology (average of 5.9 out of 10). Further, **Figure 3.3** demonstrates that the level of awareness across respondents for solar energy technology is high (average 7.3 out of 10).

Despite this, **Figure 3.4** indicates that there is a low level of acceptance of renewable energy projects within the community, with the rate of acceptance averaging 3.2 out of 10. Additionally, **Figure 3.5** demonstrates that the level of acceptance of the Wattle Creek Energy Hub Project is lower than general acceptance of renewable energy projects, with an average of 2.7 out of 10. This correlates to the higher level of negative impacts associated with the Project which were highlighted by participants in the online survey (refer to **Table 4.1**) discussed throughout **Section 4.0**.

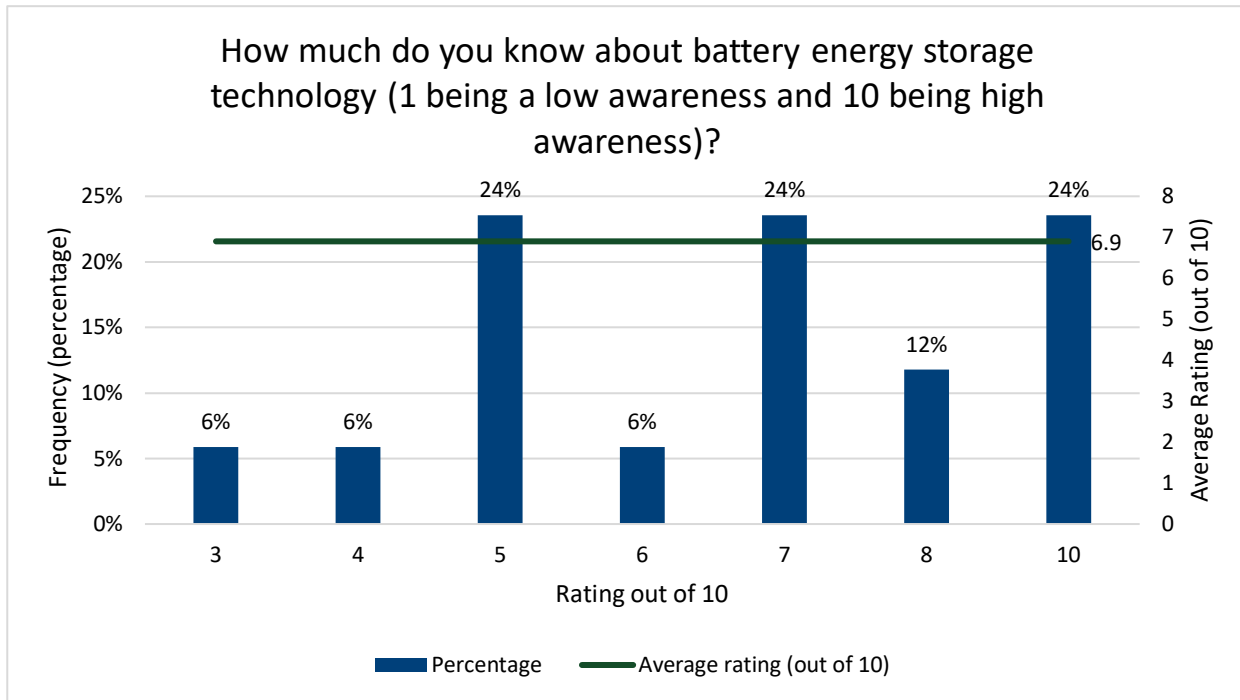


Figure 3.2 Community Awareness of Battery Energy Storage

Source: Umwelt, 2023, (n=17)

When asked to provide a reason for their rating, respondents mentioned that they had conducted prior research and attended the information session for the Project. Other respondents stated that their occupation and the completion of a relevant degree increased their understanding. Lastly, one respondent also linked their level of awareness to owning a private battery energy unit.

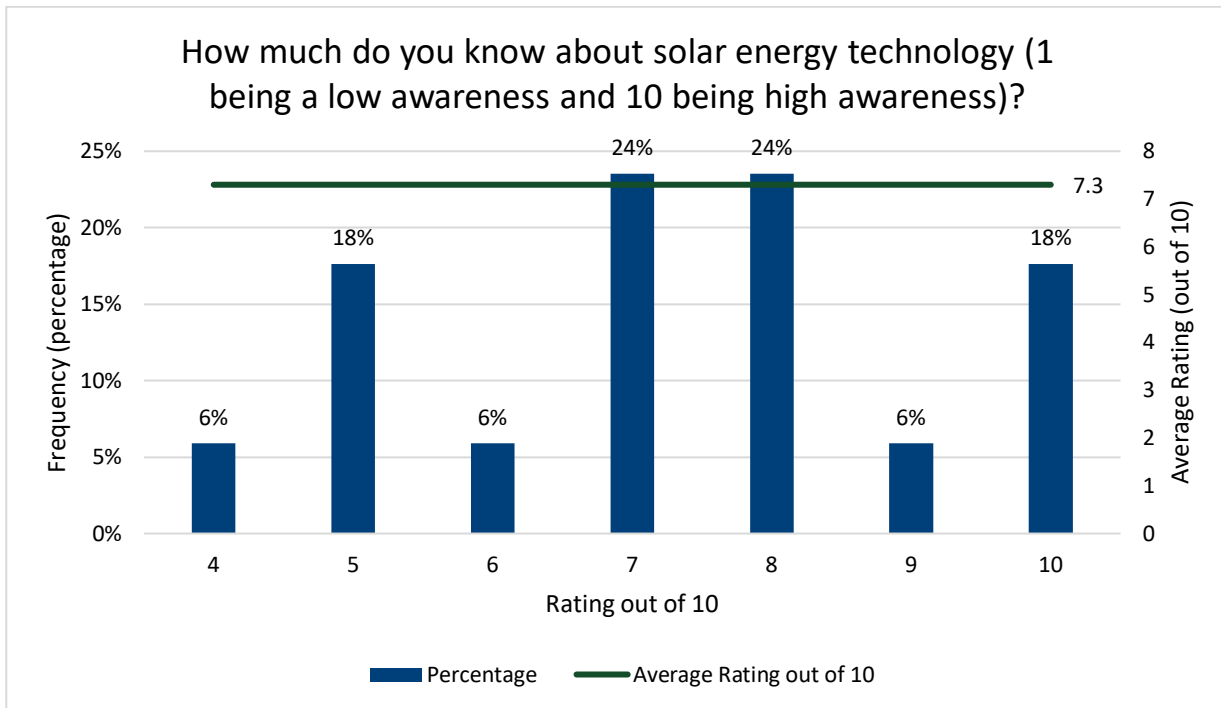


Figure 3.3 Community Awareness of Solar Energy Technology

Source: Umwelt, 2023, (n=17)

When asked to explain the reason for their rating, many respondents linked their awareness to having a privately owned solar energy system. The high level of awareness was shown to also be correlated to some respondent's occupation and the completion of relevant tertiary education.

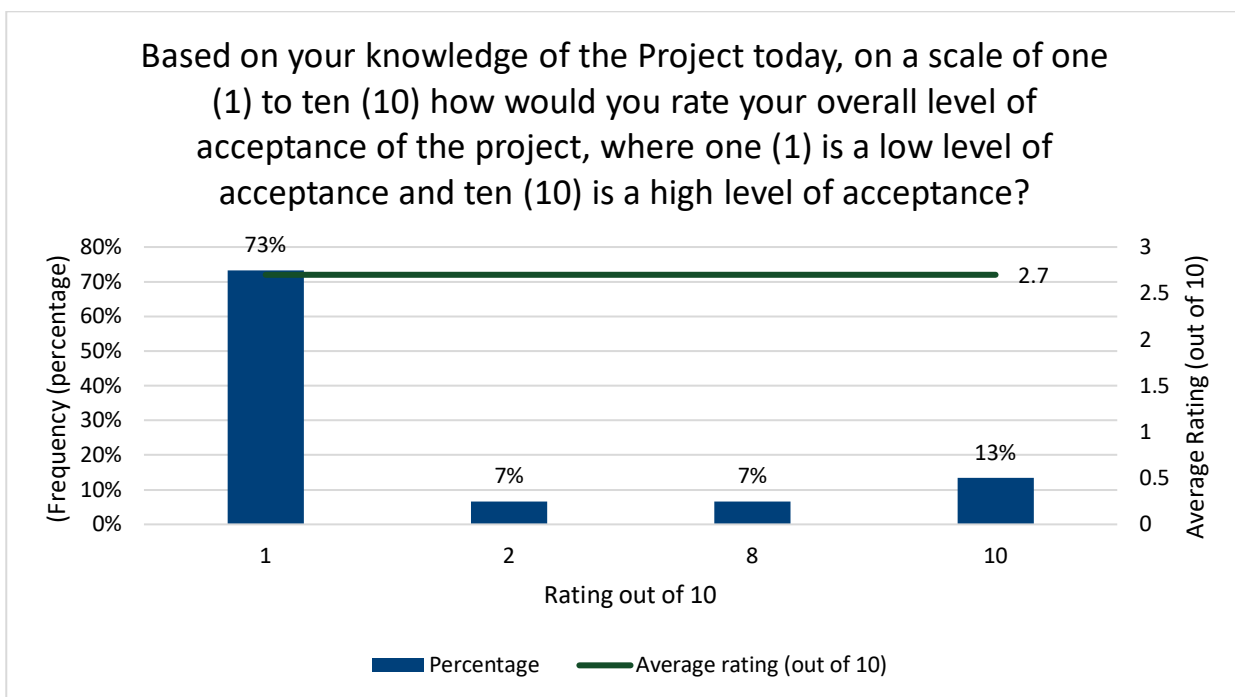


Figure 3.4 Level of Acceptance of Renewable Energy Projects

Source: Umwelt, 2023, (n=17)

Again, when asked to provide a reason for their rating, there were a range of reasons provided as contributing to the level of acceptance for renewable energy projects in the region. Most cited were impacts on visual amenity, raised in relation to both wind and solar, followed by decreases in property values. Other reasons provided included a lack of information, knowledge gained from their occupation, destruction of rural areas and environment, social amenity and the cost of such projects.

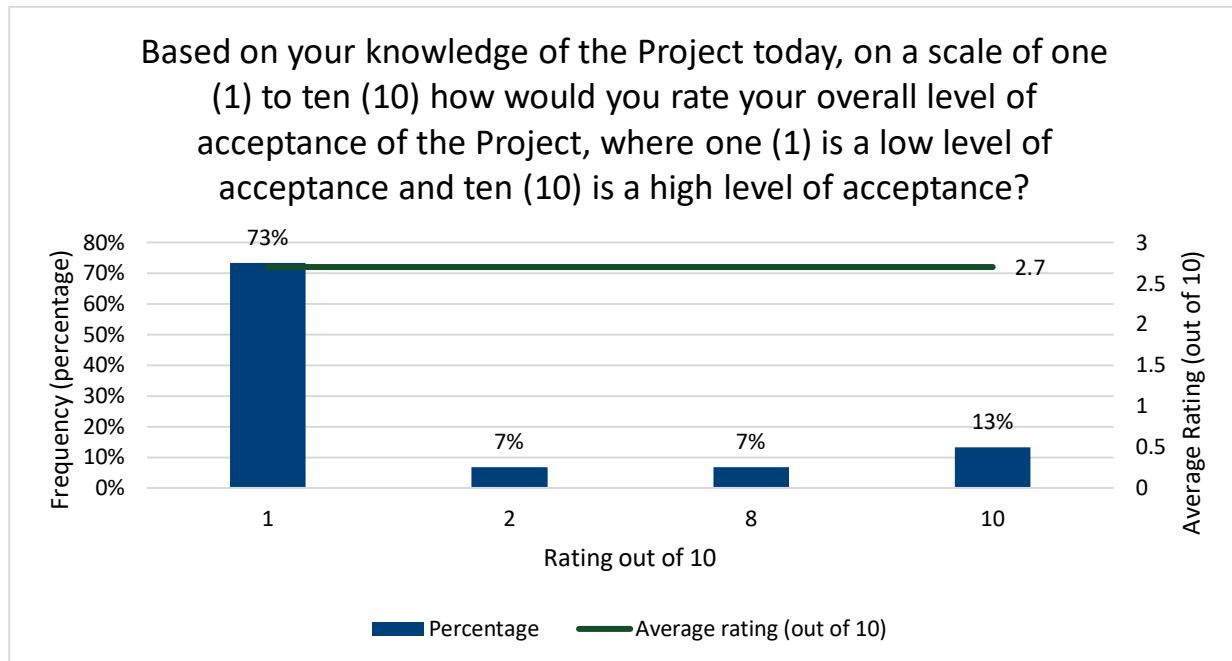


Figure 3.5 Level of Acceptance of the Wattle Creek Energy Hub Project

Source: Umwelt, 2023, (n=17)

This low level of acceptance of the Project is correlated to a range of factors raised by participants, including a concern that the negative impacts will outweigh the positive, a belief that the location is not appropriate, and size of Project is too big. These issues were raised more often for the proposed wind farm, rather than solar and battery, with 2 participants stating a preference for the solar farm over the wind farm.

3.3 Sustainable Livelihoods Approach

To better understand the social locality, and to evaluate community resilience and adaptive capacity, the social baseline has utilised the Sustainable Livelihoods Approach (U.K. Department for International Development (DFID, 2001), and the community capitals approach outlined in the IAIA SIA Guidance (IAIA, 2015), for analysis purposes.

According to the Sustainable Livelihoods framework, people seek to maintain their livelihood within a context of vulnerability. Specifically, threats to their livelihood including shocks (such as sudden onsets of natural disasters, health problems, conflicts, and economic crises), trends (for instance, those relating to the economy, health, resources, and governance) and seasonality (such as cyclical fluctuations in prices or employment), with people drawing on these assets to build and maintain their livelihood. Consequently, a livelihood is considered sustainable ‘...when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base’ (DFID, 2001).

The DFID approach draws on a number of broad categories of community capital as a fundamental basis to identifying and further enhancing community capacity and resilience, with this approach used in many SIA studies (Coakes and Sadler, 2011) (refer to **Figure 3.6**).



Figure 3.6 Capitals Framework

Adapted from Coakes and Sadler (2011)

3.3.1 Natural Capital

Natural capital refers to the natural assets and resources that contribute to community sustainability. Natural capital can include resources such as minerals, land, forests, and waterways, that provide benefit to the community, as well as environmental assets that provide cultural, social, or recreational value.

Table 3.3 Natural Capital Summary

Key Takeaway	Description
<p>The region includes conservation areas, national parks and reserves</p>	<p>The Southern Highlands includes a range of conservation areas, reserves and national parks that are valued in the local community. The Tarlo River National Park is located directly to the west of the Project site. The park is home to some threatened animal and plant species, and sites of Aboriginal cultural value have been recorded (NSW National Parks and Wildlife Service, 1998).</p> <p>The Wombeyan Karst Conservation Reserve, located to the northwest of the Project site is a popular tourist attraction and also a conservation area for endangered species. The caves consist of a series of limestone caves (NSW National Parks and Wildlife Service, 2023).</p>
<p>There is a long history of agriculture and grazing in the community</p>	<p>The Southern Highlands has a long history of agriculture, with livestock grazing continuing to occupy most of the productive land in the Upper Lachlan Shire. Agricultural production such as Virbac, farming of sheep, cattle, alpacas, potato growing and wool industries are an important contributor to the local economy in the Upper Lachlan Shire (Upper Lachlan Shire Council, n.d.) (further explored in Section 3.3.2). The Upper Lachlan Shire Council recognises the importance of the rural landscapes, with new development which includes building, renovating, demolishing, tree removal, subdividing land, the display of advertising, or changing the use of a building or land, needing to compliment this landscape, noting that need to foster an agricultural industry that is “diverse, adaptive and innovative” (Upper Lachlan Shire Council, n.d.).</p> <p>Goulburn Mulwaree is predominantly rural, with the main land use (accounting for 69.6%) being for primary production. This is largely dominated by sheep grazing, with some cattle grazing and boutique industries. There are also two operational quarries in Marulan – Lynwood and Gunlake (.id, 2021).</p> <p>Similar to the other two LGAs, the Wingecarribee is predominately agricultural land use (.idcommunity, 2021) Wingecarribee Council have expressed the desire to maintain the rural landscape as the north of the Shire is characterised by Eucalyptus bushland, the west of the shire contain rivers, sandstone valleys and part of the area forms the catchment for Warragamba Dam (Wingecarribee Shire Council, 2023).</p> <p>NSW Landcare and the community group Growing at Goulburn have joined to gain potential investment of \$16 million to encompass 1,600 acres of farmland including vegetable growing, grazing, a diary and cheese making. 800 acres of biodiverse bushland to be preserved. A solar farm to supply power to the farm operation and beyond. This will become a University Agriculture Hub (NSW Landcare, n.d.).</p>
<p>Presence of quarrying industry</p>	<p>The Marulan South Limestone Mine is one of the oldest mines to date since the 1830s and has been an employment hub for generations of families in Marulan and has further contributed to the economic and social life of the area (Boral, n.d.). Mining has continued to grow in the Southern Highlands and draws on the natural resources present, with various quarries, including Holcims’s Lynwood Quarry, Boral Quarry, Gunlake Quarries and Global Quarries operating near the township of Marulan.</p>

3.3.2 Political Capital

Political capital refers to the individuals, institutions, and systems that contribute to a community’s ability to maintain and uphold a governance structure. Political capital can determine the extent to which people are able to participate in decisions that affect their lives, the level of democratisation within a community, and the resources provided for this purpose. A summary of the political capital relating to the social locality is provided below.

Table 3.4 Political Capital Summary

Government Area	Description
Pejar Local Aboriginal Land Council (LALC)	The Upper Lachlan Shire LGA sits within the Pejar Local Aboriginal Land Council (LALC). The Pejar LALC was established in 1977 under the <i>Aboriginal Land Rights Act 1983</i> as the Land Council for the area and sits within the Wiradjuri region. The Regional Councillor for Wiradjuri is Cr Leanne Hampton who is a member of the NSW Government’s Aboriginal Culture and Heritage Advisory Committee (NSW Aboriginal Land Council, 2023).
Upper Lachlan Shire Council	The Shire is governed by the Upper Lachlan Shire Council. The Shire was formed in 2004, following the amalgamation of the former Crookwell Shire, and parts of the former Gunning and Mulwaree shires (Upper Lachlan Shire, 2013). Pam Kensit was elected as Mayor in 2021 and re-elected in 2023, with Mandy Macdonald as Deputy Mayor. The Shire has seven elected councillors. The Shire has regular democratic elections with the most recent election occurring in 2023 and the previous election in 2021.
Goulburn Mulwaree Council	<p>The Goulburn Mulwaree LGA is governed by the Goulburn Mulwaree Council, which was formed in 2004 following the amalgamation of Goulburn City and parts of the former Mulwaree Shire. The Council is governed by Mayor Peter Walker and nine other Councillors as of January 2022. The Councillors include Andrew Banfield, Andy Wood, Bob Kirk, Carol James, Daniel Strickland, Jason Shepherd, Michael Prevedello and Steven Ruddell (Goulburn Mulwaree Council, 2022). The election of new councillors was described in the media as an ‘emphatic endorsement from the community’, as the new councillors from vastly different backgrounds brought new ideas to the local council (Thistleton, 2021). The next election for local council will proceed in September 2024 (Goulburn Mulwaree Council, 2020).</p> <p>The Council is part of the Canberra Region Joint Organisation (CRJO), a group of 10 LGA councils as members, and complemented by associate members including the ACT government and other LGAs. The CRJO provides a forum for councils, state agencies and stakeholders to collaborate in addressing shared priorities and delivering regional projects.</p>
Wingecarribee Shire Council	In September 2021, the NSW Government announced a Public Inquiry would be held into Wingecarribee Shire Council. The inquiry resulted in the dismissal of the councillors due to concerns over infighting, and in turn the Council’s ability to perform its required functions (Fuller, 2022). Administrator, Mr Viv May would remain at Wingecarribee Shire Council until the local government election is held in late 2024 (Wingecarribee Shire Council, 2022).

Government Area	Description
State Government	The Project Area is in the State electoral district of Goulburn, which extends to the Australian Capital Territory border in the south-west, bordered by the Abercrombie River in the north and encompassing Moss Vale in the east. The Member of Parliament representing Goulburn on the NSW Legislative Assembly is the Hon. Wendy Tuckerman. Wendy Tuckerman has been the Member for Goulburn since 2019 and is a member of the Liberal Party (Parliament of New South Wales, 2022). In the 2023 election Wendy Tuckerman won with 51.3% of voters for the Liberal Party. In recent years, Tuckerman has spoken out against renewable projects in the region (Parliament of New South Wales, 2022).
Federal Government	The Federal Member of Parliament representing Hume in the House of Representatives is Hon Angus Taylor. Taylor is a member of the Liberal Part and has held the seat since 2013. Taylor was the Minister for Energy and Emissions Reduction from 2019 to 2021. More recently (October 2021 to May 2022) Taylor was the Minister for Industry, Energy and Emissions Reduction (Parliament of Australia, 2022). Angus Taylor has been openly opposed to wind farms as demonstrated in his speaking at numerous anti-wind farm rallies and said Australia’s Renewable Energy Target was increasing electricity costs, a claim that is hotly disputed by the renewable energy industry, which points to rapidly falling costs in the sector (Davis, 2019).

3.3.3 Economic Capital

Examining a community’s economic capital involves consideration of several indicators, including industry and employment, workforce participation and unemployment, income levels and cost of living pressures, such as weekly rent or mortgage repayments. **Table 3.5** provides a summary of the key characteristics of the social locality from an economic capital perspective.

Table 3.5 Economic Capital Summary

Key Takeaway	Description
The social localities demonstrate high rates of unemployment	In September 2022, Goulburn Mulwaree had a significantly higher unemployment rate than the other LGAs and the State (5.7% compared to 2.9% in Upper Lachlan LGA, 1.7% Wingecarribee LGA and NSW) (SALM, 2022) (refer to Figure 3.4). Goulburn-Mulwaree unemployment rate has been consistently higher than Upper Lachlan LGA and Wingecarribee LGA rates since September 2015, and had its highest unemployment rate in January 2022 (7.6%) (SALM, 2022).
There are varying sectors of high economic output across the localities	The largest industry sector by output varies across the three LGAs. In the Upper Lachlan Shire, agriculture, forestry and fishing is the largest sector, generating \$266 million 2020/2021 (.idcommunity, 2021), whilst the Goulburn Mulwaree LGA’s largest industry by output is construction, generating \$615 million in 2020/21 (.id, 2021) and Wingecarribee Shire LGA largest output by industry was manufacturing (focused on machinery and equipment, non-metallic mineral products, wood products and fabricated metal products (Wingecarribee Shire Council, 2018), generating \$753 million in 2020/21, followed by construction (\$670 million of 12.3%) (.idcommunity, 2021).

Key Takeaway	Description
Employment across a wide range of industry sectors	<p>Sheep and beef cattle farming accounts for 18% of total employment in the Upper Lachlan Shire LGA and is the top industry of employment. There is less of a focus on agriculture in the other two LGAs, with the top industries of employment in Goulburn-Mulwaree largely focused on the provision of healthcare / social assistance (refer to Appendix B). Similarly, the largest industry of employment in Wingecarribee LGA is aged care and residential services (3%), followed by hospitals (3%), and cafes and restaurants (2.9%). Unsurprisingly given the high volume of quarries in proximity to Marulan, the largest industry of employment in the UCL is other construction material mining (accounting for 4.9% of total employment) (ABS, 2021).</p>
The social localities demonstrate low median incomes across the localities except for Big Hill	<p>Lower Household median incomes were recorded in the Upper Lachlan Shire LGA (\$1,465) and Goulburn LGA (\$1,196) in comparison to the State (\$1,829), whereas Wingecarribee median household income (\$1,687) was only slightly lower than the State average. Big Hill SAL had a significantly higher median household income (\$2,333) when compared to the other LGAs and the State (ABS, 2021).</p>
Low median monthly mortgage repayments when compared to the State	<p>Despite having a lower median income in Wingecarribee LGA, the monthly mortgage repayments were the same as the State (\$2,167 for both). Of the three LGAs, Upper Lachlan Shire has the lowest median mortgage repayments with these significantly lower when compared to the State (\$1,540 in the Upper Lachlan LGA compared to \$1,733 in Goulburn Mulwaree and \$2,167 in the State) (ABS, 2021).</p>
A growing demand for housing with varying median house prices	<p>In June 2018, the Goulburn Mulwaree Council area had a median house valuation of \$463,090, \$277,354 lower than the median house valuation for New South Wales (\$740,444) (.id, 2021). The Goulburn-Mulwaree LGA has experienced growth 0.8% in population, which has led to a growth in demand for housing, as in 2021 Q4 there were 169 house sales with a typical price of \$674,280 (.id, 2021). This is a significant increase of 32.5% in comparison to 2019 Q4 where there were 114 house sales, with a typical average price of \$485,454 (.id, 2021). The Upper Lachlan Shire (\$413,716) lower median house valuations in 2018 in comparison to NSW (.idcommunity, 2021). Wingecarribee had the highest median house price in comparison to the LGAs as well as the State (\$813,607) (.idcommunity, 2021).</p>
There are varying levels of economic resource disadvantage across the locality⁵	<p>Compared to the other LGAs Goulburn-Mulwaree LGA is ranked in the lowest decile, indicating lower access to economic resources such as higher paid incomes and general economic wealth (refer to Figure 3.8).</p>
Varying levels of economic diversity and resilience to economic fluctuations s	<p>The Herfindahl Index in Figure 3.9 provides an indication of market concentration within a region, and specifically provides an indication of how many industries are competing for market share within a given locality. The higher the index, the more concentrated the market by industry composition, demonstrating a low level of economic diversity, while a low index indicates a greater number of industries and occupations being serviced within the social locality.</p> <p>The Upper Lachlan Shire had the highest market concentration indicating low economic diversity in the area and greater susceptibility to fluctuations in labour and market demand, as a result of a higher degree of market concentration in a particular sector or industry.</p> <p>Wingecarribee had the lowest market concentration in comparison to the other LGAs and the State. This indicates a more resilient economic market.</p>

⁵ SEIFA scores are based upon 2016 ABS data

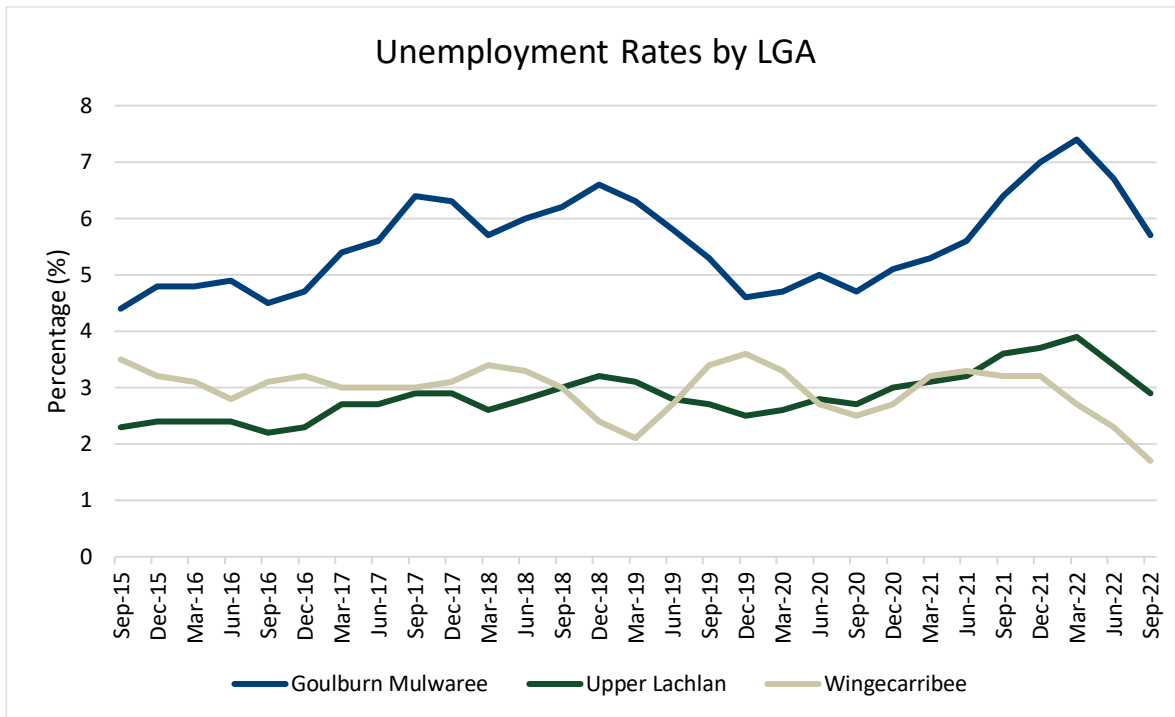


Figure 3.7 Unemployment Rates

Source: SALM, 2022

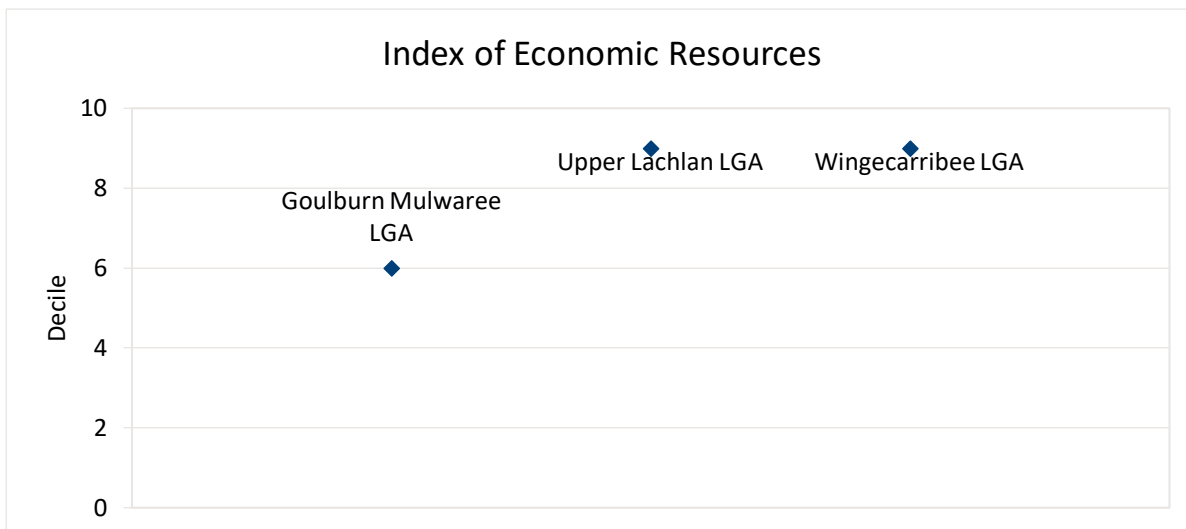


Figure 3.8 Index of Relative Economic Resources

Source: SEIFA, 2021

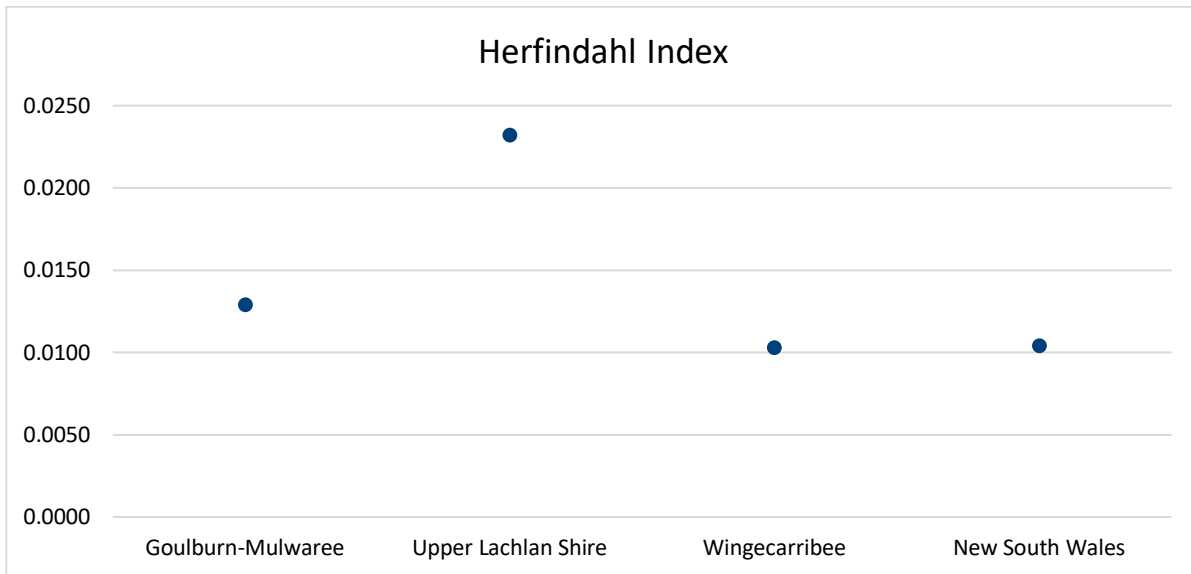


Figure 3.9 Herfindahl Index

Source: ABS, 2021

3.3.4 Social Capital

Various indicators can be used to examine and assess social capital. Such indicators include level of volunteering, population mobility, crime rates and demographic composition of the community, such as the percentage of people born overseas, language proficiency etc. **Table 3.6** provides a summary of the key characteristics of the social locality from a social capital perspective.

Table 3.6 Social Capital Summary

Key Takeaway	Description
The social localities demonstrate high levels of social cohesion	Volunteering rates are used as an indicator of how well connected and cohesive a community is. High rates suggest that there may be a fast spread of information throughout the community and investment in the sense of community in the local area. Upper Lachlan Shire has a significantly higher rate (21.9%) of people who provided voluntary assistance in the past 12 months previous to the 2021 Census period when compared with NSW (13%), suggesting a high level of social cohesion. Similarly, volunteer rates were relatively high in Wingecarribee LGA (18%) and Canyonleigh SAL (18%). Rates in Goulburn Mulwaree LGA (13.8%), Goulburn SA2 (13%) and Marulan SAL (12.2%) were more relative to the state average (ABS, 2021).
The social localities demonstrate greater social cohesion	The Upper Lachlan Shire Community Strategic Plan identifies that the LGA is a “network of close-knit and well supported communities that value our rural lifestyle” (Upper Lachlan Shire Council, 2021). The survey respondents in the online survey for the Project echoed this sentiment, identifying the region as having a quiet country lifestyle which brings the community together. The Upper Lachlan Shire Community Strategic Plan also notes the importance the local community place on its strong sporting clubs, volunteering organisations and community spirit. This was echoed throughout discussions in the consultation program for the Project: <i>We have a good community with regular gatherings</i>

Key Takeaway	Description
	The Wingecarribee Community Strategic plan highlights the collective voice of the community to support the challenges and opportunities the community (Wingecarribee Shire Council, 2021), whilst the Goulburn Mulwaree Community Strategic Plan outlines the vision for the community as “to build and maintain sustainable communities while recognising and respecting the region’s environment and heritage” (Goulburn Mulwaree Council, 2022).
Upper Lachlan Shire LGA has low population rates of mobility	The Upper Lachlan Shire is less mobile than the other relevant LGAs and the state. Of those who reside in the LGA, 60.7% had the same address as five years prior. In comparison, Goulburn Mulwaree and Wingecarribee had rates similar to the state average of 53.4% (refer to Appendix B). Rates for those who lived at the same address one year prior were relatively stable across the LGA’s and the state (ABS, 2021).
There are a high number of lone person households	Lone person households in the Upper Lachlan Shire LGA were less common than family households (26.7% compared to 71.3%), in comparison with Goulburn LGA and Goulburn SA2 which had had a higher proportion of lone person households than NSW (30.4%, 32.7% compared to 25% in NSW). Wingecarribee LGA and Marulan SAL had the same (26.2%). Big Hill SAL had the highest overall proportion with 40% of lone person households. Upper Lachlan Shire LGA, Wingecarribee LGA and Canyonleigh SAL have similar rates of family households to NSW, however this is slightly lower in Goulburn Mulwaree LGA (ABS, 2021).
The social localities have low rates of linguistic diversity	Upper Lachlan Shire, Goulburn Mulwaree LGA, and Wingecarribee LGA have significantly lower rates of the population speaking languages other than English at home in comparison to the state (2.5%, 7.9% and 8.6% respectively compared to 29.5% in NSW) (ABS, 2021).
There are lower rates of crime across the LGAs with smaller populations	Upper Lachlan Shire and Wingecarribee LGA had significantly lower incidents of assaults per 100,000 people than the State in the year to December 2022 (326.3 and 432.8 compared to 818.1) (NSW BOSCAR, 2022). In contrast, rates of assault in Goulburn Mulwaree LGA are higher than the State (998.3 compared to 818.1) (NSW BOSCAR, 2022).
Goulburn-Mulwaree has higher rates of Socio-economic disadvantage ⁶	Goulburn Mulwaree experiences a higher level of socio-economic disadvantage than the other two LGAs. This indicates that residents within the LGA are more vulnerable to changes in access to material and social resources (refer to Figure 3.10) (SEIFA, 2021).

⁶ SEIFA scores are based upon 2021 ABS data

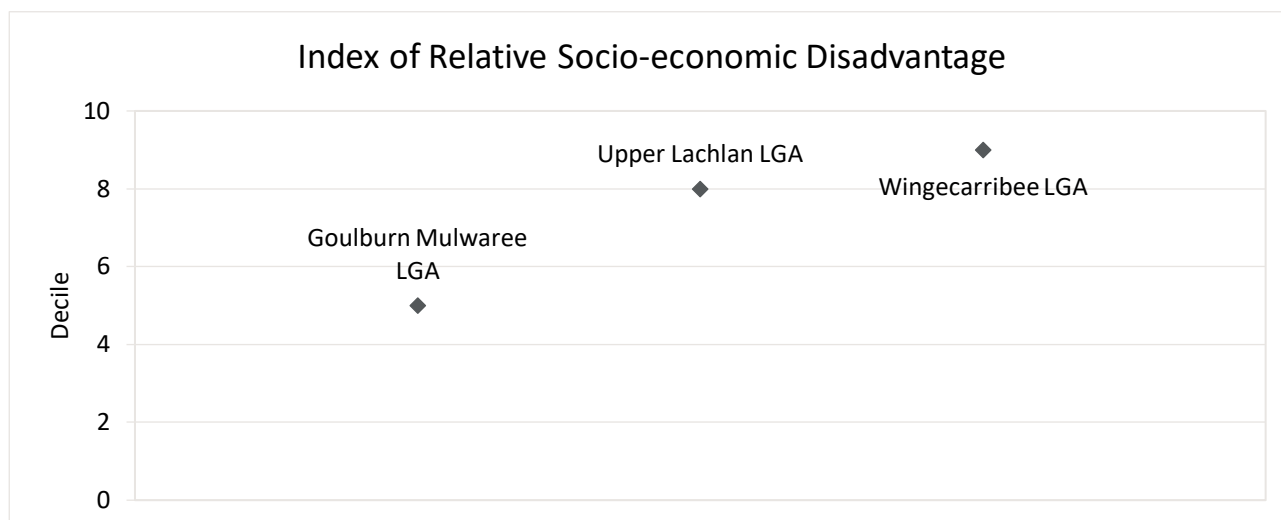


Figure 3.10 Index of Relative Socio-economic Disadvantage

Source: SEIFA, 2021

3.3.5 Human Capital

The level of human capital within a community is assessed by considering population size, age distribution, education and skills, general population health, and considers the prevalence of at-risk groups within a community. This section provides a summary of the key characteristics of the social locality from a human capital perspective.

Table 3.7 Human Capital Summary

Key Takeaway	Description
The social localities have an older population that are aging	<p>The Upper Lachlan Shire LGA (49), Big Hill SAL (53), Wingecarribee LGA (48) and Canyonleigh SAL (46) have a significantly higher median age than the State (39). Both Goulburn Mulwaree LGA (41) and Goulburn SA2 (40) have slightly higher median ages than the state, however, they are still lower than the other social localities (ABS, 2021).</p> <p>The Upper Lachlan Shire LGA had a higher proportion of persons aged 60 or older in comparison to NSW indicating an aging population (.idcommunity, 2021).</p> <p>Wingecarribee LGA also has a large proportion of elderly people, with the largest proportion of people sitting within the 70-74 age bracket (.idcommunity, 2021), whilst in Goulburn LGA the 55-59 years age group has the highest proportion of residents (.idcommunity, 2021).</p>
There are projected population increases across all localities	<p>The population of Upper Lachlan Shire is estimated to increase annually by 0.76% to reach a population of 9,699 in 2041. Of the three LGAs Wingecarribee is expected to increase at the greatest rate (1.54% annually) to reach a 70,969 in 2041 (NSW Planning Portal, 2021), whilst the population of Goulburn Mulwaree is also expected to increase by an annual rate of 1.18%. Upper Lachlan Shire is the only LGA of the three that has a slower annual growth rate than the state, which has an annual increase rate of 0.95 (NSW Planning Portal, 2021).</p> <p>Drivers of population change in Wingecarribee have been attributed to the LGAs proximity to Sydney which attracts a number of residents from Sydney to a quieter and greener environment with good access to the City (.idcommunity, 2021).</p>

Key Takeaway	Description
	<p>Migration patterns impact the Upper Lachlan Shires population as the area loses populations to the ACT and to Goulburn-Mulwaree but gains population from other parts of southern NSW. The area attracts younger families and a small proportion of older adults and retirees (.idcommunity, 2021).</p> <p>The driver of population growth in Goulburn-Mulwaree LGA has been attributed to the economic growth and employment opportunities within the area as well as being located close to Canberra (Condie, 2021).</p>
Goulburn Mulwaree LGA has a high proportion of Aboriginal and Torres Strait Islander people	The Upper Lachlan Shire LGA (3.1%) and Canyonleigh SAL (2.6%) had a slightly lower percentage of Aboriginal and/or Torres Strait Islanders residents in comparison to the state (3.4%). Wingecarribee LGA has the lowest Indigenous population (2.3%), and Goulburn LGA (5.0%), Marulan (5.1%) and Big Hill SAL (9%) have a significantly higher Indigenous population when compared to surrounding localities (ABS, 2021).
High rates of vocational qualifications and low rates of university qualifications across the localities	All localities have a higher proportion of people who have completed a certificate level education than the state (Goulburn-Mulwaree 22%, Upper Lachlan Shire 20% and Wingecarribee 18% compared to 15% for NSW), and all have a lower proportion of people who have completed a bachelor’s degree level or above than the state (refer to Appendix B). Marulan has the lowest level of bachelor’s degree education (9.6%), however the proportion of people with a certificate level education is the highest in this locality (24.1%) (ABS, 2021).
The social localities have lower rates of health and wellbeing	There was a lower percentage of people who recorded no long-term health conditions when compared with the state (Goulburn Mulwaree 51.3%, Upper Lachlan 50.9% and Wingecarribee 56% compared to the State 61%). Goulburn Mulwaree LGA had the highest proportion of people who reported having 3 or more long-term health conditions of the three LGAs (4.8%), with a high percentage of people stating they have arthritis (14.3%). These rates are perhaps indicative of the high median ages across the LGAs (ABS, 2021).
The social localities have varied Index of education and occupation scores	Goulburn Mulwaree is in the bottom 30% for education and occupation status when compared against other LGAs in the State. This indicates lower levels of qualifications and higher levels of people employed in low skilled occupations (refer to Figure 3.11).

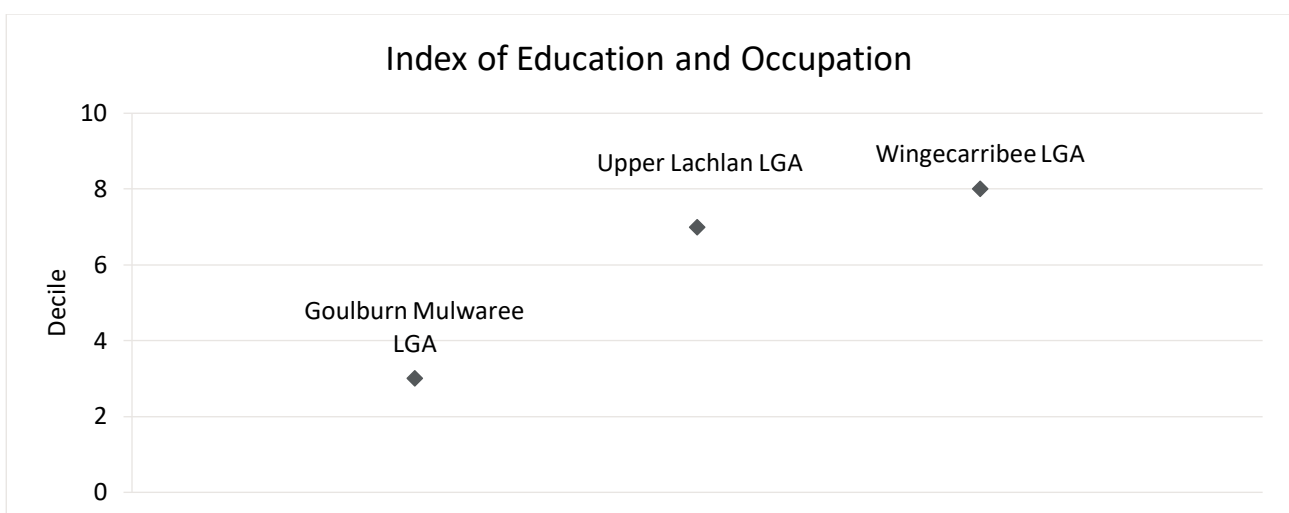


Figure 3.11 Index of Relative Education and Occupation

Source: SEIFA, 2021

3.3.6 Cultural Capital

Cultural capital refers to underlying factors that provide human societies with the means to adapt to their environment (Cochrane, 2006). It includes the way people know and understand their place within the world. It may also refer to the extent to which the local culture, traditions, or language, may promote or hinder wellbeing, social inclusion, and development (IAIA, 2015). This section provides a summary of the key characteristics of the social locality from a cultural capital perspective.

Table 3.8 Cultural Capital Summary

Key Takeaway	Description
There is limited cultural diversity in the social localities	The Upper Lachlan Shire (42.4%), Goulburn (41.6%) and Wingecarribee LGAs (37.6%) have a significantly higher proportion of Australian ancestry in comparison to the State (28.6%). This correlates to the high percentages of the populations in the Upper Lachlan Shire LGA (83.5%), Goulburn LGA (82.3%) and Wingecarribee (76.7%) being born in Australia and comparatively low rates in NSW (65.4%) (ABS, 2021).
The LGAs are rich with Aboriginal cultural heritage sites	The Upper Lachlan Shire LGA recognises the Gundungurra People as the Traditional Owners of the land. Wingecarribee also acknowledges the Gundungurra and Tharawal people as the Traditional custodians of its Shire. State Government records indicated that there are over 400 significant Aboriginal sites within Wingecarribee Shire, including 86 sites or objects that exist in the vicinity of Council-managed land or roadside reserves (Wingecarribee Shire Council, n.d.). There are currently no Native Title determinations in close proximity to the Project location.
There is a strong sense of pride in the heritage, arts, and cultural scenes of the Southern Highlands	Residents of the Goulburn Mulwaree take pride in the city's heritage and modern assets, strong arts and emerging entertainment scene, and associated economic opportunities (NSW Planning and Environment, 2017). Cultural projects like the Wollondilly Walking Track in the Guul Ngurra National Park, and adaptive re-use of a heritage building for a Performing Arts Centre contribute to community life (NSW Planning and Environment, 2017).
Significant European heritage represented throughout the buildings in Goulburn and Marulan	The European heritage reflects historical agricultural and gold mining booms that resulted in the construction of many significant buildings particularly within the Goulburn CBD (Goulburn Mulwaree Council, n.d.).

3.3.7 Physical Capital

Physical or built capital includes provision of infrastructure and services to the community. Within this capital area, it is important to consider the type, quality, and degree of access to public, built and community infrastructure (including amenities, services, and utilities), as well as housing. This section provides a summary of the key characteristics of the social locality from a physical capital perspective.

Table 3.9 Physical Capital Summary

Key Takeaway	Description
<p>The social localities are well connected through transport routes</p>	<p>The three LGAs are situated along the Hume Highway (A22). The Hume Highway is one of Australia’s major inter-city national highways connecting Melbourne and Sydney (My Travel Jam, 2019).</p> <p>The Goulburn Airport is privately owned and is home to the Goulburn Flight Training Academy (Airport Guide, n.d.). The nearest international airports are located in Sydney and Canberra (Canberra Airport, n.d.) (Airport Guide, n.d.).</p> <p>A community member consulted for the Project noted:</p> <p style="text-align: center;"><i>Canyonleigh is a quiet community, but has exceptional links to everything you would want/need North to Sydney, and South to Goulburn/Canberra. Moss Vale is a delightful drive away which has everything.</i></p>
<p>There are high rates of unoccupied dwellings</p>	<p>Upper Lachlan Shire has a much higher rate (23.3%) of unoccupied dwellings than the State (9.4%) and other LGAs (refer to Appendix B). When considering the townships of Big Hill SAL (27%) and Canyonleigh SAL (23%) there is a high rate of unoccupied private dwellings (ABS, 2021).</p>
<p>There are high rates of home ownership</p>	<p>Within Upper Lachlan Shire, 81.2% of households are owned outright or with a mortgage. These rates are significantly higher than NSW (31.5%). Wingecarribee and Goulburn LGAs also have higher rates than the state average (77.1% and 67.6% respectively). Upper Lachlan Shire has the lowest proportion (12.6%) of dwellings rented of all localities, significantly lower than the state average of 32.6% (ABS, 2021).</p>
<p>The LGAs have good access to medical facilities and practitioners</p>	<p>Goulburn has a variety of health care facilities, including the Goulburn Base Hospital and Kenmore Hospital. As noted in Section 3.2.2.1, Goulburn Base Hospital underwent an upgrade, which included a new emergency department, completed in 2021 (NSW Health Infrastructure, n.d.). Goulburn Base hospital has 5 emergency department beds (NSW Health, 2023). The hospital provides a range of health care services to the region and broader region. The Crookwell District Hospital operates an 18-bed acute care facility, as well as a 24-hour emergency department and services the Upper Lachlan Shire LGA and Wingecarribee LGA (NSW Health, 2020). When compared to NSW, all LGAs have a higher rate of general practitioners per 100,000 people (145.8 in Goulburn Mulwaree, 229.6 in Upper Lachlan Shire, and 150.7 in Wingecarribee, compared to 122.4 in NSW). The rate per 100,000 people for registered nurses is higher in Goulburn Mulwaree LGA when compared to the State (1,251.9 compared to 960.7) while both Upper Lachlan Shire LGA and Wingecarribee LGA have lower rates than the state (737.2 and 873.3 respectively, compared to 960.7).</p> <p>However, there were fewer specialist practitioners per 100,000 people in Goulburn Mulwaree and Wingecarribee than the State (79.2 and 106.3 compared to 146.2) (data was not available for Upper Lachlan Shire LGA).</p>
<p>The LGA’s have lower access to educational facilities</p>	<p>Upper Lachlan Shire have expressed a desire to increase educational facilities targeted at agriculture in the LGA (McCabe C. , 2022). Whilst the LGA has various primary and secondary public schools, they have no tertiary facilities within the Shire (School Parrot, n.d.).</p> <p>TAFE NSW Goulburn, however, is the largest TAFE location in the highlands and Wingecarribee also hosts a TAFE campus in Moss Vale (TAFE NSW, n.d.).</p>

Key Takeaway	Description
<p>There are varying levels of access to short term accommodation</p>	<p>As of May 2022, Goulburn Mulwaree has a slightly lower Airbnb occupancy rate of 48.7%, whilst Upper Lachlan Shire and Wingecarribee had similar rates (52.1% and 52.2% respectively) (AirDNA, 2022).</p> <p>As of October 2022, Goulburn had a total sleeping capacity of 2,513 (ATDW, 2022).</p> <p>Throughout the stakeholder analysis process, people at risk of or experiencing homelessness, and low-income earners who may be susceptible to continued rental increases, and therefore loss of access to housing were raised as a vulnerable group. Largely, this was centred around Goulburn.</p> <p>Furthermore, through the development of the social baseline users of short-stay accommodation and tenants in the private rental market, may be more vulnerable or susceptible to the social or economic changes associated with the Project. It is noted that demand for accommodation in the area is already high due to demand from other industry sectors, e.g., tourism and mining and ongoing coinciding development in the region.</p>
<p>The LGA's have seen an increasing demand for property in the locality</p>	<p>Goulburn-Mulwaree's proximity to Sydney and ACT, and short distance to major regional centres has increased the demand for properties from local and out-of-town buyers. The rise in out-of-town buyers can be partially attributed to incoming workforces associated with the rise of renewable energy projects within the area. The township of Crookwell in Goulburn Mulwaree LGA has potential for more residential properties with future subdivision which will increase availability of properties (Thistleton, 2023).</p> <p>The Upper Lachlan Shire has seen an increase in land value as demand for commercial space has increased from local businesses (Opteon, 2017). The Upper Lachlan Shire is estimated to gain 250 more dwellings by 2036, this has been estimated against the small population growth predicted for the area (.idcommunity, 2021).</p> <p>Wingecarribee has had a steady growth in housing supply as estates on the edges of the Shire have become subdivided and developed.</p>
<p>LGA Councils and community have identified a need to improve local road networks</p>	<p>The Upper Lachlan Shire has recognised the need to improve key regional road infrastructure to improve agriculture and other industry competitiveness (Upper Lachlan Shire Council, n.d.). The Upper Lachlan Shire Council has also recognised that prioritisation of a priority of the upgrades to the highway and secondary roads is needed to improve transport networks (Upper Lachlan Shire, 2013).</p> <p>Wingecarribee Council have noted their desire to improved road infrastructure (Wingecarribee Shire Council, n.d.), whilst Goulburn-Mulwaree Council has previously invested \$3 million into road construction and improvements for the area to improve transport routes for residents and livestock transporters (Goulburn Mulwaree Council, 2021).</p> <p>It was raised by stakeholders who participated in the survey undertaken during the social scoping phase that quiet roads for horse riding, easy access to highways and improved local roads were valued aspects of the community that they did not want impacted by the Project. In addition, some stakeholders commented on the condition of roads:</p> <p><i>No proper roads. Very few services available. No garbage collection no postal service.</i></p> <p><i>Better roads and access to a general store would improve life in the area.</i></p>

3.4 Local challenges and opportunities

Table 3.10 outlines the key challenges and opportunities for the social locality as identified from the review of local, regional, and state government reports, strategies and plans, ABS Census data and other secondary data sources, and through community consultation.

Table 3.10 Local challenges and opportunities

Challenge	Capital	Opportunity
<ul style="list-style-type: none"> • Opposition to utilisation of farming land for renewable energy. 	Natural	<ul style="list-style-type: none"> • History of agriculture and grazing. • A large land use of natural parks and conservation areas which bring natural beauty to the areas which is valued by locals and tourists. • Ongoing capitalisation of natural resources (local quarrying industry).
<ul style="list-style-type: none"> • Low median household incomes. • High mortgage repayments across. • Low access to economic resources in Goulburn-Mulwaree. • Upper Lachlan Shire more susceptible to fluctuations in labour and market demands. • Potential for labour force competition due to other industries and a low unemployment rate in the host LGA. 	Economic	<ul style="list-style-type: none"> • Diverse local economies. • Strong industry presence in agriculture, forestry and fishing. • A desire to increase employment.
<ul style="list-style-type: none"> • High rates of socio-economic disadvantage in Goulburn-Mulwaree. • History of strong community opposition to renewable energy development in the region. 	Social	<ul style="list-style-type: none"> • Strong community and social relationships, characterised by high volunteering, and low mobility rates.
<ul style="list-style-type: none"> • Low rates of university level education. • Lower health and wellbeing when compared to the State. • Aging population leading to less potential workforces from the areas. 	Human	<ul style="list-style-type: none"> • High rates of certificate attainment.
<ul style="list-style-type: none"> • Low cultural diversity, with high reported rates of Australian ancestry. 	Cultural	<ul style="list-style-type: none"> • Rich Indigenous history with significant Aboriginal Historical sites. • Strong cultural heritage, pride in the landscape and built heritage. • Strong European and mining history in the region.
<ul style="list-style-type: none"> • Educational facilities wanted for agricultural learning. • Need for local road and highway upgrades. • Low access to accommodation in Goulburn-Mulwaree and Upper Lachlan Shire. 	Physical	<ul style="list-style-type: none"> • High rates of available housing due to unoccupied dwellings. • Access to General Medical Practitioners. • Well-connected LGAs via Hume Highway. • High availability of accommodation across study areas particularly in Wingecarribee.

Challenge	Capital	Opportunity
<ul style="list-style-type: none"> • Strain on current social infrastructure due to a number of other major developments occurring in the LGAs. • Low access to hospitals and specialist practitioners. 		<ul style="list-style-type: none"> • Hospital redevelopment at Goulburn Base Hospital.
<ul style="list-style-type: none"> • History of local council dysfunction particularly within the Wingecarribee Shire Council. 	<p>Political</p>	<ul style="list-style-type: none"> • Opposition from State and Federal parliament members to renewable projects.

4.0 Perceived and Likely Social Impacts

This section summarises the social impacts (positive and negative) in relation to the Project and has been framed in accordance with the social impact categories outlined in the SIA Guideline (DPE, 2023). The impacts have been identified through community consultation and the findings of the social baseline profile.

The impacts identified by participants of the online survey distributed throughout March and April 2023 are outlined in **Table 4.1**, with green showing positive impacts and red showing negative impacts, shaded to indicate frequency.

Table 4.1 Perceived Social Impacts from Online Survey (Prompted)

Impact Categorisation		Impact	Frequency
Positive Identified Social Impacts	Livelihoods	Training Opportunities	2
		Increased Employment Opportunities	1
	Accessibility	Access to a Renewable Energy Source	8
		Changes to General Mobility in the Area through Local Road Upgrades	2
		Improved Access to Local Services and Infrastructure	1
Negative Identified Social Impacts	Surroundings	Decreased Visual Amenity due to presence of Solar	9
		Biodiversity Impacts	9
		Decreased Social Amenity because of Construction Noise	4
		Access to and Use of the Natural Environment	1
		Safety related to Fire Risk	1
	Accessibility	Changes to General Mobility in the Area	5
		Access to Use and of Local Infrastructure	3
	Livelihoods	Decline of Property Values	5

4.1 Surroundings

Impacts upon people's surroundings refer to changes that the Project may cause on a community's experience of the landscape, environmental assets, and resources. This can include people's amenity, their access to and use of the natural and built environment, and the aesthetic value of the surrounds.

4.1.1 Visual Amenity

The sentiment expressed generally throughout consultation with the local community was a strong preference towards solar and BESS based renewable projects as opposed to wind-based renewable projects (in line with the Energy NSW survey outcomes discussed in **Section 3.2.1**), with stakeholders and online survey respondents expressing their belief that wind turbines had the potential to negatively impact both visual and social amenity more dramatically than solar panels. In the online survey, the impact on visual amenity from wind was frequently cited (n=17), while impact on visual amenity regarding solar was cited less frequently (n=9). The greater concern surrounding wind is highlighted by one online survey respondent who stated:

I do not accept wind energy technology but I do accept solar and battery energy storage technology. – Online survey.

Stakeholders at both the information session and the Canyonleigh community meeting questioned if Spark Renewables had considered increasing the solar panel component of the Project and either reducing or completely removing the wind turbine component.

Why not have more solar panels rather than the turbines? – Community information session

Would Spark Renewables consider abandoning turbines and augmenting solar component? – Canyonleigh community session.

It was felt that the Project would also be likely to further contribute to the industrialisation of the landscape in the local area due to the ongoing development of energy projects, and therefore there would be a cumulative effect on the reduction of social and visual amenity (refer also to **Section 3.2.2.1**).

There will be industrialisation of the landscape with Origin to the north... It will be visually unappealing. [referring to solar panels] – Community information session.

The potential scale of the area required for installation and operation of the solar panels was also considered to create a loss of social and visual amenity in the local area with many stakeholders wanting more information regarding how many solar panels would be installed and what area of land would be required.

How many solar panels for that much power? What kind of land area will be needed? – Canyonleigh information session.

On this scale they are obscene and a blight on the environment, nature and wildlife. – Online survey.

Local community members attending the information session were also concerned about the potential for solar panels to create glare and reflection issues.

There might be a little bit of glare. – Community information session

Solar is easier – there may be glare, but it's a completely different scenario. – Community information session

Will still have reflection issues. – Community information session.

Nine online survey respondents and five proximal landholders expressed concerns regarding changes to existing visual amenity due to the installation and operation of solar panels. Six online survey respondents felt that the best way to mitigate this risk was to restrict solar panel placement to existing buildings as opposed to using land solely for the purpose of solar farms.

They are an eyesore and blight on the environment. Solar should be confined to buildings only. – Online survey

I see no positive impacts for having solar panels on the ground and not on buildings. – Online survey.

It was also suggested by one online survey respondent that the design of the solar panels be modified, and the location of the Project site changed to minimise possible impacts to visual amenity.

[Use] solar panels that can be put lower to ground level and not block views. Or put [them] in deep areas where they are not visible to anyone. Get rid of tall metal electrical frames and replace them. – Online survey.

Another stakeholder attending the information session suggested the use of landscaping to hide the visual impact of the solar panels.

Several proximal landholders felt that the installation and operation of solar panels in such close proximity to their individual properties would be visually intrusive, with one landholder pointing out that he had paid for powerlines to be undergrounded on his property to prevent the visual impost associated with overhead power lines, only to now be faced with the visual impact of solar panels.

When asked by a member of the Spark Renewables Project team what could be done in order to achieve the landholder's property goals in combination with Spark Renewables' business goals, one proximal landholder responded, "*make it [the Project] unable to be seen or heard from my property*".

4.1.2 Social Amenity – Noise

While no concerns were noted during consultation activities with regards to noise impacts on social amenity during the operation of the solar and BESS components of the Project, attendees at the community meeting in Canyonleigh voiced concerns about the potential for noise generation during the construction phase, particularly associated with trucking activities. This concern was also raised by online survey respondents (n= 4). Stakeholders were also keen to receive more information on when construction noise would occur and its anticipated duration.

Too much noise from trucks. – Community information session.

All other concerns raised related specifically to the wind component and are therefore not relevant to the solar and BESS components of the Project.

The significant concerns raised by stakeholders in relation to the potential reduction in social amenity associated with the wind farm component have contributed to Spark Renewables decision to halt progression on the wind farm component and instead focus on the development of the solar and BESS technology components.

4.1.3 Impacts to Flora and Fauna

The potential for the Project to negatively impact local flora and fauna was also a key concern for the local community noted during consultation with both community information session attendees and online survey respondents (n=9) raising the potential destruction of native wildlife habitats associated with land clearing and ground disturbance associated with the Project during construction.

Stakeholders also questioned whether an assessment of the potential impact on flora and fauna had been completed and questioned the level of consideration of these in the assessment process:

I couldn't pull down a manuka on my property because of an endangered species. – Canyonleigh community meeting

We're in a wildlife corridor that runs from QLD to Victoria. Was that considered? – Canyonleigh community meeting.

Nine online survey respondents expressed similar concerns, stating that there would be significant impacts on flora and fauna arising from the Project.

4.1.4 Project Siting

The proposed location of the Project Area, its suitability and how this was selected was queried by several consulted stakeholders who suggested that other, more suitable locations could be considered:

I suggest Spark Renewables goes back to the drawing board, and either finds a more developed site with better access than via a rural dirt road in a pristine, peaceful environment. – Online survey

Move the proposed project closer to a more developed area. Consider land bordering the Motorway. This eliminates noise concerns, and has ideal access for infrastructure, building and maintenance. – Online survey

*The community doesn't want it. Locate to a community that is crying for industry and infrastructure.
– Online survey.*

These comments were echoed by proximal residents in relation to the regularity of flooding in the local area, particularly across Canyonleigh Road and the potential of reduced accessibility to the Project Area as a result.

One respondent to the online survey felt that the Project should be moved to another location, closer to the communities who would be consuming the energy are located.

Build it somewhere close to the end user. Most of us are off grid already and don't need your energy. – Online survey

Build the project in your own backyard. Put it in Sydney where they need the power. – Online survey.

However, other stakeholders in attendance at the information session welcomed the use of the site for renewable energy and research initiatives, commenting that the proposed site has not been used to its full potential to date.

I'm inspired University of Sydney are finally doing something with the land. Believe Arthursleigh has been a waste in the past and it will be good to see it used as a place for learning. - Community information session.

4.1.5 Safety

4.1.5.1 Fire Safety

The potential for fire hazards associated with the operation of the solar farm and BESS related infrastructure to negatively impact the safety of the local community were raised by an online survey respondent and proximal landholders as a concern.

Stakeholders were keen to understand what the fire hazards are specifically in relation to solar and BESS infrastructure and how Spark Renewables planned to manage these risks. It is noted that the potential hazards associated with the Project will be subject to detailed assessment as part of the EIS for the Project, and mitigation measures to manage the risks associated with fire and all associated hazards will be developed and implemented.

One online survey respondent voiced their concern regarding the risk of fire associated with lithium contained in BESS infrastructure components, likely as a result of previous events at other battery projects such as the 2021 fire at the Victorian Big Battery owned by developer Neoen (Energy Storage News, 2021).

Lithium fires at present cannot be controlled by Fire and Rescue. – Online survey.

Stakeholders also referenced the dense bushland surrounding the Project Area, particularly to the northeast, and were concerned about the potential hazard Project infrastructure may create for local fire services.

One proximal landholder referenced the devastating impact caused by a bushfire in the local area in 1966. Although the latter incident was not related to a solar or BESS project, it highlights the importance of communication regarding hazards, and risk management, and reflects the heightened sensitivity of communities to events that are perceived as catastrophic (Sandman, 1993).

While technical fire risk is a project planning consideration, community perceptions of risk factors are also an important consideration as they reflect the fears and aspirations of a community.

A representative from the Rural Fire Service (RFS) in Marulan also raised concerns around the provision of information to Rural Fire Service brigades, highlighting during a meeting with Spark Renewables that the Rural Fire Service agencies in the area work across multiple territories, often covering the territories of neighbouring brigades. Therefore, any information, education and training exercises planned for the Project site that are likely to involve the local area RFS would need to involve the brigades from neighbouring areas i.e., in addition to just including the Marulan and Big Hill RFS Brigades.

4.1.5.2 Road Safety

Several stakeholders noted concerns regarding heavy vehicle movements associated with the transportation of Project infrastructure, and general increased vehicle movement associated with construction and the potential this could have for an increased deterioration of public roads, and hence public safety risks to the community or other road users when driving on these roads.

This concern was reflected and shared by the Goulburn Mulwaree Council during consultation, with Council noting it is currently undertaking a review of the local roads strategy, in alignment with the State Government's South East Transport Strategy. Council raised this in the context of concerns regarding the impact of the Project on local roads and the need to ensure community safety when planning Project access roads.

Multiple stakeholders who attended the information session and others who completed the online survey also raised the issue of cumulative effects of trucking activity associated with nearby existing quarrying operations. Stakeholders also raised the need for ongoing road maintenance to be factored into Project planning:

Roads are dangerously destroyed. – Community information session

Quarry trucks already destroy the road. – Community information session

There are already a lot of trucks. – Community information session.

There was also a desire to see notifications of trucking activity disseminated to the local community as a potential mitigation measure to enable safe dual use of the roads by the local community and industry, given the way local residents currently use the road for recreational purposes.

There are a lot of joggers on the road [Canyonleigh Road] and some people walk their dog. – Community information session.

4.1.5.3 Aviation

Two attendees at the Canyonleigh community meeting queried the impact that the Project may have on aviation in the area.

Will the reflection from the solar panels interfere with aviation safety? – Canyonleigh community meeting

Arthursleigh is on a flight path – wouldn't the glare from the panels cause a problem for air traffic? – Canyonleigh community meeting.

4.1.6 Environmental Values

4.1.6.1 Weed Management

Weed management and the potential for weeds growing within the Project Area to contribute to the degradation of agricultural land and native vegetation in the surrounding area were raised as significant concerns by 4 stakeholders, including 1 proximal landholder during consultation with the Spark Renewables' Project team, as well as three local community members attending the information session.

Our country is being choked out by weeds. We can't keep up with them.

Stakeholders were also concerned about the potential for weed management activities such as the spraying of toxic chemicals associated with the operation and maintenance of the Project Area to negatively impact native flora and fauna.

Spraying will also wipe out natives.

4.1.6.2 Construction and Decommissioning

The local community were very concerned about the potential for negative impacts to the environment as a result of infrastructure production during the Project's construction phase and also waste generation during activities associated with the decommissioning of the Project at its cessation.

Online survey respondents (n=2) and proximal landholders (n=1) questioned the widely accepted perception that renewable energy projects are environmentally friendly, specifically referencing the environmental impacts associated with the production of steel and concrete-based infrastructure during the Project's construction phase.

Stakeholders attending the Canyonleigh community session (n=1), and the information session (n=1) wanted to know if the decommissioning activities associated with the Project had been taken into consideration during environmental planning and assessment.

Stakeholders were also keen to understand the potential impacts of decommissioning and how they may be managed:

What happens with the solar panels [when their] life is up? – Canyonleigh community session.

4.1.6.3 Water Management

One landholder queried the potential for the operation of solar farm infrastructure to negatively impact water quality and ecology in the local area, particularly water in the Wollondilly River system. The landholder was keen to receive more information regarding the impact of solar farms on water quality and ambient temperatures.

4.2 Livelihoods

Impacts upon people's livelihoods refer to the capacity of community members to sustain their livelihood through income-generating activities such as employment or business. This impact category considers the changes that economic conditions caused by the Project may have on individuals and businesses, and whether people experience any personal disadvantage.

4.2.1 Impact to Property Values

During stakeholder consultation, concerns were noted with respect to the potential for property values to decline due to the presence of the Project. It was particularly feared a decline may result from industrialisation of the visual landscape due to the Project. This concern was noted by all consulted stakeholders – i.e. proximal landholders during personal interviews with the Spark Renewables' Project team (n=5) and also by those completing the online survey (n=5) with local community members attending the Canyonleigh community meeting (n=2) and the information session (n=3).

The development and implementation of the proposed Wattle Creek Energy Hub is undoubtedly going to have a major negative impact on the surrounding properties, [particularly due to] the excessive number of solar panels. – Online survey.

Concerns with regards to a potential decline in property values were linked to the existing rural nature of the area and a view that the industrial nature of the Project will potentially negatively impact on this.

It will destroy the value of my property that is about to go to market. – Community information session

We moved for the nice rural outlook. It will be destroyed, and it will impact our property value. – Community information session.

Several proximal landholders shared instances of prospective buyers losing interest and withdrawing offers after becoming aware of the Project.

Some stakeholders who attended the information session held concerns that property values would be impacted negatively due to the visual impact of the solar panels, whereas others commented on their concern about the potential spread of weeds and pests, in turn devaluing land.

People are buying lifestyle blocks, they're coming for nature, it will obliterate their aesthetics. – Community information session.

Several online survey respondents suggested Spark Renewables' should consider offering monetary compensation to proximal landholders whose property experienced a reduction in value as a result of the Project.

4.2.2 Land Use Conflict and Compatibility

When asked what they value most about the local area, online survey respondents raised landscape and local character (n=14) and rural lifestyle (n=14) as the top two values and offered the following descriptions of the area:

Beautiful rolling countryside with outstanding views. Abundant local flora and fauna. Stunning escapements and wonderful bushwalks – Online survey

Peaceful yet connected. Rare and valuable. Beautiful and hard to find. Tranquil. Unique. Serene. Rural. Pristine. Protected. The uninterrupted views for miles make you feel a sense of space, luxury and offer a deep connection to the land. Canyonleigh offers a sense of stepping back in time to a more relaxed, idyllic lifestyle with views for miles with absolutely no visual impacts. – Online survey

Open green landscape. County feel. Peaceful and quiet. – Online survey

The area has the most magnificent views, offering far reaching and uninterrupted vistas to the west and south/southwest, for as far as you can see. Standing in the paddocks or at the house, all you see is a sky going on forever and the endless panorama of nature in all its glory. Completing this perfect picture, is the accompanying, peace and quiet, where the sounds of birds are the loudest thing you here. It is without a doubt, the most therapeutic place to be. – Online survey.

These comments and the broader sentiment they represent regarding the importance of the natural landscape and rural lifestyle to the local community, provide an important backdrop against which to understand the local community's concerns regarding industrialisation.

The use of prime agricultural land for the installation and operation of infrastructure associated with the solar and BESS components of this Project was also raised by multiple stakeholders and one online survey respondent as a key concern.

Both, local community members attending the information session and proximal landholders speaking with the Spark Renewables Project team, were interested in the potential to integrate agricultural activities into the solar farm component of the Project, thereby resulting in a reduction of land being used solely for hosting Project related infrastructure. Stakeholders were keen to understand if Spark Renewables had considered the possibility of the Project Area being used for agrisolar pursuits such as sheep grazing.

Agrisolar refers to co-developing the same area of land for both solar PV power as well as for agriculture. Several forms of agrisolar have been developed around the world, with a wide range of innovative approaches emerging in recent years. Local and international trials and research, particularly in the past five years, have shown that solar energy and agricultural production can be highly compatible and mutually beneficial (refer to research by Clean Energy Council). It is noted that it is intent of Spark Renewables to trial such agrisolar projects as part of the research component of the Project, in conjunction with University of Sydney. Spark Renewables is already conducting a research trial with Charles Sturt University on its operating Bomen Solar Farm near Wagga Wagga, NSW.

It was specifically noted in the information session that some residents of the local community were looking to build 'Bed and Breakfast' style short-stay accommodation on their properties to capitalise on existing rural values. It was also reported that the increasingly industrialised landscape as a result of the Project had the potential to detract from their accommodation offering in terms of reduced visual and social amenity, and therefore decrease any potential earnings from such a business venture.

Respondents to the online survey (n=2) also shared similar concerns regarding the industrialisation of the local area and the associated potential to impact on existing livelihoods such as farming.

It will cause a major devaluation of the properties making this an industrial area rather than farming what it is intended to be. – Online survey

Infrastructure of any kind in Canyonleigh is unacceptable in such a preserved rural area. – Online survey.

4.2.3 Local Employment, Procurement and Training

Local employment and opportunities for procurement were seen as positive impacts of the Project by some stakeholders including local government and three online survey respondents (3). A representative from Goulburn Mulwaree Council highlighted the increasingly positive mindset of the local community towards 'bigger industry coming to town', explaining that people were keen for their children to have access to future employment opportunities in the local area.

Local Government representatives also recognised the capacity of local businesses to service the renewable sector, with manufacturing and engineering companies already operating in Marulan and Goulburn.

However, some local community members who attended the information session were unsure of the likelihood of Project benefits eventuating in this space, questioning the scale of benefits likely to be experienced locally given likely small operational workforce numbers. Another stakeholder also felt that there would be limited employment opportunities due to the specific skillset required by companies throughout the construction period.

We don't have the skills that are needed here for locals to be employed. – Community information session.

The opportunity for skills development and training of local people to meet the needs of the construction workforce for the Project was considered an important strategy, to ensure that local employment was maximised.

While it is anticipated that there will be a number of employment opportunities associated with the Project, particularly during construction; the actual number of jobs available for local workers may be impacted by the specialised nature of aspects of Project construction and the need for workers with specific skillsets. While construction is not a top industry of employment in any of the three relevant LGAs, it is the top industry in terms of economic output within both the Goulburn Mulwaree and Wingecarribee LGAs, indicating there may be relevant skills in those localities. There is also a higher level of unemployment in the Goulburn Mulwaree LGA than in the state which indicates that there may be a labour pool to draw from for the Project. Opportunities for procurement and employment and possible strategies to enhance these will be further explored during the SIA phase of the Project.

4.2.4 Distributive Equity and Community Benefits

During stakeholder discussions, concerns were raised regarding the perceived inequitable distribution of economic benefit among the local community. Multiple members of the local community participating in scoping phase engagement expressed the view that some people may benefit from the Project more than others with some landholders left to experience the potential negative impacts associated with the Project but with no compensation provided. It was also queried how categories for economic compensation agreements will be defined:

What constitutes a 'neighbour'? Who will get these benefits? - Community information session.

Another stakeholder questioned how they would benefit from the Project given their property is already self-sustaining in terms of energy consumption and therefore they would receive no benefit in terms of a potential reduction in electricity prices.

What will be the benefit for us? We live off the grid so we it won't impact our electricity prices. - Community information session.

During personal interviews with members of the Spark Renewables Project team, a proximal landholder shared that as one of the geographically closest neighbours to the Project site they are interested in receiving more information regarding potential neighbour benefit models and arrangements and would not like to see others located further away from the Project Area receive compensation.

Spark Renewables intends to implement a program incorporating a range of opportunities for the regional community hosting the Wattle Creek Energy Hub. It is intended that the program is to be co-designed with proximal neighbours, community and other key stakeholders and will include a community fund, neighbour benefit fund, and opportunities to provide goods and services for the construction and operational phases should the Project proceed.

The prospective development of a Project community benefit program was viewed positively by many stakeholders who attended both the Canyonleigh and community information sessions.

When specifically asked to consider ways in which community benefits could be realised, stakeholders identified a range of potential investment opportunities. Examples of these include:

- Investment in street lighting on Canyonleigh road for safety measures.
- Investment in local road maintenance.
- Investment in local and regional emergency services.
- Investment in the local telecommunications network.
- Basic Rural Fire Service training for project site, as well as making sure there are firefighting resources on site.
- Sponsorship of local community facilities such as the Big Hill Church which recently stopped its monthly services because it could not afford the \$1400 cost of public liability insurance for the historic roof.

- Partnering with local community initiatives such as the University of Sydney’s shipping container-based furnace for generation of bio-char. The partnership could investigate the impact upon soil improvement of bio-char in relations to reducing bushfire risk.
- Provision of funds to a registered community housing provider with these used to advance the availability of affordable housing area within the Goulburn area.
- Installation of solar and battery storage infrastructure on individual properties to enable the local community to access the energy being generated by the Project free of charge.

Rather than Community/Neighbour benefit funds consider installing solar and battery storage on every resident. That way the community all gets free electricity, supports green energy, and raises the sale values of their properties. This initiative demonstrates to the community that Spark Renewables want the community to really benefit [as] individuals - which is more meaningful, more personal, and will achieve a better acceptance of the project. - Online survey respondent.

Several online survey respondents also suggested incorporating profit sharing arrangements for proximal landholders into the community benefits scheme as a way of directing investment to those members of the community who would be most affected. Another online survey respondent suggested the proximal landholders should be given the option of hosting Project infrastructure in return for compensation.

There was however some scepticism amongst some consulted stakeholders as to how effective such a program would be with this in large due to past experiences with community benefit schemes offered by other renewable developers.

During a meeting with the Spark Renewables Project team, local government representatives particularly raised concerns regarding the ability for the community benefit scheme to address Project impacts and maximise opportunities and the fact that there were community expectations that substantial and meaningful benefits would be secured for the host LGA. Examples were also provided of experiences with other developer benefit schemes and the fact that their governance structures led to the schemes being accessed by the same groups, year-on-year. This was seen to have resulted in the gifting/donation of much equipment and infrastructure that has since become Council property or assets by ‘stealth’ resulting in additional unbudgeted cost burdens through maintenance, upkeep and, once the asset’s life has expired, replacement. It was clear another approach of this type would be undesirable.

Community stakeholders attending the Canyonleigh community meeting and the participating in the online survey also expressed scepticism towards the concept of a community benefit program, questioning the intention behind the development of the program and likening the implementation of such a scheme to bribery.

If it [the Project] was that good and critical, we should be paying you [in relation to community benefit arrangements]. – Canyonleigh community meeting

Seems a bit like bribery. – Canyonleigh community meeting

All the above are designed to BUY our community. Go away. - Online survey

The above-mentioned benefits by the Project are not benefits at all. They provide nothing for the community, environment (i.e., they only offer downside) and offer only upside for Sydney University, SPARK and the foreign owners (A US Investment Bank and Canadian pension funds). - Online survey.

4.3 Decision-Making Systems

Impacts in relation to decision-making systems relate to people's ability to make meaningful contributions to decisions that affect their lives, including their ability to influence change.

A lack of information regarding the terms of the original bequeathment of the Project Area to the University of Sydney has the potential to create a sense of disempowerment within the local community and negatively impact the community's perception of being able to contribute to and be part of the decision-making process regarding key issues and developments, which may affect them.

Multiple stakeholders attending the Canyonleigh community session felt that the University of Sydney had not been transparent in sharing information regarding its intention to lease the Project Area to a renewable energy developer for the purposes of developing a renewable energy project. Stakeholders conveyed that they would like to be given the opportunity to review the terms of the original trust and subsequent lease.

The University of Sydney should have been more open. – Canyonleigh community meeting

Wasn't the site gifted to the University of Sydney for a specific purpose? How does this use fit in with that? – Canyonleigh community meeting

They [the University of Sydney] would have to abide by specific access and uses. – Canyonleigh community meeting.

A proximal landholder shared their concern that the University of Sydney had not been transparent regarding the financial arrangements of the Project Area lease. Representatives from the Upper Lachlan Shire Council (ULSC) also raised concerns regarding the lack of information that had been provided to the Council about the Project and also a lack of engagement with the Upper Lachlan Shire community.

Some local stakeholders felt that they had not been provided with enough information regarding the Project, with one local resident who was also the editor of a local newsletter, expressing during a call with the Spark Renewables' Project team they felt there was a 'degree of controversy' in the community about the proposal but that there seemed to be an absence of information available.

It was apparent in the information session that people's experiences with other industrial projects operating in the area was influencing their perception of trust in Spark Renewables and their approach to managing impacts of the Project on the local community.

That's what's proposed, but that isn't what will happen [in regard to truck movements and traffic assessment]. We've seen that with the quarry trucks in the past taking different routes to miss the weigh station. – Community information session.

The level of trust may also correlate with the levels of knowledge of renewable technology being utilised for the Project. For solar and battery, respondents' level knowledge averaged 7.3 out of 10 and 6.9 out of 10.

Community members discussed their experiences with proximal renewable energy projects and emphasised the need for consultation to be transparent and focused on listening to the concerns and experiences of individual and local stakeholders. They also noted a need for ongoing consultation during all stages of the Project.

As such Spark Renewables will continue to proactively engage to enable the sharing of Project information and to ensure that local voices and affected people have been heard, their issues understood, and interests considered in the planning and assessment of the Project.

4.4 Accessibility

Impacts in relation to way of life refers to the potential impacts on how people live, work, play and interact with one another; with community impacts referring to changes in the composition, cohesion, and character of the population, as well as how the community functions and impacts on sense of community and sense of place. Impacts to community accessibility refers to people's ability to access and use infrastructure, services, and facilities and how the Project may inhibit or enhance this access.

4.4.1 Increased Strain on Housing

The potential for population change associated with incoming construction workforces and subsequent strain on local services and infrastructure was raised during consultation activities.

Goulburn Council highlighted accommodation as the biggest concern within their LGA, explaining that the temporary accommodation needs of the Project workforce may have the potential to cause a strain on existing service providers and may potentially limit the availability and affordability of housing to local residents.

It is noted that demand for accommodation in the area is already high due to demand from other industry sectors e.g., tourism and mining and ongoing coinciding development in the region (refer to **Section 3.3.7**) and additional pressure on local accommodation provision can also affect access and affordability for other user groups, including workers from other sectors, visitors, and tourists, who may also experience an increase in housing and accommodation prices during the construction period.

4.5 Health and Wellbeing

Health and wellbeing impacts include impacts to both physical and mental health and may include psychological stress resulting from uncertainty, financial and/or other pressures, as well as changes to individual and public health.

The potential for negative impacts to the health and wellbeing of the local community and for psychosocial impacts to occur, as a result of the Project were raised in community information sessions.

Local community spoke of the potential for increased levels of anxiety and stress for nearby residents as a result of the Project due to a fear of the unknown and feelings of uncertainty and loss of control over one's future and local surroundings.

Neighbours are anxious about it. – Community information session

Past experiences in the community will make people apprehensive. – Community information session.

Research confirms that the impacts of major projects on people most affected can increase levels of stress with stakeholders experiencing a perceived lack of control and distress induced by environmental and social change connected to their home environment (Albrecht, 2009).

As highlighted at **Section 4.3**, a commitment to ongoing and proactive engagement will be important to addressing this possible impact.

The potential for electromagnetic fields (EMF) produced by Project infrastructure during operation to negatively impact health and wellbeing was also raised by stakeholders. Potential EMF related impacts will be assessed during the preparation of the EIS.

Solar panels affect people with pacemakers.

This concern also reflects the level of knowledge about the Project technology (average 7.3 out of 10 for solar energy technology) and can be addressed by effective communication with stakeholders.

4.6 Culture

Impacts on culture include changes that may occur to values, shared beliefs, customs, and connections of those who reside within a social locality due to a particular Project.

As noted in **Section 2.5** consultation has been initiated with local Aboriginal stakeholder groups and future consultation will ensure that the interest and concerns of key stakeholders are understood. Impacts on culture identified in other similar projects include land rights, land use and management; the disturbance of cultural sites, objects and artefacts, and the preservation of traditional practices; cultural connections to country; community programs and partnerships; and support for representation and the interests of Aboriginal people in the local area.

Local community members at the Canyonleigh community meeting were keen to understand whether an assessment of Aboriginal Cultural Heritage has taken place. Further, one online survey respondent expressed concerns that the Project should not be constructed in an area with significant Aboriginal heritage.

Impacts upon culture and on local Aboriginal communities, will be assessed during the preparation of the EIS and SIA.

Community members also expressed a concern that sites of European heritage significance may be negatively impacted as a result of land clearing and ground disturbance of the Project site during the construction phase of the Project. One stakeholder attending the Canyonleigh community session noted the importance of preserving the cultural heritage of the site:

We're lucky enough to have a historic site like this, we should be preserving it.

One local resident and business owner who operates a local eco-accommodation farm stay in the area and attended a meeting of the Marulan and District Historical Society, which was held to raise awareness of the potential negative impacts of the Project to heritage sites in Arthursleigh and the surrounding valley, expressed her concern regarding these impacts during a phone call with the Spark Renewables' Project team.

5.0 Preliminary Social Impact Evaluation

The preliminary impact evaluation undertaken using the DPE Social Scoping Worksheet (DPIE, 2021a) is outlined in **Table 5.1**. Notably, it considers a range of social impacts relating to the Project and determines the level of assessment to be undertaken for each identified impact in subsequent phases of the SIA process (in line with the methodology outlined in **Section 2.1**).

The preliminary significance ratings identified are based on preliminary investigation and current understanding of the potential social impacts, prior to any mitigation measures being applied. It should be noted that these impact ratings will be further evaluated in the assessment phase of the SIA with consideration of mitigation measures, including landholder agreements.

Table 5.1 Preliminary Social Impact Evaluation

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration ⁶	Affected Stakeholder Group	Stakeholder Perceived Impact Significance	Preliminary Impact Significance	Possible Project Refinements/Management Measures	Residual Impact Significance	Level of Further Assessment
Way of Life Livelihoods	Potential decline in property values impacting on personal livelihoods	Establishment and operation of Project infrastructure including ancillary infrastructure	P, C, & O	Proximal Landholders	Medium	Medium	Further consultation to characterise and assess specific circumstances and extent. Open, transparent and accessible communication of Project information. Development of participatory local benefits scheme or good neighbour programs including potential financial compensation, where appropriate and on a case by case basis.	Medium	Standard Assessment
Way of Life Livelihoods Surroundings	Industrialisation of the landscape impacting the way people use their land and therefore their livelihoods	Installation and operation of Project Infrastructure	C & O	Proximal Landholders	High	High	Further consultation to characterise and assess specific circumstances and extent. Open, transparent and accessible communication of Project information. Development of participatory local benefits scheme or good neighbour programs including potential financial compensation, where appropriate and on a case-by-case basis.	Medium	Standard Assessment
Livelihoods	Provision of employment opportunities	Establishment, construction, and operation of Project infrastructure	C, O, & D	Broader Community	Medium positive	Medium positive	Develop local participation plan to preference local employment and to target training and capacity building initiatives for local workforce.	High positive	Detailed Assessment
Livelihoods	Opportunity for the Project to increase training, skills, and capacity development of individuals	Establishment, construction, and operation of Project infrastructure	C, O, & D	Broader Community	Medium positive	Medium positive	Develop local participation plan to preference local employment and to target training and capacity building initiatives for local workforce.	High positive	Detailed Assessment
Livelihoods	Procurement of local suppliers, services and contractors	Establishment, construction, and operation of Project infrastructure	C, O, & D	Broader Community, Local service providers and businesses	Medium positive	Medium positive	Develop a local participation plan. Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services or suppliers giving preference to local contractors and services.	High positive	Detailed Assessment

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration ⁶	Affected Stakeholder Group	Stakeholder Perceived Impact Significance	Preliminary Impact Significance	Possible Project Refinements/Management Measures	Residual Impact Significance	Level of Further Assessment
Livelihoods	Inequitable distribution of economic benefit	Payments to landholders	P, C, O & D	Proximal Landholders	Medium	Low	Further consultation to characterise and assess specific circumstances and extent. Open, transparent and accessible communication of Project information. Development of participatory local benefits scheme or good neighbour programs including potential financial compensation, where appropriate. and on a case by case basis.	Low	Standard Assessment
Livelihoods	Investment in community benefit sharing programs	Community benefit fund.	P, C, & O	Broader community, Local service providers, Community groups, Local government, Vulnerable community members	Medium positive	High positive	Robust community consultation process during EIS preparation and pre-construction period to understand local needs, priorities and aspirations. Develop targeted community benefit program to meet local needs and priorities.	High positive	Detailed Assessment
Surroundings Way of Life	Visual amenity changes impacting the rural landscape	Installation and operation of Project Infrastructure	C & O	Host and proximal landholders, nearby residents, tourists, and tourism operators	High	High	Consideration of neighbour/adjacent property impacts and mechanisms to address personal issues on a case-by-case basis. Detailed assessment of the technical risk by the Visual Impact Assessment.	Medium	Detailed Assessment
Surroundings	Social amenity impacts due to noise, vibration and dust affecting personal wellbeing	Establishment and construction of Project infrastructure	C	Proximal landholders	Medium	Medium	Development and implementation of a Construction Environmental Management Plan (CEMP) in consultation with local communities and key stakeholders. Construction and operational management controls to be developed in consultation with key stakeholders to ensure appropriate social amenity conditions during construction and operational activities. Ensure appropriate mechanisms to enable open, transparent and accessible communication of Project information to key stakeholders. Detailed assessment of the technical risk by the Noise and Vibration Impact Assessment.	Low	Standard Assessment

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration ⁶	Affected Stakeholder Group	Stakeholder Perceived Impact Significance	Preliminary Impact Significance	Possible Project Refinements/Management Measures	Residual Impact Significance	Level of Further Assessment
		Operation of Project infrastructure	O	Proximal landholders, Broader community	Medium	Low	Development and implementation of an Operational Environmental Management Plan in consultation with local community and key stakeholders. Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders, including a grievance mechanism. Detailed assessment of the technical risk by the Noise and Vibration Impact Assessment.	Low	Standard assessment
Surroundings	Potential impacts to flora and fauna	Project establishment and operations	C, & O	Broader Community	Medium	Medium	Engage proactively with relevant community groups to support and protect local environmental values. Detailed assessment of the technical risk by the Biodiversity Assessment Development of a Biodiversity / Fauna Management Plan to protect local wildlife, particularly migratory birds. Development of a biodiversity offset plan to protect the natural environment. Actively engage and involve key stakeholder groups in development of relevant environmental plans.	Low	Standard Assessment
Surroundings Way of life	Impacts to visual and social amenity due to project siting	Project establishment and operations	C, & O	Proximal Landholders Broader Community	Medium	Low	Ensure appropriate mechanisms to enable open, transparent and accessible communication of Project information to key stakeholders. Detailed assessment of the technical risk by the Visual Impact Assessment.	Low	Standard Assessment
Accessibility Surroundings	Increased construction-related traffic resulting in deterioration in road condition, and potential road safety issues	Establishment and construction of Project Infrastructure	C	Proximal Landholders, Broader Community and road users	High	Medium	Development and implementation of a CEMP in consultation with local communities and key stakeholders. Commission a detailed Traffic and Transport Impact Assessment to satisfy relevant Government guidelines and assessment standards. Develop detailed planning transport routes with public safety considerations and information disclosure, consulting with and notifying residents, considering any sensitive user groups. Consider supporting upgrades to local roads or transport infrastructure.	Low	Standard Assessment

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration ⁶	Affected Stakeholder Group	Stakeholder Perceived Impact Significance	Preliminary Impact Significance	Possible Project Refinements/Management Measures	Residual Impact Significance	Level of Further Assessment
Livelihoods Surroundings Accessibility	Potential fire risk to property (including plant, livestock, homes) due to decreased site accessibility for aerial firefighting services and increased fire hazards associated with solar and BESS infrastructure	Establishment and operation of Project infrastructure including ancillary infrastructure	C & O	Host and proximal landholders, including for ancillary infrastructure	High	Low	Implementation of an effective community engagement program to discuss risk with affected landholders. Collaboration with emergency services units to ensure appropriate site accessibility. Detailed assessment of hazards and safety impacts.	Low	Standard Assessment
Surroundings	Impacts to aviation	Operation of Project Infrastructure – specifically glare and reflection of solar panels	O	Aviation industry	Medium	Low	Implementation of an effective community engagement program to discuss risk with community. Collaboration with appropriate aviation organisations to ensure adherence to relevant aviation standards and regulations.	Low	Standard Assessment
Surroundings	Potential for environmental degradation associated with decommissioning (e.g., removal of waste, recycling, site remediation) of Project Infrastructure	Decommissioning	D	Proximal landholder and broader Community	Medium	Low	Development and implementation of a waste management and recycling plan for the Project. Development and implementation of a rehabilitation plan for the Project.	Low	Standard Assessment
Surroundings	Potential for environmental degradation associated with weed management	Operation	O	Proximal landholder and broader Community	Medium	Low	Development and implementation of a weed and vegetation management plan for the Project.	Low	Standard Assessment
Decision-Making Systems	Perceived inability to influence planning and decision-making in relation to the Project	Community and stakeholder engagement activities	P	Proximal landholder and broader Community	Medium	Low	Organise in-person community consultation and community information sessions during EIS preparation period. Continue proactive personal engagement with community members and proximal residents. Respond to community suggestions on preferred engagement mechanisms, prioritising personal and face-to-face consultation.	Low	Standard Assessment

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration ⁶	Affected Stakeholder Group	Stakeholder Perceived Impact Significance	Preliminary Impact Significance	Possible Project Refinements/Management Measures	Residual Impact Significance	Level of Further Assessment
Decision Making Systems	Lack of trust due to perceived lack of information sharing and transparency around bequeathment to University of Sydney	Community and stakeholder engagement activities	P	Proximal landholder and broader Community	Medium	Low	Organise in-person community consultation and community information sessions during EIS preparation period. Continue proactive personal engagement with community members and proximal residents. Respond to community suggestions on preferred engagement mechanisms, prioritising personal and face-to-face consultation.	Low	Standard Assessment
Accessibility Livelihoods Way of Life Community (cumulative)	Reduced access to housing and accommodation due to cumulative workforce project influx	Establishment and Construction of Project Infrastructure	C	Broader Community, Service Providers, Vulnerable community groups	High	Medium	Develop local participation plan and workforce accommodation strategy. Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services or suppliers.	Low	Detailed Assessment
Accessibility	Reduced access to television, internet and phone signals due to operation of project infrastructure	Operation	O	Proximal landholder and broader Community	Medium	Low	Implementation of an effective community engagement program to monitor accessibility with proximal landholders and broader community.	Low	Standard Assessment
Health and Wellbeing	Project development may increase stress and anxiety for proximal residents who feel uncertain about their futures and changes to their way of life	Public release of Project plans and documentation	P & C	Proximal Landholders	Medium	Medium	Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders. Development of participatory local benefits scheme or good neighbour programs.	Medium	Standard Assessment
Culture	Impacts to Aboriginal Cultural Heritage and European Heritage	Establishment and construction of Project infrastructure	C	Traditional Owners Broader Community	Medium	Medium	Inclusion of Traditional Owners in decision-making processes. Detailed assessment through an Aboriginal Cultural Heritage Assessment and Historic Heritage Assessment Active community engagement with Traditional Owners providing clear information of next steps of Project development. Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders.	Low	Standard Assessment

6.0 Conclusion

The SISR has identified and profiled the social locality and has documented preliminary social impacts and opportunities associated with the solar and battery components of the Wattle Creek Energy Hub. The SISR forms part of the broader Project Scoping Assessment to inform the issue of SEARs by the NSW DPE.

Phase 1 of the SIA has included the compilation of a social baseline profile for the Project, a summary of outcomes of early community and stakeholder consultation to inform the scoping of Project-related social impacts and opportunities, and preliminary social impact prediction and evaluation. The preliminary social impact evaluation has been undertaken to inform and support the refinement of Project design and plans to reduce negative Project impacts and facilitate the enhancement of positive Project benefits.

Much of the community focus was centred on the wind energy technology component, but with this element now removed from the Project design, a substantial amount of the perceived impacts will no longer be realised.

The focus on the development of the solar and BESS technology components is likely to be more acceptable to the community, noting the very limited feedback received on solar and BESS to date.

A detailed assessment of social impacts is required as part of the EIS and will be informed by an ongoing process of community consultation. As part of the EIS, future stages of the SIA for this Project will include a comprehensive prediction and assessment of social impacts and development of relevant strategies to mitigate the negative and enhance the positive impacts associated with the Project. Further SIA and technical environmental impact studies will address perceptions of impacts raised by key stakeholders during this phase.

Subsequent phases of the SIA program will involve the following key activities:

- An update of the baseline social profile so that any further baseline data relevant to the social impacts identified is obtained.
- Further validation of the area of social influence and identification of affected communities and vulnerable groups.
- Provision of feedback to 148 community members and key stakeholders on the outcomes of the issues raised in the scoping phase and communication of the Project's SEARs (once issued), including an outline of the next steps in the assessment process and further opportunities for community input.
- Update of the Project CSEP and further engagement with community members and other key stakeholders on key social impact areas as noted above. This will involve feedback on the outcomes of EIS technical studies and will provide opportunities for input to the development of appropriate management and enhancement measures to address social impacts and residual effects.
- A comprehensive assessment and evaluation of social impacts against existing baseline conditions.

7.0 References

- .id. (2021). *Goulburn Mulwaree*. Retrieved from .idcommunity demographic resources:
<https://economy.id.com.au/goulburn>
- .idcommunity. (2021). *Upper Lachlan Shire*. Retrieved from .idcommunity demographic resources:
<https://economy.id.com.au/upper-lachlan>
- .idcommunity. (2021). *Upper Lachlan Shire*. Retrieved from .idcommunity demographic resources:
<https://forecast.id.com.au/upper-lachlan/drivers-of-population-change#:~:text=Residential%20supply%20has%20been%20identified%20in%20all%20small,period%2C%20resulting%20in%20little%20population%20change%20to%202036>.
- .idcommunity. (2021). *Upper Lachlan Shire community profile*. Retrieved from .idcommunity demographic resources: <https://profile.id.com.au/upper-lachlan>
- .idcommunity. (2021). *Upper Lachlan Shire population forecast*. Retrieved from .idcommunity demographic resources: <https://forecast.id.com.au/upper-lachlan/drivers-of-population-change#:~:text=Expansion%20of%20existing%20towns%20and%20villages%20in%20Upper, but%20more%20importantly%2C%20the%20demand%20for%20future%20development>.
- .idcommunity. (2021). *Wingecarribee Shire*. Retrieved from .id community demographic resources:
<https://economy.id.com.au/wingecarribee>
- .idcommunity. (2021). *Wingecarribee Shire community profile*. Retrieved from .idcommunity demographic sources: <https://profile.id.com.au/wingecarribee/about>
- .idcommunity. (2021). *Wingecarribee Shire community profile*. Retrieved from .idcommunity demographic resources: <https://profile.id.com.au/wingecarribee>
- .idcommunity. (2021). *Wingecarribee Shire population forecast*. Retrieved from .idcommunity demographic resources: <https://forecast.id.com.au/wingecarribee/drivers-of-population-change>
- ABS. (2021). *Search Census Data*. Retrieved from ABS: <https://www.abs.gov.au/census/find-census-data/search-by-area>
- AirDNA. (2022). *Short-Term Rental Data Analytics LGA*. AirDNA.
- Airport Guide. (n.d.). *Goulburn Airport*. Retrieved from Airport Guide:
<https://airportguide.com/airport/info/GUL>
- Angus Taylor MP. (2015, February 25). *Taralga needs full solution on TV reception*. Retrieved from
<https://www.angustaylor.com.au/media/media-releases/taralga-needs-full-solution-tv-reception>
- ATDW. (2022). *ATDW Accommodation as at 14 Oct 2022*. Australian Tourism Data Website.
- Boral. (n.d.). *Boral Cement Marulan South Limestone Mine*. Retrieved from Boral:
<https://www.boral.com.au/locations/boral-cement-marulan-south-limestone-mine>

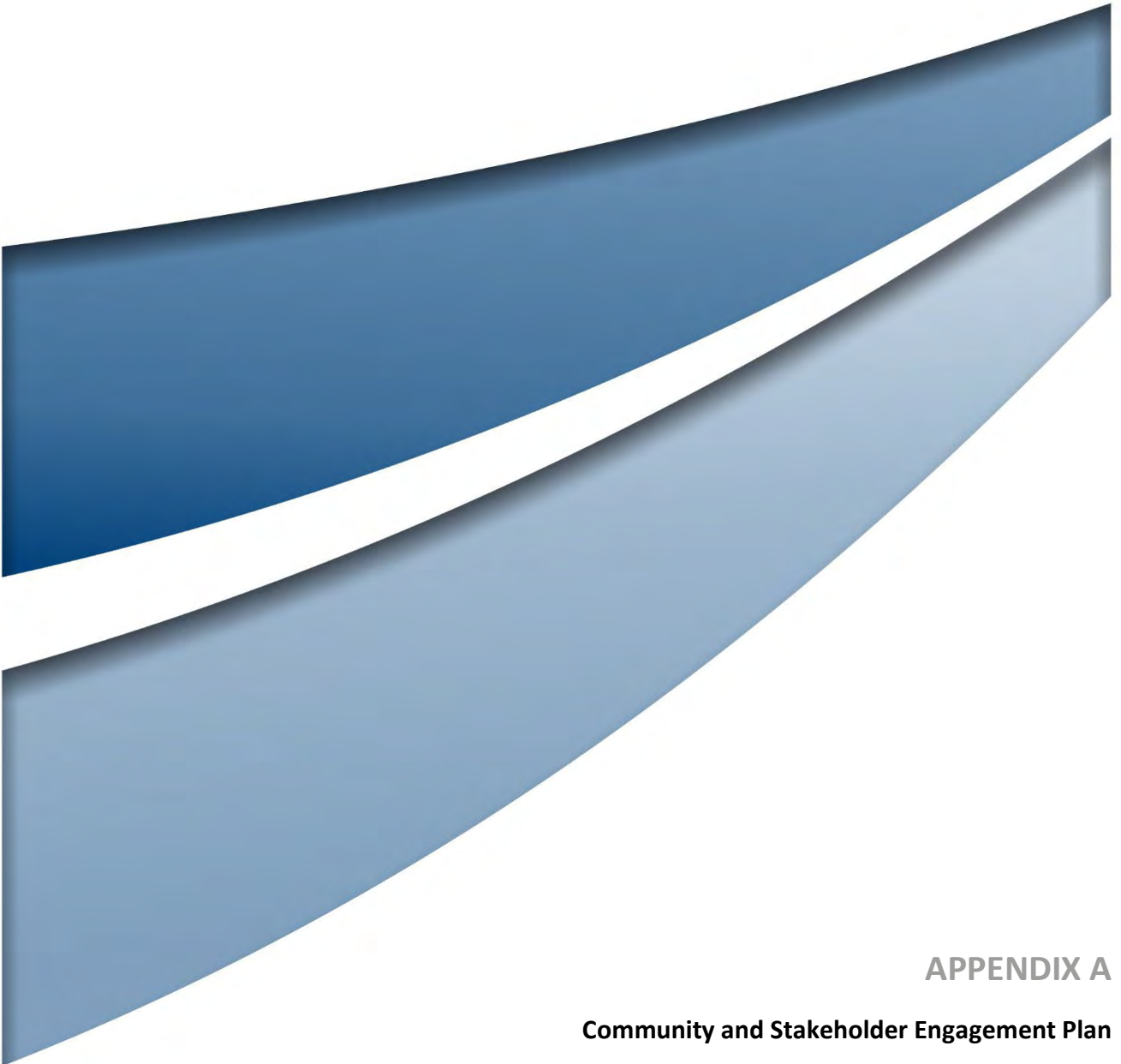
- Calver, O. (2022, March 2023). *Riverina farmers call for solar farm developments to be put on hold until review completed*. Retrieved from ABC News: <https://www.abc.net.au/news/2022-03-23/solar-farms-conflict-with-agricultural-land-use-/100920184>
- Canberra Airport. (n.d.). *International Destinations*. Retrieved from Canberra Airport: <https://www.canberraairport.com.au/flights/international/>
- Condie, K. (2021, May 14). *Record growth expected for Goulburn Mulwaree region*. Retrieved from about regional: <https://aboutregional.com.au/record-growth-expected-for-goulburn-mulwaree-region/>
- Condon, D. C. (2022, February 9). *As wind power is developed in NSW's north west, questions are raised about their impact on locals*. Retrieved from ABC News: <https://www.abc.net.au/news/rural/2022-02-09/farmers-worried-about-massive-wind-farm-expansion/100809354>
- Coote, G. (2017). *Wind farm debate rages on after almost 20 year-presence in southern NSW district*. Retrieved from Wind farm debate rages on after almost 20 year-presence in southern NSW district
- Davis, A. (2019, November 30). *The Angus Taylor story: from the Liberals' golden boy to a man on the edge*. Retrieved from The Guardian: <https://www.theguardian.com/australia-news/2019/nov/30/the-angus-taylor-story-from-the-liberals-golden-boy-to-a-man-on-the-edge>
- Department of Planning, Industry and Environment. (2020). Net Zero Plan Stage 1: 2020-203.
- df. (n.d.). Retrieved from f
- DPE. (2019). *NSW Electricity Strategy*.
- DPE. (2023). *Social Impact Assessment Guideline*.
- Energy Storage News. (2021). Tesla 450MWh Victorian Big Battery in Australia resumes testing after fire setback.
- Frolic, K. (2014, July 29). *Electrical compatibility: solar farms and wireless transmissions*. Retrieved from Pager Power: <https://www.pagerpower.com/news/solar-farms-electromagnetic-interference-emi/>
- Fuller, A. D.-S. (2022, May 11). *Wingecarribee Council public inquiry finds culture 'festered', recommends councillors be sacked*. Retrieved from ABC News: <https://www.abc.net.au/news/2022-05-11/wingecarribee-council-sacking-calls/101056396>
- Goulburn Australia. (n.d.). *Marulan*. Retrieved from Goulburn Australia: <https://www.goulburnaustralia.com.au/our-region/marulan/>
- Goulburn Mulwaree Council. (2020, March 26). *Council elections deferred*. Retrieved from Goulburn Mulwaree Council: <https://www.goulburn.nsw.gov.au/News-Articles/Council-elections-deferred>
- Goulburn Mulwaree Council. (2020). *Goulburn Mulwaree Council Operational Plan 2020-2021*. Goulburn Mulwaree: Goulburn Mulwaree Council.

- Goulburn Mulwaree Council. (2021, October 27). *Forging ahead with rural road improvements*. Retrieved from Goulburn Mulwaree Council: <https://www.goulburn.nsw.gov.au/News-Articles/Forging-ahead-with-rural-road-improvements>
- Goulburn Mulwaree Council. (2022). *Draft Regional Community Strategic Plan*. Goulburn Mulwaree: Goulburn Mulwaree Council.
- Goulburn Mulwaree Council. (2022). *What Council Does* . Retrieved from Goulburn Mulwaree Council: <https://www.goulburn.nsw.gov.au/Council/Contact-a-Councillor>
- Goulburn Mulwaree Council. (n.d.). *Heritage*. Retrieved from Goulburn Mulwaree Council: <https://www.goulburn.nsw.gov.au/Development/Environment-Heritage/Heritage>
- Goulburn Post. (2021, November 16). *HumeLink Alliance action group rallies support for TransGrid underground line*. Retrieved from <https://www.goulburnpost.com.au/story/7505824/lines-of-resistance-form-against-companys-overhead-power-proposal/>
- GPG. (n.d.). *Crookwell 3 Wind Farm*. Retrieved from GPG Naturgy Group: <https://crookwellthreewindfarm.globalpower-generation.com.au/the-project/>
- Gulgong Residents for Responsible Renewables. (2019). *Australia has boundless plains - why put solar panels on productive farms?* Change.org.
- Gunlake. (2022). *About Gunlake*. Retrieved from <https://www.gunlake.com.au/about-gunlake/>
- Hannam, P. (2021, May 25). *'Value for money': NSW government electricity contract to bolster solar, big battery*. Retrieved from Sydney Morning Herald: <https://www.smh.com.au/politics/nsw/value-for-money-3-2-billion-deal-for-nsw-to-bolster-solar-big-new-battery-20210524-p57uon.html>
- Holcim. (2004). *Lynwood Quarry*. ReadyMix.
- Koziol, M. (2022, January 15). *In tranquil Southern Tablelands, an unusual group of activists emerge*. Retrieved from Sydney Morning Herald: <https://www.smh.com.au/national/nsw/in-tranquil-southern-tablelands-an-unusual-group-of-activists-emerge-20220104-p59lrg.html>
- McCabe, C. (2021, September 15). *New Crookwell wind farm to inject funds into local community*. Retrieved from <https://the-riotact.com/new-crookwell-wind-farm-to-inject-funds-into-local-community/494194>
- McCabe, C. (2022, March 2). *Farmers reach regenerative agriculture success in the Upper Lachlan Shire*. Retrieved from about regional: <https://aboutregional.com.au/farmers-reach-regenerative-agriculture-success-in-the-upper-lachlan-shire/>
- My Travel Jam. (2019, 2 January). *Driving Melbourne to Sydney on the Hume Highway*. Retrieved from My Travel Jam: <https://www.mytraveljam.com/driving-melbourne-sydney/>
- NSW Aboriginal Land Council. (2023). *Pejar LALC*. Retrieved from https://alc.org.au/land_council/pejar/
- NSW BOSCAR. (2022). *NSW Crime Tool*. Retrieved from NSW Bureau of Crime Statistics and Research: <http://crimetool.bocsar.nsw.gov.au/bocsar/>

- NSW Government. (2020). *Electricity Infrastructure Roadmap*.
- NSW Government, Planning & Environment. (2017). *NSW Renewable Energy Action Plan*. NSW Government.
- NSW Health. (2020). *Crookwell District Hospital*. Retrieved from <https://www.snswhd.health.nsw.gov.au/our-facilities/crookwell-district-hospital>
- NSW Health. (2023). *Goulburn Base Hospital*. Retrieved from NSW Government Health: <https://www.emergencywait.health.nsw.gov.au/#a>
- NSW Health Infrastructure. (n.d.). *Houlburn Hospital and Health Service Redevelopment*. Retrieved from NSW Government Health Infrastructure: <https://www.hinfra.health.nsw.gov.au/projects/project-search/goulburn-hospital-and-health-service-redevelopment>
- NSW LALC. (2022). *Broken Hill LALC*. Retrieved from https://alc.org.au/land_council/broken-hill/
- NSW Landcare. (n.d.). *Growing at Goulburn Regenerative Farm, University Agriculture Hub and Solar Farm*. Retrieved from NSW Landcare Gateway: <https://landcare.nsw.gov.au/groups/community-voice-for-hume/growing-at-goulburn-regenerative-farm-university-agriculture-hub-and-solar-farm/>
- NSW National Parks and Wildlife Service. (1998). *Tarlo River National Park Plan of Management*.
- NSW National Parks and Wildlife Service. (2022). Retrieved from Mutawintji National Park: <https://www.nationalparks.nsw.gov.au/visit-a-park/parks/mutawintji-national-park>
- NSW National Parks and Wildlife Service. (2023). *Big Hill Rainforest walking track*. Retrieved from NSW National Parks and Wildlife Service: <https://www.nationalparks.nsw.gov.au/things-to-do/walking-tracks/big-hill-rainforest-walking-track/visitor-info>
- NSW National Parks and Wildlife Service. (2023). *Wombeyan Karst Conservation Reserve*. Retrieved from <https://www.nationalparks.nsw.gov.au/visit-a-park/parks/wombeyan-karst-conservation-reserve>
- NSW Planning and Environment. (2017). *South East and Tablelands Regional Plan (2036)*.
- NSW Planning Portal. (2021). *Projections Explorer*. Retrieved from NSW Government : <https://www.planningportal.nsw.gov.au/populations>
- NSW Trade & Investment. (2013). *NSW Renewable Energy Action Plan*.
- Office of Environment & Heritage. (2015). *Community Attitudes to Renewable Energy in NSW*. NSW Government.
- Opteon. (2017). *2017 Upper Lachlan Shire Valuing Year*. Opteon.
- Parliament of Australia. (2022). *Hon Angus Taylor MP*. Retrieved from https://www.aph.gov.au/Senators_and_Members/Parliamentarian?MPID=231027
- Parliament of New South Wales. (2022). *The Hon. Wendy Margaret TUCKERMAN, MP*. Retrieved from <https://www.parliament.nsw.gov.au/members/Pages/member-details.aspx?pk=2240>

- Parliament of New South Wales. (n.d.). *Mr (Roy) Royal Francis BUTLER, MP*. Retrieved from <https://www.parliament.nsw.gov.au/members/Pages/profiles/butler-roy-rf.aspx>
- Peacock, B. (2022, August 30). *NSW solar farm agrees to pay \$5.9 million 'community benefit contribution' as part of council REZ demands*. Retrieved from PV Magazine: <https://www.pv-magazine-australia.com/2022/08/30/nsw-solar-farm-agrees-to-pay-5-9-million-community-benefit-contribution-as-part-of-council-rez-demands/>
- PHIDU. (2021). *Data Workbooks*. Retrieved from PHIDU Torrens University Australia: <https://phidu.torrens.edu.au/social-health-atlases/data>
- PV Magazine. (2023). *Fire at NSW Solar Farm*.
- ReadyMix. (n.d.). *Lynwood Quarry Development Proposal*.
- SALM. (2022). *Small Area Labour Markets*. Australian Government, Jobs and Skills Australia.
- Sandman, P. (1993). *Responding to Community Outrage: Strategies for Effective Effective Risk Communication*. *Fairfax VA: American Industrial Hygiene Association*.
- School Parrot. (n.d.). *Schools in the Upper Lachlan Shire*. Retrieved from School Parrot: <https://www.schoolparrot.com.au/search/upper-lachlan-shire-nsw-australia>
- Scott, M. (2023, April 26). *Asustralia: Liddell coal power station closes, cutting jobs and raising supply concerns*. Retrieved from World Socialist Website: <https://www.wsws.org/en/articles/2023/04/27/tkst-a27.html>
- SEIFA. (2021). *SEIFA*. Australian Bureau of Statistics. Retrieved from Australian Bureau of Statistics.
- Smith, A. (2023, February 19). *NSW Labor's power plan for state investment in renewable energy*. Retrieved from Sydney Morning Herald: <https://www.smh.com.au/politics/nsw/nsw-labor-s-power-plan-for-state-investment-in-renewable-energy-20230218-p5clkv.html>
- Stop Gundry Solar Farm. (2023). *Stop Gundry Solar Farm*. Retrieved from <https://www.stopgundarysolarfarm.com/>
- TAFE NSW. (n.d.). *Locations*. Retrieved from TAFE NSW: <https://www.tafensw.edu.au/locations>
- Thistleton, J. (2021, December 21). *New face on Goulburn council shares his vision for the LGA*. Retrieved from about regional: <https://aboutregional.com.au/new-face-on-goulburn-council-shares-his-vision-for-the-shire/>
- Thistleton, J. (2023, January 23). *Wind turbines add to perfect property storm for Goulburn*. Retrieved from about regional: <https://aboutregional.com.au/wind-turbines-add-to-perfect-property-storm-for-goulburn/#:~:text=Goulburn%E2%80%99s%20proximity%20to%20Sydney%20and%20the%20ACT%2C%20more,demand%20for%20properties%20from%20local%20and%20out-of-town%20buyers.>
- Tilt Renewables. (2022). *Crookwell Wind Farm*. Retrieved from <https://www.tiltrenewables.com/assets-and-projects/Crookwell-Wind-Farm/#project-details>

- Upper Lachlan Shire. (2013). *Social and Community Plan*.
- Upper Lachlan Shire Council. (2018). *Early stage actions arising from the Southern Tablelands Regional Economic Development Strategy*.
- Upper Lachlan Shire Council. (2018). *Upper Lachlan Shire Regional Economic Development Strategy 2018-2022*. Upper Lachlan: Upper Lachlan Shire Council.
- Upper Lachlan Shire Council. (2021). *Community Engagement Report*. Upper Lachlan: Upper Lachlan Shire Council.
- Upper Lachlan Shire Council. (n.d.). *Council*. Retrieved from Upper Lachlan Shire Council: <https://www.upperlachlan.nsw.gov.au/council/>
- Visit Southern Highlands. (n.d.). *Canyonleigh*. Retrieved from Visit Southern Highlands: <https://www.visitsouthernhighlands.com.au/about-us/towns-villages/canyonleigh/>
- Vorrath, S. (2022, July 22). *Good Vibe? New data shows wind farm complaints tumbled in 2021*. Retrieved from Renew Economy: <https://reneweconomy.com.au/good-vibe-new-data-shows-wind-farm-complaints-tumbled-in-2021/>
- Walsh & Monaghan. (2018). *Wingecarribee Local Government Area*. Walsh & Monaghan.
- Wingecarribee Shire Council. (2018). *Wingecarribee Regional Economic Development Strategy 2018-2022*. Wingecarribee: Wingecarribee Shire Council.
- Wingecarribee Shire Council. (2020). *Wingecarribee 2040 Local Strategic Planning Statement*. Wingecarribee.
- Wingecarribee Shire Council. (2021). *Community Strategic Plan- Wingecarribee 2041*. Wingecarribee: Wingecarribee Shire Council.
- Wingecarribee Shire Council. (2022). *About the Wingecarribee Shire*. Retrieved from <https://www.wsc.nsw.gov.au/Council/About-the-Wingecarribee-Shire>
- Wingecarribee Shire Council. (2023). *About the Wingecarribee Shire*. Retrieved from Wingecarribee Shire Council: <https://www.wsc.nsw.gov.au/council/about-the-wingecarribee-shire>
- Wingecarribee Shire Council. (n.d.). *Roads & Traffic*. Retrieved from Wingecarribee Shire Council: <https://www.wsc.nsw.gov.au/services/roads-traffic#section-3>



APPENDIX A

Community and Stakeholder Engagement Plan

Wattle Creek Energy Hub

Community and Stakeholder Engagement Plan



WE ACKNOWLEDGE THE TRADITIONAL CUSTODIANS OF THE LAND ON WHICH THIS PROJECT IS LOCATED, BEING THE GUNDUNGURRA PEOPLE, AND RECOGNISE THEIR CONTINUING CONNECTION TO LAND, WATER AND COMMUNITY.

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Document Control

Abbreviations

Abbreviation	Definition
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
BESS	Battery Energy Storage System
CEC	Clean Energy Council
CER	Clean Energy Regulator
CO ₂	Carbon dioxide
CSEP	Community and Stakeholder Engagement Plan
CPI	Consumer price index
DPE, Department	NSW Department of Planning & Environment
EIS	Environmental impact statement
EMFs	Electric and Magnetic Fields
EPA	NSW Environmental Protection Authority
FAQs	Frequently Asked Questions
FTE	Full Time Equivalent
GW	Giga Watt
IAP2	International Association for Public Participation
IPC	Independent Planning Commission
km	Kilometre(s)
kV	Kilovolt
LALC	Local Aboriginal Land Council
LGA	Local Government Area
MP	Member of Parliament
MW	Megawatt
NBN	National Broadband Network
NEM	National Electricity Market
NSW	New South Wales
PCU	Power conditioning unit
RTS	Response to Submissions
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SSD	State Significant Development
VIC	Victoria

1. Introduction

1.1. Purpose

This Community and Stakeholder Engagement Plan (CSEP) outlines the methods and tools for effective engagement with stakeholders through the planning, development, construction, operation and decommissioning of the proposed Wattle Creek Energy Hub Project (or “the Project”), proposed by Spark Renewables Pty Limited (“Spark Renewables” or “the Proponent”). This is a live document to be updated and revised as the Project progresses.

1.2. Distribution

The document is internal for use by Spark Renewables and any consulting parties that have been engaged to work on the Project. An external public document will also be developed and included as part of the submission for the Development Consent.

1.3. Engagement Objectives

Spark Renewables aims to increase community acceptance of the Project (the social licence to operate) by undertaking effective and ongoing community engagement through the Project assessment phases.

The CSEP has the following key objectives:

- To utilise appropriate methods to inform the community about the Project and provide updates on Project progress
- To develop trusted relationships with stakeholders through open and transparent communication and engagement
- To ensure the community has a voice in the process and their input is used to inform the social and environmental assessment for the Project and ongoing project design and planning, including the development of community benefit sharing programs.
- To ensure the broader community and stakeholders are kept informed about potential impacts, benefits, and activities associated with the Project.
- To ensure that commitments made to the community in the Project development stage are met.

The above objectives are in line with the NSW Department’s *Undertaking Engagement – Guidance for State Significant Projects (2021)* community participation objectives for engaging on State Significant Development projects (refer to Figure 1 below).



Figure 1 Community Participation Objectives (Community Participation Plan (DPE, 2019))

This CSEP identifies:

- Relevant local community and regulatory stakeholders to be engaged
- Perceived impacts (positive and negative) related to each stakeholder group
- Engagement mechanisms to meaningfully involve different stakeholder groups
- Key Project messages
- Engagement timing
- Responsibilities, and
- Protocols for ongoing consultation and evaluation.

The 10 commitments of the Best Practice Charter for Community Engagement (Clean Energy Council, 2021) have also been considered in the development of the CSEP.

1.4. Governance

The Project is State Significant Development (SSD) and will require development consent under the NSW Environmental Planning and Assessment Act (EP&A Act). The project will involve the submission of two development applications, one for each component of the Project - solar and BESS - which are each to be accompanied by a detailed Environmental Impact Statement (EIS), that will identify relevant Project impacts and management strategies.

A detailed Social Impact Assessment (SIA) will also be prepared for each component of the project as a component of each of the Project EIS's. The SIA's will be informed by a comprehensive community engagement program, which is outlined within this CSEP, and be prepared in accordance with the NSW Department of Planning and Environment (DPE or 'the Department') *Social Impact Assessment Guideline for State Significant Projects (2021)* and 'Undertaking Engagement – Guidance for State Significant Projects' (2021). These guidelines note that respectful, inclusive, and meaningful engagement is a fundamental part of project planning and development. Engagement with affected communities and stakeholders provides first-hand insight into what people value and how they expect a project to affect them. The community will also have formal opportunities to be engaged on the project in line with the Department's Community Participation Plan (2019).

The Project may also require approval under the federal Environment Protection Biodiversity Conservation Act 1999 (EPBC Act).

1.5. Industry Best Practice

Spark Renewables is committed to engaging respectfully and transparently with community stakeholders throughout the lifecycle of the Project. Spark Renewables is committed to addressing significant environmental, social and cultural impacts and in facilitating positive social and economic outcomes in the regions in which it operates.

As a member of the industry's peak body – the Clean Energy Council (CEC) - Spark Renewables is signatory to the voluntary set of commitments outlined in the Community Engagement Best Practice Charter for Renewable Energy Developments (CEC, 2018). In line with this charter, when developing, constructing, and operating projects, Spark Renewables will:

1. Engage respectfully with the local community, including Traditional Owners of the land, to seek their views and input before submitting a development application and finalising the design of the project.
2. Provide timely information and be accessible and responsive in addressing the local community's feedback and concerns throughout the life of the project.
3. Be sensitive to areas of high biodiversity, cultural and landscape value in the design and operation of projects.
4. Minimise the impacts on highly productive agricultural land and explore opportunities to integrate agricultural production.
5. Consult the community on the potential visual, noise, traffic, and other impacts of the project, and on the mitigation options.
6. Support the local economy by providing local employment, training, and procurement opportunities.

7. Offer communities the opportunity to share in the benefits of the Project, and consult them on the options available, including the relevant governance arrangements.
8. Commit to using the Project to support educational and tourism opportunities where appropriate.
9. Demonstrate responsible land stewardship over the life of the project and welcome opportunities to enhance the ecological, cultural and/or agricultural value of the land.
10. During the life of the project, recycle waste materials where feasible and commit to responsible decommissioning or refurbishment/repowering of the site at the end of the Project's life.

Further, the document addresses the Clean Energy Council's *Community Engagement Guideline (2018)*, which builds on the International Association for Public Participation's (IAP2) participation spectrum. The spectrum outlines levels of participation that define the public's role in public participation processes, from the provision of information (inform) through to increasing levels of collaboration and empowerment, as outlined below.

Inform – the public has access to the information about the Project and potential impacts on them.

Consult – the public can provide suggestions and feedback about the Project.

Involve – their material concerns relating to the Project are directly addressed in risk mitigation plan.

Collaborate – their advice and suggested alternatives are incorporated in the Project to the maximum extent possible.

Empower – they make the final decision that will be implemented in the Project.

1.6. Planning process

There are eight phases within the planning process. Community consultation outcomes during this process will inform the ongoing project design and assessment processes in the preparation of the Scoping Report, Social Impact Assessment, and in the preparation and exhibition of the EIS.



Figure 2 Planning and assessment process for state significant development in NSW

1.7. Roles and responsibilities

Spark Renewables has ultimate responsibility and accountability to ensure that the Project is developed, designed, built, operated, and decommissioned in accordance with the Project's Development Consent. Spark Renewables has engaged Umwelt Environmental and Social Consultants ("Umwelt") to develop the EISs and SIAs for the project, and thus, Umwelt also have responsibilities related to the implementation of the stakeholder engagement program in line with the CSEP.

Table 1 Key roles related to communication and stakeholder engagement

Organisation	Role	Responsibilities and authorities
Spark Renewables	Senior Development Manager	<ul style="list-style-type: none"> - Overall management of community and public relations during development. - Face-to-face consultation, meetings, phone calls and correspondence with community members and stakeholders. - Run public information drop-in sessions. - Ensuring that issues are responded to quickly and mitigated where possible. - Local media interviews.
	Development Manager	<ul style="list-style-type: none"> - Assistance with research and management of stakeholder database.
	Senior Development Engineer	<ul style="list-style-type: none"> - Provide figures and maps to assist with stakeholder communication.
	Communications Manager	<ul style="list-style-type: none"> - Maintenance and updating of the Project website. - Prepare and distribute public information materials (e.g. newsletters and media releases).
	Head of Development	<ul style="list-style-type: none"> - Provide oversight to community engagement activities.
	Head of Legal and Community	<ul style="list-style-type: none"> - Provide community engagement support and compliance oversight on engagement activities.
	Head of Renewables	<ul style="list-style-type: none"> - Overall accountability for obtaining and maintaining the social licence to operate, and reputation. - High profile/national media interviews.
Local Community Liaison	Community liaison	<ul style="list-style-type: none"> - Assistance with face-to-face consultation, meetings and phone calls with community members and stakeholders. - Review of public information materials.
Environmental Consultants (Umwelt)	Environmental assessment	<ul style="list-style-type: none"> - Provide technical information to assist Spark Renewables to prepare communication collateral, project updates, respond to stakeholder holder enquiries and review key messages as appropriate to ensure it meets technical requirements. - Assistance with figures and maps to assist with stakeholder communication.
Social Impact Consultants (Umwelt)	Social impact assessment and associated engagement	<ul style="list-style-type: none"> - Assist Spark Renewables with the preparation and delivery of engagement materials - Collaborate with Spark Renewables to deliver targeted engagement to support the development and delivery of a social impact assessment and associated inputs.

2 Project overview

2.1 Project scope

Key aspects of the Project (as of September 2022) are provided below.

Table 2 Project scope (September 2022)

Proponent	Spark Renewables is a developer, and long-term owner and operator of renewable energy assets. The company's operational portfolio includes the 100 MW Bowmen Solar Farm near Wagga Wagga, which commenced operations in 2020, alongside a diversified portfolio of wind, solar and storage developments, in excess of 5 gigawatts (GW). Spark Renewables is owned by the Spark Infrastructure Group, an owner of critical energy assets, including generation, transmission, and distribution infrastructure across Australia.
Project generation capacity	The Wattle Creek Energy Hub has a proposed solar generation capacity of 265 MW(ac), and an 800MW Battery Energy Storage System (up to 2 hours storage).
Components	Solar farm: 490,000 modules Battery Energy Storage System: 416 containerised PCUs
Annual power	Up to 80,000 houses powered annually ¹ and offsetting up to approximately 380,000 tonnes of CO ₂ emissions annually ² .
Grid connection	Direct connection into the Marulan 300kV/132kV substation owned by Transgrid. The site is located adjacent to the substation.
Community	Proposed establishment of a community benefit sharing program to support the local community.
Contact & receiving information	Project website www.wattlecreekenergyhub.com Project email info@wattlecreekenergyhub.com Phone 1300 271 419

The Project is strategically located to take advantage of the existing electricity transmission network.

The Project Site is located within a rural setting, with the site itself, adjacent properties and the broader locality currently used for agriculture and research by the University of Sydney. Agricultural land use will continue as an agrisolar system, through the integration of grazing during operation and agricultural rehabilitation following decommissioning. The site is in proximity to the Hume Highway and there are a number of potential sensitive receivers located in a new housing estate, Equinox Marulan, and Holcim's Lynwood Quarry located proximal to the Project site.

Initial investigations associated with the Wattle Creek Energy Hub included consideration of wind, solar and battery energy storage system (BESS) technology. However, Spark Renewables have decided not to proceed with the wind farm component of the Project and will proceed with developing the solar farm and BESS components only.

2.2 Project location

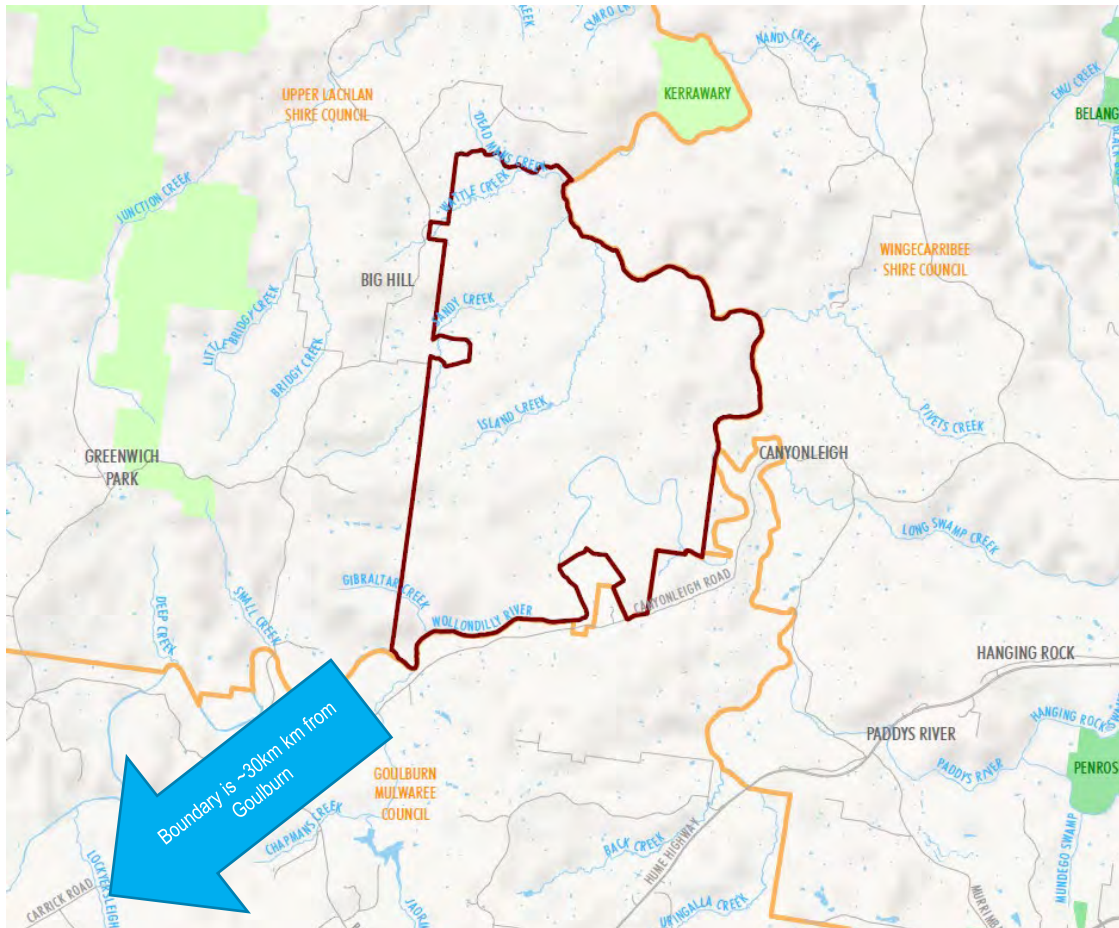
The Project is proposed to be located east of Big Hill, which is approximately 25 kilometres (km) south-east of the Taralga township, 20km to the north of the Marulan township, 30km north-east of the rural city of Goulburn and 7km north of the

¹ Based on household consumption of 6700kWh/year.

² National Greenhouse Accounts Factors (DCCEEW, 2021).

M31 Hume Highway. The Hume Highway is an important national highway, connecting Melbourne and Sydney. The Project falls within the Upper Lachlan Local Government Area (LGA), with the bordering LGAs including Wingecarribee LGA to the east and Goulburn-Mulwaree LGA to the south.

Figure 3 The project site is located in the Upper Lachlan LGA



Community Context

Upper Lachlan Shire is a local government area in the Southern Tablelands region of New South Wales. The Shire was formed in February 2004 from Crookwell Shire and parts of Mulwaree, Gunning and Yass Shires. The Shire has a population of 8,514 (ABS, 2021) and covers an area of approximately 7,200km². Upper Lachlan is a regional area that is known for its quaint villages, fine wool and potato production, windfarms, local history and its picturesque countryside.

Goulburn Mulwaree LGA, bordering the Project boundary to the south, is more populous than Upper Lachlan Shire, with a current population of 32,053, but covering a smaller area (approximately 3,220km²). The township of Goulburn, is the largest town in the LGA, accounting for 24,565 of the total population. Goulburn was historically a regional centre dependent on a large railway workshop, wool stores, and textile mills. Today, Goulburn hosts a diverse industry that includes IT, communications, retail, distribution and logistics, engineering, mines, renewable energy and commercial precincts.

Big Hill and Taralga have significantly smaller populations than Goulburn (78 and 403 respectively). Marulan, located to the south of the Project area, has a slightly larger population, currently 1,428, and is home to 4 quarries. Given the nature of this industry, it is not surprising that road freight transport, construction material mining and site preparation services are the top three industries of employment, accounting for a total of 11.1% of total employment.

Wingecarribee LGA, bordering the Project to the east, is the most populous LGA, with a population of 52,709. The major townships within the LGA include Bowral, Moss Vale, Mittagong, and Bundanoon. The LGA also has a semi-rural landscape, characterised by small towns and villages (Wingecarribee Shire Council, 2022).

The site is located within the boundaries of the Pejar Local Aboriginal Land Council (LALC). The Pejar LALC was established in 1977 and sits within the Wiradjuri region. The Traditional Owners are recognised as the Gundungurra People, with Wingecarribee also acknowledging the Tharwal People as Traditional Owners in the shire area.

Renewable energy has been recognised within both local and regional plans as an area for future investment, with the Upper Lachlan Shire LGA Regional Economic Development Strategy 2018-2022 identifying the need for a plan for renewable energy that benefits the community. Similarly, the Southeast and Tablelands Regional Plan 2036 (NSW Planning and Environment, 2017), in which the three LGA's sit, has a clear direction to position the region as a hub for renewable energy to ensure a connected and prosperous economy.

Characteristics of Upper Lachlan Shire LGA	Characteristics of Goulburn- Milwaree LGA	Characteristics of Wingecarribee LGA	Considerations for Engagement
Median age 49 years	Median age 41years	Median age 48 years	A higher than state average median age suggests more personal face-to-face mechanisms may be more suitable to facilitate engagement e.g., telephone surveys, personal meetings.
			Likely to have an interest in the Project.
81.2% of housing owned outright/with a mortgage compared to 64.0% in NSW	67.5 of housing owned outright/with a mortgage	77.1% of housing owned outright/with a mortgage	Landholders are likely to be more invested in outcomes of the Project/concerned about the impacts on their property and livelihoods
Significantly low rate (2.5%) of Languages other than English (LOTE) spoken in the home, compared to 29.5% in NSW.	8.0% of households speak a LOTE in Goulburn Mulwaree	9.5% of households speak a LOTE in Wingecarribee	Low proportion of Culturally and Linguistically Diverse communities suggests it is unlikely to require translation of materials into other languages.
The site is located near multiples other proposed renewable projects.			There may be a chance of consultation fatigue, as well as high levels of interest in renewable energy development projects.
Upper Lachlan Shire (21.9%) and Wingecarribee (18%) have significantly higher rates of volunteering than the state average (13%) and Goulburn-Mulwaree (13.8%).			Volunteering rates are used as an indicator of how well connected and cohesive a community is. High rates suggest that there may be a fast spread of information throughout the community and investment in the sense of community in the local area.
80.1% had the same address one year ago, and 60.7% had the same address five years ago.	77.4% one year prior and 53.4% five years prior to the census	79.7% one year prior and 53.5% five years prior	Low household mobility rates are indicators of how established and invested

<p>Upper Lachlan Shire has an unemployment rate of 3.9%, slightly lower than the state average. Sheep and beef cattle farming accounts for 18% of total employment in the LGA.</p>	<p>Goulburn Mulwaree has a significantly higher unemployment rate (7.9%) than the other LGA's and the State (4.1%). Top industries of employment are largely focused around the provision of healthcare / social assistance (accounting for 10.2%).</p>	<p>In contrast to the other LGA's, Wingecarribee has recently seen a decline in unemployment, currently sitting at 2.7%. The largest industry of employment Aged care and residential services (3%), hospitals (3%), followed by cafes and restaurants (2.9%).</p>	<p>people are in their local community. Opportunities for the Project to provide employment and/or contractor/supplier opportunities may be limited due to the existing skills profile and a limited labour pool. Collaboration with local Council, employment services and business groups will be key to maximise opportunities.</p>
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Potential Concerns

In recent times, proposed renewable energy projects across NSW have had diverse responses from local communities in relation to their perceived environmental and social impacts. Following a preliminary review of submission reports and other publicly available documentation on nearby renewable energy projects within the region, we understand the following key local issues to be of importance in the planning and potential development of the Project:

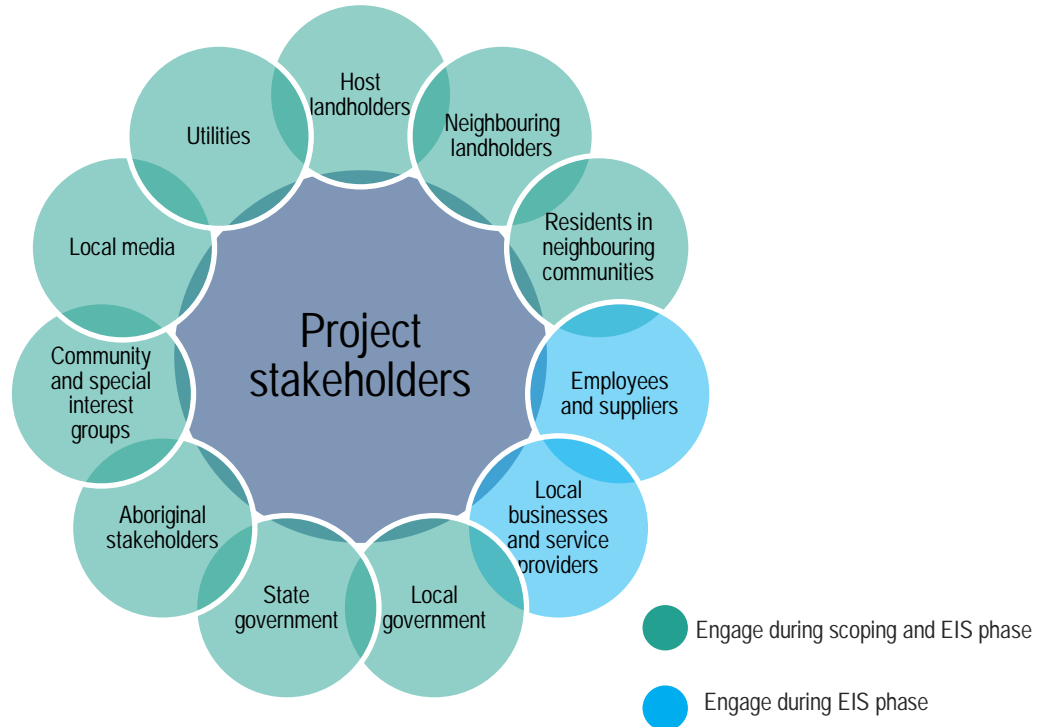
- Visual impact on social amenity due to view lines.
- Land use conflict due to renewables development in productive agricultural areas, with land primarily used for grazing.
- Perceived public health and safety concerns of neighbouring residents associated with Electric and Magnetic Fields (EMFs), radiation, hazardous materials, sleep disturbance from noise impacts and heat generation and flow on effects on livestock e.g., cattle and sheep.
- Concern regarding the management of project land and the potential spread of noxious weeds to surrounding properties.

There are a number of key aspects of the Project that would benefit from the input from community members and key stakeholders, namely:

- Design of the solar farm and BESS
- Identification of potential Project impacts to inform investigations for the EIS and SIA
- Suggestions for mitigation and enhancement measures to manage the Project's potential impacts
- Preferred methods and tools for ongoing engagement with the community and key stakeholders
- Community and stakeholder benefit-sharing programs and initiatives.

3 Stakeholders

Spark Renewables will consult widely as part of the planning and EIS/SIA for the Project, and throughout the construction, operation, and decommissioning phases of the Project. Stakeholder groups include but are not limited to:



The contact details of individual stakeholders and organisations will be kept securely by Spark Renewables in a database (Simply Stakeholders). Table 6 in 'Appendix A' of this document outlines the stakeholders of relevance to the Project, their potential issues of concern or interest in the proposed Project, and the primary responsibility holder for stakeholder relationships.

5.1 Engagement tools and methods

A range of online, in-person and offline tools and methods may be used to communicate with and engage the community and other stakeholders during the Project. Face-to-face activities will be subject to any public health orders in effect at the scheduled time of delivery. Tools and methods utilised will, where possible, reflect the preferences of the community and may be modified in response to stakeholder feedback and to ensure that the engagement program is meeting its objectives.

All engagement data obtained through consultation will be stored in Simply Stakeholders, an online secure platform to record engagement outcomes with Project stakeholders, and in order to keep track of commitments made and suggestions or issues raised.

Table 7 Tools for engagement and indicative participation level

Tool/Method	Detail	Participation level
Advertising	Advertising in local newspapers and radio stations to advise of upcoming consultation opportunities and provide Project updates.	Inform

Tool/Method	Detail	Participation level
Briefings	Formal letters, phone calls, and face-to-face or virtual meetings with key stakeholders including MPs, councillors and council staff to provide updates on the Project.	Inform
Community contact cards	Business card provided to specialists and contractors to give to community stakeholders if approached.	Inform
Community Newsletters	Project information distributed by email or in hard copy to registered stakeholders.	Inform
Door-knocks	Project representatives go door-to-door to speak with impacted landowners and neighbours and/or provide them with Project materials.	Inform Consult
Drop-in sessions	Multi-hour time periods when stakeholders can drop in to speak to the Project team and experts, view documents and plans and ask questions.	Inform Consult
Email inbox	A dedicated Project email address (info@wattlecreekenergyhub.com) for managing community and stakeholder correspondence.	Inform
Frequently Asked Questions (FAQs)	A generalised brochure (both online, sent to emails, and handed out at information sessions) responding to common questions from the community regarding project impacts, benefits, mitigation efforts, and technology.	Inform
Letterbox drops or unaddressed mail	Unaddressed collateral containing information about the Project delivered by the Project team or Australia Post.	Inform
Letters	Addressed mail containing information, clarification, response or request to a particular household, business or individual.	Inform
Media releases/statements	Proactive or responsive media announcements distributed to the media outlets and other key stakeholders to provide updates on the development application process, reaching Project milestones, address concerns, and clarify information.	Inform
Meetings	One-on-one or small group meetings to discuss Project issues and concerns in more detail.	Inform Consult Involve Collaborate
Phone line	A dedicated number for stakeholders to contact Spark Renewables. The number is 1300 271 419.	Inform Consult
Photography	Photos, composites, concept and artist imagery can help illustrate processes and make technical information more accessible.	Inform
Pop-up stalls	An engagement booth/stall set up at community events and centres to engage and consult with stakeholders.	Inform Consult
Posters	Printed material visualising Project information such as location of the proposed site, background information of the proponent, technology overview, approximate timeline, steps in the planning process, milestones, potential studies required to address impacts to the environment,	Inform Consult

Tool/Method	Detail	Participation level
	construction activities, benefit-sharing options and mitigation of impacts on the community.	
Presentations/Project Briefings	A presentation about the Project delivered to a group of interested persons, club or committee on request or by invitation, provided in digital and written form.	Inform
Project overview	A high-level summary of the Project that includes the Project scope, location (including regional and locality maps), the strategic context and rationale for the Project, the Project's potential impacts and benefits, contact information for the Project team and information on the consultation process.	Inform
Signage	Identification, directional, informational, and regulatory signs, boards and banners used to inform and direct people around the Project site.	Inform
Stakeholder Database	A distribution list of contacts of individuals and/or organisations considered to be a relevant stakeholder to the Project.	Inform
Surveys	Online surveys to obtain input and feedback on Project decision-making.	Consult
Website	A website dedicated to the Project (www.wattlecreekenergyhub.com) including a description and overview of the Project, development application process, company information, responses to key concerns, risk management plans, maps, media releases and contact information.	Inform
Workshops	A structured method of working with groups of stakeholders to identify and suggest solutions for Project issues and concerns.	Inform Consult Involve

Delivery Plans

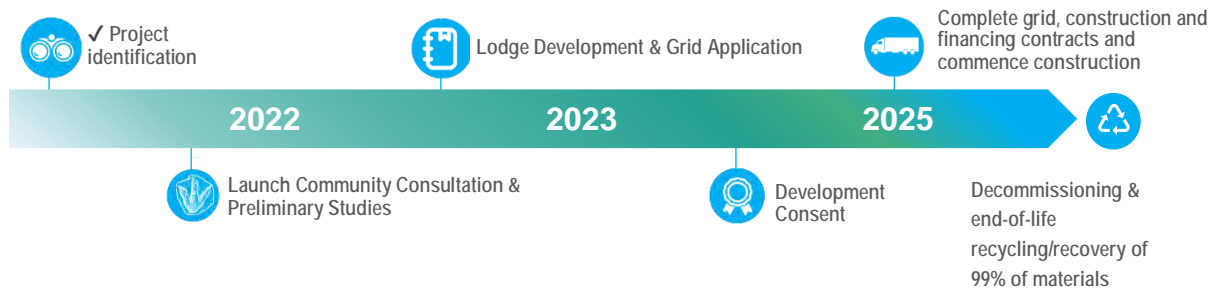
Spark Renewables has a high-level framework for the delivery of communication and engagement through the planning and assessment process for each stage of the Project, which has been developed in line with the SIA Guideline (the Department, 2021) and Community Engagement guideline (the Department, 2021). However, as the Project evolves, and based on stakeholder and community feedback, the delivery plans for the Project and/or stages may be updated. Therefore, all dates in the delivery plan are indicative and subject to change. Delivery plans for different Project phases are also included below and described in more detail in the appended tables.

Phase	Approach
Scoping phase: <i>Delivery plan for community engagement during the scoping phase</i>	<p>Spark Renewables understands the role the NSW DPE plays in the SSD planning and approvals process and understands, that as part of the Application for SEARs it will:</p> <ul style="list-style-type: none"> consult with relevant government agencies and councils when preparing projects publish the SEARs on the major projects website and notify the relevant councils publish the SEARs on the major projects website (once issued).
EIS development phase: <i>Delivery plan from receipt of SEARs to lodgement of the EIS</i>	<p>Engagement activities during the development of the EIS have been developed in line with the requirements in the SIA Guideline (the Department, 2021) and Community Engagement Guideline (the Department, 2021). Issues raised during engagement will inform the social and environmental assessments and the preparation of the EIS.</p> <p>Spark Renewables will continue to engage with the community, through various methods in order to understand people's perceived impacts, to appropriately manage identified social impacts, and to ensure an appropriate community benefit-sharing program is put in place to enhance positive impacts of the Project at the local community level.</p>
EIS exhibition phase: <i>Lodgement of the EIS</i>	<p>This engagement will build on the communication and stakeholder relationships formed during the Scoping and EIS development phases and will continue to provide information about the Project and seek feedback from the community and stakeholders on the EIS. The EIS will be placed on public exhibition for a period of at least 28 days, or as per any requirements outlined in the SEARs, and may be extended on request and with the agreement of Spark Renewables. During the exhibition period, any stakeholder may make a written submission on the EIS and lodge this with the Department through the NSW Government Major Projects website. The formal feedback process in this phase will be managed by the Department in line with their Community Participation Plan (2019).</p>
Response to Submissions: <i>Engagement following exhibition of the EIS</i>	<p>Following the exhibition period, Spark Renewables will respond to submissions received during exhibition. Once the EIS has been assessed and a decision determined for the Project, Spark Renewables will seek clarification from the Department about any aspects of the approval that are unclear. Post approval, Spark Renewables will continue to engage with the community, relevant council and government agencies during the pre-construction, construction, operation and decommissioning of the Project (and/or rehabilitation of the site) in line with the development consent conditions of approval.</p>

3.1 Project timeline

There is a rigorous process for assessing State Significant Developments (SSD) under NSW planning legislation. Community and stakeholder engagement is a critical component of this process; with opportunities for community and stakeholder input during preparation of the Scoping Report, preparation of the Environmental Impact Statement (EIS), in the public exhibition phase and, if approved, during construction of the Project.

Figure 3 Indicative milestones for the Project



4 Benefit-sharing

Spark Renewables is looking to work with the community to co-design a program that meets the unique needs of the wider community, and delivers long-lasting social, economic and environmental benefits for decades to come, Table 3 and Table 4 outline preliminary commitments to the program that will be further refined throughout the planning and assessment process.

Table 3 Cash commitments

Criteria	Per annum	Project life ³
Community and neighbours	\$50,000 (CPI adjusted)	~\$2 million
Research and education	\$100,000 (CPI adjusted)	~\$4 million
Enhanced access, bushfire management and stock-proofing security	N.a.	~\$10 million

Table 4 Research and education in-kind commitments

Criteria	Research and education commitments
Other in-kind commitments	<ul style="list-style-type: none"> - Spark Renewables Project Manager to participate as a member of the University of Sydney steering body. - Extensive sharing of data.
Hosting Interns and Researchers	<ul style="list-style-type: none"> - Students and researchers could either be hosted locationally at the Project, or at the Spark Renewables' office in Manly. - Educational opportunities.
Sharing data	<ul style="list-style-type: none"> - Meteorological, plant performance and SCADA data. - Historical and ongoing survey data from bird, bat and environmental monitoring. - Construction contract information. - All environmental studies and management plans. - Graphic mapping and plant design data, including site infrastructure and environmental constraints.

³ Calculated using assumptions of 33 years and CPI average rate of 2%.

Key messages

Key messages (for external purposes) and quotes will be developed and refined throughout the EIS process, around the following critical message categories and will be used to inform the engagement strategy and material development:

- Top message – the headline message that characterises the Project in one sentence and provides a memorable feature for the audience.
- Proponent – details on Spark Renewables, its background and development, activities in NSW, Australia and internationally.
- Project – details on the site and plans, quick facts and profile of the proposed Project.
- Process – the development planning and assessment process, including community consultation and key EIS milestones including submission, public exhibition, and determination.
- Issues and benefits – key issues in relation to the Project i.e., social, and environmental issues, interests, or concerns.

Top Message

- Project is strategically located to provide energy security to critical electrical infrastructure including the Sydney transmission ring.
- Solar and BESS layout utilises the least productive land onsite and sheep will continue to graze beneath the solar panels.
- The project is well screened by surrounding topography and vegetation.

Suggested Proponent Messages

- Spark Renewables is a leading developer, long-term owner, and operator of renewable energy projects in Australia. The Spark Renewables portfolio comprises the Bomen Solar Farm, operational since 2020, and is currently developing in excess of 7GW of solar, wind, and renewable storage projects across the National Electricity Market, including the Dinawan Energy Hub.
- Spark Renewables is owned by the Spark Infrastructure Group – an owner of leading essential energy infrastructure, including generation, transmission and distribution infrastructure across Australia
- Spark Renewables is a NSW based company, primarily operating in NSW and SA.
- Spark Renewables is a member of the Clean Energy Council (CEC) and a signatory to the CEC's Best Practice Charter for Renewable Energy Developments.
- Spark Renewables is committed to energy system stability, reliability and minimising costs to customers as well as contributing to long-term sustainability and adding value to communities by investing in renewable energy infrastructure.
- Spark Renewables is focussed on providing local employment opportunities and giving back to the local community by establishing community funds to provide long-term, distributed benefits equitably across the community.

Suggested Project Messages

- Spark Renewables are proposing to develop a renewable energy hub, including solar and BESS on a site approximately 25km south-east of Taralga, and 30km north-east of the rural city of Goulburn.
- The project area is currently operated commercially and is used for a range of research initiatives including animal science, pasture agronomy and unmanned aerial vehicle applications. Agricultural land use will continue with the operation of the project, with sheep grazing within the solar farm areas.
- The areas within the project area associated with Solar will continue as an agrisolar system through the integration of grazing during operation and agricultural rehabilitation following decommissioning
- The project would have an installed capacity of 1,065 MW, consisting of 265MW of solar capacity megawatts solar generation with an 800MW, 2hr battery energy storage system.

- The Project will have the capacity to power up to 80,000 houses annually, offsetting up to 380,000 million tonnes of CO₂ emissions annually.
- Site access points are still to be determined but are likely to follow existing entrances along Canyonleigh Road and to be upgraded to facilitate the delivery of construction materials and components.
- Temporary infrastructure would also be developed to support the construction of the Project, including site office buildings, storage areas and concrete batching plants.
- The project would generate up to 300 jobs during construction and sustain 10 direct jobs during its operational life span.
- Construction would commence as soon as possible after all environmental and regulatory assessments and approvals are received. Construction would last approximately 18 months.
- As part of the project, a research collaboration will be setup between Spark Renewables and the University of Sydney with a supporting fund for research initiatives focused on supporting the energy transition. Research initiatives will be in line with the Office of the NSW Chief Scientist & Engineer 20yr R&D road map titled: Shaping the future of NSW in science and technology (May 2022).
- This will include the development of a new Research Facility (or 'Test-bed'), which could be used to test innovative technologies, such as Gelion batteries, a spin-out company from the University of Sydney.

Suggested Process Messages

- The Wattle Creek Energy Hub is in the early stage of planning works. The three components will be assessed as separate State Significant Developments (SSDs) under Part 4 of the NSW Environmental Planning and Assessment Act 1979 (the EP&A Act).
- The NSW Department of Planning and Environment (DPE) is the State planning authority for the Project.
- The EP&A Act requires preliminary Scoping Reports to be prepared for each component and be submitted to the Department. The Department will then prepare and issue the Secretary's Environmental Assessment Requirements (SEARs) to guide the development of each EIS.
- As part of Spark Renewables applications to the Department, Umwelt has been engaged to develop Scoping Reports to inform the assessment, that will include a number of technical studies to assess the potential impacts of the Project. These technical studies will include noise and vibration, visual amenity, shadow flicker, biodiversity, Aboriginal heritage, historical heritage, traffic and access, contamination, flooding and hydrology, soils, hazards (electromagnetic fields and interference (EMF/EMI), blade throw, bushfire and preliminary hazard analysis), waste, air quality, utilities, land use and social impact.
- Once complete, the Department will assess each EIS, considering all potential impacts across each component of the Project, and provide a determination on each component of the Project to Spark Renewables.
- The SIAs will assess the impact of the Project on people and communities. To inform the SIAs, Spark Renewables and Umwelt will consult with the community to understand their concerns, interests, issues, or the benefits that people perceive the Project may deliver. Spark Renewables will endeavour to undertake regular, open, and transparent engagement that is helpful and constructive and to ensure feedback is addressed in project design and planning.
- Spark Renewables and Umwelt will work closely with the host landholder, neighbouring landholders and property owners, Aboriginal community representatives, and the wider community, in addition to the Upper Lachlan Shire, Goulburn Mulwaree and the Wingecarribee Councils and NSW Government agencies, to gain a detailed understanding of the views, issues, and interests on the Project.
- Engagement to inform the Scoping Reports will occur from in November 2022, with the second round of engagement expected to take place during the preparation of the EIS's.
- Involvement of Traditional Custodians in project design and planning including guaranteed ongoing access to sites of Significance if relevant.
- Prior to the determination from the Department, the EISs will be made public, allowing for submission to be made by any member of the community or interested party. This gives the public and the wider community the opportunity to further contribute to the Project's assessment

4.1 Suggested Issues and Benefits Messages

Spark Renewables is committed to sharing the benefits of the Project with the community in a number of ways:

- The 265 MW Solar Farm will have the capacity to generate enough clean electricity each year to supply electricity to approximately 80,000 homes.
- The Project will be utilised as a training and research facility for interns and researchers at the University of Sydney, with the active sharing of data between Spark Renewables and the University of Sydney during its operational period.
- The Project will advance resource recovery solutions for end-of-life solar panels and other associated waste through research opportunities.
- The Project is expected to employ a construction workforce of approximately 200 people and generate an estimated 7 jobs during the operation phase.
- Where possible, Spark Renewables aims to source the construction workforce from the local area. Local service providers and suppliers will also have opportunities to contract services during the construction period.
- Additionally, Spark Renewables will endeavour to provide employment opportunities for Aboriginal and Torres Strait Islander residents of areas nearby the Project.
- Accommodation plans for construction workers will be formulated following the undertaking of the Scoping Report.
- Spark Renewables will conduct a community engagement process to refine the Project's design and embed local concerns and opportunities in the Project's planning and assessment.
- It is Spark Renewables' intent to develop an annual benefit fund for community and neighbours to provide a long-term positive contribution to the local community and to ensure benefits of the Project are shared locally.
- The Project will result in enhanced access roads that will also benefit bushfire management, river crossing, landscaping and stock-proofing security for local residents and property owners.
- The Project will support co-locational and mutually beneficial agri-solar grazing opportunities across the solar site.

5 Engagement throughout the planning process

Spark Renewables has a framework for the delivery of communication and engagement through the planning and assessment process. However, as the Project evolves, and based on stakeholder and community feedback, the delivery plans for the Project and/or stages may change. All dates in the delivery plan are indicative and may be subject to change.

Table 7 Delivery plan from Project announcement to lodgement of Scoping Report

Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Meeting	the Department	Pre-scoping meeting with the Department to present the Project timeline and the draft CSEP for comment	September	Organise and attend meeting with the Department	Spark Renewables
Briefing letters	Council State MP Federal MP NSW Energy Minister AEMO CEO	To provide a Project overview, process, and timeline.	H1 2022	Develop and distribute briefing letters	Spark Renewables
Meetings, emails, phone calls	Host Landholder	To negotiate land access agreements for the Project site and gain feedback to inform the SIA.	Ongoing	Identify, undertake and record landholder engagement	Spark Renewables
Letters, meetings, emails, phone calls	Proximal landholders	To inform them of the project, share outcomes of studies, work to design project refinements and mitigation measures to address potential project impacts, negotiate neighbour agreements, gather information to inform the scoping and assessment of social impacts.	Ongoing	Identify, undertake and record proximal landholder engagement	Spark Renewables
Project website	All	To provide a comprehensive online portal for Spark Renewables and its projects. The website will include information and channels to interact with community stakeholders. The website will include FAQs, maps, plans, documents, videos, photos and schematics, consultation events and announcements, a Project timeline and information about Spark Renewables.	Feb 2022	Develop and update website	Spark Renewables
				Review website materials and content	Umwelt
Briefing meetings	Upper Lachlan Shire Council Goulburn Mulwaree Council Wingecarribee Council Councillors State MP Federal MP Councillors	To seek input into the Scoping Report, specifically the identification of perceived Project impacts.	H1 2022	Send invitation to stakeholders regarding a briefing meeting	Spark Renewables
				Organise and attend briefing meeting	Umwelt/Spark Renewables

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Project Information sheet (No.1)	Broader community	To provide high level project and proponent information, introducing the broader community to Spark Renewables and the Project. The information sheet/newsletter will also outline upcoming engagement and communication channels and contact information encouraging community members to provide feedback and improve understanding of key project impacts.	Distribution W/C 27 February 2023	Develop information sheet/newsletter	Umwelt/Spark Renewables
				Organise printing and distribution	Umwelt
Online community survey	Broader community	Gather information to inform the scoping and assessment of social impacts. It will also provide the SIA team with detailed and specific information about the needs, desires and impacts on stakeholders related to the Project.	H1 2022	Review draft community survey	Umwelt
				Finalise and upload community survey	Spark Renewables
Key Stakeholder interviews	Community groups Environmental groups Service providers Business representatives Aboriginal groups	Gather information to inform the scoping and assessment of social impacts. It will also provide the SIA team with detailed and specific information about the needs, desires and impacts on stakeholders related to the Project.	H1 2022	Develop interview guides and conduct interviews	Umwelt
				Review interview guides	Spark Renewables
Newspaper/ Radio advertising/ Media interviews	Broader community	To inform the community about the Project and upcoming community events	H1 2022	Develop and organise newspaper and radio advertising Organise and prepare for media interview	Umwelt/Spark Renewables
Information session	Broader community	Face-to-face engagement with the community, providing opportunity for community members to meet the Project team and ask questions about the Project and/or how they may be impacted (positively and negatively). Opportunity for Umwelt to take detailed notes to better inform the team's understanding of social impacts.	W/C 6 March 2023	Organise and advertise info session	Umwelt
				Attend information session	Umwelt/Spark Renewables
Scoping Meeting and site tour, if requested	the Department Referral agencies	To provide an opportunity for agencies to tour the site and speak to the Project team to facilitate input into the SEARs.	If requested	Organise and attend scoping meeting	Spark Renewables

5.1 Engagement during development of the EIS

Issues raised during engagement for the SIA Scoping Report will inform the social and environmental impact assessment and the preparation of the EIS.

Stakeholder engagement activities to be undertaken during the preparation of the EIS are outlined in Table 10.

Table 10 Activities in the delivery plan from receipt of SEARs to lodgement of each EIS

Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Project information Sheet (No.2)	Broader Community	To provide a Project update and share notes and feedback received from community received during the scoping phase.	TBC post receipt of SEARs	Develop information sheet/newsletter Organise printing and distribution	Umwelt/Spark Renewables
Briefing letters	Upper Lachlan Shire Council Goulburn Mulwaree Council Wingecarribee Council State MP Federal MP Community and interest groups	To advise key stakeholders about the issue of SEARs, upcoming consultation opportunities and offer a meeting	TBC post receipt of SEARs	Develop and distribute briefing letters	Spark Renewables
Meetings, emails, phone calls	Host Landholders Proximal Landholders	To provide continued engagement with landholders adjacent to the Project site. Gather insights for the SIA regarding potential project impacts and mitigation and enhancement measures.	TBC post receipt of SEARs	Identify, undertake, and record landholder engagement	Spark Renewables
Project Website	All	Update project website to include information about the SEARs, EIS process, next steps, and upcoming community engagement. The website will include FAQs, maps, plans, documents, CCC minutes, videos, photos, and schematics.	TBC post receipt of SEARs	Update website	Umwelt/Spark Renewables
Briefing meetings	Upper Lachlan Shire Council Goulburn Mulwaree Council Wingecarribee Council Councillors State MP Federal MP	Discuss Project updates, planning pathways and engagement opportunities. Gather insights for the SIA regarding potential project impacts and mitigation/ enhancement measures.	TBC post receipt of SEARs	Send invitation to stakeholders regarding a briefing meeting Organise and attend briefing meeting	Umwelt/Spark Renewables

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Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Community survey	Broader community	To provide opportunity for the community to provide feedback, for Umwelt to understand project acceptance and scope social impacts. Validate impacts from scoping phase, understand potential mitigation and enhancement measures.	TBC post receipt of SEARs	Review draft community survey Finalise and upload community survey	Umwelt/Spark Renewables
Key Stakeholder interviews	Council Community groups Environmental groups Service providers Business representatives Aboriginal groups	Gather information to inform the assessment of social impacts and discuss potential mitigation and enhancement measures. It will also provide the SIA team with detailed and specific information about the needs, desires and impacts on stakeholders related to the Project.	TBC post receipt of SEARs	Develop interview guides, set up key stakeholder interviews and conduct	Umwelt/Spark Renewables
Newspaper/ Radio advertising/ Media interviews	Broader community	To inform the community about the Project and upcoming community events	TBC post receipt of SEARs	Develop and organise newspaper and radio advertising Organise and prepare for media interview	Umwelt/Spark Renewables
Information session	Broader community	Face-to-face engagement with the community, providing opportunity for community members to meet the project team and ask questions relating to the Project and/or how they may be impacted or benefited. To present the draft findings of EIS & SIA to the community with Q&A	TBC post receipt of SEARs	Organise, promote and attend information session	Umwelt/Spark Renewables
3rd community newsletter / information sheet	Broader Community	To provide a Project update and present the draft findings of EIS & SIA. To inform the community of the EIS exhibition process, noting how stakeholders can make a public submission.	TBC post receipt of SEARs	Develop information sheet/newsletter Organise printing and distribution	Umwelt/Spark Renewables

5.2 Engagement during exhibition of the EIS

Engagement during the exhibition of the EIS would build on the communication and stakeholder relationships formed during the Scoping and EIS preparation phases and would continue to provide information about the Project and seek feedback from the community and stakeholders on the impacts and proposed mitigation measures in the EIS.

The EIS will be placed on public exhibition for a period of at least 28 days, or as per any requirements outlined in the SEARs, and may be extended on request and with the agreement of Spark Renewables. During the exhibition periods, any stakeholder may make a written submission on the EIS and lodge this with DPE through the Major Projects website.

Engagement mechanisms to be utilised during this period are outlined in Table 11.

Table 11 Tools used in delivery plan for public exhibition of each EIS

Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Briefing letters	Upper Lachlan Shire Council Goulburn Mulwaree Council Wingecarribee Council State MP Federal MP Community and interest groups Industry Traditional Owners	To advise key stakeholders about public exhibition process, consultation opportunities and offer a meeting.	First week of public exhibition	Develop briefing letters Distribute briefing letters	Spark Renewables
Project website	All	Update to the project website to advise the community about public exhibition, opportunities to speak to the Project team and how to make a submission.	First week of public exhibition	Update website	Umwelt/Spark Renewables
Media release	All	To advise the community about public exhibition, opportunities to speak to the Project team and how to make a submission.	First week of public exhibition	Develop media release	Umwelt/Spark Renewables

Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Umwelt/Spark Renewables 4 th Information sheet/ newsletter	Broader community	To advise the community about public exhibition, opportunities to speak to the Project team and how to make a submission.	First week of public exhibition	Develop info sheet/ newsletter Design info sheet/newsletter Organise printing and distribution of info sheet/ newsletter	Umwelt/Spark Renewables
Meetings (face-to-face, phone or virtual)/ expert presentations	Host landholders Proximal landholders Upper Lachlan Shire Council Goulburn Mulwaree Council Wingecarribee Council Councillors State MP Federal MP Councillors Community groups Environmental groups Traditional Owners	To present an overview of the EIS, answer questions and inform groups how to make a formal submission	First week of public exhibition	Organise and conduct meetings/ expert presentations as requested	Umwelt/Spark Renewables
Information session	Broader community	To provide an opportunity for residents to speak to the Project team about the EIS, view information, ask questions and find out how to make a formal submission.	TBC post confirmation of public exhibition timeline	Organise, promote and attend information session	Umwelt/Spark Renewables

5.3 Engagement following exhibition of each EIS

Following each exhibition period, Spark Renewables will respond to submissions received and may undertake further engagement to respond to the issues raised. Spark Renewables will provide regular updates on the process during this phase and will keep key stakeholders informed of Project progress.

Subject to obtaining approvals, Spark Renewables will continue to engage with stakeholders and the community during construction phases. Spark Renewables will also develop a Construction Management Plan which will include a community engagement program. Spark Renewables will continue to be the single point of contact about the Project for all stages of the development.

Once operational, Spark Renewables will continue to maintain a high level of engagement with the community and provide regular updates to the Project website and through local media.

6 Communication management protocols

6.1 Communication management system

Spark Renewables will use Simply Stakeholders to record details of all contact and correspondence with stakeholders and the community. Simply Stakeholders will be updated to:

- Record all contacts with stakeholders and the community, and the actions resulting from this engagement.
- Track the progress and closeout of enquiries and complaints.
- Identify trending issues and opportunities.
- Enable the implementation of mitigation strategies.
- Maintain accurate contact details of stakeholders.
- Prepare regular reports for Spark Renewables on communication and engagement activities.

6.2 Complaints and enquiries

Complaints and enquiries in relation to the Project may be received via phone, email, dedicated social media channels, post or in person. An enquiry is defined as a question or request for information. A complaint is defined as a statement that something is unsatisfactory or unacceptable.

Spark Renewables will acknowledge and/or respond to complaints and enquiries about the Project:

- Within a reasonable timeframe from the time of a complaint, aiming for no later than 2 business days.
- Record the complaint, and contact with the complainant and its resolution in Simply Stakeholders.
- Within a reasonable timeframe from the time of an enquiry, aiming for no later than withing three business days.
- Provide a response to the enquiry, depending on the input required, within 5 business days for emails and phone calls or ten business days for letters.
- Record the enquiry, all contact with the enquirer and its resolution in Simply Stakeholders.

6.3 Government relations

State and Federal MPs for the area, relevant ministers and councils will be offered the opportunity for face-to-face Project briefings at Project announcement, at lodgement of each of the Scoping Reports, on completion of the EIS' and during the Response to Submissions phases.

6.4 Media relations

From time to time, Spark Renewables may choose to issue media announcements to provide an update on the Project for the benefit of the community, investors, council, government, and other stakeholders. Spark Renewables Head of Renewables and Head of Development are the approved spokespeople for the Project. They may delegate this authority to others working on the Project.

7 Reporting, evaluation and monitoring

7.1 Reporting

Progress against this CSEP will be reported to Spark Renewables, the Department and the community and other stakeholders via the Spark Renewables website, regular electronic and postal Project updates (newsletters and notifications), in the Scoping Report, in the SIA and EIS, and by request.

7.2 Monitoring

Regular monitoring of engagement and communication activities will ensure the plan is delivering on the engagement objectives.

Monitoring can take many forms and includes pulse checks and environmental scanning to track community and stakeholder sentiment. This can be by way of media and social media monitoring, feedback received through formal and informal channels, feedback received through the CCC (to be established during the EIS exhibition period) and regular analysis of complaints and enquiries received.

7.3 Evaluation

Community and other stakeholder engagement will be evaluated against the engagement outcomes identified in the Scoping phase and referenced in the SEARs. Spark Renewables shall identify measures and evidence of engagement success and report on engagement outcomes.

Table 12 Example of evaluation methodology

Engagement outcome	Methods used to achieve the outcome	Results to measure the outcome	Evaluating the success of the outcome
Work with the community and other stakeholders to understand their values and opinions of the Project and the opportunities to reflect these values and opinions in decision-making.	<p>Community drop-in sessions to identify the values and opinions of the community and other stakeholders and the perceived impacts of the Project on these.</p> <p>Phone or online surveys to establish a baseline for awareness, sentiment and levels of acceptance towards the Project and renewables in general.</p>	<p>Number of people attending drop-in sessions.</p> <p>Number of people surveyed.</p> <p>Satisfaction with the engagement process by those surveyed or attending the drop-in sessions.</p> <p>Community perspectives accurately detailed in the SIA and EIS reports</p>	<p>Responses to address the Project's impact on the values and opinions of the community can be determined (e.g. the community has concerns about visual amenity).</p> <p>Mitigation measures to address the Project's impact on the values and opinions of the community and other stakeholders can be finalised (e.g. landscaping options are negotiated with the community).</p> <p>Future engagement to address issues identified can be planned (e.g. complaints protocol established).</p> <p>Ongoing engagement to provide updates on decision-making can be established (e.g. regular project updates and photography to show change over time).</p>

Appendix A: Stakeholder Groups

Table 5 List of stakeholders and potential issue, interest or concerns

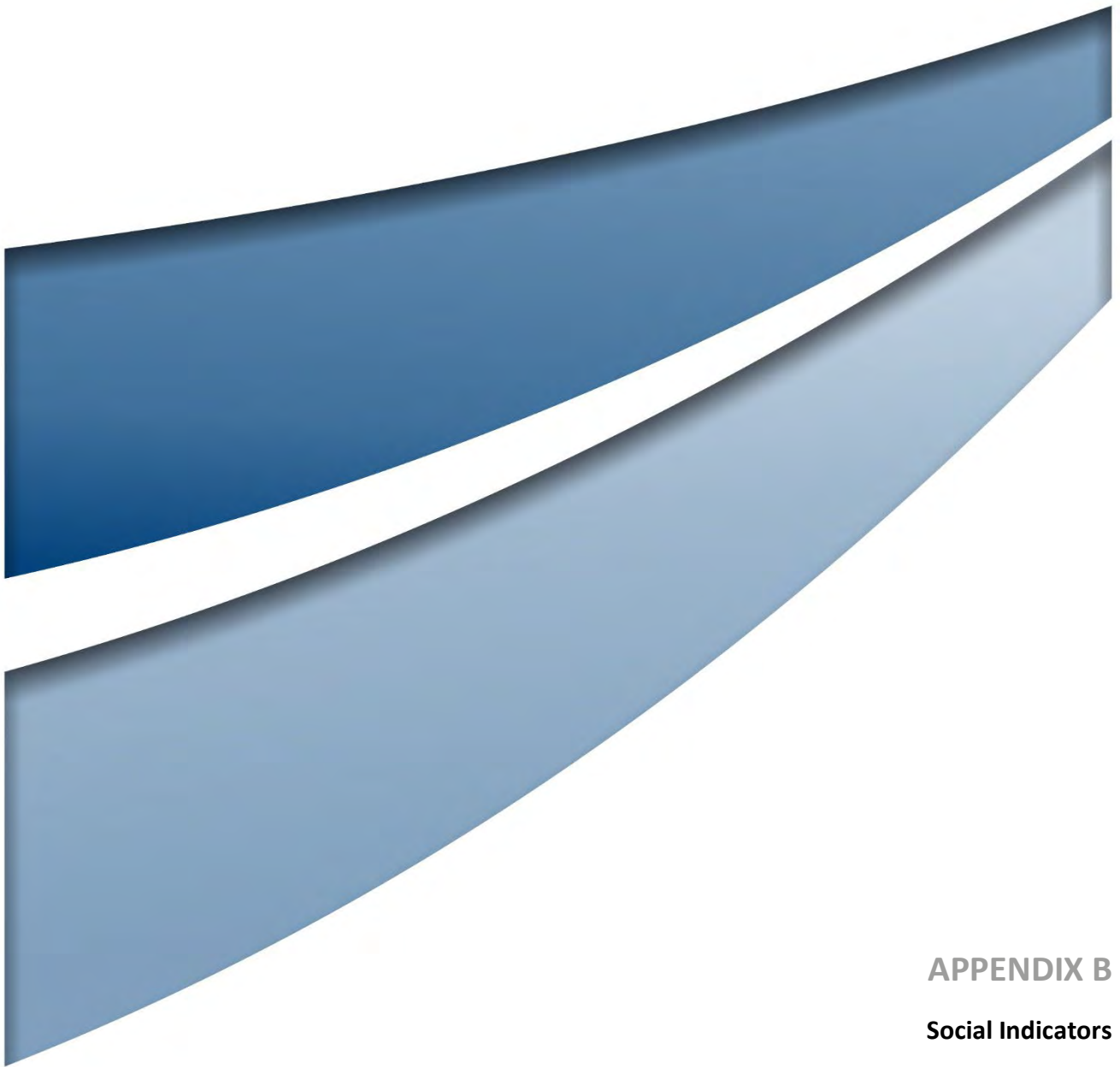
Stakeholder group	Stakeholder	Description of Issue/Interest/Concern	Responsibility
Community and interest groups	Landowners within the Project site	<ul style="list-style-type: none"> - Lease arrangements and land acquisition - Impacts to dwelling - Impacts to land use - Water use - Bushfire risk - Property values and insurance premium - Biosecurity 	Spark Renewables
	Neighbours to the Project site	<ul style="list-style-type: none"> - Access and use of existing, and potentially limited, water supply - Changes in bushfire risk associated with the Project - Changes or limitations to existing land use potentially limiting livelihoods or property access - Cumulative changes to community way of life and character - Health and wellbeing impacts associated with construction/operation noise and vibration and increased dust pollution during construction - Impacts on availability of temporary accommodation and rental properties due to workforce needs during construction - Impacts on local environmental values such as local fauna and flora, local ecosystems and/or ecosystem services - Impacts on local labour force availability due to construction workforce needs - Increased traffic on/changes to local roads resulting in changes to road use and potential safety concerns - Perceived negative impacts on property values and insurance premiums - Potential land use conflicts impacting agricultural/commercial livelihoods - Visual amenity impacts on the local area, views from dwellings and landscape character - 	Spark Renewables / Umwelt
	Wider community of Project and nearby LGAs: <ul style="list-style-type: none"> - Upper Lachlan Council - Wingecarribee Council - Goulburn-Mulwaree Council 	<ul style="list-style-type: none"> - Cumulative changes to community way of life and character - Impacts on availability of temporary accommodation and rental properties due to workforce needs during construction - Impacts on local environmental values such as local fauna and flora, local ecosystems and/or ecosystem services - Impacts on local labour force availability due to construction workforce needs - Increased traffic on/changes to local roads resulting in changes to road use and potential safety concerns 	Spark Renewables / Umwelt

Stakeholder group	Stakeholder	Description of Issue/Interest/Concern	Responsibility
		<ul style="list-style-type: none"> - Increase in direct and indirect economic benefits including workforce, project expenditure and local procurement - Increase in local employment opportunities - Temporary increase in demand for rental properties associated with construction workforce needs - Visual amenity impacts on the local area, views from dwellings and landscape character - 	
	Other community organisations: <ul style="list-style-type: none"> - Landcare branches - Progress Associations - Lion's Club branches - Rotary branches - Local action groups 	<ul style="list-style-type: none"> - Cumulative changes to community way of life and character - Diversification of farming livelihoods and incomes creating an economic benefit - Grants and funding opportunities to support community development - Impacts on availability of temporary accommodation and rental properties due to workforce needs during construction - Impacts on local environmental values such as local fauna and flora, local ecosystems and/or ecosystem services - Impacts on local labour force availability due to construction workforce needs - Increase in direct and indirect economic benefits including workforce, project expenditure and local procurement - Increase in local employment opportunities - Increased employment, supply and procurement opportunities for vulnerable members/groups of the community - Increased traffic on/changes to local roads resulting in changes to road use and potential safety concerns - Potential land use changes - Temporary increase in demand for rental properties associated with construction workforce needs - Visual amenity impacts on the local area, views from dwellings and landscape character 	Umwelt
Traditional Owners	Pejar Local Aboriginal Land Council representative of Gundungurra Traditional Owners Other Aboriginal corporations: <ul style="list-style-type: none"> - Gundungurra Aboriginal Group - Mulwaree Aboriginal Community Inc. 	<ul style="list-style-type: none"> - Impacts on local environmental values such as local fauna and flora, local ecosystems and/or ecosystem services - Grants and funding opportunities to support Aboriginal communities in the local area - Identification and protection of sites of significance or items of Aboriginal cultural heritage value, including intangible values - Increased employment, supply and procurement opportunities for the local Aboriginal community - Land access and use over Native Title land 	Spark Renewables / Umwelt

Stakeholder group	Stakeholder	Description of Issue/Interest/Concern	Responsibility
		<ul style="list-style-type: none"> - Local knowledge-sharing - Recognition and consideration of Country in design process to reduce cultural impacts for the local Aboriginal community 	
Industry	Clean Energy Council (CEC)	<ul style="list-style-type: none"> - Industry body and advocate for clean energy 	Spark Renewables
	Australian Energy Market Operator (AEMO)	<ul style="list-style-type: none"> - Energy retail market 	Spark Renewables
	Australian Energy Market Commission (AEMC)	<ul style="list-style-type: none"> - Rule maker for the National Electricity Market (NEM) 	Spark Renewables
	NSW Farmers Association	<ul style="list-style-type: none"> - State industry body and advocate for farmers - Changes or limitations to existing land use potentially limiting livelihoods - Access and use of existing, and potentially limited, water supply - Diversification of farmers' income and livelihoods - Cumulative impacts on availability of local workforce due to COVID-19 and potential Project demand - Cumulative changes to community way of life and character 	Spark Renewables
	National Farmers Federation	<ul style="list-style-type: none"> - National industry body and advocate for farmers - Energy generation - Climate change - Access, supply and use of water - Sustainable development and livelihood diversification - Cumulative changes to community way of life and character 	Spark Renewables
	PV Industries	<ul style="list-style-type: none"> - Recycling and end-of-life cycle services for solar panels 	Spark Renewables
Business and Service providers	Marulan Chamber of Commerce	<ul style="list-style-type: none"> - Local employment and training opportunities - Opportunities for local supply and procurement - Grants and sponsorship opportunities to support community development 	Umwelt
	Regional Development Australia and Industry Capability Network	<ul style="list-style-type: none"> - Increase in regional employment opportunities - Increase opportunities for regional supply and procurement 	Spark Renewables
	Accommodation and housing providers	<ul style="list-style-type: none"> - Increased demand for accommodation services due to incoming construction workforce - Strain on accommodation services - Decreased capacity for tourism related accommodation 	Umwelt
	Education providers	<ul style="list-style-type: none"> - Potential for collaboration regarding learning workers and apprentices 	Umwelt
	Health care providers	<ul style="list-style-type: none"> - Demand for health services due to incoming construction workforce 	Umwelt

Stakeholder group	Stakeholder	Description of Issue/Interest/Concern	Responsibility
Federal government	Clean Energy Regulator (CER)	- Economic and clean energy regulation	Spark Renewables
	Australian Energy Regulator (AER)	- Electricity network regulation	Spark Renewables
	Minister for, Energy and Emissions Reduction (Department of Industry, Science, and Resources)	- Federal government agency for energy - Investment in network infrastructure - Network reliability - Network connectivity between states	Spark Renewables
	Member for Hume: Angus Taylor	- Community impacts and benefits associated with Project - Environmental impacts associated with Project - Increased employment opportunities associated with the Project	Spark Renewables
NSW state government	Member for Goulburn: Wendy Tuckerman	- Community impacts and benefits associated with Project - Environmental impacts associated with Project - Increased employment opportunities associated with the Project - Increase in local supply and procurement opportunities - Media opportunities	Spark Renewables
	Minister for Planning and Homes	- Planning and assessment process - Consent authority	Spark Renewables
	Minister for the Environment and Heritage	- Environmental impacts - Planning and assessment process	Spark Renewables
	Treasurer and Minister for Energy	- Investment in network infrastructure	Spark Renewables
	NSW Environmental Protection Agency (EPA)	- Environmental impacts - Recycling of Project infrastructure, including solar panels	Spark Renewables
	NSW Department of Planning and Environment (DPE)	- Planning and assessment process - Proximity to Tarlo River National Park and Kerrawary Nature Reserve - Aboriginal and non-Aboriginal heritage	Spark Renewables
	Heritage NSW	- Aboriginal and non-Aboriginal heritage	Spark Renewables
	NSW Department of Industry	- Crown land, water and agriculture	Spark Renewables
	Department of Regional NSW	- Primary industries, local land services, mining, exploration and geoscience	Spark Renewables
	Transport for NSW	- Traffic and roads	Spark Renewables
	Fire and Rescue NSW and NSW Rural Fire Service	- Fire safety	Spark Renewables
	SafeWork NSW	- Construction and operations workforce safety	Spark Renewables
	Independent Planning Commission	- Planning and assessment process - Alternate consent authority	Spark Renewables
	Local government	Upper Lachlan Council: Mayor Pam Kensit	- Planning and assessment process - Community impacts and benefits associated with Project
Wingecarribee Council: Council Administrator, Mr Viv May		- Environmental impacts - Employment opportunities	
Goulburn-Mulwaree Council: Mayor Peter Walker		- Local supply and procurement opportunities - Council rates - Changes to road conditions and usage	

Stakeholder group	Stakeholder	Description of Issue/Interest/Concern	Responsibility
		<ul style="list-style-type: none"> - Land use changes - Cumulative impacts caused by the incoming construction workforce 	
Utilities	Transgrid	- Network provider	Spark Renewables
	Essential Energy	- Network distributor	Spark Renewables
	Telstra	- Telecommunications services	Spark Renewables
	National Broadband Network (NBN)	- Broadband services	Spark Renewables
	WaterNSW	- Impacts on surface and groundwater	
Emergency services	NSW Rural Fire Service Fire and Rescue NSW	- Bushfire risk	Spark Renewables
	NSW Police	<ul style="list-style-type: none"> - Hazards and risks - Traffic and roads - Safety and security 	Spark Renewables
	NSW Ambulance	<ul style="list-style-type: none"> - Hazards and risks - Safety 	Spark Renewables
	NSW State Emergency Service (Goulburn Unit)	- Hazards and risks	Spark Renewables
Education	TAFE NSW Goulburn Charles Sturt University University of Sydney	- Scholarships and training opportunities to upskill current and future workforce	Spark Renewables / Umwelt
	Big Hill Public School Marulan Public School	- Grants and sponsorship opportunities to provide community benefit to the local area	Spark Renewables / Umwelt
Media	Local and regional radio and TV stations: ABC	<ul style="list-style-type: none"> - Project updates - Promote community engagement activities - Community impacts and benefits 	Spark Renewables
	Social media groups	<ul style="list-style-type: none"> - Communicate community impacts and benefits - Advertise local supplier and procurement opportunities 	Spark Renewables
	Regional newspapers and magazines: - Goulburn Post	<ul style="list-style-type: none"> - Project updates - Promote community engagement activities - Community impacts and benefits 	Spark Renewables
	Metropolitan newspapers: - The Guardian Australia	- Investment in renewables	Spark Renewables
	Industry online news: - Renew Economy	<ul style="list-style-type: none"> - Project updates - Investment in renewables 	Spark Renewables
	National and financial publications: - Australian Financial Review	<ul style="list-style-type: none"> - Project updates (major milestones) - Investment in renewables 	Spark Renewables



APPENDIX B

Social Indicators

	Big Hill SAL:	Marulan SAL	Canyonleigh SAL	Goulburn SA2	Goulburn Mulwaree LGA	Upper Lachlan Shire LGA	Wingecarribee LGA	NSW
Human capital								
Population size	78	1,426	455	24, 565	32, 053	8, 514	52, 709	8, 072, 163
Median age	53	38	46	40	41	49	48	39
Unemployment (%) (September 2022)	- ¹	-	-	-	5.7	2.9	1.7	-
Type of educational institute attending: vocational	0	7.3%	8.8%	9.4%	9.1%	8.9%	9.0%	8.5%
Type of educational institute attending: university	0	3.9%	4.4%	8.4%	8.0%	5.8%	9.5%	15.3%
Level of highest educational attainment: Bachelor Degree level and above (%)	8	9.6	19.9	14.1	14.2	15.6	25.5	27.8
Level of highest educational attainment: Certificate level III or IV (%)	48.5	24.1	28.4	21.1	21.7	20.4	18	15
SEIFA - Index of Relative Education and Occupation (decile)	-	-	-	-	3	7	8	NA
Social Capital								
No long-term health conditions (%)	66.7	55	60.4	50.4	51.3	50.9	56	61
Did voluntary work through an organisation or group (last 12 months) (%)	10.3	12.2	18	13	13.8	21.9	18	13
Population density	-	-	-	-	9.97 person per km	1.19 person per km	19.51 person per km	10.2 person per km
Assault incident (per 100,000)	-	-	-	-	820.8	253.8	417.3	760.4
Malicious damage to property (per 100,000)	-	-	-	-	678.2	425.1	465.6	581.0
SEIFA - Index of Relative socio-economic disadvantage (decile)	-	-	-	-	5	8	9	NA

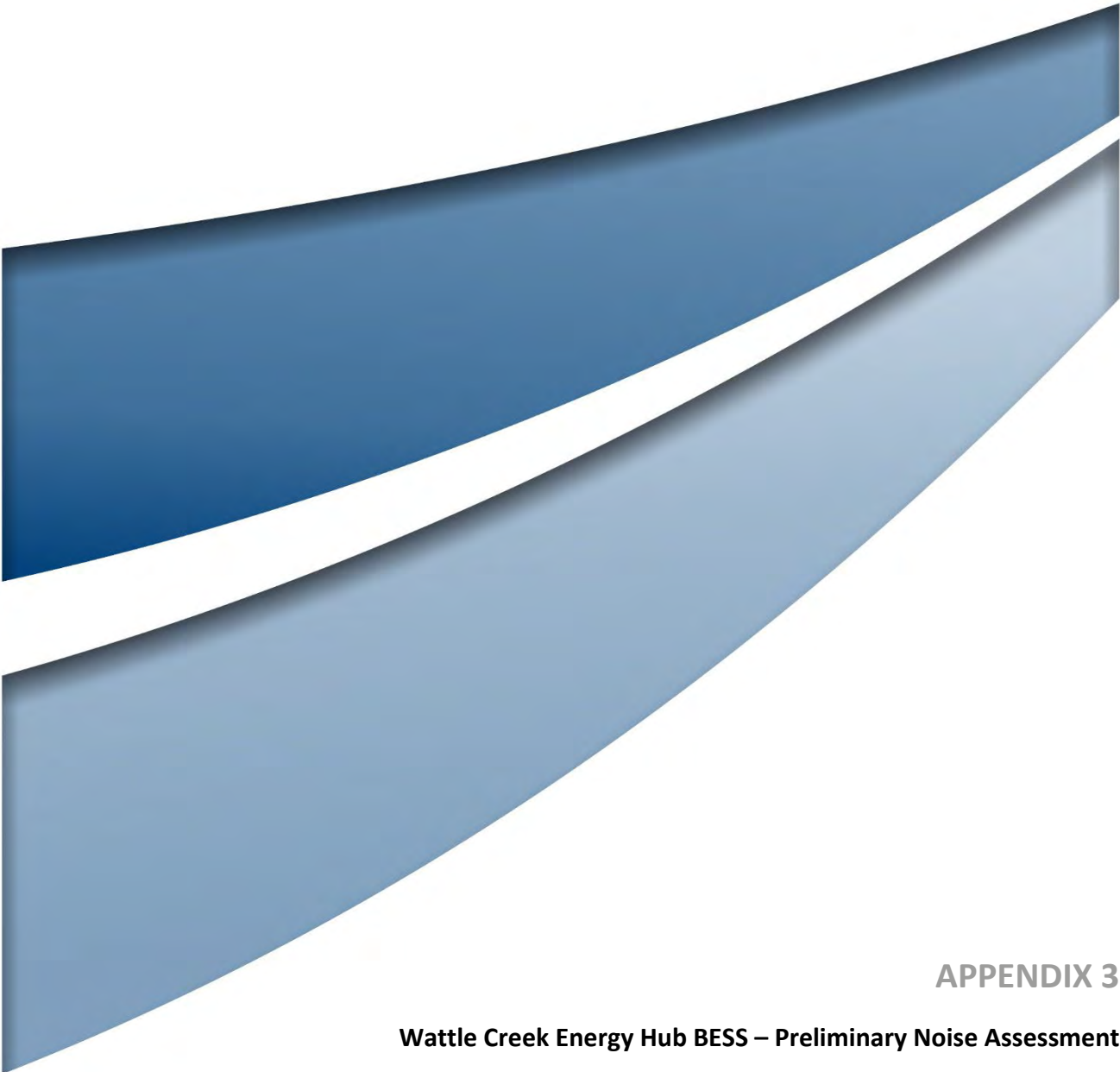
¹ "-" denotes data is not available.

	Big Hill SAL:	Marulan SAL	Canyonleigh SAL	Goulburn SA2	Goulburn Mulwaree LGA	Upper Lachlan Shire LGA	Wingecarribee LGA	NSW
Cultural Capital								
English only spoken at home (%)	64.1	84.6	87.3	85.6	85	89.3	88	67.6
Households where a non-English language is used (%)	0	9.3	8.1	8.1	7.9	2.5	8.6	29.5
Aboriginal and/or Torres Strait Islander (%)	9.0	5.1	2.6	5.3	5.0	3.1	2.3	3.4
Economic Capital								
Family households (%)	73.3	71.7	77	64.6	66.9	71.3	71.1	71.2
Lone person household (%)	40	26.2	19.1	32.7	30.4	27.6	26.2	25
Individual income	\$933	\$739	\$836	\$746	\$749	\$753	\$794	\$813
Median household income	\$2,333	\$1,484	\$2,016	\$ 1,418	\$1,196	\$1,465	\$1,673	\$1,829
Median rent	\$550	\$380	\$393	\$320	\$320	\$277	\$430	\$420
Median monthly mortgage repayment	\$1,777	\$1,950	\$2,292	\$1,636	\$1,733	\$1,540	\$2,167	\$2,167
SEIFA - Index of Economic Resources (decile)	-	-	-	-	6	9	9	NA
Herfindahl Index	-	-	-	-	0.0129	0.0232	0.0103	0.0104
Top three industries of employment	-	Road freight transport 4.2%	Cafes and Restaurants 4.3%	Hospitals 5.0%	Hospitals 4.5%	Sheep farming (specialised) 9.4%	Aged care residential services 3.0%	Hospitals (except psychiatric hospitals) 4.2%
	-	Other construction material mining 3.5%	Road freight transport 3.8%	Ages care residential services 3.6%	Aged care residential services 3.2%	Beef Cattle Farming (Specialised) 4.4%	Hospitals 3.0%	Supermarket and grocery store 2.5%
	-	Site preparation services 3.4%	Sports and physical recreation instruction 3.8%	Supermarket and grocer services 3.4%	Supermarket and grocery services 3.1%	Sheep-Beef Cattle Farming 4.2%	Cafes and restaurant 2.9%	Other social assistance services 2.4%
Employment status (worked full time) (%)	82.8%	57.8	59.9	58.7	58.7	58.6	53.5	55.2
Employment status (worked part time) (%)	31.0%	28.3	27.0	30.2	30.2	31.6	36.3	29.7

	Big Hill SAL:	Marulan SAL	Canyonleigh SAL	Goulburn SA2	Goulburn Mulwaree LGA	Upper Lachlan Shire LGA	Wingecarribee LGA	NSW
Employment status Away from work (%)	13.8%	9.0	10.5	6.5	6.8	6.7	7.3	10.2
Unemployed (%)	0.0%	4.9	1.7	4.5	4.3	3.0	3.0	4.9
Physical Capital								
Unoccupied Dwellings (%)	64.3	14	23	8.5	13	23.3	10	9.4
Owned outright (%)	73.3%	33.7	40.9	33	35.3	49.9	44.6	31.5
Owned with a mortgage (%)	73.3%	41.4	45	30.4	32.3	31.3	32.5	32.5
Rented %	0.0%	20.9	12.1	33.5	28.9	12.6	19.3	32.6

Source: ABS, BOSCAR





APPENDIX 3

Wattle Creek Energy Hub BESS – Preliminary Noise Assessment

MARSHALL DAY
Acoustics 

WATTLE CREEK ENERGY HUB
BESS
PRELIMINARY ACOUSTIC ASSESSMENT

Rp 001 20220318 | 1 September 2023

Project: **WATTLE CREEK ENERGY HUB**

Prepared for: **Umwelt (Australia) Pty Ltd**
75 York Street
Teralba NSW 2284

Attention: **Penelope Williams**

Report No.: **Rp 001 20220318**

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Document Control

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1.0 INTRODUCTION

Spark Renewables Pty Ltd (the Proponent) are proposing to develop a battery energy storage system (BESS) known as the Wattle Creek Energy Hub BESS (the Project) on land owned by the University of Sydney, located approximately 35 km to the north-east of the city of Goulburn (the Project Area).

The Project is proposed to comprise a BESS with an estimated capacity of up to 800 MW / 1600 MWh and associated infrastructure, including connection to existing transmission infrastructure.

Marshall Day Acoustics (MDA) have been commissioned by Umwelt (Australia) Pty Ltd (Umwelt) on behalf of the Proponent, to undertake a preliminary assessment of operational noise associated with the Project.

At this early stage, a detailed project design has not been established, however for the purposes of assessment, a design concept for the BESS has been developed by the Proponent, comprising a generic layout of inverters, medium voltage (MV) transformers, battery units and high voltage (HV) transformers.

The Proponent has proposed two investigation areas within which the BESS design concept has been commonly applied. The intent of the Proponent is to develop only one of the investigation areas however both have been considered in this assessment to allow the merits of each to be evaluated. On this basis the investigation areas are considered individually and not cumulatively.

This assessment is intended to provide a preliminary demonstration of the feasibility of the Project based on generic concepts and representative assumptions. Detailed design of the Project, including revised noise modelling, will occur during the Environmental Impact Statement (EIS) phase, when the equipment selections, layout and numbers are finalised following equipment tenders and design development.

This report is intended to support the Scoping Report for the Project, submitted as part of the request for the provision of project-specific Planning Secretary's Environmental Assessment Requirements (SEARs). It contains details of the proposed investigation areas, conceptual site layout and noise data, relevant environmental noise criteria and a preliminary noise assessment to establish feasibility of the Project from an acoustic perspective.

Assessment of noise from the Project has been conducted in accordance with the NSW EPA's Noise Policy for Industry (NPfI). Background noise monitoring has not been conducted for the assessment. On this basis minimum background noise levels have been adopted based on information provided in the NPfI. Noise limits applicable to the project, described as project noise trigger levels in the NPfI, have been developed from these minimum background noise levels.

A glossary of relevant acoustic terminology used within this report has been included in Appendix A.

2.0 PROJECT OVERVIEW

2.1 Description

The Project Area is located in the Southern Tablelands region of New South Wales, approximately 35 km to the north-east of the city of Goulburn and 15 km to the north of the township of Marulan.

The Project is positioned within the University of Sydney's 'Arthursleigh' property, a 6,200-hectare property currently utilised as both a commercial grazing farm as well as a research and teaching resource for several university faculties.

The Project is expected to comprise:

- A large-scale BESS including battery enclosures, inverters, transformers and auxiliary components, with a capacity of up to 800 MW / 1600 MWh;
- A HV collector substation;
- A transmission line connection between the BESS and the nearby TransGrid Marulan 330/132 kV substation, located directly south of the Project boundary;
- Ancillary elements including but not limited to internal access roads and parking, control room and staff amenities, infrastructure, amenities, fencing, security systems and landscaping; and
- A 'test-bed facility' adjacent to the BESS site, proposed to be operated as a university research and development facility.

It is noted that while the proposed use of the 'test-bed facility' has the potential to generate noise, further detail is required before an assessment can be conducted. It is expected that this will be addressed in detail as part of the later detailed design and EIS phase.

Conceptual information with respect to noise generating equipment associated with the Project has been supplied by the Proponent and is described as:

- Two hundred and forty-eight (248) inverters;
- Two hundred and forty-eight (248) MV transformers;
- One thousand, nine hundred and eighty-six (1,986) battery units, equating to approximately 416 containerised battery systems; and
- Three (3) HV transformers to be located in a separate substation.

As discussed in Section 1.0, a specific project design is not yet available. Instead, this assessment refers to two investigation areas identified by the Proponent as potential sites for development of the Project. The assessment in this report has been based on conceptual equipment layouts, confirmed by the Proponent to be representative of the proposed size of the Project.

The existing Transgrid Marulan 330 kV Substation is located approximately 500 m to the east of the nearest Project equipment items. Current noise levels from operation of this facility have not been measured or quantified. The substation boundary can be seen in Figure 1.

The conceptual layouts used for noise modelling purposes are shown in Appendix B.

2.2 Noise sensitive receivers

Noise sensitive receivers up to 3 km from the two BESS investigation areas have been identified based on a GIS dataset identified as 'LAN_ARTW_Dwellings_v008' provided by Umwelt via email dated 24 March 2023. All receivers are identified as residences or dwellings.

Compliance demonstrated at these nearest receivers would also mean compliance at receivers further away.

The receivers included within this assessment and their spatial relationship to the BESS investigation areas are tabulated in Table 1 and presented graphically in Figure 1.

All receivers are zoned 'RU2 – Rural Landscape', per the NSW Planning Portal Spatial Viewer¹.

Table 1: Noise sensitive receiver positions included in the assessment, GDA2020 / MGA Z56

Receiver ID	Easting, m	Northing, m	Approximate distance to investigation area A, km	Approximate distance to investigation area B, km
R001 ^[1]	229,763	6,168,554	1.6	1.8
R003	231,045	6,165,359	3.5	1.7
R004	232,573	6,165,748	4.6	2.4
R008	227,877	6,165,373	2.3	3.1
R010	227,080	6,165,083	2.9	3.9
R040	232,765	6,168,803	4.5	2.9
R041	232,922	6,168,360	4.6	2.8
R042	232,550	6,168,003	4.2	2.3
R043	232,753	6,167,481	4.4	2.3
R079 ^[1]	230,029	6,167,935	1.7	1.1
R270	228,623	6,165,260	2.4	2.6
R271	228,202	6,165,318	2.3	2.8

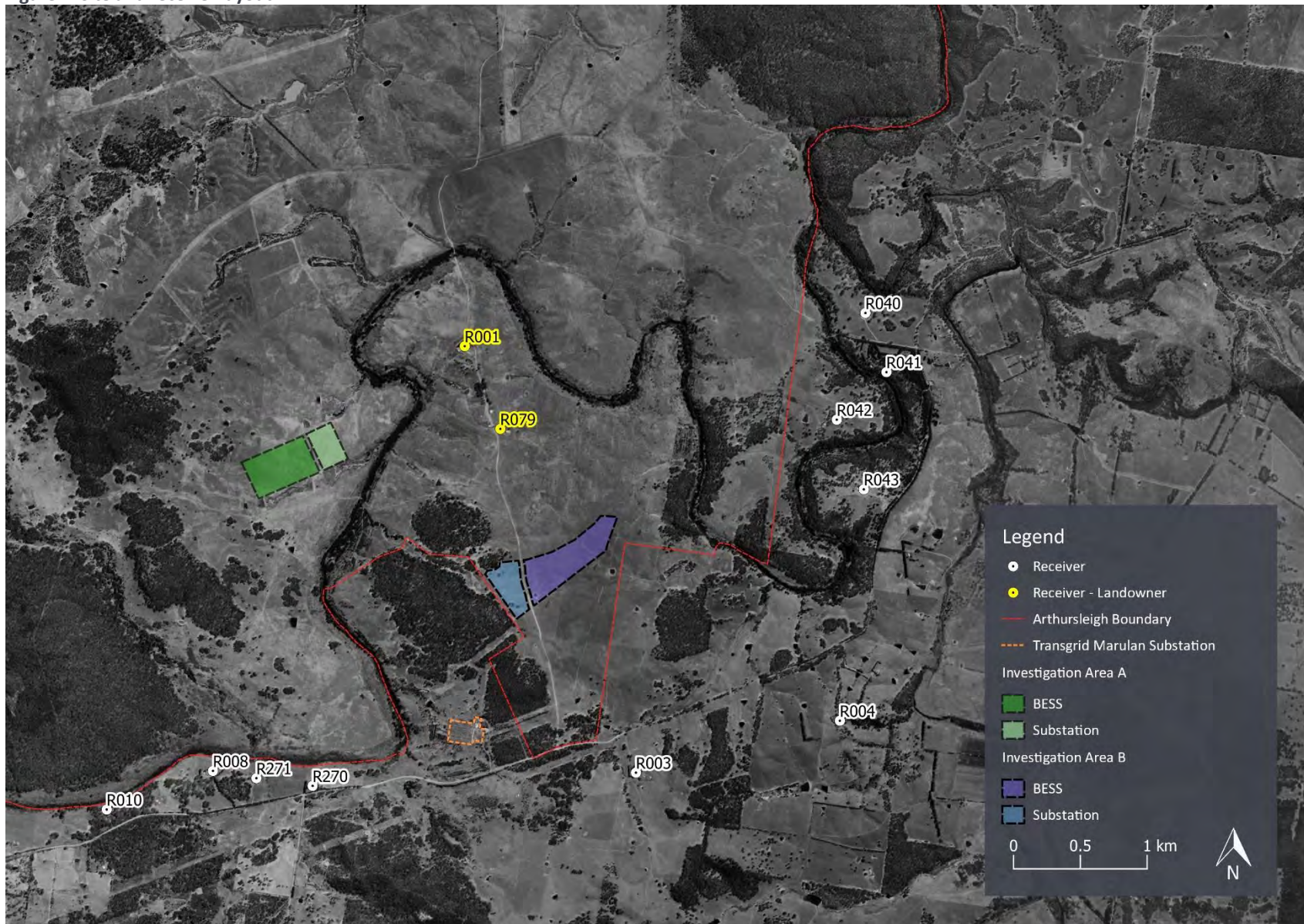
1 Project host landowner

It is noted that receivers R001 and R079 are located within the Arthursleigh property, owned by University of Sydney. R001 is permanently resided in by the on-site farm manager. R079 is used infrequently as temporary accommodation by research staff and students of the University. On this basis these receivers are specially identified as being related to the Project host landowner.

It is expected that the relationship between noise from the Project and these Project host landowner properties may be managed internally by the University, however these receivers are included in the noise assessment for completeness.

¹ <https://www.planningportal.nsw.gov.au>

Figure 1: Site and receiver layout



3.0 NOISE POLICY FOR INDUSTRY

The NPfl is the applicable guideline for assessing operational noise associated with the Project.

The NPfl provides a method for determining project noise trigger levels that are used for assessing the potential impact of noise from industry at existing receivers. Specifically, the project noise trigger levels provide a benchmark or objective for assessing a proposal or site. The NPfl states that the project noise trigger levels are not intended for use as mandatory requirements, but represent the levels that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; e.g. further investigation of mitigation measures.

The project noise trigger levels are derived from an analysis of the background noise environment and zoning information, accounting for amenity-based criteria and, in the case of residential receivers, intrusiveness criteria. The project noise trigger levels are defined as the minimum of the intrusiveness noise levels and the amenity noise levels.

The following subsections describe the amenity and intrusiveness noise levels used to determine the project noise trigger levels. Further details on the derivation of appropriate project noise trigger levels are provided in Section 5.1 and Appendix C.

3.1 Amenity noise levels

The amenity noise assessment is designed to prevent industrial noise continually increasing above an acceptable level. The NPfl provides recommended amenity noise levels based on receiver categories and typical planning zones.

The recommended amenity noise levels outlined in the NPfl have been selected on the basis of studies that relate industrial noise to annoyance in communities and have been subjectively scaled to reflect the perceived differential expectations and ambient noise environments of rural, suburban, and urban communities for residential receivers. They are based on protecting the majority of the community (90 %) from being highly annoyed by industrial noise.

The amenity levels defined in the NPfl relate to total industry noise levels. The project amenity noise levels for an individual industry are set at a level 5 dB below the recommended amenity levels to provide a margin for cumulative industry noise.

3.2 Intrusiveness noise levels

The intrusiveness noise assessment is applicable to residential receivers and is based on knowledge of the background noise level at the receiver. The background noise levels are referred to as the rating background noise level (RBL) in the NPfl.

The intrusiveness noise level is the RBL at the nearest noise sensitive location plus 5 dB. Therefore, the noise emissions from the premises are considered to be intrusive if the source noise level ($L_{Aeq, 15 \text{ min}}$) is greater than the background noise level (L_{A90}) plus 5 dB.

4.0 NOISE PREDICTION METHOD

Operational noise levels associated with the Project, i.e. the typical operation of inverters, transformers and battery units, are predicted using:

- noise emission data for the inverters, transformers, and battery units;
- a 3D digital model of the Project and the surrounding environment using proprietary noise modelling software SoundPLAN v8.2; and
- international standards used for the calculation of environmental sound propagation.

The method selected to predict noise levels is International Standard ISO 9613-2: 1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613).

The implementation of ISO 9613 within proprietary noise modelling software enables multiple sound transmission paths, including reflected and screened paths, to be accounted for in the calculated noise levels. ISO 9613 was designed to assume conditions that favour the propagation of noise from meteorological effects, described as a slight wind (1 to 5 m/s) blowing from source to receiver, or a well-developed moderate ground-based temperature inversion. This is expected to satisfy the ‘*noise-enhancing meteorological conditions*’ definition in the NPfI and provide a conservative approach to noise modelling.

10 m vertical resolution terrain data for the Project site and surrounds has been provided by the Proponent and is considered appropriate for noise modelling purposes at this stage. More detailed topographical information will be included in revised modelling to be conducted as part of the detailed noise assessment component of the EIS.

All equipment items are modelled as omnidirectional point sources of noise with associated octave band sound power level noise emissions. Further details regarding equipment noise levels are provided in Section 5.2.

The ground factor, representing the ground attenuation as a result of sound reflected by the ground surface interfering with the sound propagating directly from source to receiver is variable throughout the model being $G = 0.5$ i.e. mixed hard / soft ground outside the Project Area boundary to represent the surrounding existing landscape between the proposed infrastructure and noise sensitive receivers.

Additional information with respect to noise modelling is provided in Appendix D.

5.0 OPERATIONAL NOISE ASSESSMENT

5.1 Project noise trigger levels

Measurement of background noise levels has not been undertaken at this stage of the Project. On this basis, minimum background noise levels, and associated noise limits, have been adopted as per the procedures detailed in the NPfl.

Based on this approach the project noise trigger levels shown in Table 2 have been derived and are applicable to the Project.

Table 2: Project noise trigger level

Receiver	Time of day	Project noise trigger level, $L_{Aeq, 15min}$, dB
Residential	Day	40
	Evening	35
	Night	35

5.2 Operational noise sources

The primary influence over the accuracy of a noise model is the accuracy of input noise data.

The preferred standard of noise data is third octave band sound power levels for each equipment item operating under the worst-case condition likely to occur during the operation of the Project, provided by the manufacturer and measured in accordance with a recognised standard.

The selection of an appropriate measurement standard will depend on various factors including the conditions under which the measurements occur, the measurement equipment available, and the character of the noise being measured, amongst others. Example standards include:

- ISO 3741 to ISO 3747 - determination using sound pressure level measurements
- ISO 9614-1 to ISO 9614-3 - determination using sound intensity measurements

At this stage of the Project, equipment selections have not been conclusively determined and detailed third octave noise data is not available from the Proponent in all instances. Where this data is not available MDA has established approximations or assumptions based on comparable data or existing acoustic literature.

Noise modelling for the Project will be refined in more detail at a later stage during detailed design development and OEM tender.

Notwithstanding the above, responsibility for providing representative, accurate noise emissions data for proposed equipment items is that of the Proponent. Where inaccurate data is used, predicted noise levels may not accurately represent resultant noise levels in practice.

Sound power levels for individual Project equipment items, as used in the noise model, are detailed in Table 3. Data is provided as un-weighted (linear) octave band spectra and A-weighted overall sound power level.

Table 3: Sound power levels for Project equipment items, dB L_w

Item	Octave band centre frequency, Hz							dBA
	63	125	250	500	1000	2000	4000	
Inverter	91	92	92	87	85	83	88	93
Battery Unit	70	75	71	68	66	61	55	71
MV Transformer	77	79	74	74	68	63	58	75
HV Transformer	103	105	100	100	94	89	84	101

Additional information with respect to the source of the data is provided in Table 4.

Table 4: Noise data descriptions

Item	Description
Inverter	<p>Third octave band sound power levels measured in accordance with EN ISO 9614-2 have been sourced from MDA library data. Extensive specific operating conditions for the test were described in the supplied data sheet but included all fans running at 100 %.</p> <p>Due to commercial sensitivities the specific inverter manufacturer and model is not detailed in this report but has been confirmed by the Proponent to be representative of the specification required for the Project.</p>
Battery Unit	<p>Noise related to the battery unit is typically limited to that associated with the cooling systems.</p> <p>In the absence of specific equipment data provided by the Proponent, comparative overall spectral data has been taken from a typical residential condenser unit (Kirby WRC493BECB). The spectral data was then normalised to provide a resultant 71 dB L_{WA} to align with the overall sound power level of comparative equipment items.</p>
HV / MV Transformer	<p>At this stage of the project, specific details of the transformer makes and models are yet to be finalised. The Proponent has advised that the HV and MV transformers would have a capacity of up to 300 MVA and 4.2 MVA, respectively.</p> <p>In the absence of measured sound power level data for a specific transformer model, reference has been made to the method for estimating overall transformer sound power levels for a given power rating described in AS 60076-10:2009².</p> <p>Spectral data for each transformer was then estimated by applying Bies & Hansen³ corrections from Table 11.27, (Location 1a for outdoor transformer noise) to the determined overall sound power level.</p>

² Australian Standard AS 60076-10:2009 Power transformers – Part 10: Determination of sound levels (AS 60076-10:2009)

³ Bies, D. H. & Hansen, C. H. (2009). *Engineering noise control: theory and practice (Fourth edition.)*. p. 601

5.3 Tonality

Noise associated with inverters and transformers is often tonal in nature, typically evidenced in associated third octave spectral noise data.

Fact Sheet C of the NPfI provides a mechanism by which the characteristics of a noise source, such as tonality, may attract the application of a modifying factor correction if deemed to meet the prescribed criteria. The NPfI states that:

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level.

With regards to tonality, the NPfI references the ISO1996-2 - 2007⁴ objective method for assessing the audibility of tones, with the application of a modifying factor correction of 5 dB to the measured or predicted noise level for the subject source where tonality is present.

Given the method employed, accurate application of the tonality modifying factor correction requires third octave spectral noise information to be known for a subject noise source.

Review of the manufacturer produced third octave band sound power levels for the inverter model indicates the presence of a tonal component within the 3.15 kHz one-third octave band. Based on typical ISO 9613 atmospheric attenuation factors, and the distance to noise sensitive receivers, the tonal component of the inverter noise data is not predicted at the receiver locations. On this basis a modifying factor correction for tonality has not been applied for inverter noise sources.

For the HV and MV transformers third octave noise data is not readily available, and the review conducted for the inverters cannot be employed for these noise sources. In order to provide a conservative assessment a 5 dB modifying correction factor for tonality has been applied to these sources. Detailed assessment during later stages of the Project may establish that a modifying factor correction is not warranted however the approach adopted by this assessment provides a pragmatic reduced risk approach appropriate for a feasibility study.

5.4 Predicted noise levels

Operational noise level predictions at the noise sensitive receivers have been conducted based on the Project design described in Section 2.1, the method detailed in Section 4.0, and the noise data shown in Section 5.2.

The results of these predictions are provided in Table 5.

As the Project is proposed to be operated over a 24-hr period, the predicted noise levels have been compared to the more stringent evening and night period project noise trigger level of 35 $L_{Aeq, 15min}$ dB for an assessment of compliance.

Predicted noise level contours for each investigation area are shown in Appendix E.

⁴ ISO 1996-2 - Second edition 2007-03-15 - Acoustics — Description, measurement and assessment of environmental noise —Part 2: Determination of environmental noise levels

Table 5: Predicted noise levels, dB LAeq, 15 min

Receiver	Investigation area A	Compliance	Investigation area B	Compliance
R001 ^[1]	35	✓	31	✓
R003	23	✓	31	✓
R004	19	✓	29	✓
R008	27	✓	26	✓
R010	25	✓	23	✓
R040	19	✓	24	✓
R041	19	✓	25	✓
R042	21	✓	29	✓
R043	20	✓	29	✓
R079 ^[1]	33	✓	38	✗
R270	27	✓	28	✓
R271	27	✓	27	✓

1 Project host landowner

5.5 Cumulative noise

The Transgrid Marulan 330 kV Substation is located approximately 500 m to the east of the nearest Project equipment items. Current noise levels from operation of this facility have not been measured or quantified.

It is also understood that the proposed site and surrounds may feature other future industrial and energy generation developments, including the approved (but not yet constructed) Marulan Gas Fired Power Station and a solar farm development proposed as part of the wider Wattle Creek Energy Hub project.

The NPfl project amenity noise level is designed 'to protect against cumulative noise impacts from industry' with modifications made to the recommended amenity noise level to account for noise contributions for existing industry, as described in Section 3.1 and Appendix C.

Further, the NPfl states:

Where the project amenity noise level applies and it can be met, no additional consideration of cumulative industrial noise is required.

On this basis no further consideration is given to noise from Transgrid Marulan 330 kV Substation or other approved or proposed developments, and assessment of cumulative industrial noise under the NPfl is considered satisfied.

Detailed consideration will be given to cumulative noise impacts during the EIS phase.

5.6 Discussion

The results shown in Table 5 demonstrate that:

- The predicted noise levels associated with investigation area A are below the applicable noise criteria at all noise sensitive receivers; and
- The predicted noise levels associated with investigation area B are below the applicable noise criteria at all noise sensitive receivers, with the exception of R079.

As discussed in Section 2.0, R001 and R079 are located within the project boundary and are operated as temporary accommodation for university staff and students.

The properties are understood to be used infrequently as temporary accommodation by research staff and students of the University. On this basis these receivers are specially identified as being related to the Project landowner.

It is expected that the relationship between noise from the Project and these Project landowner properties may be managed internally by the University. Notwithstanding this, noise control measures have been investigated, limited to noise control packages offered by the manufacturer of the inverter.

Taking into account the noise mitigation performance offered by the OEM, providing in the order of 3 dB noise control to inverter noise sources, the evening and night-time project noise trigger level of 35 $L_{Aeq, 15min}$ dB would be achieved by investigation area B at R079.

Additional noise modelling and assessment undertaken as the Project progresses will incorporate noise control measures as required, developed for the specific equipment selections and Project arrangement that is established during detailed design.

6.0 CONCLUSION

Spark Renewables Pty Ltd are proposing to develop a new BESS, identified as the Wattle Creek Energy Hub BESS, on land owned by the University of Sydney, located approximately 35 km to the north-east of the city of Goulburn. The BESS has a proposed capacity of up to 800 MW/1600 MWh.

At this early stage, detailed information with respect to project design and operation has not yet been developed. In order to provide a demonstration of acoustic feasibility, a conceptual BESS layout has been provided by the Proponent. Two investigation areas have been proposed comprising investigation area A and investigation area B with the conceptual BESS layout applying commonly to both.

Based on these conceptual layout designs, a preliminary environmental noise assessment has been carried out. This assessment has considered;

- Sound power levels for representative equipment such as inverters, battery packs and transformers;
- Project noise trigger levels developed per NPfl procedures; and
- Noise modelling of each investigation area and the surrounding environment implementing the method described in ISO 9613.

The assessment indicates that predicted noise levels associated with investigation area A comply with the evening and night-time project noise trigger levels at all relevant noise sensitive receivers.

Predicted noise levels associated with investigation area B are below the evening and night-time project noise trigger levels at all relevant noise sensitive receivers, with the exception of R079.

On the basis that R079 is Project landowner property it is expected that the relationship between noise from the Project and these Project landowner properties may be managed internally by the University.

Notwithstanding this, noise control measures have been investigated. OEM noise control packages applicable to the inverters are known to be capable of providing 3 dB of noise control. With the inclusion of the OEM noise control packages, the evening and night-time project noise trigger level of 35 $L_{Aeq, 15min}$ dB would be achieved by investigation area B at R079.

The noise limits derived for assessment include inherent allowances for cumulative noise from other nearby industrial noise sources, including the Transgrid Marulan 330 kV Substation. On this basis no additional impacts are expected from the cumulative operation of the Project and other existing and potential industrial developments, however this will be subject to detailed assessment during the EIS Phase.

This assessment is intended to support the scoping phase of the Project with a preliminary demonstration of the feasibility of the proposed Project, based on generic concepts and representative assumptions. Detailed design of the Project, including revised noise modelling, will occur during the EIS phase, when the equipment selections, layout and numbers are finalised following equipment tenders and design development.

The EIS phase noise assessment will include the following components;

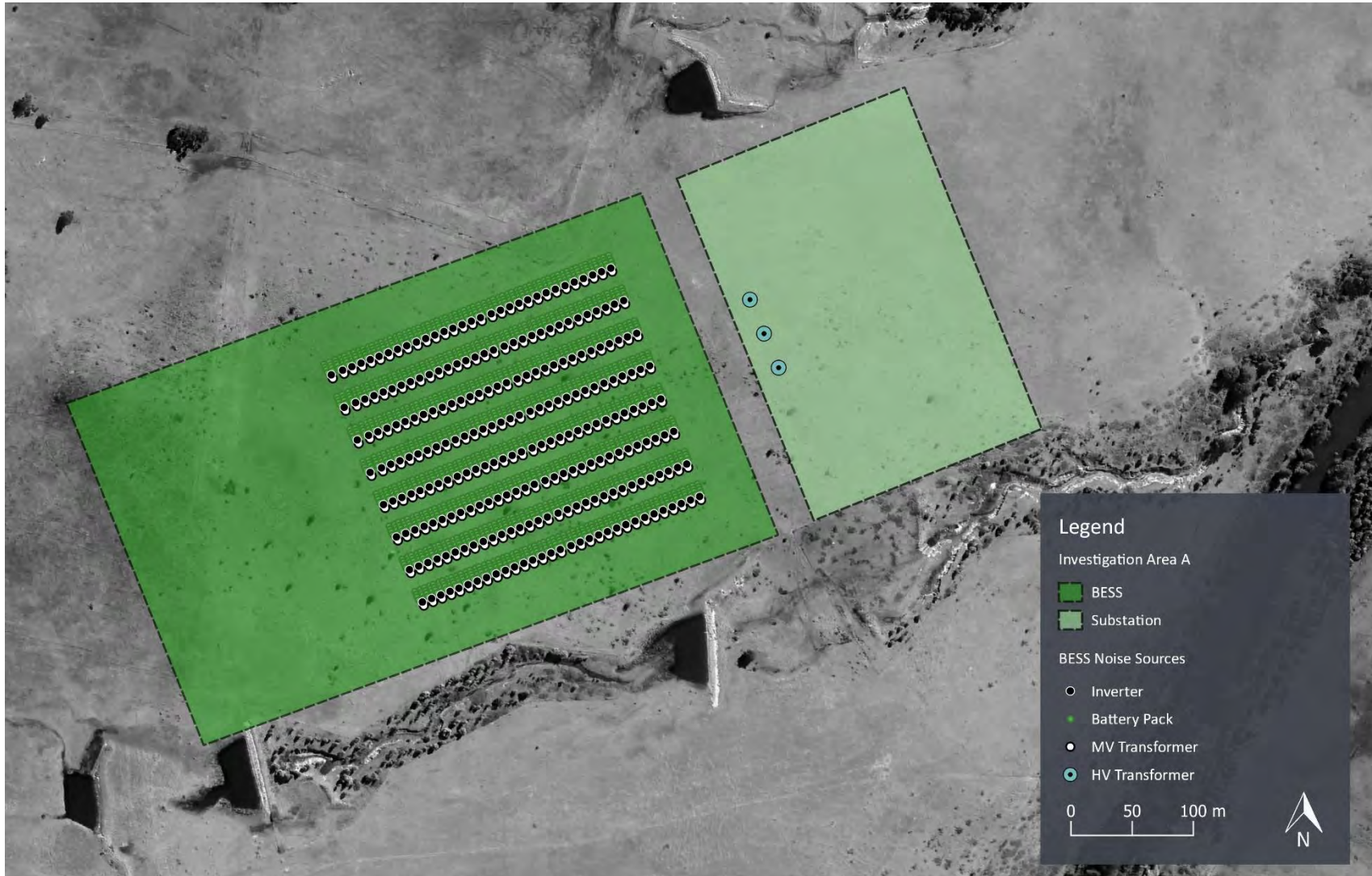
- Operational noise from the developed project;
- Noise and vibration associated with the construction of the developed project;
- Noise from construction traffic on public roads; and
- Cumulative operational noise associated with other nearby industrial noise sources, including a solar farm development proposed as part of the wider Wattle Creek Energy Hub project.

APPENDIX A GLOSSARY OF TERMINOLOGY

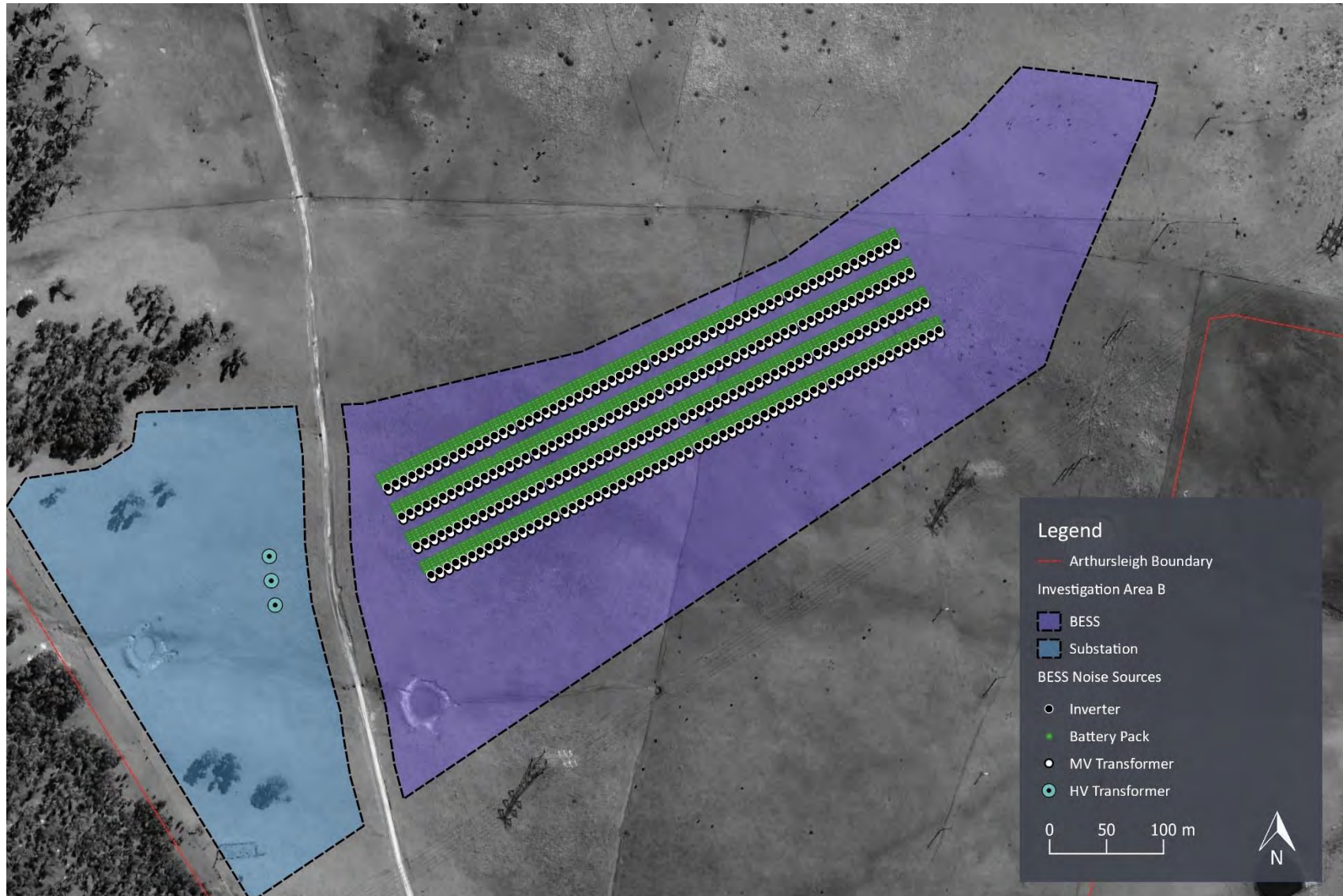
Term	Definition
A-weighting	<p>A set of frequency-dependent sound level adjustments that are used to better represent how humans hear sounds. Humans are less sensitive to low and very high frequency sounds.</p> <p>Sound levels using an “A” frequency weighting are expressed as dB L_A. Alternative ways of expressing A-weighted decibels are dBA or dB(A).</p>
Background sound	<p>The sound that is continuously present in a room or outdoor location. Often expressed as the A-weighted sound level exceeded for 90 % of a given time period i.e. L_{A90}.</p>
dB	<p>Decibel. The unit of sound level.</p>
Frequency	<p>Sound occurs over a range of frequencies, extending from the very low (e.g. thunder) to the very high (e.g. mosquito buzz). Measured in units of Hertz (Hz).</p> <p>Humans typically hear sounds between 20 Hz and 20 kHz. High frequency acuity naturally reduces with age most adults can hear up to 15 kHz.</p>
Hertz (Hz)	<p>The unit of frequency, named after Gustav Hertz (1887-1975). One hertz is one pressure cycle of sound per second.</p> <p>One thousand hertz – 1000 cycles per second – is a kilohertz (kHz).</p>
L_{Aeq}	<p>The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and is measured in dB.</p>
L_w	<p>Sound Power Level. The calculated level of total sound power radiated by a sound source. Usually A-weighted i.e. L_{WA}.</p>
Octave band	<p>The interval between one frequency and its double. Sound is divided into octave bands for analysis. The typical octave band centre frequencies are 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz and 4 kHz.</p>

APPENDIX B CONCEPTUAL BESS LAYOUTS

B1 Investigation area A



B2 Investigation area B



APPENDIX C NOISE POLICY FOR INDUSTRY ASSESSMENT

In NSW, the Environmental Protection Authority's NPfl is the guideline for assessing noise emissions from industrial facilities and other developments with noise sources that may be considered industrial in nature. The NPfl sets out a procedure where an industrial facility can be assessed against a series of noise levels. Project specific noise levels are derived from an analysis of the ambient noise environment and zoning information.

An NPfl assessment requires the derivation of two project noise trigger levels - one from an intrusiveness assessment and another from an amenity assessment. Assessment locations for residential receivers have been taken as the nearest point within 30m of the dwelling, in accordance with the NPfl.

C1 Intrusive noise level

The intrusiveness noise assessment is applicable to residential receivers and is based on knowledge of the background noise level at the receiver location. In the absence of measured background noise levels, assumed minimum RBLs are provided in Table 2.1 of the NPfl. The intrusiveness level is taken to be the RBL plus 5dB. Therefore, the noise emissions from the noise source are considered to be intrusive if the A-weighted source noise level ($L_{Aeq, 15min}$) is greater than the background noise level (L_{A90}) plus 5 dB.

Based upon Table 2.1 of the NPfl, the intrusiveness noise levels have been calculated in accordance with the NPfl and are presented in Table 6.

Table 6: Derived Intrusiveness noise level

Period	Rating Background Level, $L_{A90, 15min}$ dB	Intrusiveness Noise Level (RBL + 5 dB), $L_{Aeq, 15 min}$ dB
Day	35	40
Evening	30	35
Night	30	35

C2 Amenity noise levels

Project amenity noise trigger levels are designed to prevent industrial noise continually increasing above an acceptable level over time with the expansion of infrastructure and development. The initial stage in determining the amenity level is to correct the acceptable noise levels set for the appropriate amenity area with the baseline noise monitoring.

The expected residential noise environment is typical of a rural area. Modification is undertaken to account for the standardisation of the assessment time periods to recommended amenity noise levels (as detailed in Section 2.2 of the NPfl). Modification of the amenity noise levels (in accordance with Section 2.4 of the NPfl) is required to account for the potential existing contribution of industrial noise on residential receivers. This has been applied to allow for existing noise from the TransGrid Marulan 330/132 kV substation, located approximately 2,000 m directly south of investigation area A.

Resultant levels and the relevant modifications are shown in Table 7.

Table 7: Derived Amenity noise level

Receiver	Period	Recommended Amenity Noise Level $L_{Aeq, Period}$ dB	Modified Amenity Noise Level $L_{Aeq, 15min}$ dB
Residential (Rural)	Day	50	48
	Evening	45	43
	Night	40	38

Source: Table 2.2 NSW Noise Policy for Industry

C3 Project noise trigger levels

The final process in determining the operational noise limits for the development is to derive the project noise trigger levels. The project noise trigger levels are levels that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The project noise trigger levels are derived by selecting the more stringent of either the intrusiveness or amenity noise levels. The project noise trigger levels applicable to residential receivers within the vicinity of the Project are shown in Table 8.

Table 8: Project noise trigger levels

Receiver	Period	Project Noise Trigger Level, $L_{Aeq, 15min}$, dB
Residential	Day	40
	Evening	35
	Night	35

APPENDIX D NOISE MODELLING METHOD

A computer model was created in the environmental noise modelling program SoundPLAN v8.2 to predict noise levels from the proposed development to the nearest noise-affected receivers in the vicinity of the subject site. The noise model has been used to calculate noise levels at the nearest noise-affected premises in accordance with ISO-9613-2:1996 Acoustics – *Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2). The noise model enables the calculation of noise levels over a wide area, and accounts for key considerations including site arrangement, terrain and atmospheric conditions.

The ISO 9613-2 standard specifies an engineering method for calculating noise at a known distance from a variety of sources under meteorological conditions that are favourable to sound propagation. The standard defines favourable conditions as downwind propagation where the source blows from the source to the receiver within an angle of +/-45 degrees from a line connecting the source to the receiver, at wind speeds between approximately 1 m/s and 5 m/s, measured at a height of 3 m to 11 m above the ground. Equivalently, the method accounts for average propagation under a well-developed moderate ground based thermal inversion.

Accordingly, predictions based on ISO 9613-2 account for the instances when local atmospheric conditions at the site favour the propagation of sound to surrounding receptor locations. Under alternative atmospheric conditions, such as when the wind is blowing from a receiver location to the development site, the noise levels would be lower than calculated.

To calculate far-field noise levels according to the ISO 9613-2, the noise levels of each source are firstly characterised in the form of octave band frequency levels. A series of octave band attenuation factors are then calculated for a range of effects including:

- Geometric divergence
- Air absorption
- Reflecting obstacles
- Screening
- Ground reflections.

The octave band attenuation factors are then applied to the noise data to determine the corresponding octave band and total calculated noise level at relevant receiver locations.

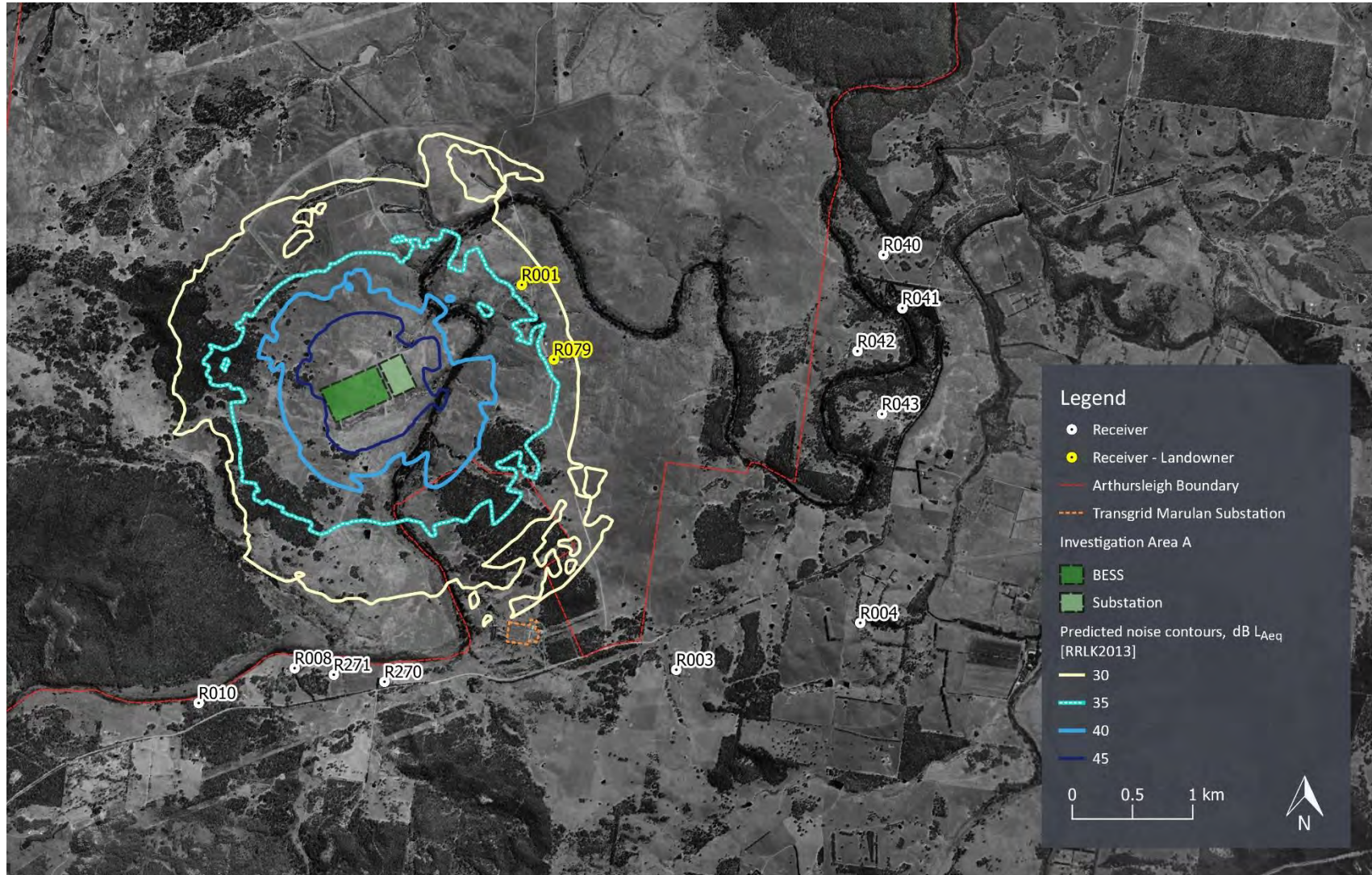
Geometry data for the model has been sourced from public aerial photography and client provided data. The geometries in the model are simplified representations of the built environment that have been configured to a level of detail that is appropriate for noise calculation purposes.

The following inputs have been referenced in the noise model to predict noise levels from onsite activities.

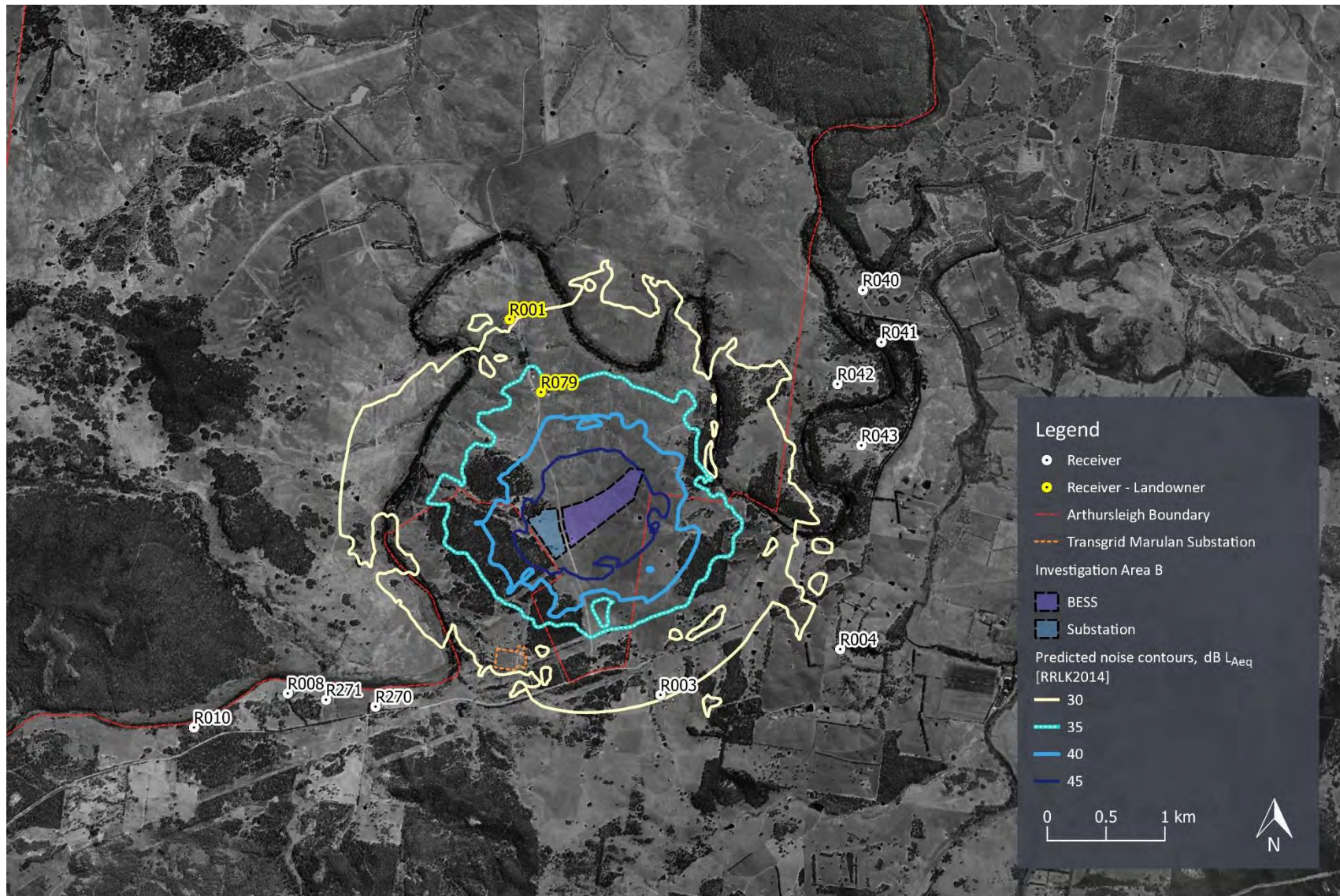
- Receiver locations positioned according to client provided data and at 1.5 m AGL.
- Topographical data provided the client.
- Emission data for each noise source at the site as detailed in Section 5.2.

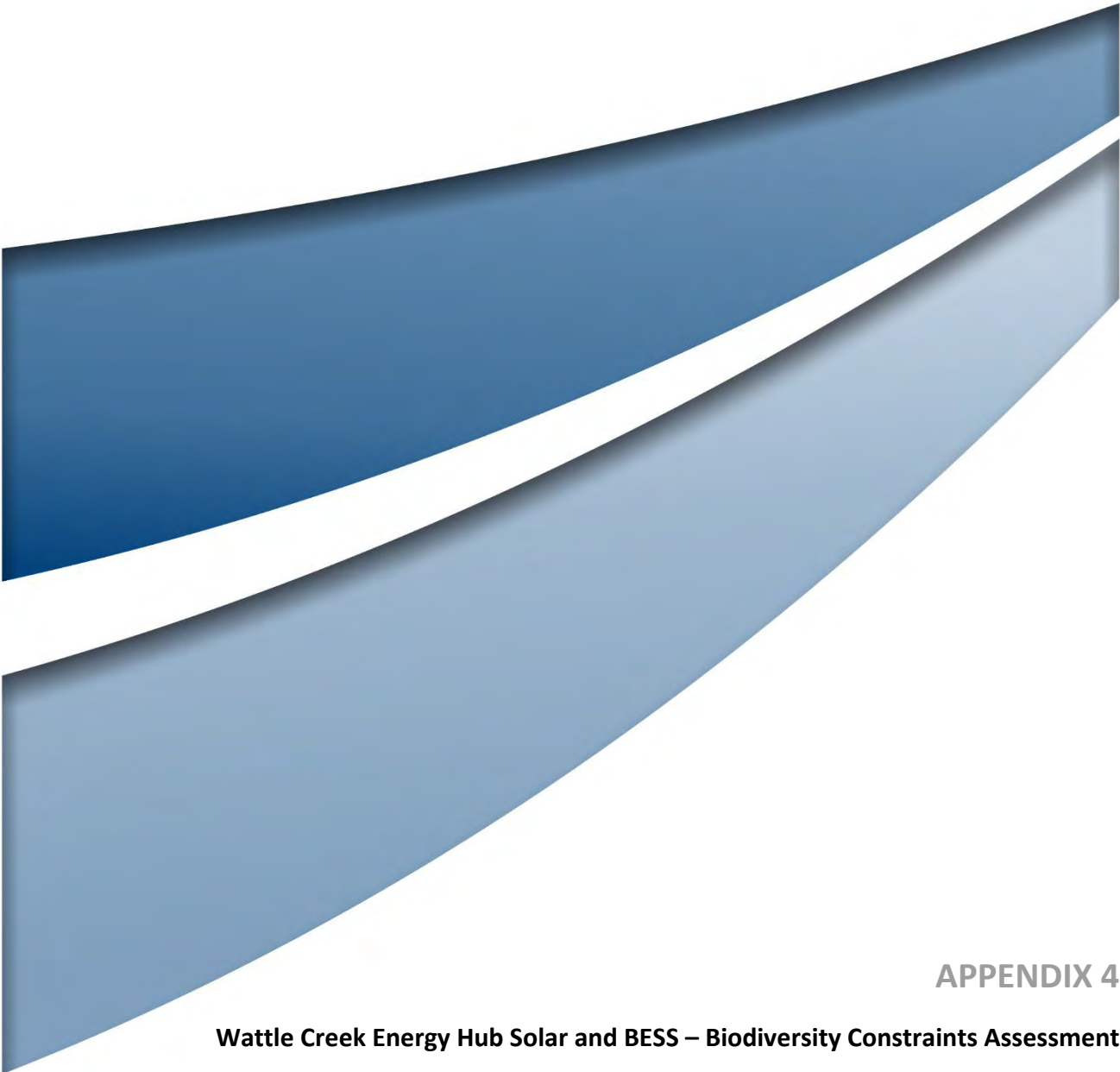
APPENDIX E PREDICTED NOISE LEVEL CONTOURS

E1 Investigation area A



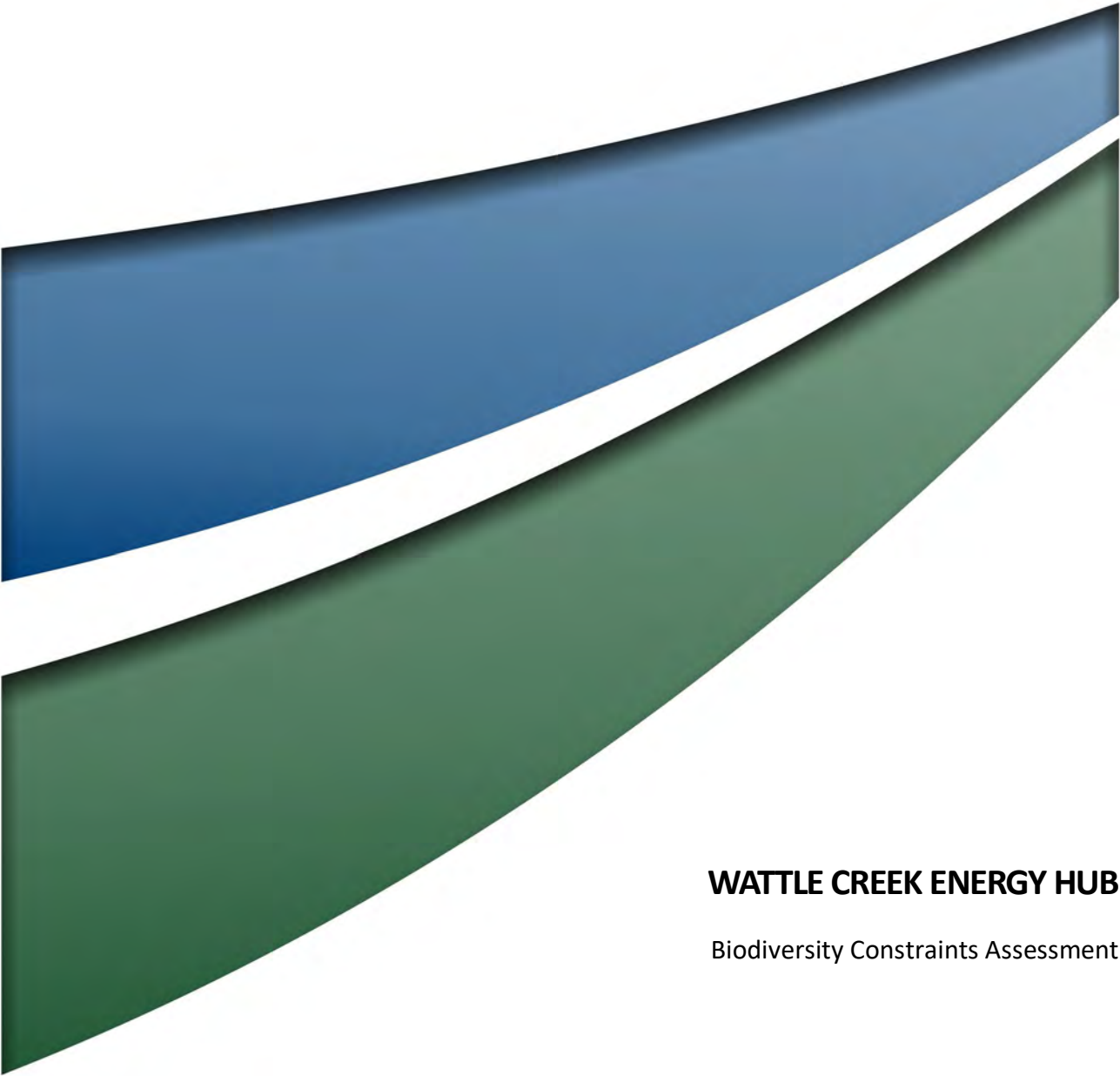
E2 Investigation area B





APPENDIX 4

Wattle Creek Energy Hub Solar and BESS – Biodiversity Constraints Assessment



WATTLE CREEK ENERGY HUB
Biodiversity Constraints Assessment

FINAL

September 2023

WATTLE CREEK ENERGY HUB

Biodiversity Constraints Assessment

FINAL

Prepared by
Umwelt (Australia) Pty Limited
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Report No. R01
Date: September 2023



QMS Certification Services

This report was prepared using
Umwelt's ISO 9001 certified
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Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Draft V1	Paul Douglass	30/09/22	Paul Douglas	30/09/22
Draft V2	Penelope Williams	01/09/23	Maddy Young	01/09/23
Final	Naomi Buchhorn	06/09/23	Naomi Buchhorn	06/09/23

Executive Summary

Spark Renewables propose to develop the Wattle Creek Energy Hub located approximately 80 kilometres west of Wollongong and 15 kilometres north west of Marulan, on the property known as 'Arthursleigh' (the Project Area), within the Upper Lachlan Shire Council and bordering the Wingecarribee and Goulburn Mulwaree Shire Council Local Government Areas (LGA).

Spark Renewables engaged Umwelt (Australia) Pty Limited (Umwelt) to prepare a Biodiversity Constraints Assessment to support the Scoping Report to request the Secretary's Environmental Assessment Requirements (SEARs) for each Project.

After five days of rapid site assessments, the preliminary vegetation mapping determined that 20 Plant Community Types (PCTs) and six threatened ecological communities (TECs) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are present within the Project Area. The vegetation zones will be assigned and refined during the EIS stage of the Projects.

Within the Project Area using the current design and layouts, three main habitat constraints have been identified. These include:

- intact woodland
- the riparian zones
- rocky habitat.

These constraints have been classified as moderate as additional survey is required. To refine the constraints analysis further, Umwelt will be required to confirm the extent of TECs and confirm potential threatened species habitat. This would be detailed during the EIS phases of the Project. Detailed understanding of the cost of offsetting impacts will be determined by assessment in accordance with the Biodiversity Assessment Method (BAM).

Abbreviations

Abbreviation	Definition
AOBV	Areas of Outstanding Biodiversity Value
ASL	above sea level
ATLAS	NSW State listing tool for nearby records within 10 km
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BCD	Biodiversity Conservation Division of the Department of Planning and Environment
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BV	Biodiversity Values
BVMTT	Biodiversity Values Map Threshold Tool
Coastal Management SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DNG	Derived Native Grasslands
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
EAH	Environment Agency Head
EIS	Environmental Impact Statement
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act)
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	NSW <i>Fisheries Management Act 1994</i>
GHG	Greenhouse gas
ha	hectares
HBT	Hollow bearing trees
IBRA	Interim Biogeographic Regionalisation for Australia
IGGAM	Interim Grasslands and other Groundcover Assessment Method
km	kilometres
Koala SEPP 2021	State Environmental Planning Policy (Biodiversity Conservation) 2021
kV	kilovolts
LEP	Local Environment Plan
LGA	Local Government Area
LLS	Local Land Services

Abbreviation	Definition
LLS Act	NSW <i>Local Land Services Act 2013</i>
m	metres
MNES	Matters of National Environmental Significance
MW	megawatts
NPW Act	NSW <i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NVR Map	Native Vegetation Regulatory Map
PAH	Planning Agency Head
PMST	Department of Climate Change, Energy, the Environment and Water's Protected Matters Search Tool
Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
SAIL	serious and irreversible impacts
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEPP 44	State Environmental Planning Policy No 44 – Koala Habitat Protection
SSD	State Significant Development
SVTM	NSW State Vegetation Type Map
TBDC	BioNet Threatened Biodiversity Data Collection
TEC	Threatened Ecological Communities
TSC Act	NSW <i>Threatened Species Conservation Act 1995</i>
Umwelt	Umwelt (Australia) Pty Limited
WONS	Weed of National Significance

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Appendix A	Protected Matters Search Tool (PMST)
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1.0 Introduction

1.1 Background

Spark Renewables propose to develop the Wattle Creek Energy Hub, which includes both Solar and Battery Energy Storage System (BESS) development, located approximately 80 kilometres west of Wollongong and 15 kilometres northwest of Marulan, on the property known as 'Arthursleigh', within the Upper Lachlan Shire Council and bordering the Wingecarribee and Goulburn Mulwaree Shire Council Local Government Areas (LGA) (**Figure 1.1**).

Two separate development applications will be lodged for the respective solar farm and BESS projects. The Project Area applied to this assessment captures both components, inclusive of the Solar Farm and BESS Development Corridors. The proposed connection point is to Transgrid's existing Marulan Substation located directly south of the Arthursleigh property at either 132 kilovolt (kV) or 330 kV.

Spark Renewables engaged Umwelt (Australia) Pty Limited (Umwelt) to prepare a Biodiversity Constraints Assessment to support the Scoping Reports for the request for the Secretary's Environmental Assessment Requirements (SEARs).

It is noted that at the time this Biodiversity Constraints Assessment (BCA) was originally prepared (draft version 1, September 2022) a separate wind farm component was also proposed by Spark Renewables as part of the Wattle Creek Energy Hub Project. The wind component was subsequently removed from the Wattle Creek Energy Hub Project. Any reference to the wind component has since been removed, however contextual information and subsequent biodiversity constraints relating to the Project Area remain within this report.

1.2 Purpose

The purpose of this report is to inform, based on preliminary analysis and rapid assessment, the likely areas requiring assessment under the NSW Biodiversity Assessment Method (BAM) and provide ecological input into the preliminary constraints analysis. To this end, this report provides a summary of the preliminary vegetation mapping, as well as potential constraints relating to threatened fauna and flora present within the Project Area.

Information presented within this report is based on desktop review and a rapid site assessment (five days on site). Fine-scale vegetation mapping is currently in progress to inform a detailed vegetation assessment which will be reported in the Environment Impact Statement (EIS) phase. This biodiversity constraints assessment has also informed early consultation relating to the technical details of the biodiversity assessment (for example, land categorisation mapping) with the Biodiversity Conservation Division (BCD) of the Department of Planning and Environment (DPE) to mitigate risk and avoid potential future project delays.

1.2.1 Contributing Authors

The following contributing authors prepared this report:

- Sarah Hart – Senior Ecologist.

- Maddy Young – Senior Ecologist.
- Rachel Musgrave – Principal Ecologist.
- Naomi Buchhorn - Principal Ecologist.

1.3 Project Overview

The Project Area is located approximately 80 kilometres west of Wollongong and 15 kilometres northwest of Marulan, within the Upper Lachlan Shire Council and bordering the Wingecarribee and Goulburn Mulwaree Shire Council LGAs. The Project Area is situated on a mix of agricultural (grazing) land and remnant native vegetation, with the closest larger population centre being Goulburn about 34 kilometres southwest of the Project Area (refer to **Figure 1.1**). Smaller townships of Brayton, Paddys Creek and Canyonleigh are nearer to the Project Area.

The Project Area is bound to the south by the Wollondilly River and Canyonleigh Road, to the east by the Wollondilly River, to the north by Dead Mans Creek, and to the west by private property (refer to **Figure 1.1**). The Hume Highway is located about 11 kilometres to the south of the Project Area. Tarlo River National Park is located approximately three kilometres west of the Project Area.

The Project Area is zoned as RU2 Rural Landscape within the Upper Lachlan Shire Council Local Environment Plan (LEP) 2011 (**Figure 1.2**). The majority of land that surrounds the Project Area is also zoned RU2 Rural Landscape, however, land immediately east is zoned RU1 Primary Production.

The Project Area encompasses an area of approximately 6,200 hectares (ha). The topography of the Project Area is variable ranging from between 500 and 720 metres above sea level (ASL).

The Project Area is dissected by a number of waterways including Island Creek, Wattle Creek, and Sandy Creek. The Wollondilly River traverses along the Project Area's southern and eastern boundary, as well as through the southern portion of the Project Area.

1.3.1 Indicative Design

The Project Area captures both the Solar Farm and BESS within the boundary of the Arthursleigh property. This assessment is a biodiversity constraints assessment documenting the likely constraints within the Project Area based on the conceptual project layout. The layout is subject to change as the environmental assessment for the project progresses.

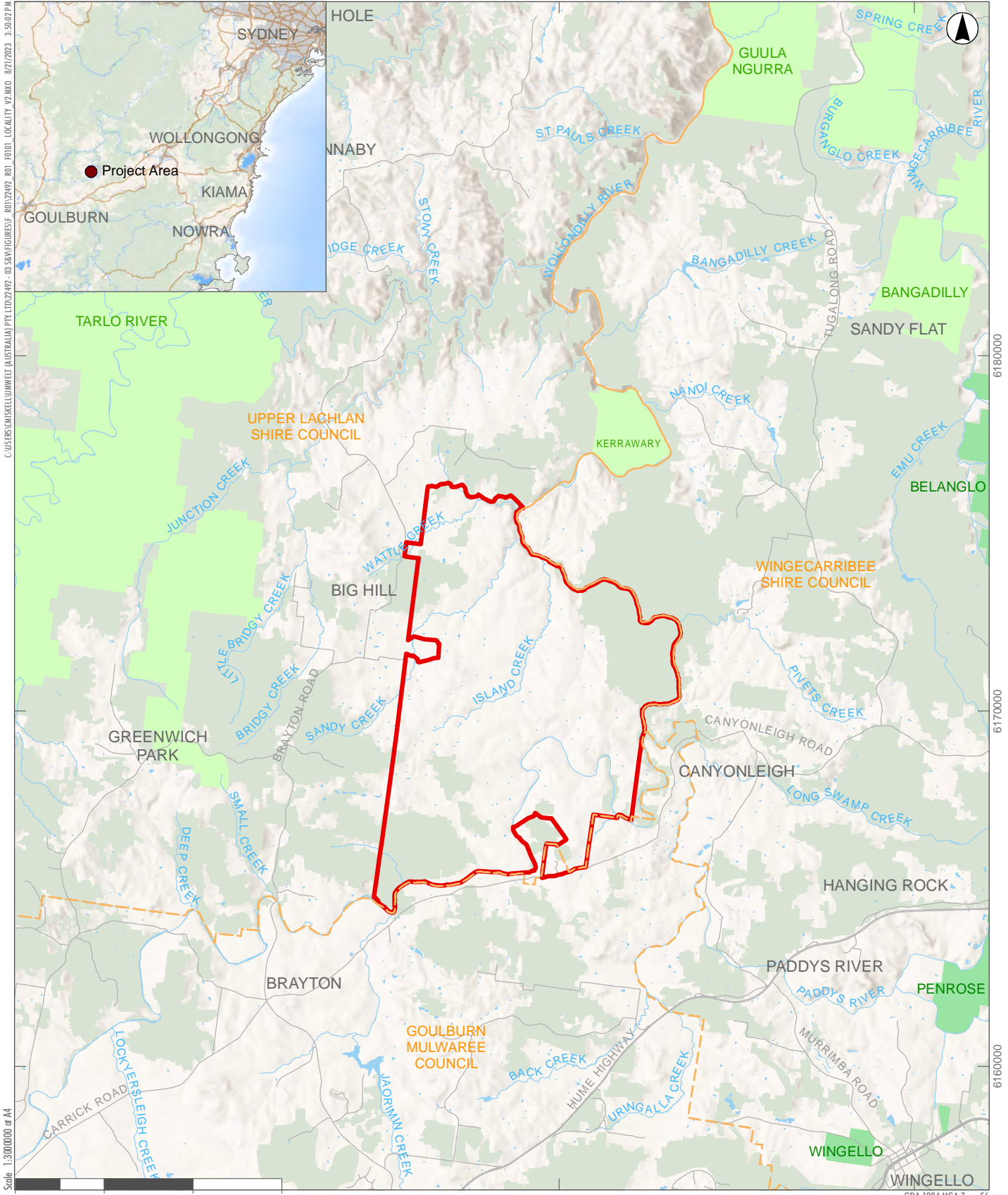
1.3.1.1 Solar Farm

The conceptual solar layout extends north across the western side of the Project Area with a development corridor of approximately 1,195 ha (**Figure 1.3**).

1.3.1.2 BESS

The conceptual BESS layout fits within the solar development corridor and covers an area of approximately 410 ha, as identified on **Figure 1.3**.

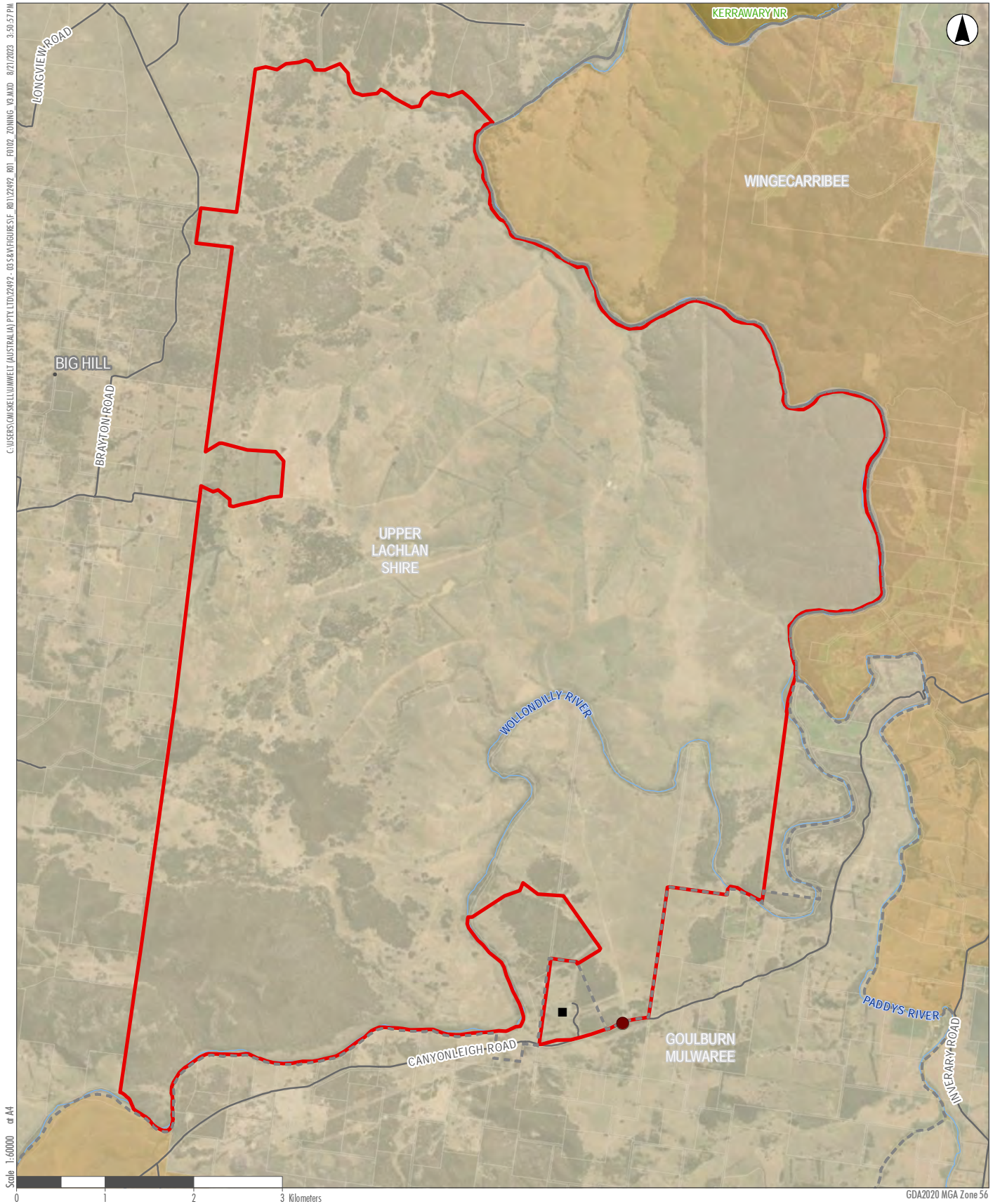
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- Legend**
- Project Area
 - Local Government Boundary
 - National Parks (NPWS Estate)
 - State Forest
 - Native Vegetation
 - Road
 - Watercourses
 - Railway Line

FIGURE 1.1
Project Location



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GDA2020 MGA Zone 56

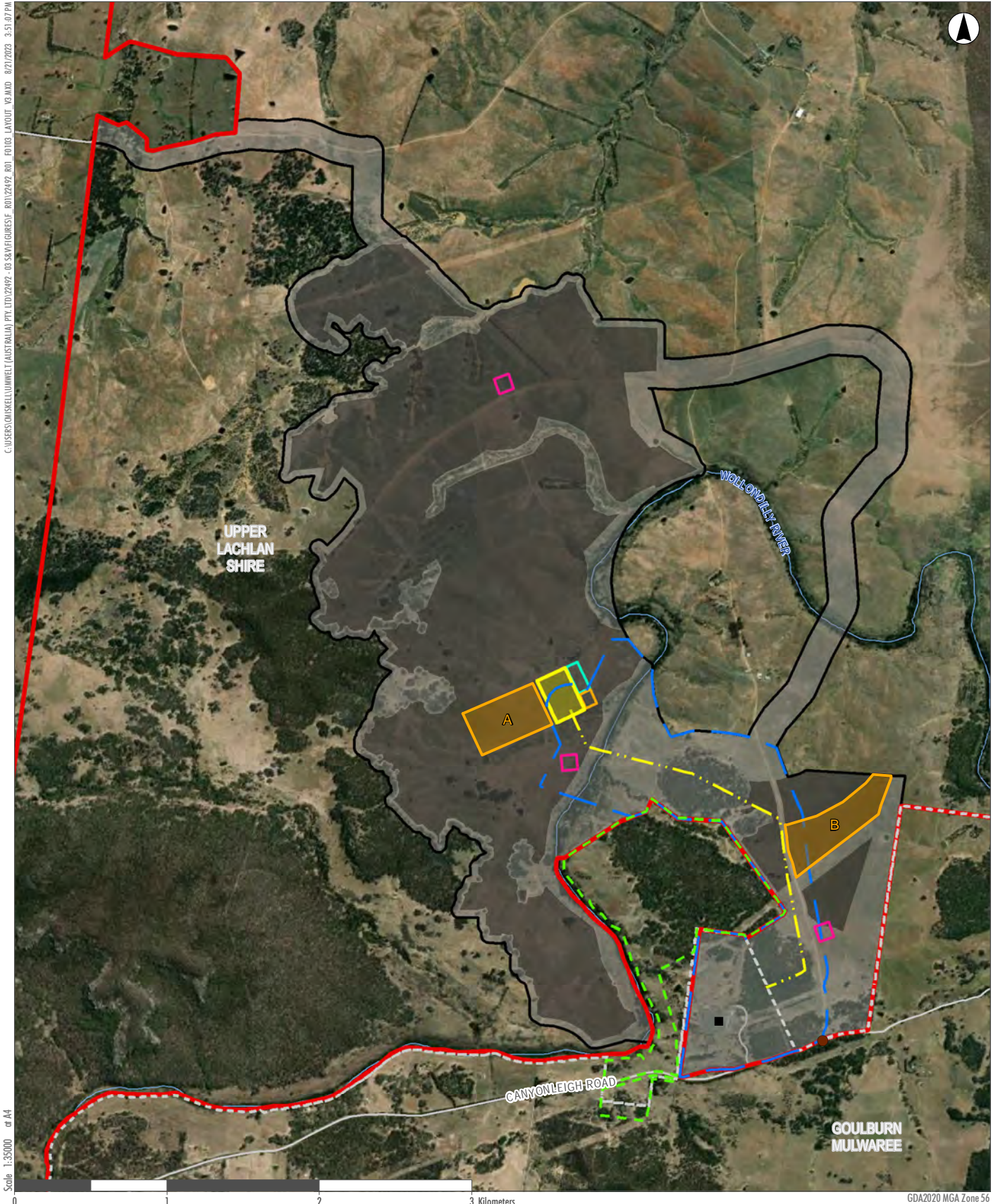
Legend

- | | |
|-----------------------|---|
| Project Area | C1 - National Parks and Nature Reserves |
| Development Corridor | C2 - Environmental Conservation |
| Local Government Area | RU1 - Primary Production |
| Lot Boundary | RU2 - Rural Landscape |
| NPWS Estate | |
| Roads | |
| Watercourses | |
| Access Point | |
| Existing Substation | |

FIGURE 1.2
LEP Zoning



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- Scale 1:35000 or A4
- 0 1 2 3 Kilometers
- GDA2020 MGA Zone 56
- | | |
|--|-------------------------------------|
| Project Area | Development Corridor |
| Local Government Area | Conceptual solar array |
| Marulan Gas Fired Power Station Project Area | BESS Site Option |
| Watercourses | Solar Farm Substation |
| Roads | Onsite Maintenance Facilities |
| Access Point | Construction Compound |
| Existing Substation | Test Bed Area |
| | Proposed Transmission Easement |
| | Proposed Overhead Transmission Line |

FIGURE 1.3

Indicative Project Layout

1.4 Statutory Considerations

Commonwealth and State Legislation relevant to this biodiversity constraints assessment report is described in **Table 1.1**.

Table 1.1 Legislation Relevant to the Project

Relevant Legislation	Governing Agency	Summary
Commonwealth Legislation		
<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	Department of Climate Change, Energy, the Environment and Water	The <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) is the Commonwealth Government's primary piece of environmental legislation and is administered by the Australian Government – Department of Climate Change, Energy, the Environment and Water (DCCEEW). It is designed to protect national environmental assets, known as matters of national environmental significance (MNES), which include threatened species of flora and fauna, threatened ecological communities (TECs), and migratory species, as well as other protected matters. It defines the categories of threat for threatened flora and fauna, identifies key threatening processes and provides for the preparation of recovery plans for threatened flora, fauna, and communities. Actions that may adversely affect MNES may be deemed to be a controlled action under the EPBC Act. The significance of the proposed action on MNES can be determined through self-assessment using <i>Significant Impact Guidelines 1.1 – Matters of National Environmental Significance</i> (Department of the Environment, Water, Heritage and the Arts, 2013). A referral is required for proposed actions that may affect nationally listed threatened species, TECs, and migratory species.
State Legislation		
<i>Environmental Planning and Assessment Act 1979 (EP&A Act)</i>	Department of Planning and Environment	The <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act) is the overarching planning legislation in NSW that provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the protection of the environment, including the protection and conservation of native animals and plants. This includes threatened species, populations and ecological communities, and their habitats of biodiversity values as listed in the BC Act and NSW <i>Fisheries Management Act 1994</i> (FM Act). The EIS anticipated to be prepared for the Projects will meet the necessary environmental assessment requirements under the relevant provisions of the EP&A Act.

Relevant Legislation	Governing Agency	Summary
<p><i>Biodiversity Conservation Act 2016 (BC Act)</i></p>	<p>Department of Planning and Environment</p>	<p>The <i>Biodiversity Conservation Act 2016</i> (BC Act) and its supporting regulations commenced on 25 August 2017. The BC Act repealed the <i>Threatened Species Conservation Act 1995</i> (TSC Act) along with other natural resource management legislation, while retaining the TSC Act species list.</p> <p>The BC Act sets out the environmental impact assessment framework for threatened species, TECs, and Areas of Outstanding Biodiversity Value (AOBV) (formerly critical habitat) for Major Projects, Part 5 activities, and local development.</p> <p>Sections 7.9 of the BC Act requires that an application of development under Part 4 of the EP&A Act for State Significant Development (SSD) must be accompanied by a Biodiversity Development Assessment Report (BDAR) prepared by an accredited assessor in accordance with the BAM (DPIE, 2020), unless Planning Agency Head (PAH) and the Environment Agency Head (EAH) determine that the proposed development is not likely to have any significant impact on biodiversity values. The potential impacts associated with the Projects are such that the PAH and EAH will likely consider them significant, and a BDAR be required.</p>
<p><i>National Parks and Wildlife Act 1974 (NPW Act)</i></p>	<p>Department of Planning and Environment</p>	<p>The <i>National Parks and Wildlife Act 1974</i> (NPW Act) provides for the protection of Aboriginal sites and designated conservation areas as well as the flora and fauna within conservation areas. There are no conservation areas declared under the NPW Act that are within or immediately adjoining the Project Area, however the Tarlo River National Park is located approximately three kilometres to the west of the Project Area.</p> <p>The objective of the NPW Act is to consolidate and amend the law relating to the establishment, preservation and management of national parks, historic sites, certain other areas, and the protection of certain fauna, native plants and Aboriginal objects.</p>
<p><i>Fisheries Management Act 1994 (FM Act)</i></p>	<p>Department of Primary Industries</p>	<p>The objectives of the <i>Fisheries Management Act 1994</i> (FM Act) are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. More detailed objectives relevant to the Project include:</p> <ul style="list-style-type: none"> • to conserve fish stocks and key fish habitats • to conserve threatened species, populations and ecological communities of fish and marine vegetation • to promote ecologically sustainable development, including the conservation of biological diversity.

Relevant Legislation	Governing Agency	Summary
<p>Local Land Services Act 2013 (LLS Act)</p>	<p>Local Land Services</p>	<p>The <i>Local Land Services Act 2013</i> (LLS Act), supported by the Local Land Services Regulation 2014 (LLS Regulation), established 11 regional Local Land Services organisations to provide biosecurity, natural resources management and agricultural advisory services.</p> <p>Under Part 5A of the LLS Act and the supporting regulation, a transitional Native Vegetation Regulatory (NVR) map showing the extent of categorised land in NSW is to be published by the EAH. The NVR map underpins the legislative framework for native vegetation clearing in rural areas by categorising land in NSW. However, the map applies only to the following zones (if they are not in an excluded LGA): Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone RU5 Primary Production Small Lots and Zone RU6 Transition.</p> <p>The current draft NVR map displays all map layers associated with the LLS Act for eleven LGAs including the Upper Lachlan Shire. The online NVR map viewer currently displays Excluded Land, Category 2 – Vulnerable Land, Category 2 – Sensitive Land, Category 1 – Exempt Land and Category 2 – Regulated Land maps have not yet been released. The NVR map was accessed on 1 September 2023 and the draft mapping assessed during the desktop and field surveys undertaken as part of the Scoping phase.</p>
<p>Biosecurity Act 2015</p>	<p>Department of Primary Industries</p>	<p>The <i>Biosecurity Act 2015</i> outlines the requirements of government, councils, private landholders, and public authorities in the management of biosecurity matters. Priority weeds are regulated under the Biosecurity Act with a general biosecurity duty to prevent, eliminate or minimize any biosecurity risk they may pose. Some priority weeds have additional management obligations which may apply generally, or under specific circumstances. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised as is reasonably practicable.</p>
<p>State Environmental Planning Policy (Biodiversity and Conservation) 2021</p>	<p>Department of Planning and Environment</p>	<p>SEPP (Biodiversity and Conservation) 2021 commenced in March 2022 and includes a number of previous planning policies including Koala Habitat Protection 2019 and Koala Habitat Protection 2021, Chapter 3 and 4, respectively. Schedule 2 identifies that the provisions of chapters 3 and 4 apply in the Upper Lachlan LGA. For all RU1 (Primary Production), RU2 (Rural Landscape) or RU3 (Forestry) zoned land outside of the Sydney Metropolitan Area and Central Coast, Chapter 3 Koala Habitat Protection 2020 applies.</p> <p>Chapter 3 aims to <i>encourage the proper conservation and management of areas of natural vegetation that may provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline</i>. This is to be achieved through identifying areas of core koala habitat, including these areas in environment protection zones and where required managing development consent in relation to areas of core koala habitat.</p>

2.0 Methodology

2.1 Desktop Assessment

A review of relevant public databases and literature was undertaken to identify threatened and migratory species, endangered populations, TECs and their habitats that have previously been recorded within the locality (a 10-kilometre radius around the Project Area). Threatened species, migratory species, endangered populations and TECs (listed under the BC Act and EPBC Act) that have the potential to occur within the locality were also considered based on the type of habitat present and the NSW bioregion within which the Project Area occurs.

Databases and literature resources were reviewed as part of this ecological assessment in 2022, the following resources were also reviewed on 1 September 2023 to ensure all recent listings were considered in this assessment. The Database and literature recourses include:

- a search of the Department of Planning and Environment (DPE) BioNet Atlas based on a 10-kilometre radius around the Project Area
- a search of the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) based on a 10-kilometre radius around the Project Area
- BioNet Threatened Biodiversity Data Collection (TBDC)
- BioNet Vegetation Classification
- the Biodiversity Values Map Threshold Tool (BVMTT)
- DPE's Important Habitat Mapping.

2.2 Vegetation Mapping

The NSW State Vegetation Type Map (SVTM) Extent (DPE 2022) was considered to inform the assessment of the vegetation communities present within the Project Area. The SVTM classifies vegetation to Plant Community Type (PCT) and was therefore adopted as baseline mapping.

2.3 Site Visit

Two (2) Umwelt ecologists conducted the site visit over two separate trips totalling five (5) days from 29–30 June and 8–11 August 2022.

The ecologists inspected the Project Area to verify the baseline vegetation mapping and record observations of any TECs and any threatened and migratory species habitat. Incidentally observed threatened species and general ecological features – such as waterbodies – were also recorded.

Rapid data assessments were undertaken across the Project Area to:

- Record the flora species occurring and to capture the structural variation in PCTs.

- Record the variation in species diversity across PCTs.
- Define changes in abiotic conditions (the occurrence of creek lines and past disturbances).

The presence of fauna habitat within the Project Area was also noted. Specific attention was paid to the potential occurrence of semi-permanent waterbodies, creek lines, rocky outcrops, and presence of hollow bearing trees.

2.3.1 Limitations and Constraints

During the site visit much of the Project Area was inaccessible due to inclement weather and boggy conditions. The site inspection focussed on the development corridor (as proposed at the time of the inspection), in particular patches of intact woodland and areas with the potential for any major ecological constraints. It is noted that the development corridor has since been amended, however surveys undertaken have informed further vegetation mapping and characterisation of the Project Area as presented in this report. Areas of native pasture and derived native grasslands will be assessed in more detail during the EIS phase of the Projects.

3.0 Existing Environment

3.1 Landscape Context

The landscape context which describes attributes that are potentially relevant to the biodiversity occurring in the Project Area is outlined in **Table 3.1** and shown on **Figure 3.1** below.

Table 3.1 Landscape Features of the Project Area

Landscape features	Landscape context
IBRA region	South Eastern Highlands Interim Biogeographic Regionalisation for Australia (IBRA) Region.
IBRA subregion	Bungonia IBRA Sub-region.
NSW (Mitchell) Landscapes	<ul style="list-style-type: none"> • Bungonia Tableland and Gorge. • Moss Vale Highlands. • Robertson Basalts. • Wollondilly – Bindook Tablelands and Gorges.
National parks and reserves	<ul style="list-style-type: none"> • There are no National Parks or reserves within the Project Area. • Tarlo River National Park is located to the west and Bangadilly National Park is located to the northeast of the Project Area.
Rivers, stream and estuaries	<p>Wattle Creek, Dead Mans Creek, Sandy Creek and Island Creek are four named waterways within the north of the Project Area.</p> <p>Gibraltar Creek and the Wollondilly River occur in the south of the Project Area while Pivets Creek runs along the eastern boundary of the Project Area.</p>
Wetlands (within, adjacent to and downstream) and Ground Dependent Ecosystems	<p>The DCCEEW’s PMST does not identify any wetlands of international importance within 10 kilometres of the Project Area.</p> <p>All of the riparian zones have a moderate to high interaction with ground water dependency.</p>
Areas of geological significance or soil hazard features	There are no karsts or areas of geological significance within the Project Area.
Connectivity	There are patches of intact woodland that traverse the Project Area. Several of these patches follow the contours of creek lines and may provide connectivity between fragmented terrestrial habitat.

3.2 Biodiversity Values Map

The Biodiversity Values (BV) map identifies land with high biodiversity value that is especially sensitive to impacts from development and clearing. Land types included on the BV include:

- coastal wetlands and littoral rainforest mapped under the *State Environmental Planning Policy (Resilience and Hazards) 2021* (formerly State Environmental Planning Policy (Coastal Management) 2018)
- core koala habitat identified in a plan of management under State Environmental Planning Policy (Biodiversity and Conservation) 2021 Chapter 3 Koala Habitat Protection 2020 (formerly *State Environmental Planning Policy No 44 – Koala Habitat Protection* (SEPP 44))
- declared Ramsar wetlands defined by the EPBC Act
- land containing threatened species or TECs identified as potential serious and irreversible impacts (SAII) under section 6.5 of the BC Act
- biodiverse riparian land
- high conservation value grasslands or groundcover
- old growth forest identified in mapping developed under the National Forests Policy Statement but excluding areas not meeting the criteria published jointly by the Minister of the Environment and the Minister for Primary Industries
- rainforest identified in mapping developed under the National Forests Policy Statement but excluding areas not meeting the criteria published jointly by the Minister for Energy and Environment and the Minister for Primary Industries
- declared AOBV
- council nominated areas with connectivity or threatened species habitat that the Minister for Energy and Environment considers will conserve biodiversity at bioregional or state scale
- any other land that in the opinion of the EAH is of sufficient biodiversity value to be included.

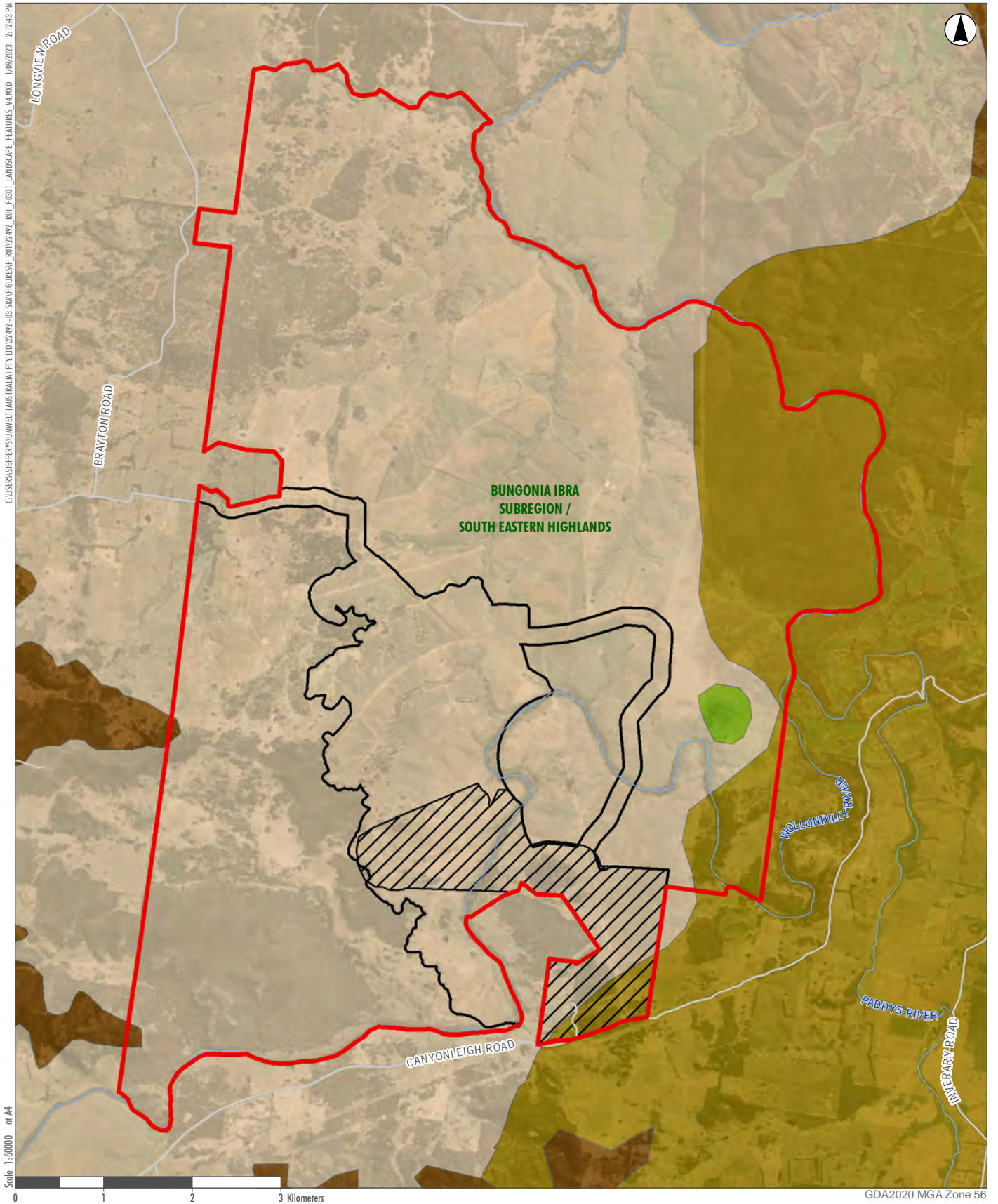
Areas within the Project Area identified on the BV Map are shown in **Figure 3.2** and include biodiverse riparian land. These riparian lands cross several locations in the Project Area and are relevant to the development corridor.

3.3 Important Habitat Mapping

For a small number of threatened species as detailed within the TBDC, *Section 5.1.3* of the BAM (DPE 2020) allows for important habitat maps. Important habitat maps identify areas that are considered essential to support critical life stages of the species, for example breeding areas or locations important for foraging or over-wintering for migratory species. Currently, important habitat maps are provided for the following species:

- Swift Parrot (*Lathamus discolor*)
- Plains-wanderer (*Pedionomus torquatus*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Migratory Shorebirds.

Important habitat mapping for the swift parrot (*Lathamus discolor*), regent honeyeater (*Anthochaera phrygia*), the plains-wanderer (*Pedionomus torquatus*) and migratory shorebirds is not present within the Project Area.



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GDA2020 MGA Zone 56

Legend

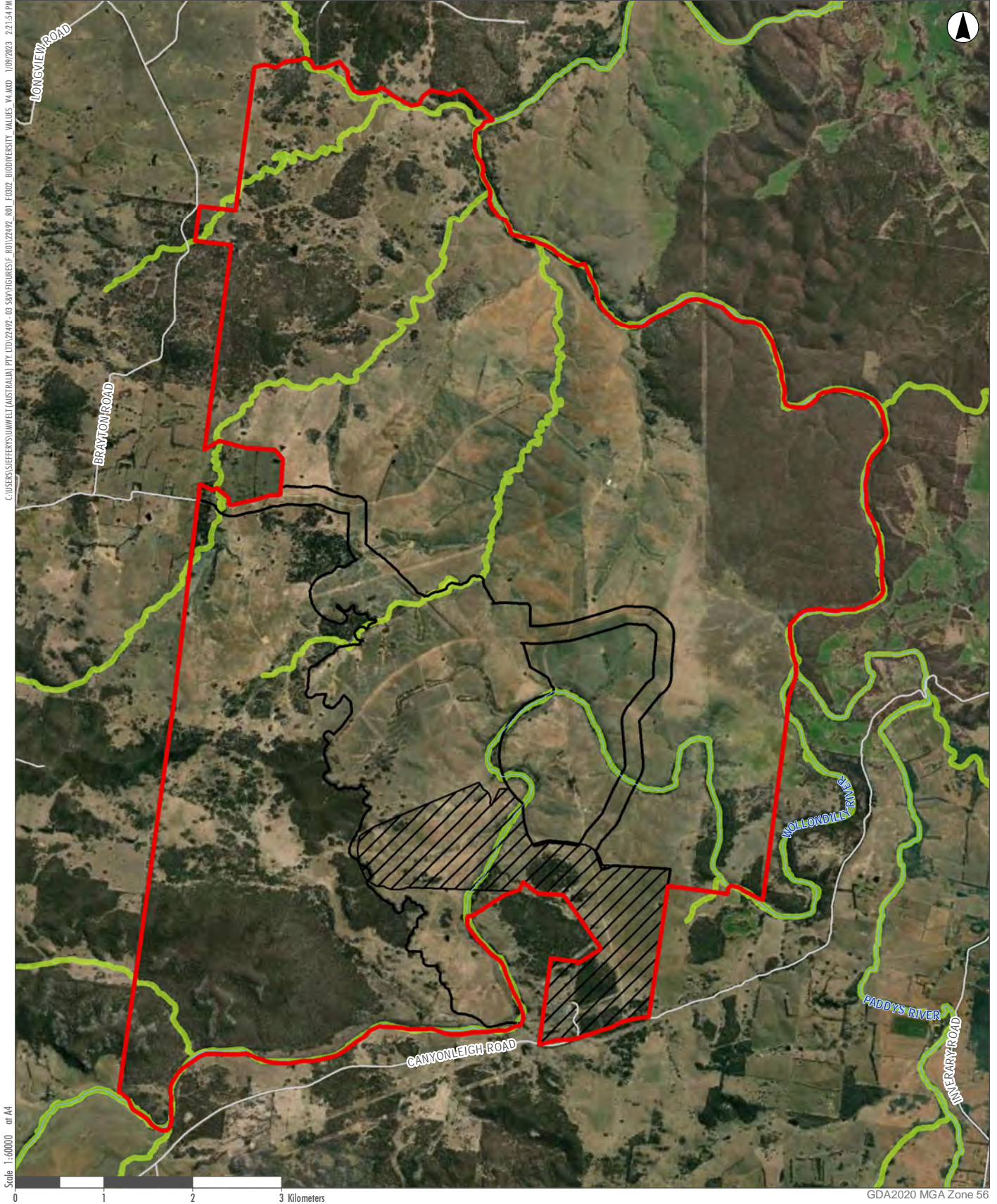
- | | | |
|-----------------------------|---|------------------------------------|
| Project Area | Mitchell Landscapes | IBRA Subregion / Region |
| Watercourses | Bungonia Tableland and Gorge | Bungonia / South Eastern Highlands |
| Roads | Moss Vale Highlands | |
| Development Corridor | Robertson Basalts | |
| Development Corridor - BESS | Sydney Basin Western Escarpment | |
| | Wollondilly - Bindook Tablelands and Gorges | |

FIGURE 3.1

Landscape Features within the Project Area



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- Scale 1:60000 at A4
- 0 1 2 3 Kilometers
- GDA2020 MGA Zone 56
- | | |
|-----------------------------|----------------------------|
| Project Area | Biodiversity Values |
| Development Corridor | Biodiverse riparian land |
| Development Corridor - BESS | |
| Watercourses | |
| Roads | |

FIGURE 3.2

Biodiversity Values Mapped within the Wattle Creek Energy Hub Area

3.4 Preliminary Vegetation Mapping

3.4.1 Plant Community Types

A total of 20 PCTs have been identified as occurring across the Project Area either via the SVTM Extent (DPE 2022) or during the site visit (**Table 3.2**). Rapid site assessments carried out during the site visit confirmed that the majority of the grassland present within the Project Area is dominated by exotic species, however, areas of natural or derived native grassland may be present. The woody vegetation is predominantly comprised of grassy woodland communities, with smaller patches of shrubby open forest and riparian forests along the waterways. It should be noted that this mapping is preliminary and would require further surveys as part of any biodiversity assessment carried out in the EIS.

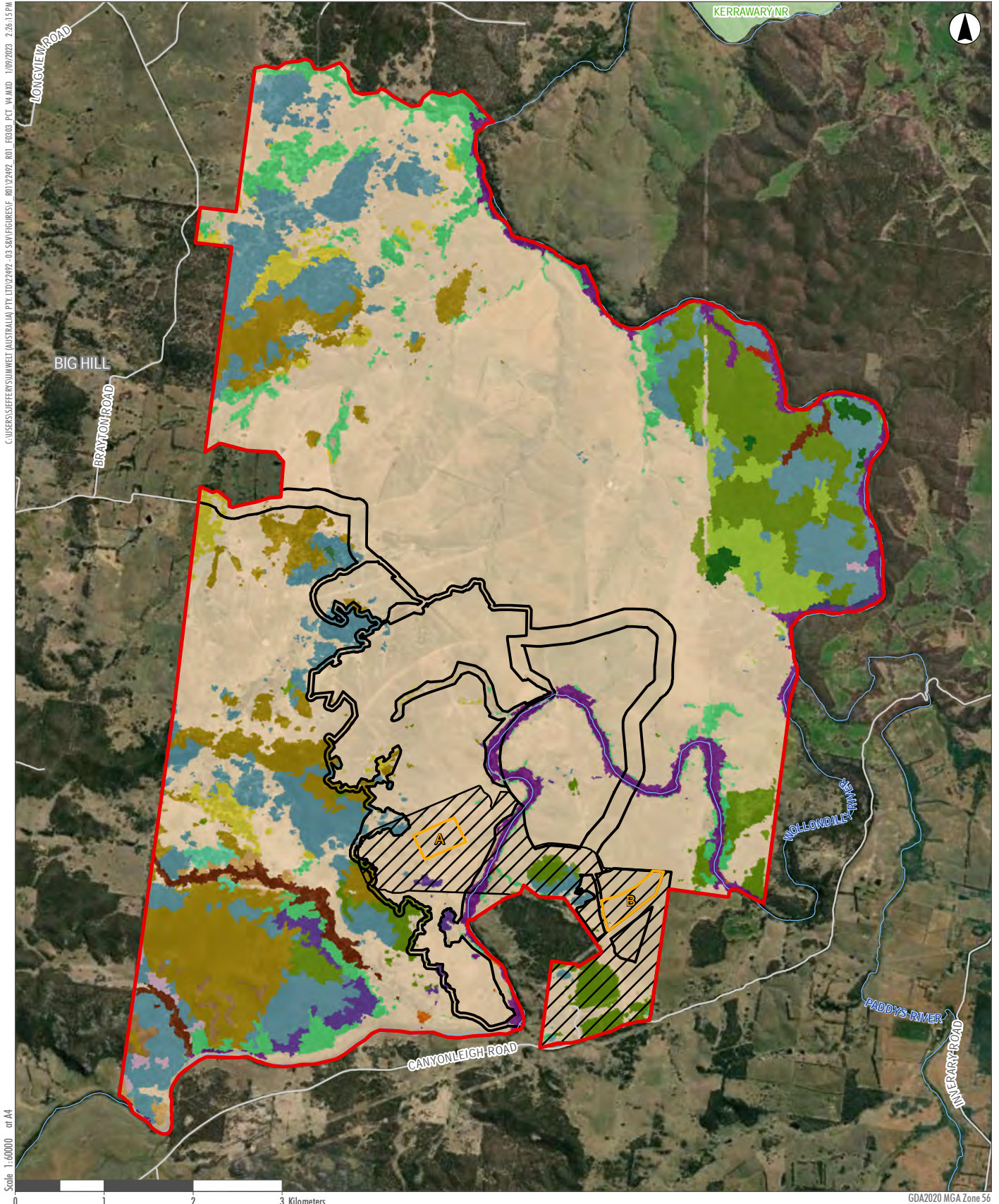
A total of seven PCTs have been identified within the development corridor. The impact area based on indicative survey design at this stage has not been calculated.

Table 3.2 Preliminary Vegetation Mapping within the Project Area

PCT #	PCT Name	Associated Threatened Ecological Communities		Area (Ha)		
		BC Act	EPBC Act	Solar Farm	BESS	Project Area
3037	Sydney Basin Warm Temperate Rainforest	Not listed.	Not listed.	0	0	0.17
3110	Greater Sydney Enriched Grey Myrtle Dry Rainforest	Western Sydney Dry Rainforest in the Sydney Basin Bioregion. Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregion.	Western Sydney Dry Rainforest and Moist Woodland on Shale.	0	0.0	0.02
3303	Central Tableland Ribbon Gum Sheltered Forest	Mt Canobolas Xanthoparmelia Lichen Community	Not listed.	0	0	13.77
3338	Goulburn Tableland Frost Hollow Grassy Woodland	Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South Eastern Corner Bioregions.	Not listed.	0	0	18.97
3347	Southern Tableland Creekflat Ribbon Gum Forest	Not listed.	Not listed.	0	0	57.26
3348	Southern Tableland Granites Ribbon Gum Grassy Forest	Not listed.	Not listed.	0	0	12.07
3373	Goulburn Tableland Box-Gum Grassy Forest	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland.	6.66	2.62	42.39

PCT #	PCT Name	Associated Threatened Ecological Communities		Area (Ha)		
		BC Act	EPBC Act	Solar Farm	BESS	Project Area
3376	Southern Tableland Grassy Box Woodland	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland.	8.5	0	95.69
3416	Southern Tableland Valley Flats Damp Grassland	Not listed.	Not listed.	1.3	0.39	2.97
3481	Burraborang Gorges Felsic Stringybark Forest	Not listed.	Not listed.	0	0	1.04
3483	Central Gorges Box-Red Gum Grassy Forest	Not listed.	Not listed.	0	0	4.36
3486	Wollondilly-Shoalhaven Slopes Grassy Open Forest	Not listed.	Not listed.	36.08	16.79	728.95
3492	Wollondilly-Shoalhaven Quartz Hills Forest	Not listed.	Not listed.	0	0	20.10
3498	Wingecarribee Gorges Stringybark-Grey Gum Forest	Not listed.	Not listed.	0	0	99.74
3643	Bungonia Tableland Silvertop Ash-Stringybark Forest	Not listed.	Not listed.	14.92	2.46	446.76
3737	Bungonia Tableland Scribbly Gum Shrub Forest	Not listed.	Not listed.	0	0	2.22
3738	Goulburn-Lithgow Tableland Hills Grassy Forest	Not listed.	Not listed.	58.26	52.42	385.15
3746	Southern Tableland Snow Gum-Candlebark Shrub Forest	Not listed.	Not listed.	7.23	4.52	246.82

PCT #	PCT Name	Associated Threatened Ecological Communities		Area (Ha)		
		BC Act	EPBC Act	Solar Farm	BESS	Project Area
3869	Southern Escarpment Montane Heath	Not listed.	Not listed.	0	0	17.91
4063	Central and Southern Tableland River Oak Forest	Not listed.	Not listed.	34.17	10.70	176.64
EXOTIC (0)	Non-native	Not listed.	Not listed.	1,029.30	319.87	3,9058.67
Total				1,196.44	409.77	6,331.73



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Legend Project Area Development Corridor Development Corridor - BESS Conceptual solar array BESS Site Option NPWS Estate Roads Watercourses		Plant Community Type PCT : 0, Not native vegetation PCT : 3037, Sydney Basin Warm Temperate Rainforest PCT : 3110, Greater Sydney Enriched Grey Myrtle Dry Rainforest PCT : 3303, Central Tableland Ribbon Gum Sheltered Forest PCT : 3338, Goulburn Tableland Frost Hollow Grassy Woodland PCT : 3347, Southern Tableland Creekflat Ribbon Gum Forest PCT : 3348, Southern Tableland Granites Ribbon Gum Grassy Forest PCT : 3373, Goulburn Tableland Box-Gum Grassy Forest PCT : 3376, Southern Tableland Grassy Box Woodland PCT : 3416, Southern Tableland Valley Flats Damp Grassland	PCT : 3481, Burragorang Gorges Felcic Stringybark Forest PCT : 3483, Central Gorges Box-Red Gum Grassy Forest PCT : 3486, Wollondilly-Shoalhaven Slopes Grassy Open Forest PCT : 3492, Wollondilly-Shoalhaven Quartz Hills Forest PCT : 3498, Wingecarribee Gorges Stringybark-Grey Gum Forest PCT : 3643, Bungonia Tableland Silvertop Ash-Stringybark Forest PCT : 3737, Bungonia Tableland Scribbly Gum Shrub Forest PCT : 3738, Goulburn-Lithgow Tableland Hills Grassy Forest PCT : 3746, Southern Tableland Snow Gum-Candlebark Shrub Forest PCT : 3869, Southern Escarpment Montane Heath PCT : 4063, Central and Southern Tableland River Oak Forest
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FIGURE 3.3
Preliminary Vegetation Mapping

Image Source: ESRI Basemap 2020 Data source: NSW DFSI(2020)

3.4.2 Threatened Ecological Community Mapping

A desktop assessment identified six TECs with a moderate or higher likelihood of occurring within a 10-kilometre radius of the Project Area. Within each development corridor, there are likely sections of vegetation that meet the final determination of TECs under the BC Act and/or EPBC Act. The TECs identified in the desktop assessment as potentially occurring within the Project Area are detailed in **Table 3.3** and shown in **Figure 3.4**. Detailed vegetation surveys and analysis across the Project Area have not been carried out to date. As such, other TECs may be present within the Project Area.

Table 3.3 Threatened Ecological Communities Potentially Occurring in the Project Area

Threatened Ecological Community	Status – BC Act	Status – EPBC Act	Area (Ha)			Likelihood of Occurrence
			Solar Farm	BESS	Project area	
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregion	Endangered	Not listed	0	0	0.0	Low
Mt Canobolas Xanthoparmelia Lichen Community	Endangered	Not listed	0	0	13.77	Low
Natural Temperate Grassland of the South Eastern Highlands.	Not listed	Critically Endangered	1.30	0.39	2.98	Moderate
Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South Eastern Corner Bioregions.	Critically Endangered	Not listed	0	0	18.97	Low
White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	Critically Endangered	Not listed	15.17	2.62	138.07	Recorded
White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland.	Not listed	Critically Endangered	15.17	2.63	138.07	Recorded

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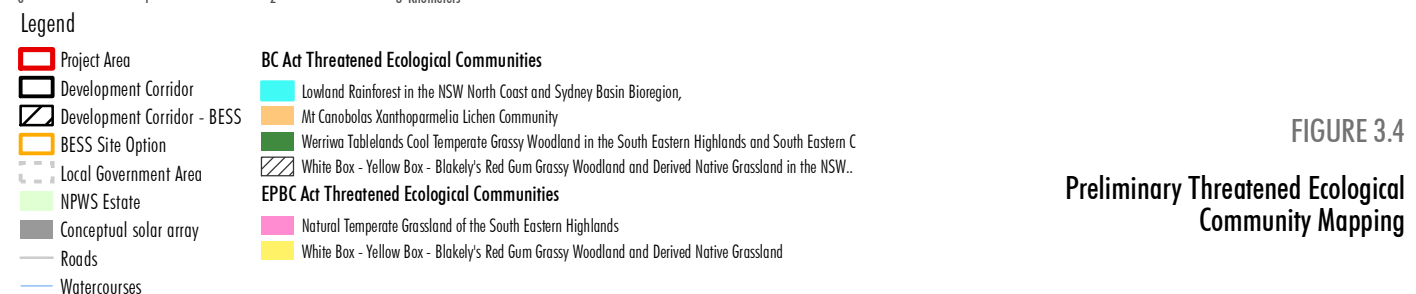
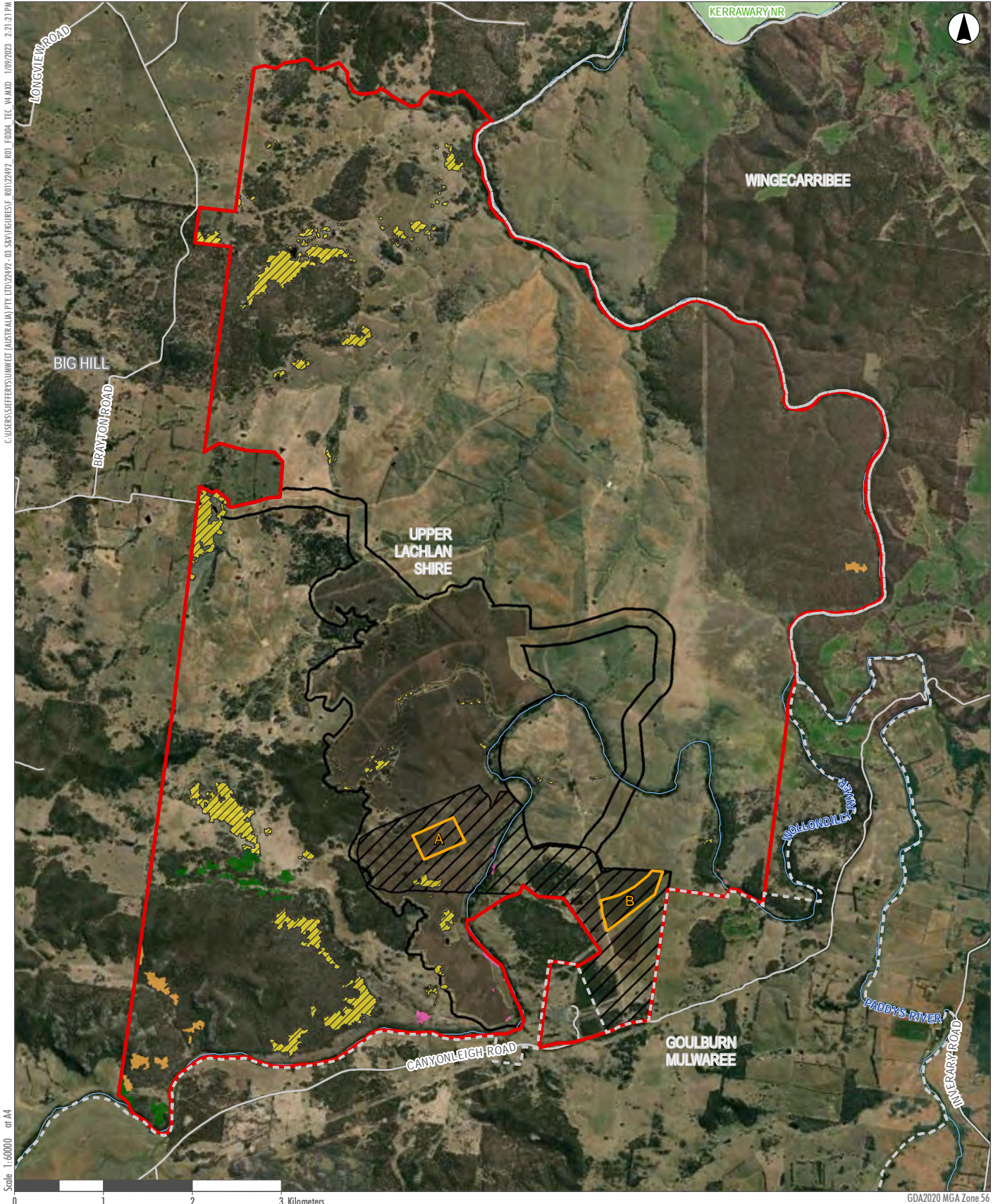


FIGURE 3.4

Preliminary Threatened Ecological Community Mapping

3.5 Flora and Fauna Habitat Features

There are four main habitat features across the Project Area including:

- woodland vegetation
- grassland vegetation
- rocky outcrops and surface rocks
- rivers, streams, farm dams and natural water bodies.

These have been broadly described below with context to the indicative layout, all of which are relevant to both solar and BESS development corridors.

3.5.1 Woodland Vegetation

Woodland habitat provides a wide range of food and shelter for vertebrate fauna. Trees from the family Myrtaceae (mostly *Eucalyptus* spp.) generally dominate the upper canopy in these areas and supply direct food (foliage, nectar, exudates) and indirect food (arthropods) for a range of vertebrates, particularly birds and arboreal mammals. Tree hollows (formed in dead trees (stags) and mature trees) provide nesting and roosting habitat for hollow-dwelling fauna such as bats, birds and gliders. Hollow bearing trees (HBT) are important habitat components of native forests and isolated paddock trees.

Across the Project Area there are large patches of woodland vegetation and abundant isolated paddock trees that have the potential to support a range of threatened fauna species. The understory in the timbered areas with limited grazing and disturbance pressure and a relatively intact canopy cover has potential for threatened flora habitat.

A more thorough targeted survey will be undertaken to support the preparation of the BDAR and to confirm the species that have the potential to utilise the Project Area as fauna breeding habitat or flora habitat.

3.5.2 Grassland Vegetation

Grassland habitat within the Project Area is in varying condition, with evidence of historic grazing and recent cultivation of pastures. The dominant groundcover species within the Project Area is serrated tussock (*Nassella trichotoma*), a Weed of National Significance (WONS). While serrated tussock provides little nutritional value to native fauna, its dense tussock formations can provide refuge and foraging habitat to small reptiles and mammals. The sheep and cattle provide a disturbance pressure that many threatened species are not tolerant of, reducing the likelihood that large areas of the Project Area provide suitable habitat for threatened flora or fauna species. The native grasslands and native pastures within the Project Area allow for many small reptiles and flora species to persist.

3.5.3 Rocky Outcrops and Surface Rocks

Rocky outcrops are common throughout the Project Area, existing as exposed bedrock, exfoliated surfaces and crevices and loose surface rock. With the exception of exposed bedrock, these habitat features provide refuge for a range of threatened and non-threatened reptile species such as pink-tailed legless lizard (*Aprasia parapulchella*) and brush-tailed rock-wallaby (*Petrogale penicillata*). These species rely on these rocky habitats for over-wintering, thermoregulation, and shelter, and as a refuge for juveniles and prey species. These areas of important habitat would be refined with detailed vegetation mapping and targeted surveys to determine presence or absence of the species most likely to utilise these habitat features.

3.5.4 Rivers, Streams, Farm Dams and Natural Water Bodies

Wattle Creek, Deadmans Creek, Sandy Creek, Island Creek are four named waterways within the north of the Project Area and Gibraltar Creek and the Wollondilly River in the south. There is also Pivets Creek which is the eastern boundary of the Project Area, these and a number of tributaries provide habitat for a number of amphibian species and provide foraging and drinking water for many fauna species. There are a large number of farm dams and low-lying areas which provide suitable habitat for a number of threatened flora and fauna species. All of the riparian zones have a moderate to high interaction with ground water dependency (**Figure 3.2**).

3.6 Flora and Fauna Likelihood

As described in **Section 2.1**, a search of BioNet Atlas and PMST was carried out to identify species which have been previously recorded, or are predicted to occur, within 10-kilometres of the Project Area. A preliminary rating for likelihood of occurrence has been assigned to each species identified within the database searches, with the categories; High, Moderate, Low, None and Review (**Table 3.4**). These would be refined as part of Stage 2 BAM assessment, with all relevant species habitat to be outlined in the BDAR. **Table 3.5** and **Table 3.6** identify those species listed as associated with the relevant PCTs that have been identified across the Project Area. Many of these species are likely to be excluded on the basis of lack of habitat and conditions within the Project Area.

Table 3.4 Likelihood Rating for Threatened Species

Likelihood Rating	Threatened Species Criteria
Review	The species habitat needs further investigation within the Project Area.
High	It is likely that a species inhabits or utilises habitat within the Project Area.
Moderate	Potential habitat for a species occurs on the site. Adequate field survey would determine if there is a 'high' or 'low' likelihood of occurrence for the species within the Project Area.
Low	It is unlikely that the species inhabits the Project Area.
None	The habitat within the Project Area is unsuitable for the species.

3.6.1 Threatened Flora

The NSW BioNet Wildlife Atlas search and Commonwealth PMST search identified records for 37 threatened flora species within a 10 kilometre radius of the Project Area. Of these, 22 threatened flora species are assessed as having a moderate or higher likelihood of occurrence in the Project Area (refer **Table 3.5**). Threatened flora species recorded within the locality of the Project Area are shown in **Figure 3.5**.

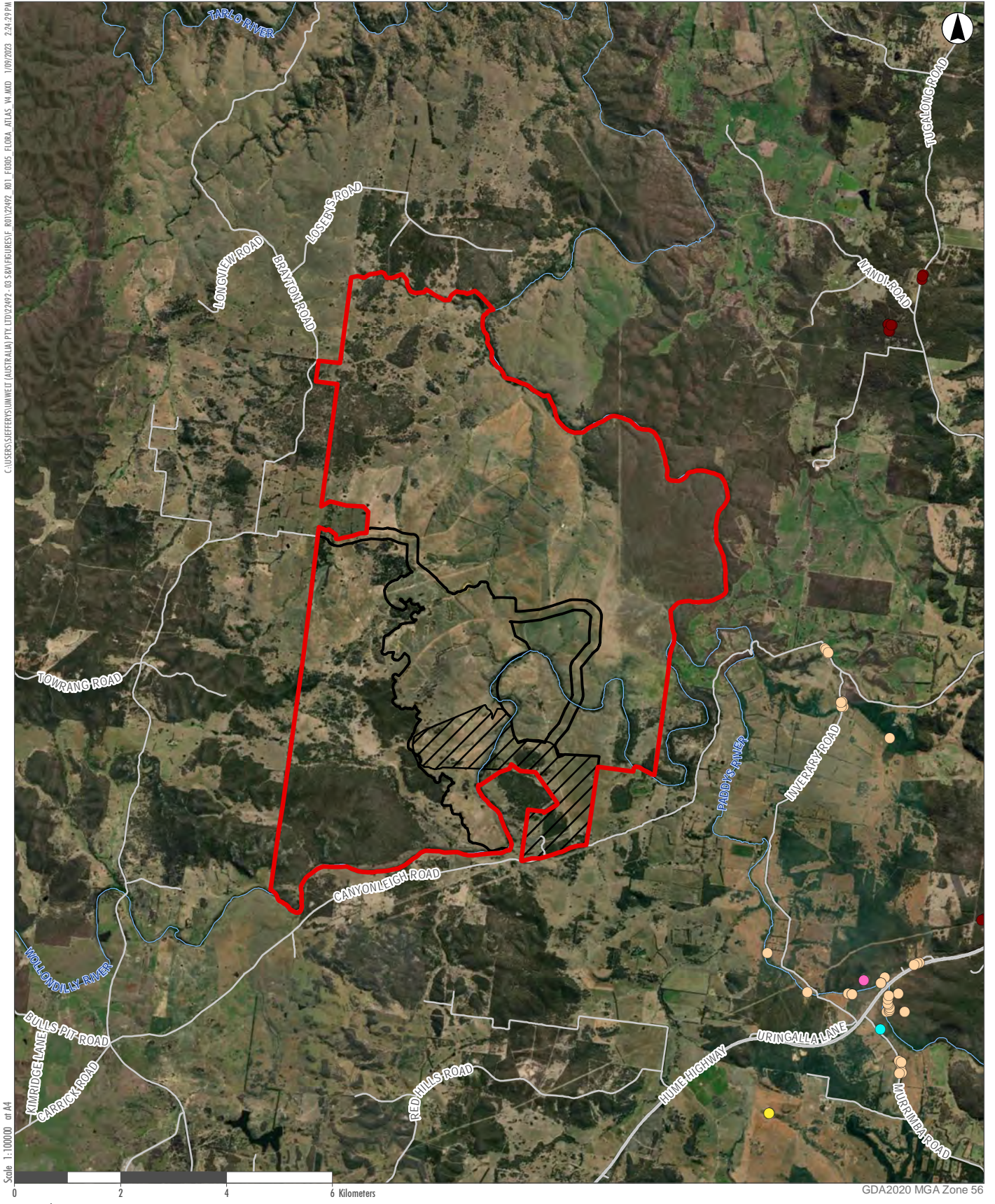
Table 3.5 Threatened Flora Potentially Occurring in the Project Area

Scientific name	Common Name	BC Act	EPBC Act	Entity with the potential for SAI	Likelihood of occurrence	
1	<i>Acacia bynoeana</i>	Bynoe's Wattle, Tiny Wattle	Endangered	Vulnerable	No	Moderate
2	<i>Baloskion longipes</i>	Dense Cord-rush	Vulnerable	Vulnerable	No	Moderate
3	<i>Bossiaea oligosperma</i>	Few-seeded Bossiaea	Vulnerable	Vulnerable	No	Low
4	<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid, Daddy Long-legs	Endangered	Vulnerable	Yes	Moderate
5	<i>Commersonia prostrata</i>	Dwarf Kerrawang	Endangered	Endangered	No	Moderate
6	<i>Dodonaea procumbens</i>	Trailing Hop-bush	Vulnerable	Vulnerable	No	Low
7	<i>Diuris aequalis</i>	Buttercup Doubletail	Vulnerable	Vulnerable	No	Moderate
8	<i>Diuris tricolor</i>	Pine Donkey Orchid	Not Listed	Not Listed	No	Moderate
9	<i>Eucalyptus aggregata</i>	Black Gum	Vulnerable	Vulnerable	No	Moderate
10	<i>Eucalyptus aquatica</i>	Mountain Swamp Gum, Broad-leaved Sallee, Broad-leaved Sally	Vulnerable	Vulnerable	Yes	Moderate
11	<i>Eucalyptus macarthurii</i>	Camden Woollybutt, Paddys River Box	Endangered	Endangered	No	Moderate
12	<i>Genoplesium baueri</i>	Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid	Endangered	Endangered	Yes	Low
13	<i>Gentiana wingecarribiensis</i>	Wingecarribee Gentian	Critically Endangered	Endangered	Yes	Moderate

Scientific name	Common Name	BC Act	EPBC Act	Entity with the potential for SAIL	Likelihood of occurrence	
14	<i>Grevillea molyneuxii</i>	Wingello Grevillea	Vulnerable	Endangered	Yes	Low
15	<i>Grevillea raybrownii</i>	-	Vulnerable	Not listed	No	Moderate
16	<i>Haloragis exalata subsp. exalata</i>	Wingless raspwort	Vulnerable	Vulnerable	No	Low
17	<i>Helichrysum calvertianum</i>	-	Vulnerable	Not listed	No	Moderate
18	<i>Kunzea cambagei</i>	-	Vulnerable	Vulnerable	No	Moderate
19	<i>Leucochrysum albicans subsp. tricolor</i>	Hoary Sunray, Grassland Paper-daisy	Not listed	Endangered	No	Moderate
20	<i>Persicaria elatior</i>	Knotweed, Tall Knotweed	Vulnerable	Vulnerable	No	Moderate
21	<i>Persoonia hirsuta</i>	Hairy geebung	Endangered	Endangered	Yes	Low
22	<i>Persoonia mollis subsp. revoluta</i>	null	Vulnerable	Not listed	No	Moderate
23	<i>Persoonia oxycoccoides</i>	-	Endangered	Endangered	No	Low
24	<i>Phyllota humifusa</i>	Dwarf Phyllota	Vulnerable	Vulnerable	No	Moderate
25	<i>Pomaderris brunnea</i>	Rufous Pomaderris, Brown Pomaderris	Endangered	Vulnerable	No	Moderate
26	<i>Pomaderris cotoneaster</i>	Cotoneaster Pomaderris	Endangered	Endangered	No	Moderate
27	<i>Pomaderris pallida</i>	Pale Pomaderris	Vulnerable	Vulnerable	Yes	Moderate
28	<i>Pultenaea elusa</i>	Elusive bush-pea	Critically Endangered	Endangered	Yes	Low
29	<i>Rhizanthella slateri</i>	Eastern Underground Orchid	Vulnerable	Endangered	Yes	Moderate
30	<i>Rutidosis leptorhynchoides</i>	Button Wrinklewort	Endangered	Endangered	No	Low
31	<i>Solanum armourense</i>	Solanum armourense	Not Listed	Not Listed	Yes	Low
32	<i>Solanum celatum</i>	Solanum celatum	Not Listed	Not Listed	No	Low

Scientific name		Common Name	BC Act	EPBC Act	Entity with the potential for SAI	Likelihood of occurrence
33	<i>Swainsona sericea</i>	Silky Swainson-pea	Not Listed	Not Listed	No	Low
34	<i>Thelymitra kangaloonica</i>	Kangaloon Sun Orchid	Critically Endangered	Critically Endangered	Yes	Low
35	<i>Thesium australe</i>	Austral Toadflax, Toadflax	Vulnerable	Vulnerable	No	Moderate
36	<i>Xerochrysum palustre</i>	Swamp Everlasting, Swamp Paper Daisy	Not listed	Vulnerable	No	Low
37	<i>Zieria murphyi</i>	Velvet Zieria	Vulnerable	Vulnerable	No	Low

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- Legend**
- Project Area
 - Development Corridor
 - Development Corridor - BESS
 - Watercourses
 - Roads

- Flora ATLAS Records**
- *Eucalyptus aggregata*
 - *Eucalyptus aquatica*
 - *Eucalyptus macarthurii*
 - *Persoonia mollis* subsp. *revoluta*
 - *Pomaderris brunnea*

FIGURE 3.5

Threatened Flora Species Records

3.6.2 Threatened Fauna

The NSW BioNet Wildlife Atlas search and Commonwealth PMST search identified records for 47 threatened fauna species within a 10-kilometre radius of the Project Area. Of these, one threatened reptile species, 11 mammal species and 17 threatened bird species are assessed as having a moderate or higher likelihood of occurrence in the Project Area (refer **Table 3.6**).

Threatened fauna species recorded within the locality of the Project Area are shown in **Figure 3.6**. No threatened invertebrates or fish were assessed as having a moderate or higher likelihood of occurring in the Project Area.

Table 3.6 Threatened Fauna Potentially Occurring in the Project Area

Scientific name	Common Name	BC Act	EPBC Act	Entity with the potential for SAI	Likelihood of occurrence	
Amphibians						
1	<i>Heleioporus australiacus</i>	Giant burrowing frog	Vulnerable	Vulnerable	No	Moderate
2	<i>Litoria watsoni</i>	Watson's Tree Frog	Not listed	Endangered	No	Low
Birds						
3	<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered	Critically Endangered	Yes	Moderate
4	<i>Aphelocephala leucopsis</i>	Southern whiteface	Not Listed	Vulnerable	No	Low
5	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	Vulnerable	Not listed	No	Moderate
6	<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered	Endangered	No	Low
7	<i>Calidris ferruginea</i>	Curlew Sandpiper	Endangered	Critically Endangered	No	Low
8	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable	Endangered	No	High
9	<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	Vulnerable	Vulnerable	No	Moderate
10	<i>Chthonicola sagittata</i>	Speckled Warbler	Vulnerable	Not listed	No	Moderate
11	<i>Climacteris picumnus victoriae</i>	Brown treecreeper (south-eastern)	Vulnerable	Vulnerable	No	Moderate
12	<i>Daphoenositta chrysoptera</i>	Varied Sittella	Vulnerable	Not listed	No	Moderate
13	<i>Falco hypoleucos</i>	Grey Falcon	Endangered	Vulnerable	No	Moderate

Scientific name		Common Name	BC Act	EPBC Act	Entity with the potential for SAI	Likelihood of occurrence
14	<i>Falco subniger</i>	Black Falcon	Vulnerable	Not listed	No	Moderate
15	<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable	Vulnerable	No	Moderate
16	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Vulnerable	Not listed	No	Moderate
17	<i>Hieraetus morphnoides</i>	Little Eagle	Vulnerable	Not listed	No	Moderate
18	<i>Hirundapus caudacutus</i>	White-throated Needletail	Not listed	Vulnerable	No	Moderate
19	<i>Lathamus discolor</i>	Swift Parrot	Endangered	Critically Endangered	Yes	Moderate
20	<i>Melnodryas cucullata cucullata</i>	South-eastern hooded robin	Not listed	Endangered	No	Low
21	<i>Neophema chrysostoma</i>	Blue-winged parrot	Vulnerable	Vulnerable	No	Low
22	<i>Ninox strenua</i>	Powerful Owl	Vulnerable	Not listed	No	Moderate
23	<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Not listed	Critically Endangered	Yes	Low
24	<i>Petroica boodang</i>	Scarlet Robin	Vulnerable	Not listed	No	Moderate
25	<i>Petroica phoenicea</i>	Flame Robin	Vulnerable	Not listed	No	Moderate
26	<i>Polytelis swainsonii</i>	Superb Parrot	Vulnerable	Vulnerable	No	Low
27	<i>Pycnoptilus floccosus</i>	Pilotbird	Not listed	Vulnerable	No	Low
28	<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Endangered	No	Low
29	<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable	Vulnerable	No	Moderate
Fish						
30	<i>Macquaria australasica</i>	Macquarie Perch	Not listed	Endangered	No	Low
31	<i>Prototroctes maraena</i>	Australian grayling	Not listed	Vulnerable	No	Low
Mammals						
32	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Vulnerable	Yes	Moderate

Scientific name		Common Name	BC Act	EPBC Act	Entity with the potential for SAI	Likelihood of occurrence
33	<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Vulnerable	Endangered	No	Moderate
34	<i>Miniopterus australis</i>	Little Bent-winged Bat	Vulnerable	Not listed	Yes	Moderate
35	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Vulnerable	Not listed	Yes	Moderate
36	<i>Myotis macropus</i>	Southern Myotis	Vulnerable	Not listed	No	Moderate
37	<i>Petauroides volans</i>	Greater Glider (southern and central)	Not listed	Vulnerable	No	Moderate
38	<i>Petaurus australis australis</i>	Yellow-bellied Glider (southeastern)	Vulnerable	Not listed	No	Moderate
39	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	Endangered	Vulnerable	Yes	Moderate
40	<i>Phascolarctos cinereus</i>	Koala	Endangered	Endangered	No	Moderate
41	<i>Pseudomys novaehollandiae</i>	New Holland Mouse, Pookila	Not listed	Vulnerable	No	Low
42	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable	No	Moderate
43	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Vulnerable	Not listed	No	Moderate
Reptiles						
44	<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	Vulnerable	Vulnerable	No	Moderate
45	<i>Delma impar</i>	Striped Legless Lizard, Striped Snake-lizard	Vulnerable	Vulnerable	No	Low
46	<i>Hoplocephalus bungaroides</i>	Broad-headed snake	Endangered	Vulnerable	Yes	Low
Insect						
47	<i>Keyacris scurra</i>	Key's matchstick grasshopper	Endangered	Endangered	No	Moderate

3.6.3 Migratory Species

The Commonwealth PMST search identified records for 13 threatened migratory species within a 10-kilometre radius of the Project Area. At this stage all of these species are considered to have a moderate to higher likelihood of occurring within the Project Area as described in **Table 3.7**.

Table 3.7 Migratory Species Potentially Occurring in the Project Area

Scientific Name	Common Name	BC Act	EPBC Act	
Migratory (Marine)				
1	<i>Apus pacificus</i>	Fork-tailed Swift	Not listed	Migratory
Migratory (Wetlands)				
2	<i>Actitis hypoleucos</i>	Common Sandpiper	Not listed	Migratory
3	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Not listed	Migratory
4	<i>Calidris ferruginea</i>	Curlew Sandpiper	Endangered	Critically Endangered/ Migratory
5	<i>Calidris melanotos</i>	Pectoral Sandpiper	Not listed	Migratory
6	<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	Not listed	Migratory
7	<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Not listed	Critically Endangered/ Migratory
8	<i>Pandion haliaetus</i>	Osprey	Vulnerable	Migratory
Migratory (Terrestrial)				
9	<i>Hirundapus caudacutus</i>	White-throated Needletail	Not listed	Vulnerable/ Migratory
10	<i>Monarcha melanopsis</i>	Black-faced Monarch	Not listed	Migratory
11	<i>Motacilla flava</i>	Yellow Wagtail	Not listed	Migratory
12	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Not listed	Migratory
13	<i>Rhipidura rufifrons</i>	Rufous Fantail	Not listed	Vulnerable/ Migratory

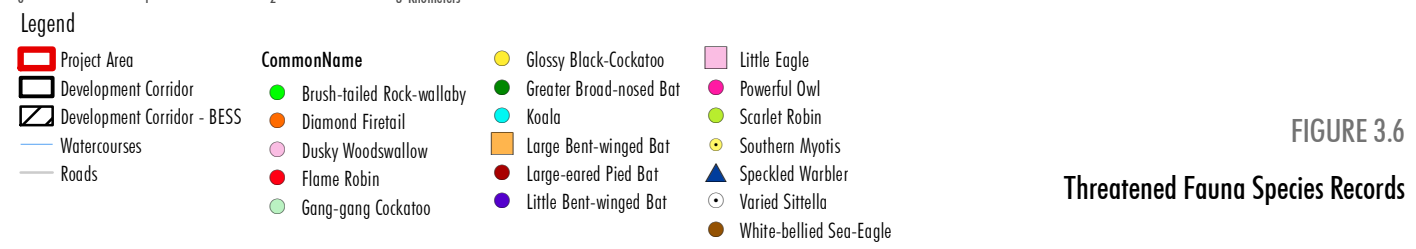
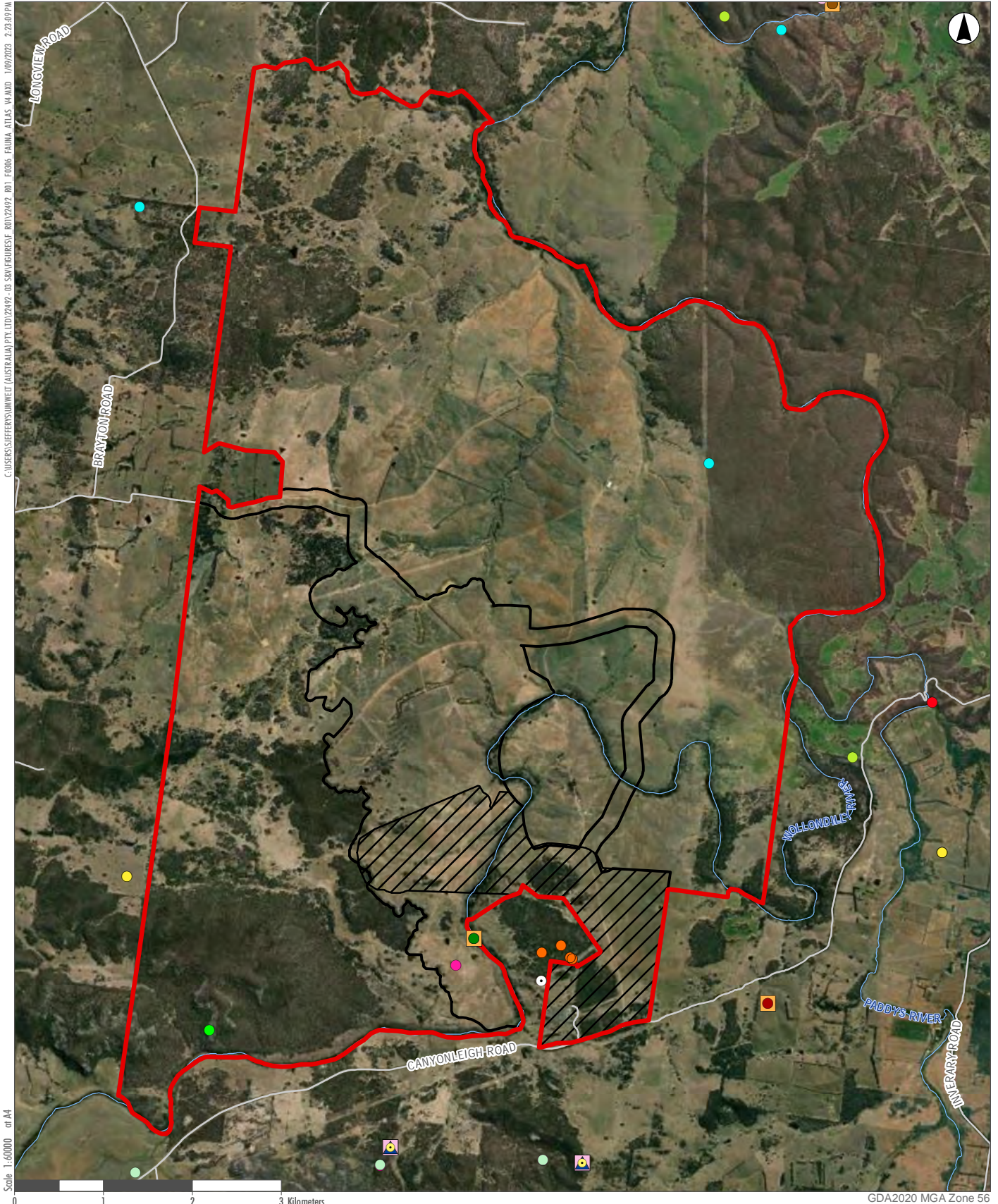


FIGURE 3.6

Threatened Fauna Species Records

3.7 Matters of National Environmental Significance

The EPBC Act provides protection of the environment from actions proposed to ‘have the potential to significantly impact on Matters of National Environmental Significance (MNES) or the environment of Commonwealth land’. MNES under the Act include the following:

- World Heritage Properties.
- National Heritage Places.
- Ramsar Wetlands.
- Threatened species or ecological communities listed in the EPBC Act.
- Migratory species listed in the EPBC Act.
- Commonwealth marine environment.
- Nuclear actions.
- Great Barrier Reef Marine Park.
- A water resource, in relation to coal seam gas development and large coal mining development.

A search of the Commonwealth PMST was undertaken on 1 September. The search included a 10-kilometre buffer from the Project Area. The search results are summarised in **Table 3.8** and a record of the PMST report is provided in **Appendix A**.

Table 3.8 Matters of National Environmental Significance (MNES)

MNES	Relevance to Development
World Heritage Properties	None
National heritage properties	None
Wetlands of international importance	None
Threatened ecological communities	5
Threatened species	63
Migratory species	13
State and territory reserves	3
Commonwealth marine area	None
Commonwealth Land	4
The Great Barrier Reef Marine Park	None

The PMST identified threatened ecological communities (see **Section 3.4.2**), threatened species and migratory species (see **Section 3.6**), which may occur within 10 kilometres of the Project Area. Surveys to determine the presence and likelihood of impacts to MNES would be undertaken during the preparation of the BDAR.

4.0 Threatened Species Survey Requirements

All BAM assessments require extensive field surveys including the collection of floristic data, vegetation mapping and targeted seasonal species-credit species surveys. Seasonal requirements for threatened species surveys can be variable and up to a year is usually required to cover all predicted species-credit species survey periods. The exact survey requirements are driven by the PCT, patch size and presence of habitat constraints within the survey corridor. The Biodiversity Assessment Method Calculator (BAM-C), BioNet Atlas records, and PMST was used to derive a list of candidate species that would likely require survey and assessment in accordance with the BAM.

Umwelt have undertaken vegetation mapping throughout the Project Area and to date have sampled 30 vegetation integrity (VI) plots. To inform the development of the survey schedule, a preliminary run of the BAM-C (correct as of 16 November 2022) was undertaken using a combination of the data collected in October 2022 and areas of PCTs from the State Vegetation Type Mapping to determine the likely species-credit species requiring targeted surveys as part of the biodiversity assessment. Confirmation of vegetation mapping may result in the identification of new PCTs as well as additional species being predicted by the BAM-C. The species generated through the BAM-C are detailed in **Section 4.1** and **Section 4.2**.

4.1 Threatened Flora Species-Credit-Species Survey Requirements

Threatened flora species-credit species which would likely require survey and assessment is detailed in **Table 4.1**.

Table 4.1 Threatened Flora Species Credit Species Likely Requiring Survey

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the potential for SAIL	Survey Period											
							Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Acacia bynoeana</i>	Bynoe's Wattle	E	V	N/A	None	No												
<i>Acacia clunies-rossiae</i>	Kanangra Wattle	V	Not Listed	N/A	None	No												
<i>Acacia flocktoniae</i>	Flockton Wattle	V	V	N/A	None	No												
<i>Baloskion longipes</i>	Dense Cord-rush	V	V	N/A	None	No												

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the potential for SAIL	Survey Period											
							Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Bossiaea oligosperma</i>	Few-seeded Bossiaea	V	V	N/A	None	No												
<i>Caladenia tessellata</i>	Thick Lip Spider Orchid	E	V	N/A	Known from <=3 locations and/or an AOO <10 km ² or EOO <100 km ²	Yes												
<i>Callitris oblonga</i>	Pygmy Cypress Pine	V	V	N/A	None	No												
<i>Carex klaphakei</i>	Klaphake's Sedge	E	Not Listed	Swamps; Or within 50 m	Known from <=3 locations and/or an AOO <10 km ² or EOO <100 km ²	Yes												
<i>Dillwynia glaucula</i>	Michelago Parrot-pea	E	Not Listed	N/A	None	No												
<i>Diuris aequalis</i>	Buttercup Doubletail	E	V	N/A	None	No												
<i>Diuris tricolor</i>	Pine Donkey Orchid	V	Not Listed	N/A	None	No												
<i>Eucalyptus aggregata</i>	Black Gum	V	V	N/A	None	No												
<i>Eucalyptus aquatica</i>	Broad-leaved Sally	V	V	Swamps; Land containing peat swamps and their margins or tributaries	Known from <=3 locations and/or an AOO <10 km ² or EOO <100 km ²	Yes												

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the potential for SAIL	Survey Period											
							Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Eucalyptus macarthurii</i>	Paddys River Box, Camden Woollybutt	E	E	N/A	None	No												
<i>Eucalyptus recurva</i>	Mongarlowe Mallee	CE	CE	N/A	Known from <=3 locations and/or an AOO <10 km ² or EOO <100 km ²	Yes												
<i>Galium australe</i>	Tangled Bedstraw	E	Not Listed	N/A	Known from <=3 locations and/or an AOO <10 km ² or EOO <100 km ²	Yes												
<i>Genoplesium superbum</i>	Superb Midge Orchid	E	Not Listed	N/A	None	Yes												
<i>Gentiana wingecarribiensis</i>	Wingecarribee Gentian	CE	E	Swamps; land containing peat bogs and margins on either Sphagnum Moss humps or sedge communities	Known from <=3 locations and/or an AOO <10 km ² or EOO <100 km ²	Yes												
<i>Grevillea renwickiana</i>	Nerriga Grevillea	E	Not Listed	N/A	None	Yes												

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the potential for SAIL	Survey Period											
							Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Helichrysum calvertianum</i>	<i>Helichrysum calvertianum</i>	V	Not Listed	Rocky areas; or within 50 m of rocky areas	None	No												
<i>Kunzea cabbagei</i>	Cabbage Kunzea	V	V	N/A	Known from 4–6 locations and/or an AOO <500 km ² or EOO <5000 km ²	No												
<i>Leucochrysum albicans</i> var. <i>tricolor</i>	Hoary Sunray	Not Listed	E	N/A	None	No												
<i>Persoonia mollis</i> subsp. <i>revoluta</i>	<i>Persoonia mollis</i> subsp. <i>revoluta</i>	V	Not Listed		None	No												
<i>Phyllota humifusa</i>	Dwarf Phyllota	V	V	N/A	Known from 4–6 locations and/or an AOO <500 km ² or EOO <5000 km ²	No												
<i>Pomaderris brunnea</i>	Brown Pomaderris	E	V	N/A	None	No												
<i>Pomaderris cotoneaster</i>	Cotoneaster Pomaderris	E	E	N/A	None	No												

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the potential for SAIL	Survey Period												
							Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<i>Pomaderris delicata</i>	Delicate Pomaderris	CE	CE	N/A	Known from <=3 locations and/or an AOO <10 km ² or EOO <100 km ²	Yes													
<i>Pultenaea pedunculata</i>	Matted Bush-pea	E	Not Listed	N/A	None	No													
<i>Solanum celatum</i>	<i>Solanum celatum</i>	E	Not Listed	N/A	None	No													
<i>Swainsona sericea</i>	Silky Swainson-pea	V	Not Listed	N/A	None	No													
<i>Thesium australe</i>	Austral Toadflax	V	V	N/A	None	No													

Note: AOO = Area of occupancy, EOO = extent of occurrence, N/A Not applicable, V = Vulnerable, E = Endangered, CE= Critically Endangered.

4.2 Threatened Fauna Species-Credit-Species Survey Requirements

Threatened fauna species-credit-species which would likely require survey and assessment is detailed in **Table 4.2**.

Table 4.2 Threatened Fauna Species Credit Species Likely Requiring Survey

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Constraints	Entity with the potential for SAI	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amphibians																	
<i>Litoria booroolongensis</i>	Booroolong Frog	E	E	None.	No												
<i>Litoria littlejohni</i>	Littlejohn's Tree Frog	V	V	None.	No												
<i>Pseudophryne australis</i>	Red-crowned Toadlet	V	Not Listed	None.	No												
Birds																	
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	See Important Area Mapping.	Yes												
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	E	None.	No												
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V	V	None.	No												
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	Not Listed	None.	No												
<i>Hieraaetus morphnoides</i>	Little Eagle	V	Not Listed	None.	No												
<i>Lathamus discolor</i>	Swift Parrot	E	CE	See Important Area Mapping.	Yes												
<i>Lophoictinia isura</i>	Square-tailed Kite	V	Not Listed	None.	No												

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Constraints	Entity with the potential for SAIL	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Ninox connivens</i>	Barking Owl	V	Not Listed	None.	No												
<i>Ninox strenua</i>	Powerful Owl	V	Not Listed	None.	No												
<i>Petroica rodinogaster</i>	Pink Robin	V	Not Listed	None.	No												
<i>Tyto novaehollandiae</i>	Masked Owl	V	Not Listed	None.	No												
Invertebrates																	
<i>Petalura gigantea</i>	Giant Dragonfly	E	Not Listed	Swamps; Within 500 m of swamps.	Yes												
Mammals																	
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	Not Listed	None.	No												
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Cliffs; Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.	Yes												
<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	E	E	Other; Requires dense ground cover in a variety of habitats.	No												
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	Not Listed	None.	Yes (Breeding)												

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Constraints	Entity with the potential for SAIL	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	Not Listed	None.	Yes (Breeding)												
<i>Myotis macropus</i>	Southern Myotis	V	Not Listed	Hollow bearing trees; Within 200 m of riparian zone Other; Bridges, caves or artificial structures within 200 m of riparian zone Waterbodies; This includes rivers, creeks, billabongs, lagoons, dams and other waterbodies on or within 200 m of the Project Area.	No												
<i>Petauroides volans</i>	Greater Glider	Not Listed	V	Hollow bearing trees.	No												
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	Not Listed	None.	No												
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	Other; Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff lines.	Yes												
<i>Phascolarctos cinereus</i>	Koala	V	E	None.	No												
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	None.	No												

Note: AOO = Area of occupancy, EOO = extent of occurrence, N/A Not applicable, V = Vulnerable, E = Endangered, CE= Critically Endangered.

5.0 Potential Impacts

The BAM requires the assessment of discrete types of impacts on biodiversity values resulting from proposed development during both construction and operational phases. The types of impacts requiring assessment are as follows:

- **Direct impacts:** impacts on biodiversity values and threatened species habitat that relate to clearing native vegetation and impacts on biodiversity values prescribed by the BC Regulation.
- **Indirect impacts:** impacts that occur when the proposal affects native vegetation and threatened species habitat beyond the development footprint or within retained areas (e.g. transporting weeds or pathogens, dumping rubbish).
- **Prescribed impacts:** means the prescribed impacts identified in clause 6.1 of the BC Regulation. Prescribed impacts can be direct or indirect impacts.
- **Serious and irreversible impacts (SAII):** impacts likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct in accordance with the principles set out in clause 6.7(2) of the BC Regulation.

Based on the findings of the desktop assessment and preliminary site inspection, the potential impacts to biodiversity from both Project's (Solar and BESS facilities) are detailed in **Table 5.1**.

Table 5.1 Potential Impacts Associated with the Project

Impact Type	Potential Impact	Details
Direct impact	Removal of native vegetation	<ul style="list-style-type: none"> • The Projects may result in the removal of native vegetation, including TECs listed under both the BC Act and EPBC Act. Vegetation removal that may be required for the proposed works would likely contribute to further fragmentation of native vegetation communities within the locality. • Hollow-bearing trees provide habitat for threatened species such as forest owls, woodland and forest birds and microbats, which may occur within the Project Area. As such, the Project's have the potential to remove these tree hollows impacting on threatened species that may utilise them as habitat. • Construction of the proposed infrastructure may clear logs and debris used by threatened flora and fauna species predicted to occur within the Project Area.
	Removal of threatened species and their habitat	
	Fauna mortality	
Indirect impact	Inadvertent impacts on adjacent habitat or vegetation	<ul style="list-style-type: none"> • Inadvertent disturbance to native vegetation and threatened species habitat may occur during construction and operational phases of the Projects. • Priority weeds are likely to occur in parts of the Project Area and within the Development Corridors. Continued weed invasion and encroachment could have potentially severe consequences for the habitat of flora and fauna occurring in the area. • Potential sediment, nutrient and pollutant run-off into adjacent vegetation and fauna habitat. • Noise and vibration disturbances to fauna.
	Reduced viability of adjacent habitat due to edge effects	
	Reduced viability of adjacent habitat due to noise, dust, or light spill	

Impact Type	Potential Impact	Details
	Transport of weeds and pathogens from the Project Area to adjacent vegetation	<ul style="list-style-type: none"> Fire mitigation strategies may result in changes to fire regime across the Project Area.
	Changed fire regimes	
Prescribed impacts	Impacts to water bodies, water quality and hydrological processes	<ul style="list-style-type: none"> The Project's may create a barrier to movement across the landscape. The Project's may create a barrier to movement longitudinally for some threatened bird species. Increased vehicle movement during construction may increase risk of vehicle strike on ground-dwelling species including protected species such as emus and kangaroos. Construction of the Project's may require the removal of natural or made-made waterbodies, or could alter subterranean or overland waterflows across the Project Area.
	Impacts to habitat connectivity	
	Impacts from vehicle strike	
Serious and Irreversible Impacts (SAII)	As per examples listed above	<ul style="list-style-type: none"> A number of entities with the potential for SAI could be present within the Development Corridors. The BAM assessment may require an assessment of SAI on threatened species.

Umwelt prepared preliminary constraints mapping to inform project design during the scoping phase to achieve further avoidance of ecological values (**Figure 5.1**).

The centre of the Project Area has a history of cultivation, evidenced by historical aerial imagery, ALUMS mapping and the dominance of exotic pasture or current cropping (**Figure 3.3**). However, much of these areas close to the intact woodland canopy likely support the Derived Native Grasslands (DNG) of the relevant PCT. This has led to the moderate constraint category retaining the historically native pasture and vegetation to the lowest category which is vegetation derived from its historical condition. There are areas that have no identified constraints, and these are areas that the agricultural cultivation has occurred more frequently and the likelihood of any habitat or native pasture to be present is insignificant and therefore not a biodiversity.

Areas that are likely to contain foraging or breeding habitat for threatened fauna (birds and mammals (including bats)) have been classified as a moderate constraint and may require targeted surveys. This includes:

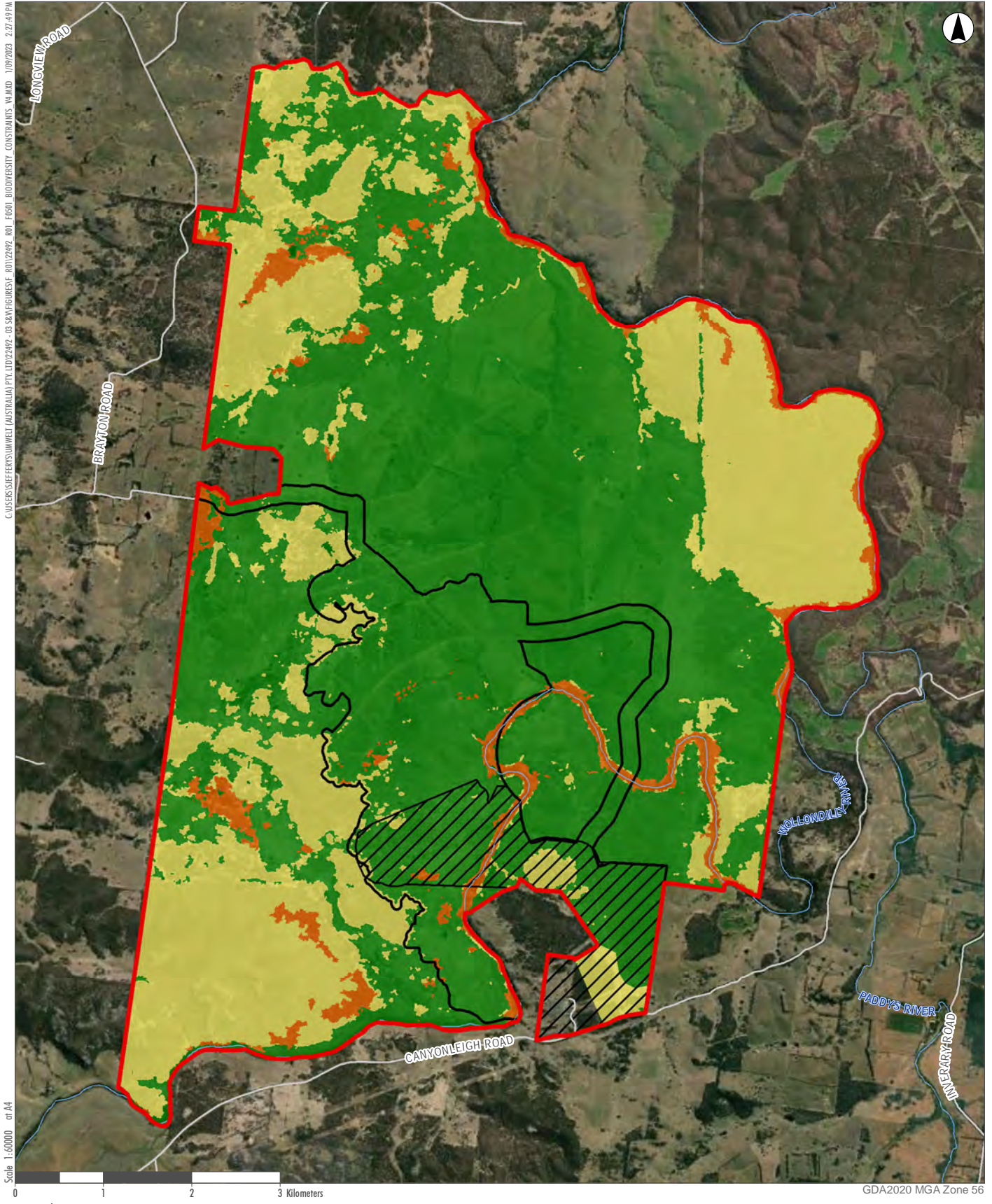
- Any planned works within or adjacent to intact woodland, derived native grassland or scattered paddock trees.
- Areas of the development corridor that intersect waterbodies (dams, creeks, rivers and swamps) have the potential to support habitat for threatened amphibians and have therefore been classified as a moderate constraint.
- Areas of rocky habitat have been identified in the development corridor. These areas provide potential habitat for threatened reptiles.

Please note that it is not a 'financial' constraints assessment based on cost but based on the following ecological values (**Figure 5.1**).

- 'High': NSW or EPBC Act listed CEECs in moderate or high condition and/or with potential to support threatened species habitat. Represented as "red" in **Figure 5.1**.
- 'Moderate': Remnant native vegetation and potential threatened species habitat present. Includes riparian vegetation. Areas of potential BC Act CEEC in a highly degraded form. Areas mapped on the Biodiversity Values Map, not otherwise meeting the 'High' criteria. Represented as "orange" in **Figure 5.1**.
- 'Low': Degraded native vegetation with limited values. Some potential to support vulnerable species in degraded habitat. Areas of planted native vegetation, and degraded native grassland that may be Category 1. Represented as "green" in **Figure 5.1**.
- Not classified: No identified constraints.



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- Legend**
- Project Area
 - Development Corridor
 - Development Corridor - BESS
 - Watercourses
 - Roads
- Biodiversity Constraint**
- High
 - Moderate
 - Low

FIGURE 5.1

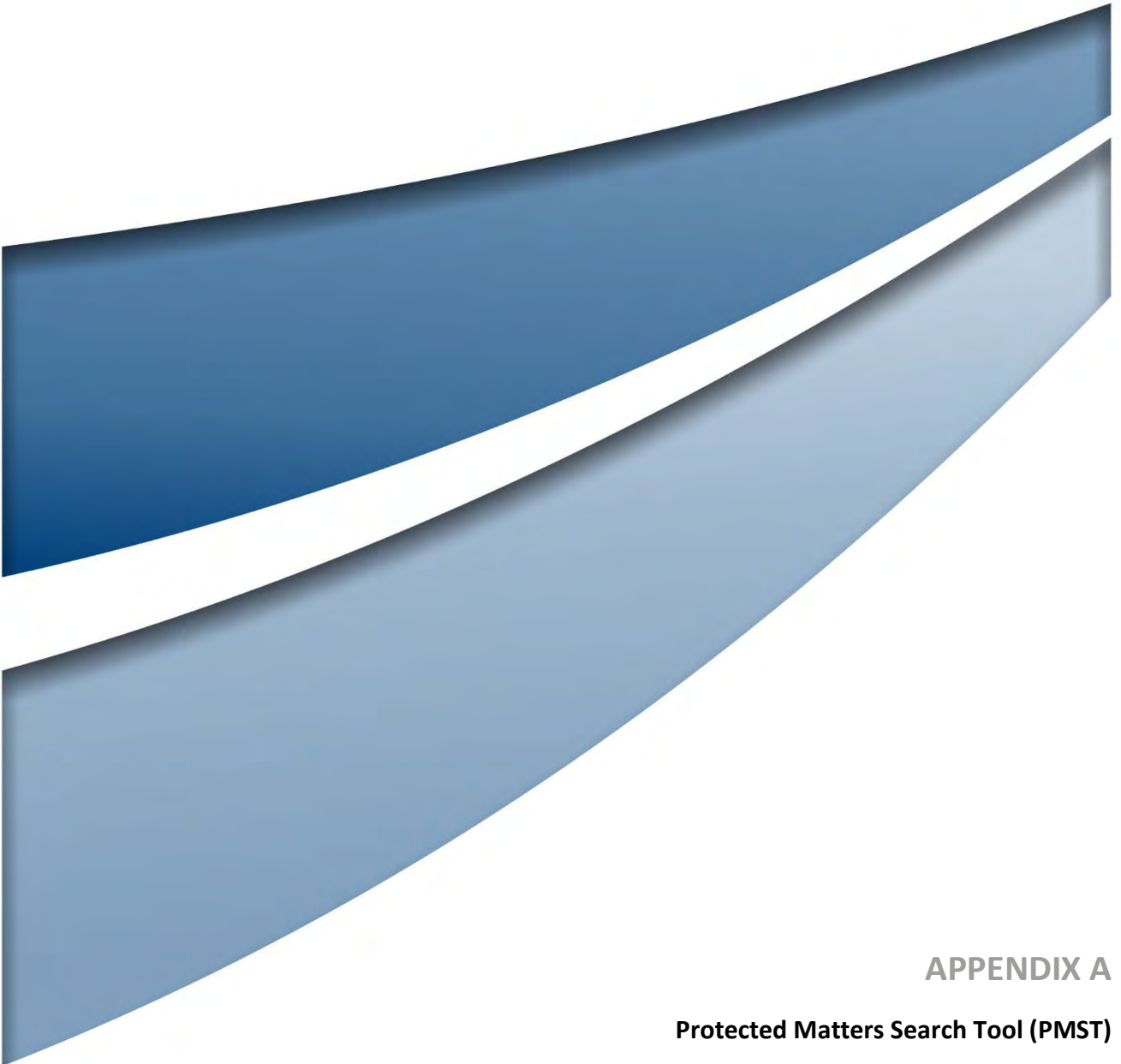
Biodiversity Constraints

6.0 Next Steps

To further refine the constraints mapping, scope the BAM assessment and assist in developing an estimate of potential offsetting costs of different parts of the Project Area, the following steps are required:

- Spark Renewables should utilise the constraints mapping to modify the design with the intent of minimising impacts on areas identified as having ‘high’ and ‘moderate’ level constraints. These areas have identified ecological values which are likely to have the substantial survey requirements and potential for associated offsetting costs. It is recommended where possible these areas are avoided.
- Early consultation with BCD regarding land categorisation. An onsite meeting, if possible, to review any approach to cultivated land. This would allow the conversations with the BCD to avoid any unnecessary consultation in the later stages due to a misunderstanding of the land categorisation. Umwelt would aim to achieve these steps in the next stages (EIS phase) of the Project.
- If required by BCD, there should be an assessment of identified likely ‘*Category 1*’ areas to further document and justify land categorisation, including implementation of the Interim Grasslands and other Groundcover Assessment Method (IGGAM) and/or BAM plots to determine the quality of the grasslands and recent cultivation.
- Following the provision of an EIS development corridor the scope will be confirmed for targeted threatened species surveys and preparation of the BDAR for the Project’s in accordance with the BAM.

Final refinement of the vegetation mapping, including determination of vegetation condition zones, confirmation of the extent of and confirmation of whether habitat is too degraded for threatened species, and targeted surveys would take place as part of the EIS Phase of the Project.



APPENDIX A

Protected Matters Search Tool (PMST)



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

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

Report created: 04-Sep-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	66
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	7
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

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

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

Community Name	Threatened Category	Presence Text	Buffer Status
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area	In feature area
Southern Highlands Shale Forest and Woodland in the Sydney Basin Bioregion	Critically Endangered	Community may occur within area	In buffer area only
Temperate Highland Peat Swamps on Sandstone	Endangered	Community may occur within area	In buffer area only
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community may occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species

[\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat known to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
FISH			
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat known to occur within area	In feature area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area	In buffer area only
FROG			
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Litoria watsoni Watson's Tree Frog [91509]	Endangered	Species or species habitat may occur within area	In buffer area only
INSECT			
Keyacris scurra Key's Matchstick Grasshopper [89739]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Acacia bynoeana			
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area	In feature area
Baloskion longipes			
Dense Cord-rush [68511]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Caladenia tessellata			
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Commersonia prostrata			
Dwarf Kerrawang [87152]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Corunastylis plumosa listed as Genoplesium plumosum Plumed Midge-orchid, Tallong Midge Orchid [78695]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat may occur within area	In feature area
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus aquatica Mountain Swamp Gum, Broad-leaved Sallee, Broad-leaved Sally [56173]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Eucalyptus macarthurii Camden Woollybutt, Paddys River Box [7827]	Endangered	Species or species habitat known to occur within area	In buffer area only
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat may occur within area	In buffer area only
Gentiana wingecarribiensis Wingecarribee Gentian [18033]	Endangered	Species or species habitat known to occur within area	In buffer area only
Grevillea molyneuxii [22052]	Endangered	Species or species habitat may occur within area	In buffer area only
Grevillea raybrownii [65665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Helichrysum calvertianum [5702]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Kunzea cambagei [11420]	Vulnerable	Species or species habitat known to occur within area	In feature area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat known to occur within area	In feature area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat may occur within area	In buffer area only
Persoonia mollis subsp. revoluta [56094]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Persoonia oxycoccoides [16114]	Endangered	Species or species habitat known to occur within area	In buffer area only
Phyllota humifusa Dwarf Phyllota [10133]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pomaderris cotoneaster Cotoneaster Pomaderris [2043]	Endangered	Species or species habitat known to occur within area	In feature area
Pomaderris pallida Pale Pomaderris [13684]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pultenaea elusa Elusive Bush-pea [78990]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area	In feature area
Rutidosia leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat may occur within area	In buffer area only
Thelymitra kangaloonica Kangaloon Sun Orchid [81861]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Zieria murphyi Velvet Zieria [4634]	Vulnerable	Species or species habitat may occur within area	In buffer area only

REPTILE

Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species

[[Resource Information](#)]

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

Migratory Terrestrial Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

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

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

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [11834]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [11833]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [11835]	NSW	In buffer area only
Transport and Regional Services - Airservices Australia		
Commonwealth Land - Airservices Australia [11832]	NSW	In buffer area only

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna striata White-fronted Tern [799]		Migration route may occur within area	In buffer area only

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Protected Area Name	Reserve Type	State	Buffer Status
Kerrawary	Nature Reserve	NSW	In buffer area only
Tarlo River	National Park	NSW	In buffer area only

Regional Forest Agreements [\[Resource Information \]](#)

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
Southern RFA	New South Wales	In buffer area only

Nationally Important Wetlands [\[Resource Information \]](#)

Wetland Name	State	Buffer Status
Long Swamp	NSW	In buffer area only

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Gunlake Extension Project, Brayton NSW	2015/7557	Controlled Action	Post-Approval	In buffer area only
Lynwood Quarry Project, Marulan, NSW	2012/6560	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Highland Source Project	2010/5697	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Lynwood Quarry Extraction Area Modification, NSW	2016/7653	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Sydney	Sydney Basin	BA website	In buffer area only

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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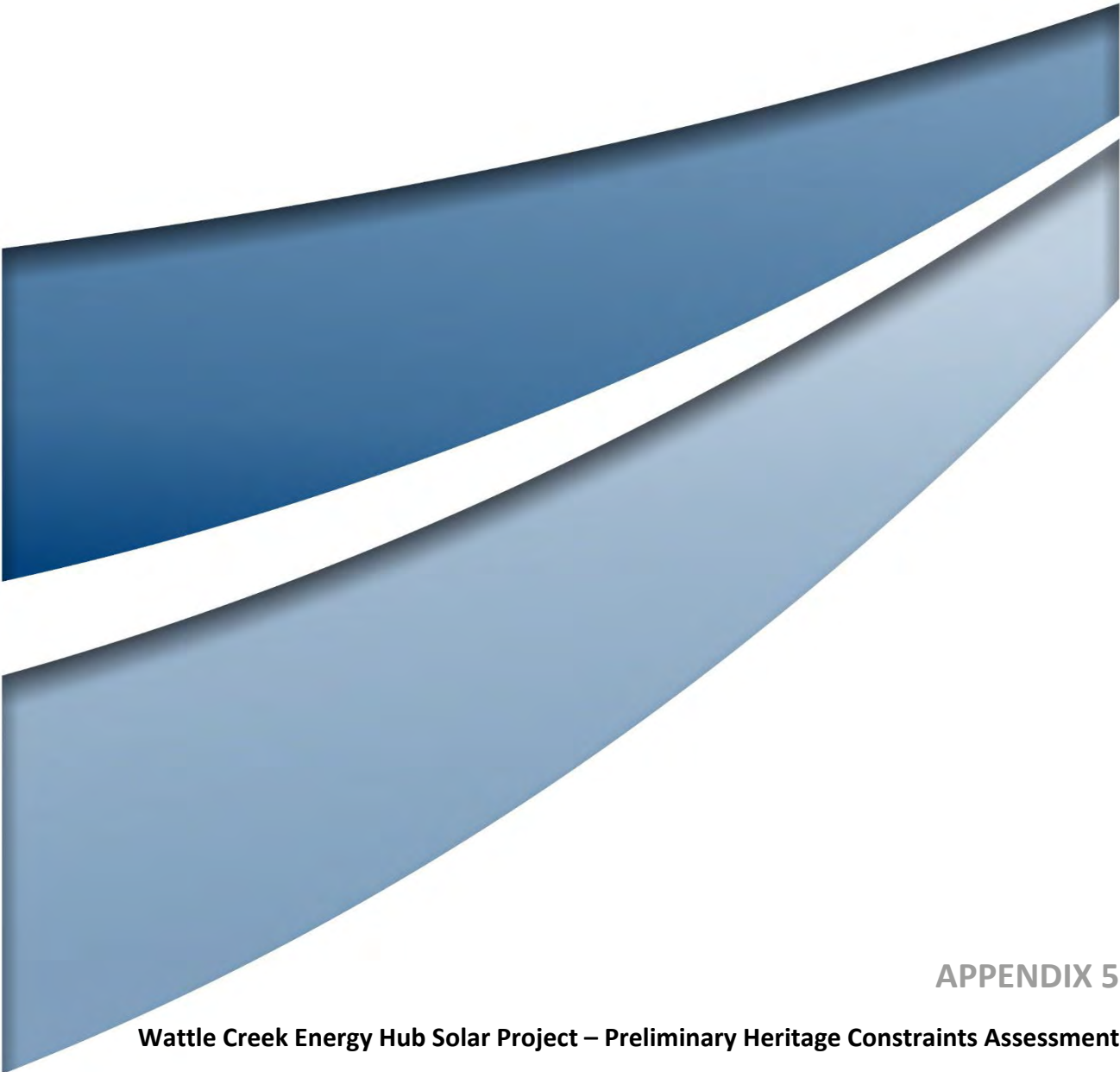
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APPENDIX 5

Wattle Creek Energy Hub Solar Project – Preliminary Heritage Constraints Assessment

Reference: 22070

31 August 2023

Penelope Williams
Umwelt Pty Ltd
Senior Environmental Consultant
75 York Street
Teralba, NSW 2284

By email: pwilliams@umwelt.com.au

Dear Penelope,

**RE: CULTURAL HERITAGE ADVICE FOR SCOPING REPORT FOR 22492 –
WATTLE CREEK ENERGY HUB - SCOPING REPORT**

Austral Archaeology Pty Ltd (Austral) has been engaged by Umwelt Pty Ltd, on behalf of Spark Renewables Pty Ltd (Spark Renewables) to provide desktop Aboriginal and non-Aboriginal cultural heritage advice for a scoping report for the proposed Wattle Creek Energy Hub (the Project). The Project Area is located approximately 80 kilometres (km) west of Wollongong and 15 km northwest of Marulan within the Upper Lachlan Shire Council Local Government Area (LGA) and abuts the Wingecarribee Shire LGA to the east, and Goulburn Mulwaree Shire Council LGA to the south. This advice is intended to assist Umwelt and Spark Renewables in determining their obligations regarding the Aboriginal and non-Aboriginal heritage items, objects, and places under the following legislation:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Environmental Planning and Assessment (EP&A) Act, 1979
- *National Parks and Wildlife Act 1974* (NPW Act)
- *NSW Heritage Act 1977* (Heritage Act)
- *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP)
- *Upper Lachlan Local Environmental Plan 2010* (LEP)
- *Upper Lachlan Development Control Plan 2010* (DCP).

Please note that this current document supersedes all previous versions and has been prepared in consultation with updated advice from Umwelt and Spark received on 2 and 17 August 2023.

1. ASSESSMENT OBJECTIVES

The purpose of this desktop heritage assessment is to evaluate the potential impact from the Project on the significance of any Aboriginal and historic heritage values that may be present within or in the vicinity of the Project Area.

The Project Area comprises the entirety of Arthursleigh Farm, Lot 3 DP1120270, 1001 Canyonleigh Road, Brayton and Big Hill NSW, 2579. The property is located within the Upper Lachlan Local Government Area (LGA), Parish of Eden Forest, County of Argyle. The Wollondilly River forms a significant portion of the northern, eastern, and southern property boundaries. Canyonleigh Road runs along the southern boundary, whilst Brayton Road is situated to the west, parallel to the Project Area. The town of Marulan is situated 10 kilometres south of the Project Area and the city of Goulburn is located approximately 33 kilometres south-west (Figure 1 and Figure 2).

The Wattle Creek Energy Hub comprises two separate projects within the broader Wattle Creek Energy Hub Project Area, including the following components:

- The construction, operation, maintenance and decommissioning of a solar farm and associated infrastructure, inclusive of solar panel installations, access tracks, substations and other buildings, and powerline alignments.
- The construction, operation, maintenance and decommissioning of a large-scale battery energy supply system (BESS) facility, ancillary infrastructure, and temporary facilities.

Each component will follow a separate approval pathway, this assessment covers all components.

2. LIMITATIONS OF THE REPORT

This report comprises a desktop-only assessment of Aboriginal and non-Aboriginal archaeological values in the Project Area. The Project is State Significant Development (SSD) as defined under the Planning Systems SEPP and will require development consent under Part 4 of the NSW EP&A Act. This assessment aims to provide Aboriginal and non-Aboriginal heritage inputs to inform a scoping report and request for Secretary's Environmental Assessment Requirements (SEARs) to prepare an Environmental Impact Statement (EIS). The report does not include any physical (field) assessments of Aboriginal and historic heritage that may be present within the Project Area.

The results, assessments and judgements contained in this report are constrained by the standard limitations of desktop research and by the unpredictability inherent in archaeological zoning from the desktop. Whilst every effort has been made to gain insight to the heritage values of the Project Area, Austral cannot be held accountable for errors or omissions arising from such constraining factors.

3. ABBREVIATIONS

The following are common abbreviations that are used within this report:

Burra Charter	<i>Burra Charter: Australia ICOMOS Charter for Places of Cultural Significance 2013</i>
CHL	Commonwealth Heritage List
DCP	Development Control Plan
DPE	Department of Planning and Environment
EPA Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Act 1999</i>
EPI	Environmental Planning Instrument
Heritage Act	<i>NSW Heritage Act 1977</i>
ICOMOS	International Council on Monuments and Sites
LEP	Local Environmental Plan
LGA	Local Government Area
NHL	National Heritage List
NPW Act	<i>National Parks and Wildlife Act 1974</i>
The Proponent	Spark Renewables
RNE	Register of the National Estate
SHI	State Heritage Inventory
SHR	State Heritage Register
Project Area	Lot 3 DP1120270, 1001 Canyonleigh Road, Brayton and Big Hill NSW, 2579
Upper Lachlan DCP	<i>Upper Lachlan Shire Council Development Control Plan 2010</i>
Upper Lachlan LEP	<i>Upper Lachlan Local Environmental Plan 2010</i>

4. STATUTORY CONTEXT

NSW ENVIRONMENTAL PLANNING AND ASSESSMENT ACT (EP&A) ACT, 1979

The EP&A is the primary legal statute that governs planning instruments and development assessments in NSW. The Project will seek assessment as an SSD under Part 4 of the EP&A Act and in accordance with the Planning Systems SEPP.

Under the Planning Systems SEPP, Spark Renewables must prepare an EIS that includes an Aboriginal Cultural Heritage Assessment (ACHA) and Statement of Heritage Impact, (SoHI). The ACHA describes the potential impacts of the Project on Aboriginal cultural heritage (both archaeological and cultural) in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (the Code)(DECCW, 2010). A SoHI assesses non-Aboriginal and historic heritage values in the Project area, and must be prepared in accordance with the *Guidelines for Preparing a Statement of Heritage Impact* (DPE 2023).

ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) established the Australian Heritage Council (formerly the Australian Heritage Commission) and provides for the protection of Matters of National Environmental Significance (MNES) including cultural heritage at a national level and items owned or managed by the Commonwealth. The EPBC Act has established two heritage registers:

- Commonwealth Heritage List (CHL): for significant items owned or managed by Commonwealth Government agencies.
- National Heritage List (NHL): for items assessed as being of national cultural significance.

A referral under the EPBC Act is required where there is potential of a project to impact on, or where works are required to an item registered on either of these lists to ensure that the item's significance is not impacted upon.

No part of the Project Area appears on either the CHL or the NHL.

The Australian Heritage Council is also responsible for keeping the Register of the National Estate (RNE). In 2007 the RNE was frozen, and no further sites were added to it. For Commonwealth properties, the RNE was superseded by the CHL and NHL lists. The RNE is now retained as an archive of information about more than 13,000 places throughout Australia.

No part of the Project Area appears on the RNE.

COMMONWEALTH NATIVE TITLE ACT 1993

The Commonwealth *Native Title Act 1993* (NTA) creates an Australia-wide native title scheme, the objectives of which include:

- Providing for the recognition and protection of native title.
- Establishing a mechanism for determining claims to native title.
- Establishing ways in which future dealings affecting native title (future acts) may proceed.

The NTA establishes the National Native Title Tribunal as an independent body with a wide range of functions, including the maintenance of a database of Native Title and Indigenous Land Use Agreements (ILUAs) and determinations.

A search of the National Native Title Tribunal Database conducted on the 28th August 2023 confirmed that no Native Title claim determinations or applications fall over the Project Area. A single ILUA, the Gundungurra Area Agreement (NI2014/001), falls over the entirety of the Project Area. However, the ILUA applies specifically to national parks and reserves declared under the NPW Act within the Gundungurra Area Agreement's geographical boundary. Consequently, the ILUA does not impact the Project in any way. Further information can be found at:

- http://www.nntt.gov.au/searchRegApps/NativeTitleRegisters/Pages/ILUA_details.aspx?NNTT_FileNo=NI2014/001, and;
- <https://www.environment.nsw.gov.au/research-and-publications/publications-search/gundungurra-indigenous-land-use-agreement>.

NSW NATIONAL PARKS AND WILDLIFE ACT 1974

Section 87 of the NPW Act makes it a strict liability offence to knowingly or unknowingly harm Aboriginal objects or declared Aboriginal places. Harm is defined under the NPW Act as “*any act or omission that destroys, defaces or damages the object or place or in relation to an object, moves the object from the land on which it had been situated*”.

The *National Parks and Wildlife Regulation 2009* (NPW Regulation) adopted the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010) (the Due Diligence Code). Throughout this desktop scoping report, the Due Diligence Code has been used as the framework for assessing the Project and Project Area in terms of potential harm to Aboriginal objects and places as defined in the NPW Act. The Due Diligence Code sets out the reasonable and practicable steps that individuals and organisations need to take in order to:

- Identify whether Aboriginal objects are, or are likely to be, present within the Project Area.
- If Aboriginal objects are, or are likely to be present, determine whether their activities are likely to cause harm.
- Inform the ACHA required for SSD approval under Part 4 of the EP&A Act.

This advice has been formulated to provide a robust assessment that will identify whether Aboriginal objects or places are present or are likely to be present within the Project Area. This has been achieved through the completion of a desktop review of the Project Area.

Aboriginal Sites In the Vicinity of the Project Area

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 25 August 2023 (Client service ID: 813144). The search identified 68 Aboriginal archaeological sites within a 10-kilometre search area centred on the proposed Project Area. The results of the AHIMS search are described in Table 1 below and shown in Figure 3.

There are 19 sites recorded within the Project Area and four sites within 100 metres of the property boundary. These are detailed in Table 1 and Table 2 below.

Spatial information for this report is displayed using the GDA94 Datum. Where AHIMS site records were provided on a different datum, they were converted using standard functions in QGIS software.

Table 1 AHIMS sites identified within 10 kilometres of the project area

Site type	Occurrence	Frequency
Artefact	45	66.18%
Artefact, Potential Archaeological Deposit (PAD)	15	22.06%
PAD	8	11.76%
Grand Total	68	100%

Only artefacts and PADs are the only archaeological features that have been identified within 10 kilometres of the Project Area. PADs are found in 33.82% (n=23) of identified sites, but 15 of the PADs sites are associated with artefacts. Artefacts are most likely found isolated from other archaeological features.

**Table 2 AHIMS sites within the project area**

Site Number	Site Name	Site Type	AHIMS Site Status
48-4-0119	MGPS5	Artefact	Valid
52-4-0085	1 Arthursleigh; Arthursleigh	Artefact	Valid
52-4-0131	TME-OS5	Artefact	Valid
52-4-0132	TME-OS4	Artefact	Valid
52-4-0133	TME-OS3 with PAD	Artefact with PAD	Valid
52-4-0134	TME-OS2 with PAD	Artefact with PAD	Valid
52-4-0237	BH11 (Canyon Leigh)	Artefact	Valid
52-4-0238	BH12 (Canyon Leigh)	Artefact	Valid
52-4-0239	BH13 (Canyon Leigh)	Artefact	Valid
52-4-0240	BH14 (Canyon Leigh)	Artefact	Valid
52-4-0244	BH15 (Canyon Leigh)	Artefact	Valid
52-4-0335	KA4a	Artefact, PAD	Valid
52-4-0336	KA5a	Artefact, PAD	Valid
52-4-0337	KA6a	Artefact	Valid
52-4-0338	KA7	Artefact, PAD	Valid
52-4-0348	KPAD-3	PAD	Valid
52-4-0349	KPAD-4	PAD	Valid
52-4-0350	KPAD-5	PAD	Valid
52-4-0351	KPAD-6	PAD	Valid

Table 3 AHIMS sites near the project area

Site Number	Site Name	Site Type	AHIMS Site Status
52-4-0236	BH10 (Canyon Leigh)	Artefact	Valid
52-4-0241	BH16 (Canyon Leigh)	Artefact	Valid
52-4-0304	MGPS8	Artefact	Valid
52-4-0339	KA8	PAD	Valid

NSW HERITAGE ACT 1977 AND THE STATE HERITAGE REGISTER

The *Heritage Act 1977* protects and conserves archaeological relics in NSW. Relics are defined by the Heritage Act to be:

any deposit, artefact, object or material evidence that:

- (a) *relates to the settlement of the area that comprises NSW, not being Aboriginal settlement, and*
- (b) *is of State or local heritage significance.*

In accordance with Part 4 of the EP&A Act and the Planning Systems SEPP, a SoHI assessing impacts to non-Aboriginal and historic heritage relics must be prepared as part of the SSD approvals process. The SoHI must be prepared in accordance with the *Guidelines for Preparing a Statement of Heritage Impact* (DPE 2023).

Part 3A of the *Heritage Act 1977* establishes the State Heritage Register (SHR), administered by the Heritage Council. A search of the SHR was conducted on 28 August 2023.

No part of the Project Area appears on the SHR.

HERITAGE AND CONSERVATION REGISTER (SECTION 170 REGISTER)

Under Section 170 of the Heritage Act, government instrumentalities must keep a Heritage and Conservation Register (a Section 170 Register) which contains items under the control or ownership of the agency, and which are, or could, be listed as heritage items (of State or local significance).

No part of the Project Area appears on any Section 170 Heritage and Conservation registers.

ENVIRONMENTAL PLANNING INSTRUMENTS

An Environmental Planning Instrument (EPI) is made under the EPA Act. An EPI can be a Development Control Plan (DCP), Local Environmental Plan (LEP) or a State Environmental Planning Policy.

Upper Lachlan Local Environmental Plan 2010

The Upper Lachlan LEP 2010 is applicable to the Project Area. Local heritage items are listed under Schedule 5, Part 1 of the Upper Lachlan LEP.

No part of the Project is listed on Schedule 5 of the Upper Lachlan LEP.

One local heritage item listed on the Upper Lachlan LEP, the Tarlo National Park (ID#160), is located approximately 4.6 kilometres west of the Project Area.

SUMMARY OF HERITAGE LISTINGS

Table 2.1 lists the relevant statutory and non-statutory registers, listings and orders, and identifies those in which any part of the site is listed. The location of heritage items in relation to the Project Area are outlined in Figure 2.1.

Table 4.4 Summary of heritage register listings for the Project Area

Register/Listing	Inclusion	Statutory implications
NHL	Nil	N/A
CHL	Nil	N/A
RNE	Nil	N/A
SHR	Nil	N/A
Upper Lachlan LEP	Nil	N/A
AHIMS sites listed in Table 2 and Table 3	23 sites	ACHA required for SSD approval under the EP&A

5. PREVIOUS ARCHAEOLOGICAL STUDIES

A review of the reports held on the AHIMS database identified several archaeological studies which have been undertaken in the locality of the Project Area. These are summarised in Table 3. Austral has also undertaken a review of information to identify whether the activity is located within landscape features likely to contain Aboriginal objects. This includes an assessment of ethnographic information, soils, geology, landform, disturbance and resource information pertinent to the Project Area. The information in Table 5 below is adapted from NGH's (2021) desktop Aboriginal due diligence assessment.

Table 5 Archaeological studies undertaken in the vicinity of the Project Area (adapted from NGH 2021, pp.11-13).

Author	Year	Details
Kotettig	1981	Kotettig undertook an archaeological survey for the proposed F5 route alignment located north of Marulan. 24 Aboriginal sites including scarred trees, grinding grooves, rock shelters with deposits and artefact scatters were located during the survey. The report concluded that the artefact sites were located close to water courses and the grinding grooves and rock shelters were located within the Hawksbury sandstone landscapes.
Brayshaw and Dallas	1990	This archaeological survey was carried out in advance of the construction of a 500Kv transmission line located between Mt Piper and Marulan. The survey included a portion of the current project area's western extent. As part of the investigation, Brayshaw and Dallas undertook an analysis of regional and local site types, distribution and raw materials used in the South East Highlands area. The analysis resulted in the development of a comprehensive predictive model for the area: <ul style="list-style-type: none"> • Areas with sandstone escarpments and ridgelines are likely to have high archaeological significance, associated with the presence of grinding grooves and rock shelters. • Creek and river flats near the Tarlo and Wollondilly rivers have moderate-to-high archaeological sensitivity, due to their suitability as areas for artefacts and open campsites. • Undulating terrain characterised by watercourses, basalt and limestone formations possessed moderate potential for archaeological materials- such as quarry sites and artefacts to be present. • Steep, rugged land without water sources has low archaeological potential.
Haglund & Associates	1990	Following Brayshaw & Dallas's survey, Haglund & Associates undertook a program of test excavations within the current project area prior to the construction of the 500Kv transmission line. Four test pits were excavated in silty clay soils with minor gravel inclusions. Fifteen artefacts were identified to a maximum depth of 20 cm. Haglund & Associates suggested that the excavated artefacts comprise deposits resulting from slope wash, and likely representing the furthest extent of a larger site extending downhill to the northeast. They concluded that Brayshaw & Dallas's predictive model of campsites being present on undulating terrain adjacent to watercourses.
Navin	1990	This survey was completed for the proposed Lynwood Quarry site west of Marulan, and approximately 3 km south of the project area. Two artefact scatters and three isolated artefacts consisting of quartz, chert and volcanic rock were located during the survey.

Author	Year	Details
Sefton	1995	Sefton undertook an archaeological investigation for a proposed water augmentation project north-east of Marulan. During this survey, no Aboriginal sites were located. In 1996 a secondary survey was conducted in which two artefact scatters containing eight artefacts and three isolated artefacts were located. The assemblages comprised of flakes, cores, flake pieces, backed blades and volcanic manuports. Raw material comprised of some quartz and chert with silcrete at the dominant material.
Umwelt	2005	This survey was conducted for the development of the 1000-hectare Lynwood Quarry site west of Marulan. The survey located 54 sites, artefact scatters (n=30) and isolated artefacts (n=15), seven scarred trees and two stone arrangements. It was suggested that one of the two stone arrangements was likely European. Umwelt concluded that the area had a high likelihood of containing low density artefact scatters along the main creeks and channels as well as areas of deep sand.
OzArk Environmental & Heritage Management (OzArk)	2005	OzArk undertook an Aboriginal cultural heritage assessment (ACHA) in advance of the proposed creation of an access track to service the transmission line described in the Brayshaw & Dallas (1990). A pedestrian and vehicle survey of the area identified two artefact scatter sites and two artefact scatters with PADs located on colluvial slopes that had low-level disturbance from vegetation clearing and grazing. PADs were identified based on the potential for deposition in slope wash and in areas where vegetation clearance was minimal. OzArk concluded that the subsurface archaeological potential of sites located within these landforms on the Arthursleigh property is low.
Biosis	2008	Biosis undertook an ACHA for a proposed gas turbine facility in the south-western portion of the current project area. The investigation comprised a survey which identified 10 new sites. Most of the new sites were located in areas subject to sheetwash erosion or exposure due to animal burrowing. The assessment concluded that the area had moderate subsurface archaeological potential and recommended a program of testing take place.
Navin Officer	2012	An ACHA was undertaken prior to the development of Kerrawary Power Station and Pipeline, located adjacent to the project area's southern boundary. Navin Officer identified 25 new Aboriginal cultural heritage sites: 15 artefacts with PADs; three artefact scatters, one isolated artefact and six PADs.
NGH Pty Ltd	2021	NGH undertook a desktop due diligence assessment over the current project area for the purpose of a mapping archaeological sensitivity across. The current scoping report draws upon NGH's assessment to inform its recommendations.

6. LANDSCAPE ASSESSMENT

Table 6 Assessment of landscape features

Information	Details
Ethnographic	<p>Ethnographic assessments by Tindale (1974) and Eddie (1985), suggest Marulan area is the junction point for the following Aboriginal nations:</p> <ul style="list-style-type: none"> • Ngunawal who inhabited the area from Goulburn, Yass and Canberra. • Wandandian who inhabited the area from Ulladulla to Nowra and west to the mountains of the Great Dividing Range. • Dharawal, whose lands extended north of the Shoalhaven river to Wollongong and west to Goulburn. • Gundangara who inhabited from Camden to south of Marulan. <p>Historian Jackson-Nakano suggests Tindale's tribal boundaries likely incorporated several smaller Aboriginal groups with their own dialects, linked by kinship networks, common belief systems, ceremonies, and customs (Jackson-Nakano 2001, pp. xxi-xxiii).</p>



	<p>Smith (1992) states that Goulburn fell within the territory of the Gundangara and was in effect an intersection of boundaries and a ‘cross roads’ for at least six Gundangara ‘bands’, including the Burra Burra, Tarlo, Wollondilly, Cookmai, Parramarrago and Pajong (Smith 1992, p. 45). MacAlister recorded that there were three fairly numerous tribes in the district; the Cookmai or Mulwarrie (Mulwaree), the Tarlo, and the Burra Burra (MacAlister 1907, p. 82). Blanket distribution lists from this period connect the ‘Mulwaree tribe’ with the Tarlo, Wollondilly and Lake Bathurst areas (Jackson-Nakano 2001, p.13).</p> <p>The Wollondilly and Tarlo river systems were home to a variety of wildlife, including eels, black swans, ducks and other water birds. Animals in the area used by Aboriginal people as food included kangaroos and wallabies, possums, emus, wild turkeys and other small marsupials such as bandicoots and echidna. In addition, Aboriginal people in the area also ate lizards, freshwater mussels, snakes, native bees, Bogong mother and ants (Bennett 1967, pp. 173, 301; MacAlister 1907, p. 88; Koettig & Lance 1986, p. 18).</p> <p>Aboriginal people in the South East Highlands also enjoyed a diet rich in fruit, tubers, and other plant foods. Bullrush (<i>Typhus sp.</i>) were readily available along watercourses, as were sow thistle, native spinach and other green leafy annuals. Argue (1995, p. 35) notes the following species as commonly eaten by Aboriginal people across much of cool-temperate southern NSW: <i>Leucopogon hookeri</i> fruits; the young fronds and rhizomes of <i>Pteridium esculentum</i>; the tubers and young shoots of Phragmites, the tubers of <i>Triglochin</i> and <i>Microseris lanceolata</i>; Acacia seeds, orchid roots and the flowers of <i>Lomandra longifolia</i>.</p> <p>Many plants were also used to make tools, baskets, bags and for other purposes. Phragmites (a reed species) was used for bags and basket making, whilst <i>Lomandra longifolia</i> was used for basket making and as a ligature. Pimelea bark was plaited and utilised for a range of purposes. Dianella was used to make cord and its distinctive blueberries were used as dye. Callitris sap was utilised as gum Phragmites reeds and Callitris wood was used for spears. <i>Acacia melanoxylon</i> bark and twigs were used as a fish poison (Argue 1995, p.32).</p> <p>Accounts of the clothing worn by Aboriginal people in the Southern Highlands include long possum cloaks, worn with the fur turned in for warmth and the tanned skins on the outside for waterproofing, and string belts made from possum or kangaroo hair (Govett 1977, p. 8; Bennett 1967, p. 175; Boswell 1890, p. 9) Both men and women sometimes wore head dresses made from kangaroo incisors and possum tails, as well as head bands and necklaces. White and red ochre were also used to decorate the upper body and face (Bennett 1967, pp. 323-326).</p> <p>Govett (1977, p.36) and MacAlister (1907, p. 87) report that Gundangara people used stone knives, scrapes, digging sticks, shields, wooden dishes, hunting spears, specialised fishing spears, woomeras, boomerangs, and axes with a ground stone head fastened to a wooden shaft by fibre binding</p>
Soils	<p>Four Mitchell soil landscapes are located within the Project Area (Mitchell 2002) (Figure 6): the Bungonia Tableland and Gorge, the Moss Vale Highlands, Robertson Basalts and Wollondilly -Bindook Tablelands and Gorges (Figure 6).</p> <p>The Bungonia Tableland and Gorge soil landscape is situated on Ordovician and Devonian slate, phyllite and quartzite, a small Carboniferous granodiorite stock, caps of Tertiary quartz sands and gravels and limited basalt. The margin of the tableland is the Great Escarpment and is cut by a 400m deep gorge with vertical walls through west dipping Silurian limestones. Numerous deep caves and sinkholes are present. General elevation 600 to 800m, local relief 500m. Red-brown well-structured clay with alkaline pH on limestone, skeletal rubble on scree slopes from slates and volcanics, red and red-yellow texture-contrast profiles over sedimentary rocks on the tableland (Mitchell 2002, p.131).</p> <p>The Moss Vale Highlands soil landscape comprises Rolling hills and rounded peaks with deep channel incision on horizontal Triassic alternating quartz sandstone and shale, general elevation 700 to 850mm, local relief 80m. Widespread yellow and grey texture-contrast soils, deep yellow earth on friable sandstone often with concretionary ironstone and accumulations of clan quartz sand in valleys (Mitchell 2002, pp. 117-118).</p>

	<p>The Robertson Basalts soil landscape consists of flat top hills and small plateau standing above undulating shale hills of the Moss Vale Highlands landscape on Tertiary basalt flows, general elevation 800 to 850m, local relief of 40m. Red and red-brown structured loam and clay loam with uniform or gradational profiles, good water holding capacity and high fertility (Mitchell 2002, p. 118).</p> <p>Dissected tablelands, marginal gorges and scree slopes on massive Devonian quartz porphyry and small areas of massive Devonian granite. General elevation 600 to 900m, local relief 250m. Thin gritty uniform profiles on steep slopes and around rock outcrops, grey and yellow texture-contrast profiles on flatter slopes.</p>
Hydrology	<p>The Wollondilly River, a sixth order stream, runs along portions of the southern and northern boundaries of the project area (Figure 5). The Project Area has a number of other creeks and minor tributaries oriented both south-west and north-east, these waterways include Dead Mans Creek and Wattle Creek to the north, Island Creek to the south-east and Sandy Creek running through the Project Area</p> <p>The Wollondilly River and the aforementioned creeks are part of the Hawkesbury-Nepean Catchment which is one of the largest coastal basins in NSW. The Project Area is ideally situated for occupation as it has access to several fresh water sources.</p>
Geology	<p>The Project Area is located within the South Eastern Highlands Bioregion which are within the Lachlan fold belt (Figure 4). The Lachlan fold belt is characterised by sandstones and shales with areas of volcanic rock, limestone and granite. The underlining geology of the project area is identified in Hird's (1991) <i>Goulburn 1:250 000 Geological Sheet</i>. It predominately consists of Devonian era granites and areas of Ordovician slates. The south-western region of the Project Area has a single outcrop of basalt and a cluster of Megalong Conglomerate of the Permian Shoalhaven Group, consisting of sandstone, silts and mudstone. The existence of the basalt outcrop presents the potential the sourcing and manufacturer of stone tools within the area. Additionally, the Bindook porphyry is found within the project area. Bindook porphyry is a stratigraphic unit classified by porphyritic rocks with quartz and feldspar (Espade 2021, Mitchell 2002). Bindook porphyry is often dense and dark in colour, with a coarse texture to a glassy fine tuffaceous which may present the required features for stone tool manufacture.</p>
Landforms	<p>The landforms within the Project Area comprise undulating hills, slopes and some river flats within favourable proximity to freshwater (Figure 5). Previous archaeological investigations (Brayshaw & Dallas 1990, Haglund and Associates 1990) indicate a moderate-to-high potential for archaeological subsurface deposits within the alluvial and colluvial landforms as well as the levees and flats.</p>
Disturbance	<p>The area has been subject to historic land clearing and use as a grazing property. There are a number of buildings, sheds, fences, internal roads and other infrastructure.</p>

Previous archaeological investigations surrounding the Project Area and the search of the AHIMS database have helped to predict which site types can be expected within the Project. Based upon the results of these background studies, Austral has developed a series of predictive statements relating to the type and character of Aboriginal cultural heritage sites that are likely to exist in the Project Area and where they are more likely to be located. These predictive statements indicate that:

- Undisturbed creek and river flats near the Tarlo and Wollondilly rivers have moderate-to-high archaeological sensitivity, due to their suitability as areas used by Aboriginal people as campsites. PADs may be found in these locations.
- Sandstone escarpments and ridgelines are likely to have high archaeological significance, associated with the presence of grinding grooves and rock shelters.
- Undulating terrain characterised by watercourses, basalt and limestone formations possess moderate potential for archaeological materials to be present in the form of surface artefacts, quarry sites and where colluvial or alluvial soils are present.

- Isolated artefacts may occur at any place in the landscape.
- Steep, rugged land lacking water sources generally has low archaeological potential.

7. ACTIVITIES IN AREAS WHERE LANDSCAPE FEATURES INDICATE THE PRESENCE OF ABORIGINAL OBJECTS

Table 7 Applicability landscape features from the Code likely to have Aboriginal objects to the Project Area.

Question	Response
Is the activity within 200m of 'waters'?	Yes
Is the activity within a sand dune system?	No
Is the activity located on a ridge top, ridge line or headland?	Yes
Is the activity located within 200m below or above a cliff face?	No
Is the activity within 20m of or in a cave, rock shelter or cave mouth?	No
Is the activity (or any part of it) on land that is disturbed?	Yes
Do the predictive statements of Section 6 indicate Aboriginal Objects or places are likely to occur on any of the topographic elements of the activity area?	Yes

8. RECOMMENDATIONS AND IMPACT ASSESSMENT

Based upon the nature of the proposed works, the project's proposed consideration as SSD under Part 4 of the EP&A Act, the discussions in sections 4 to 8 above, and the provisions of the Code, further archaeological assessment of the Project Area will be required.

Independent Aboriginal heritage assessment should be undertaken in accordance with the requirements of the Code and the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) . In accordance with the Code of Practice, the presence of a previously recorded AHIMS site within the Project Area indicates that further archaeological investigation should be undertaken if the proposed works cannot avoid the site.

Although the Project Area is disturbed by historic land clearing and grazing, it contains 19 previously recorded Aboriginal heritage sites. In addition, another 4 Aboriginal heritage sites are located within one kilometre of the Project Area. A review of relevant heritage databases, outlined in Section 4, returned no records of any non-Aboriginal (historic) heritage sites within the Project Area.

A review of previous archaeological studies in the Marulan local area and an assessment of the Project Area's landscape suggested there is a moderate-to-high potential for Aboriginal archaeological sites to be present on creek and river flats near the Tarlo and Wollondilly rivers, and a moderate potential in undulating terrain where watercourses, basalt and limestone formations are present. Elsewhere across the Project Area, there is potential for isolated artefacts and low-density artefact scatters to be present, particularly where disturbances such as land clearing are minimal, or where erosional soils have deposited artefactual material from mid and upper slopes.

Given the presence of previously recorded AHIMS sites and considering the proposed NSW planning approval pathway (SSD), further archaeological investigation in the form of ACHA will be required to support the EIS for the Project. We further advise that it is likely that the SEARs for the project will request that a Historic Heritage Assessment (HHA) and Statement of Heritage Impact (SoHI) also be prepared for the project.

If you have any questions regarding the advice within this letter, please do not hesitate to contact me on the details below.

Yours sincerely,



A handwritten signature in black ink, appearing to read 'Amanda Markham', written in a cursive style.

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9. REFERENCES

- Argue, D 1995, 'Aboriginal Occupation of the Southern Highlands: Was it Really Seasonal', , vol. 41, no. 1, pp. 30–36.
- Bennett, G 1967, *Wanderings in New South Wales, Batavia, Pedir Coast, Singapore, and China; being the journal of a naturalist in those countries, during 1832, 1833, and 1834.*, Ibotson and Palmer, London.
- Bonhomme, T 1990, *Aboriginal Burials and Sand Mining on the Riverine Plains, NSW*, National Parks and Wildlife Service.
- Boswell, A 1890, *Recollections of some Australian blacks: Bathurst District, 1835-40. Port Macquarie, 1844. Hunter's River, 1850.*, viewed 18 March 2011, <<http://nla.gov.au/nla.aus-f7289b>>.
- Brayshaw, Dr H & Dallas, M 1990, *Marulan 500 KV Transmission Line. Archaeological Study: Marulan Substation to Mares Forest Creek Area.*, The Electricity Commission New South Wales.
- DECCW 2010, 'Due diligence code of practice for the protection of Aboriginal objects in New South Wales'.
- 'Espade' 2021, <<https://www.environment.nsw.gov.au/eSpade2Webapp/>>.
- Govett, WR 1977, *Sketches of New South Wales: Written and Illustrated for The Saturday Magazine in 1836-37*, Gaston Renard Publisher, Melbourne.
- Haglund and Associates 1990, *Mt Piper - Marulan 500 KV Transmission Line. First Progress Report on Test Excavations at Archaeological Sites 1, 4 and 5.*, The Electricity Commission New South Wales, NSW.
- Hird, C 1991, 'Soil Landscapes of the Goulburn 1:250,000 Sheet'.
- Jackson-Nakano, A 2001, *The Kamberri: A History of Aboriginal Families in the ACT and Surrounds. Aboriginal History Monograph 8.*, Aboriginal History Inc., Canberra.
- Koettig, M & Lance, A 1986, *An Aboriginal Resources Planning Study for the City of Goulburn, New South Wales.*
- Landskape 2009a, *Aboriginal Cultural Heritage Assessment: Gol Gol Lake Rehabilitation Scheme*, Lower Murray Daring Catchment Management Authority.
- Landskape 2009b, *Aboriginal Cultural Heritage Assessment: Gol Gol Lake Groundwater Observation Bores*, Lower Murray Daring Catchment Management Authority.
- MacAlister, C 1907, *Old Pioneering Days in the Sunny South.*, Chas MacAlister Book Publication Committee, Goulburn, NSW.
- Mitchell, P 2002, 'Descriptions for NSW (Mitchell) Landscapes Version 2 (2002)', in, Department of Environment and Climate Change.

Smith, J 1992, *Aborigines of the Goulburn District.*, Goulburn Historical Society, Goulburn, NSW.

Time Capsule Earth 2007, *Archaeological Assessment of Proposed Residential Subdivision, Gol Gol, NSW*, R & G Panuccio.

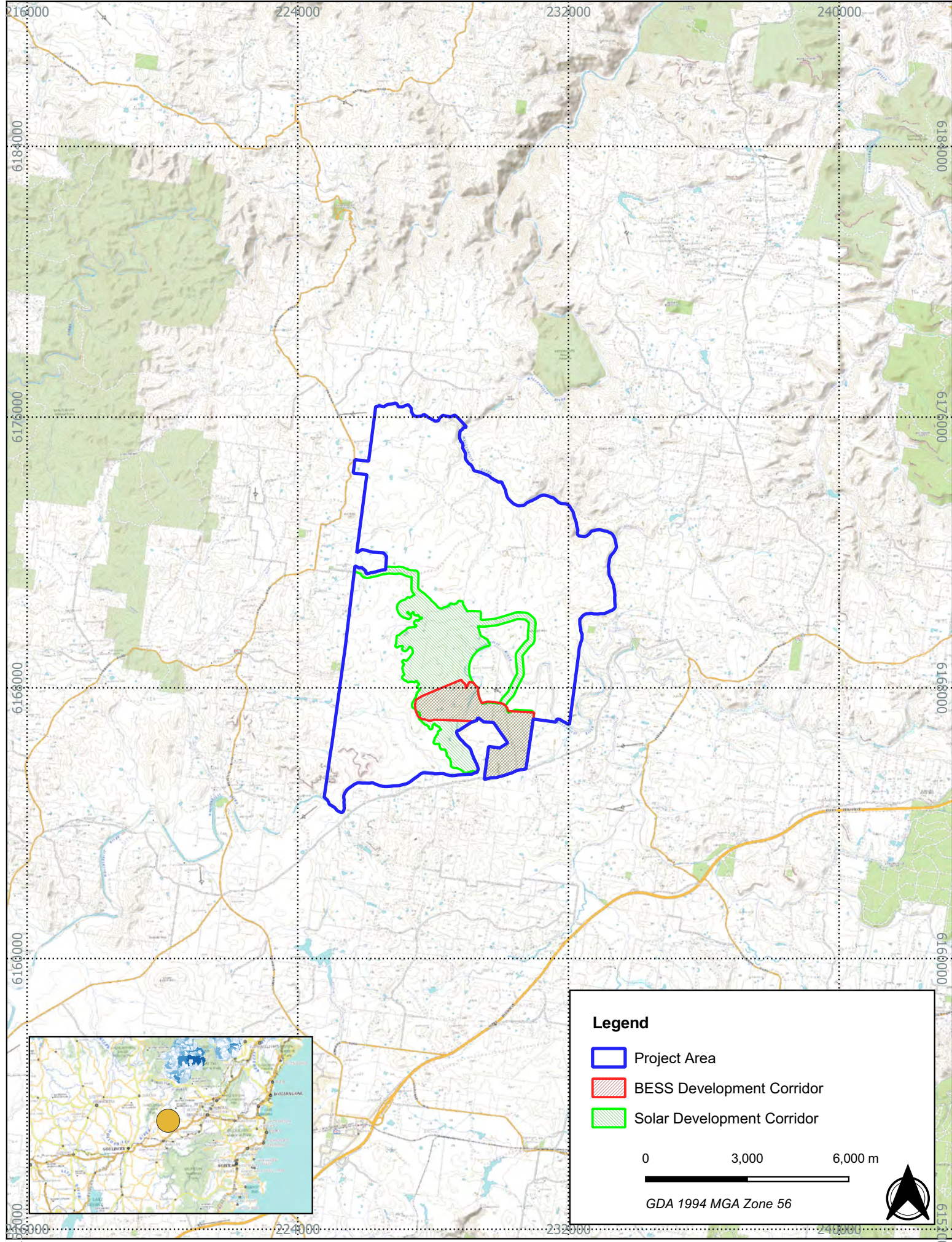


Figure 1 - Location of the project area
 22070 - Wattle Creek Solar Farm Scoping Project



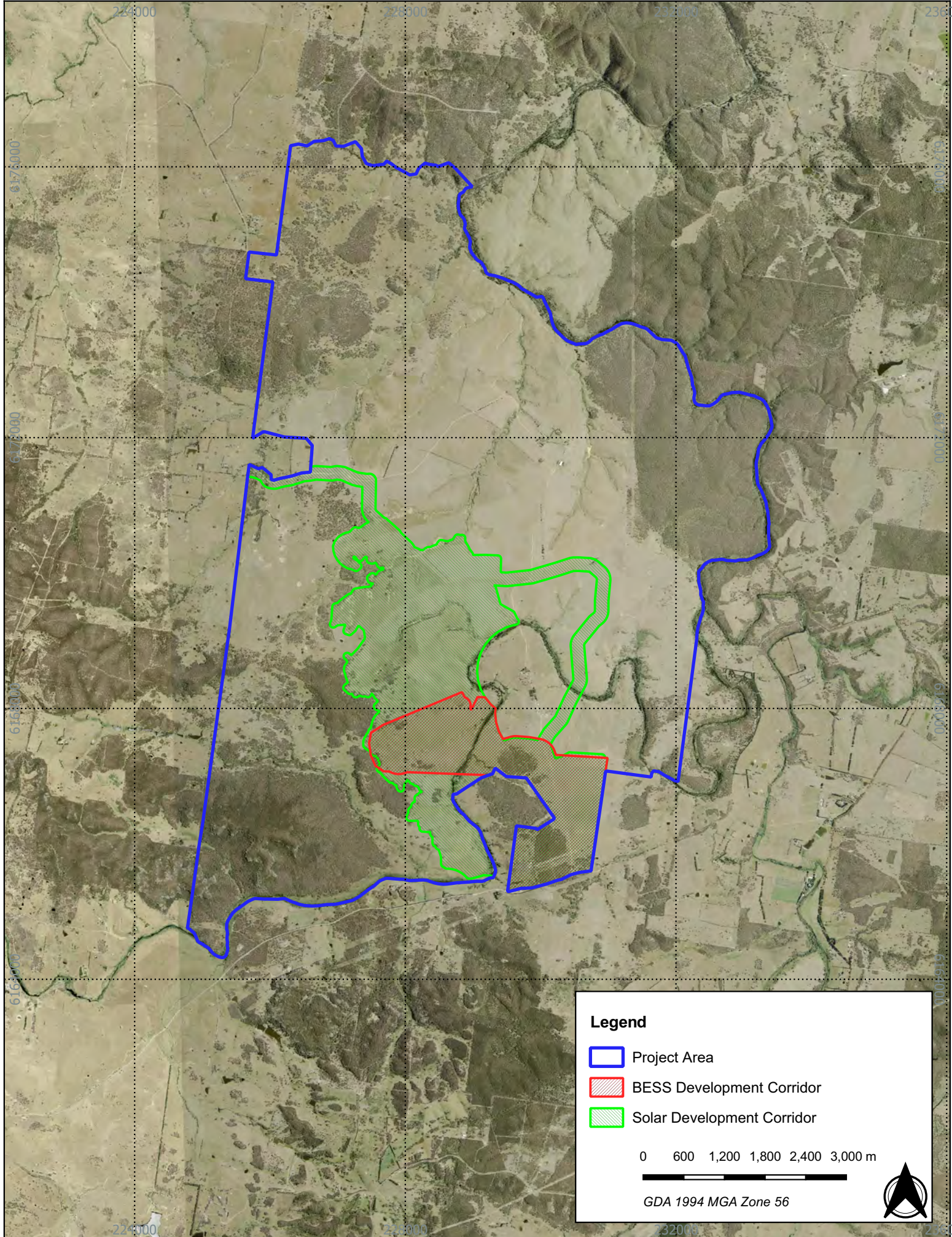


Figure 2 - Detailed aerial of the project area

22070 - Wattle Creek Solar Farm Scoping Project



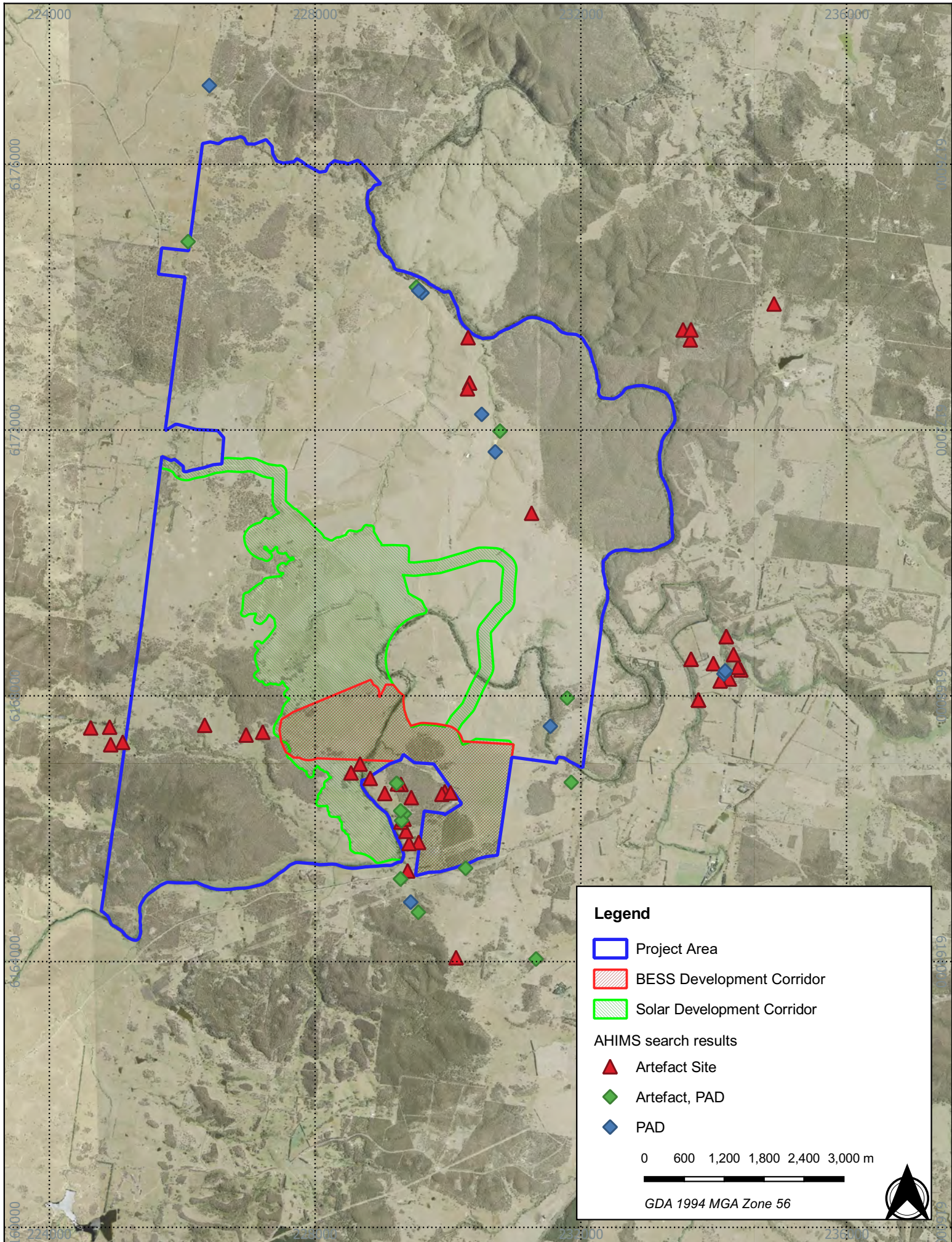
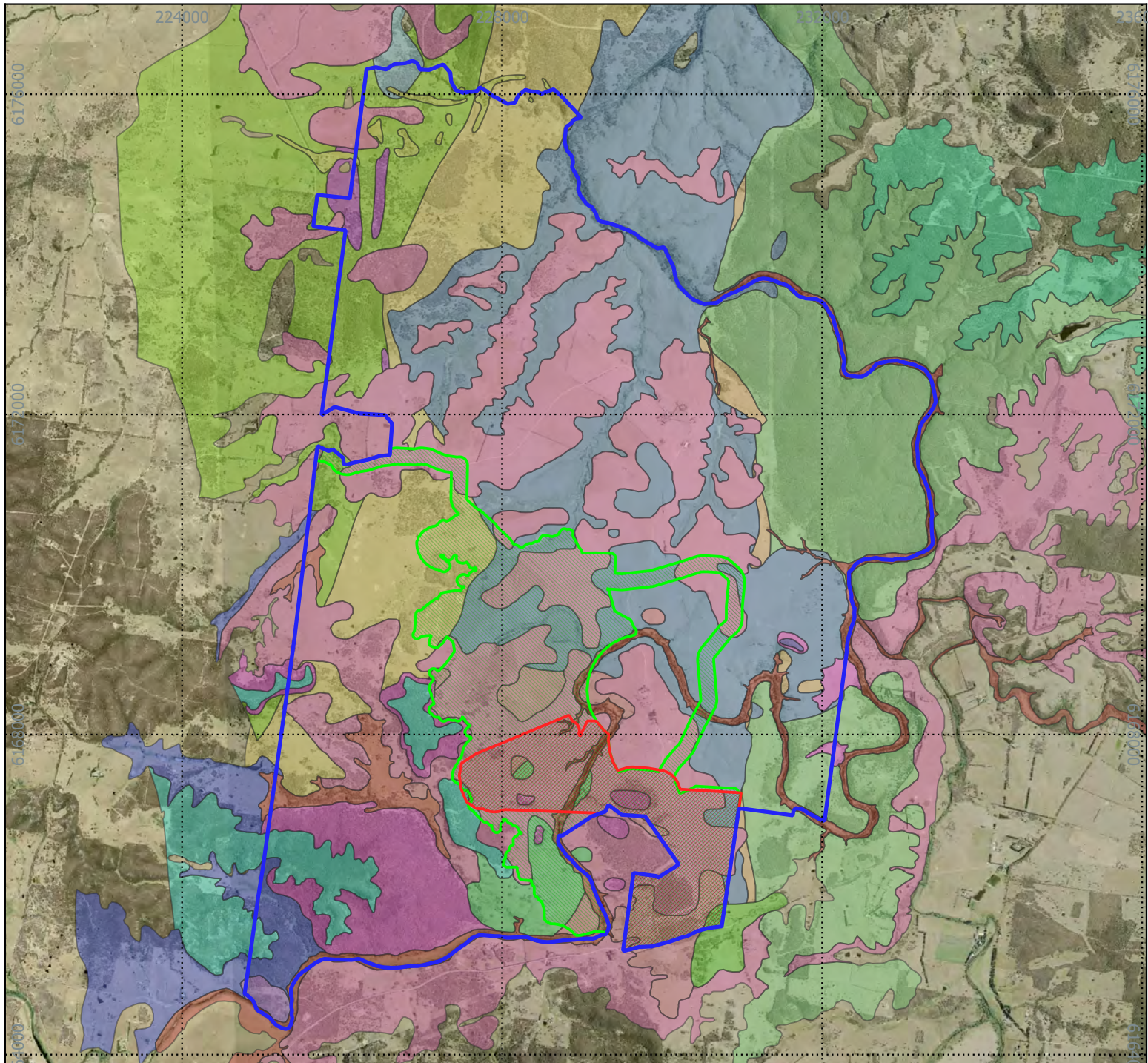


Figure 3 AHIMS search results

22070 - Wattle Creek Energy Hub - Wind Farm Scoping Project





Legend

- Project Area
 - Solar Development Corridor
 - BESS Development Corridor
- Extracted NSW Geological Units
- | | | |
|--|---|---|
| Abercrombie Formation | Berry Siltstone | Kerrawarra Dacite Member |
| Alluvium | Bindook Group - rhyolite | Kerrawarra Dacite Member, sandstone facies |
| Arthursleigh Tonalite | Bungonia Group | Pleasant Hill Granite |
| Barrallier Ignimbrite | Colluvial talus deposits | Residual deposits |
| | Colluvium | Southern Highlands Volcanics |
| | Joaramin Ignimbrite | Tallong Conglomerate |
| | Johnniefields Granodiorite | Ungrouped Cenozoic sedimentary units |
| | Kerillon Tuff Member | |

0 600 1,200 1,800 2,400 3,000 m

GDA 1994 MGA Zone 56



Figure 4 - Geology within the project area

22070 - Wattle Creek Solar Farm Scoping Project



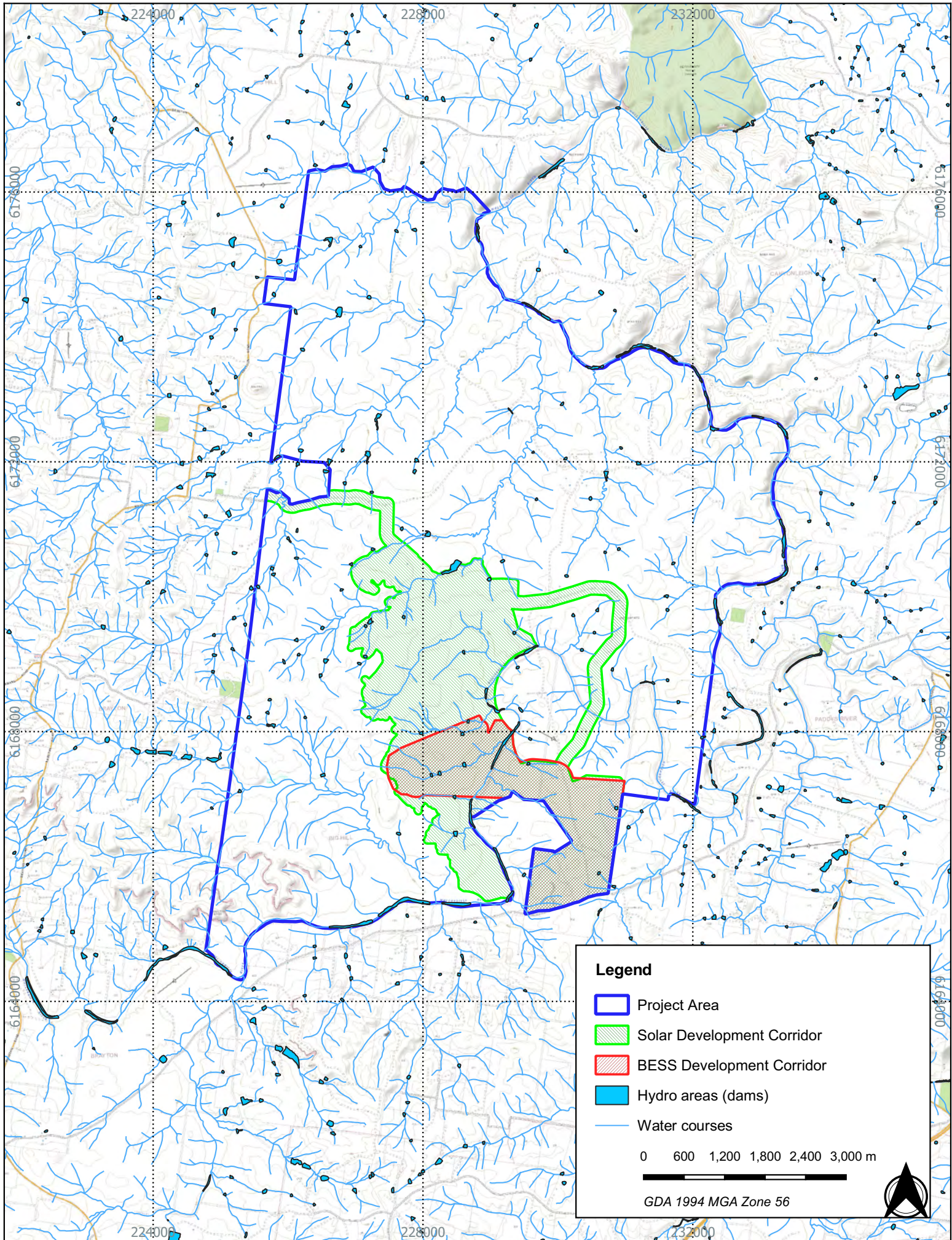


Figure 5 - Topography and hydrology of the project area

22070 - Wattle Creek Solar Farm Scoping Project



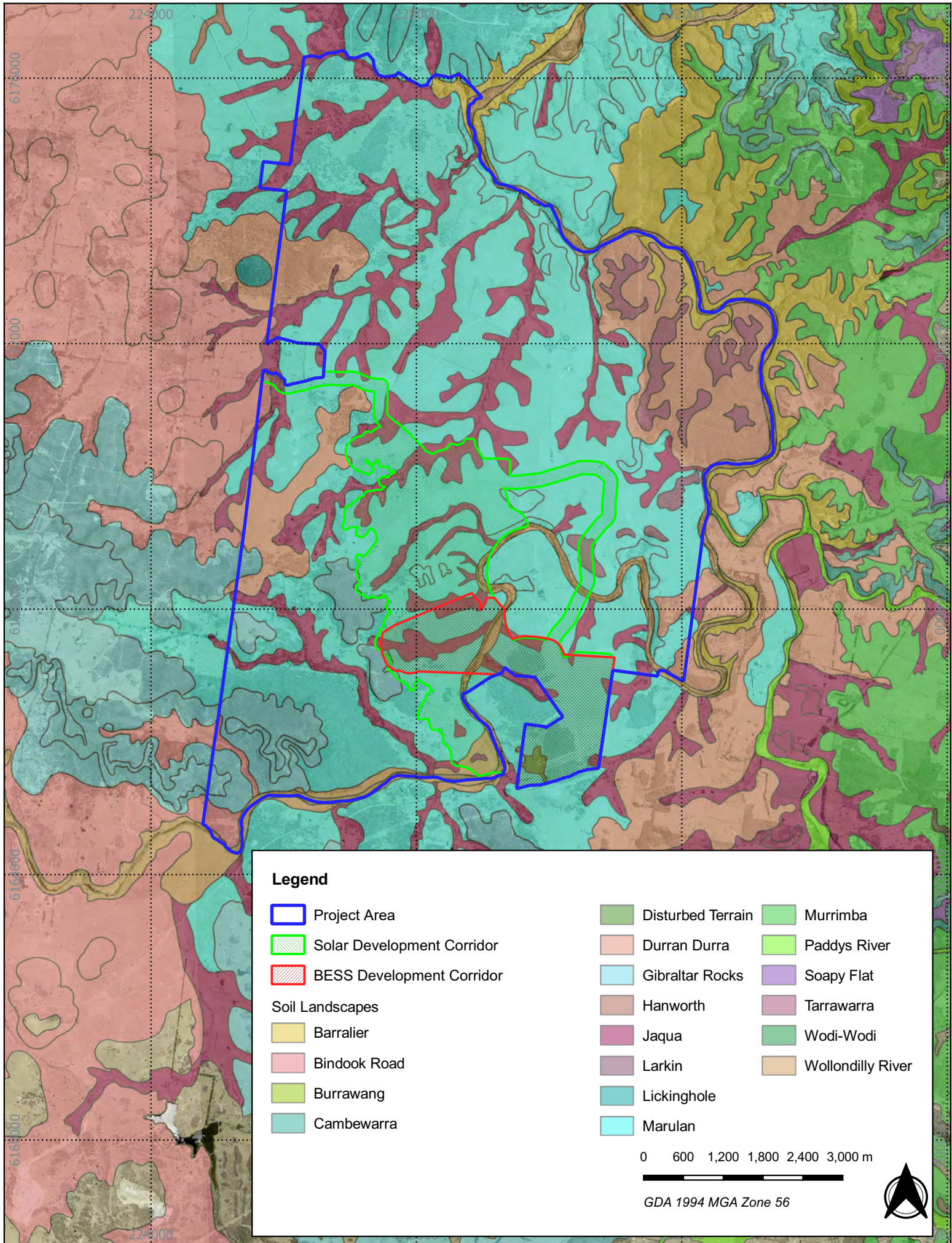
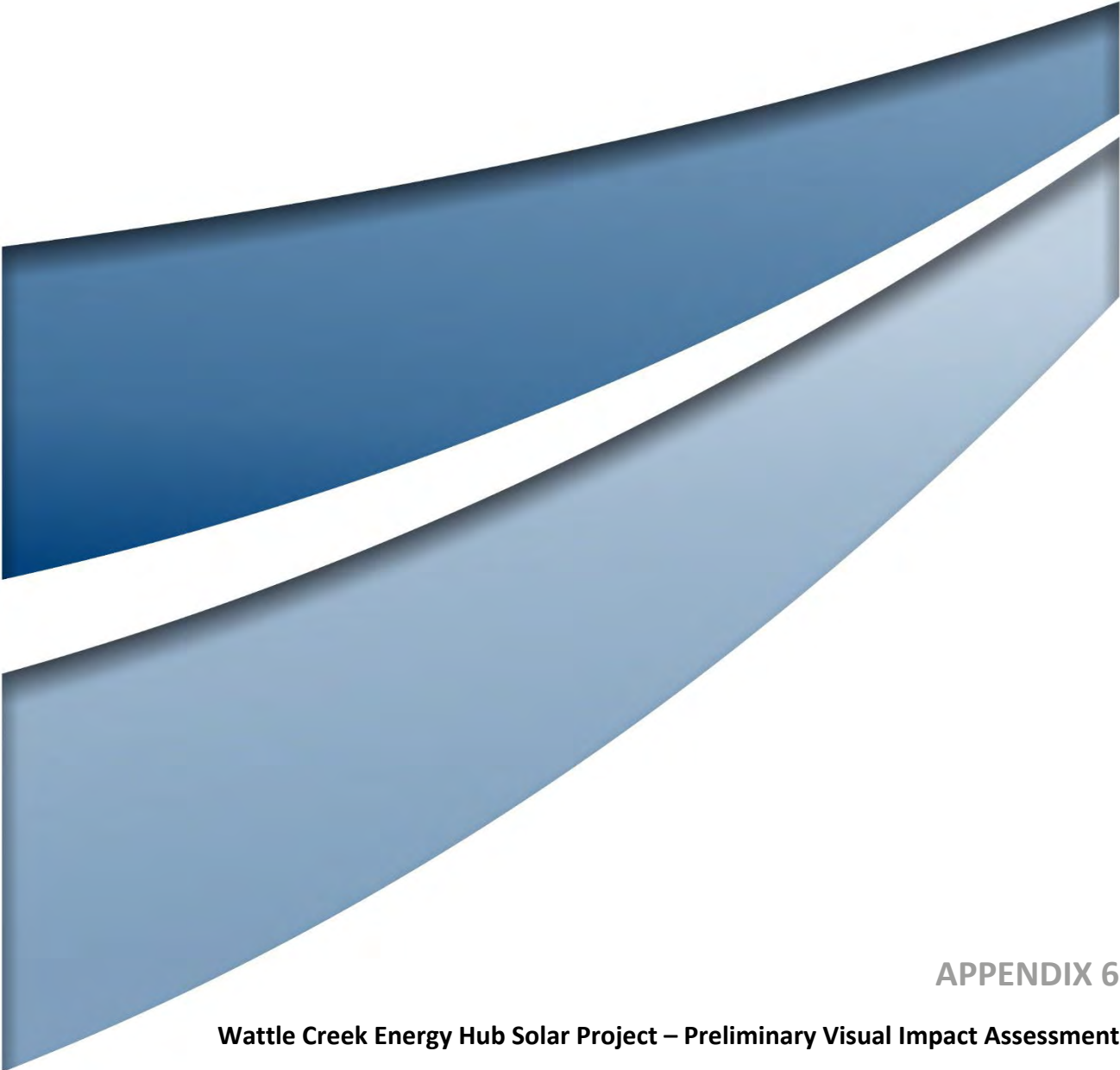


Figure 6 - Soil landscapes within the study area

22070 - Wattle Creek Solar Farm Scoping Project





APPENDIX 6

Wattle Creek Energy Hub Solar Project – Preliminary Visual Impact Assessment



Wattle Creek Solar Farm

Preliminary Visual Impact Assessment

Wattle Creek Solar Farm

Preliminary Visual Impact Assessment

Prepared for
Umwelt Pty. Ltd.

Issue
F

Date
20.09.2023

Project Number
2197

Revision	Date	Author	Checked	Comment
A	02.06.2023	SB	DM	For Review
B	25.07.2023	SB	AL	For Review
C	03.08.2023	SB	AR	For Review
D	07.08.2023	SB	-	For Review
E	01.09.2023	SB	-	For Review
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1.0 Introduction

1.1 Introduction

Spark Renewables (the Proponent) proposes to develop the Wattle Creek Energy Hub Project which includes a 265 megawatts (MW) solar farm and an 800 MW standalone Battery Energy Storage System (BESS). The Wattle Creek Energy Hub project is proposed to be located to the northeast of Marulan, NSW. The solar and BESS components will be progressed through separate approval processes.

Moir Landscape Architecture Pty Ltd (Moir LA) has been commissioned by Umwelt Pty Ltd on behalf of the Proponent to prepare a Preliminary Visual Impact Assessment (PVIA) for the proposed Wattle Creek Solar Farm, which is referred to hereafter as 'the Project'. This PVIA covers the assessment of the Wattle Creek Solar Farm only.

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

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

This PVIA will form part of the Scoping Report seeking the Secretary's Environmental Assessment Requirements (SEARs) in order to prepare an Environmental Impact Statement (EIS).

1.2 Relevant Experience

The Technical Supplement states: "*The applicant is expected to engage relevant professionals (for example: landscape architects, architects, environmental planners, geographers, or other visual assessment specialists) with demonstrated experience and capabilities. Experts should follow the guidance in this document to perform an effective and consistent assessment for large-scale solar energy development.*" (DPE, 2022b).

Moir LA is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact. Our team has extensive experience in undertaking Landscape and Visual Impact Assessments for large-scale infrastructure and renewable energy projects. In the context of our experience and with guidance from the Guideline and the Technical Supplement, we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project.

Recent experience includes the preparation of Preliminary and Landscape and Visual Impact Assessments (PVIA and LVIA) for the following Solar Energy Projects:

- *Bendemeer Solar Farm LVIA (Bendemeer, NSW)*
- *Middlebrook Solar Farm LVIA (Lomberah, NSW)*
- *Narragamba Solar Project PVIA (Stubbo, NSW)*
- *Dinawan Solar Farm PVIA (Coleambally, NSW)*
- *Blind Creek Solar Farm LVIA (Bungendore, NSW)*
- *Glenellen Solar Farm LVIA (Glenellen, NSW)*
- *Oxley Solar Farm LVIA (Castledoyle, NSW)*
- *Stubbo Solar and Battery Project PVIA & LVIA (Stubbo, NSW)*
- *Tilbuster Solar Farm LVIA (Tamworth, NSW)*

1.3 Overview of Preliminary Visual Impact Assessment for Solar Farms

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

- **Stage 1** - Preliminary Assessment
- **Stage 2** - Detailed Assessment

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

Stage 1 - Preliminary Assessment comprises of the application of the Preliminary Assessment Tools. The Preliminary Assessment Tools assist in the identification of viewpoint locations where a solar project may have impacts and warrant further consideration. This also provides the opportunity to identify potential impacts to inform and refine the proposed Solar Array Extent layout. The tools assist in identifying locations and viewpoints that are likely to experience little to no impacts which is useful in early consultation and ensures that field work and assessments are targeted only in areas with potential visual impacts.

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

2.0 Study Method

2.1 Study Method

The Guideline and Technical Supplement state that assessments for large-scale solar projects should include a landscape character assessment and visual impact assessment. It defines these two (2) components as the following:

- **Landscape Character Assessment:** *“This is the process for determining the overall impact of a project on an area’s character and sense of place including what people think and feel about it and how society values it.”* (DPE, 2022b).
- **Visual Impact Assessment:** *“This is the process for determining the day-to-day visual effects of a project on people’s views (what people see at a place, when they are there) from the private and public domain.”* (DPE, 2022b).

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

Preliminary Landscape Character Assessment:

This PVIA includes a preliminary landscape character assessment in order to assist with the determination of preliminary landscape character zones and the level of detail that may be required to develop a baseline analysis in the EIS phase. The findings of this assessment will assist in understanding sensitivities associated with the existing landscape.

Preliminary Visual Impact Assessment:

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

Community Consultation:

Community consultation has been undertaken through the scoping phase of the Project. The results of the community consultation will be utilised to gain perspective on the landscape values held by the community to inform the LVIA. Community consultation will continue through the EIS phase of the Project.

2.2 Report Structure

The following table provides an overview of the requirements of the Guideline and the Technical Supplement, and where these have been addressed in the PVIA:

Preliminary Visual Impact Assessment Report Structure:

PVIA Report:

Refer to Section 3.0: Project Overview

Guideline and Technical Supplement Requirements:

The assessment must include a full description of the proposed solar energy project design and use maps to show the location of the project in relation to viewpoints and surrounding landscapes identified for analysis.

Refer to Section 4.0: Community Consultation

The community should be engaged as early as possible to identify potential opportunities and constraints associated with the proposed development. The applicant should identify the elements of the project and the environmental assessment that can be influenced or shaped by the community.

Refer to Section 5.0: Preliminary Landscape Character Assessment

The applicant is encouraged to consult with the department in scoping its project to determine the level of detail that may be required in the landscape character assessment.

Section 6.0: Preliminary Visual Impact Assessment and Viewshed Mapping

A preliminary visual assessment must be included in an applicant’s scoping report as part of their request for the Secretary’s environmental assessment requirements (SEARs). The applicant can use viewshed mapping to further eliminate the need to assess viewpoints that fall below the lines in the Preliminary Assessment Tool if the analysis shows there is intervening terrain that would block line of sight to a particular viewpoint. The applicant should also consider undertaking a reverse viewshed analysis.

Section 7.0: Cumulative Visual Impacts

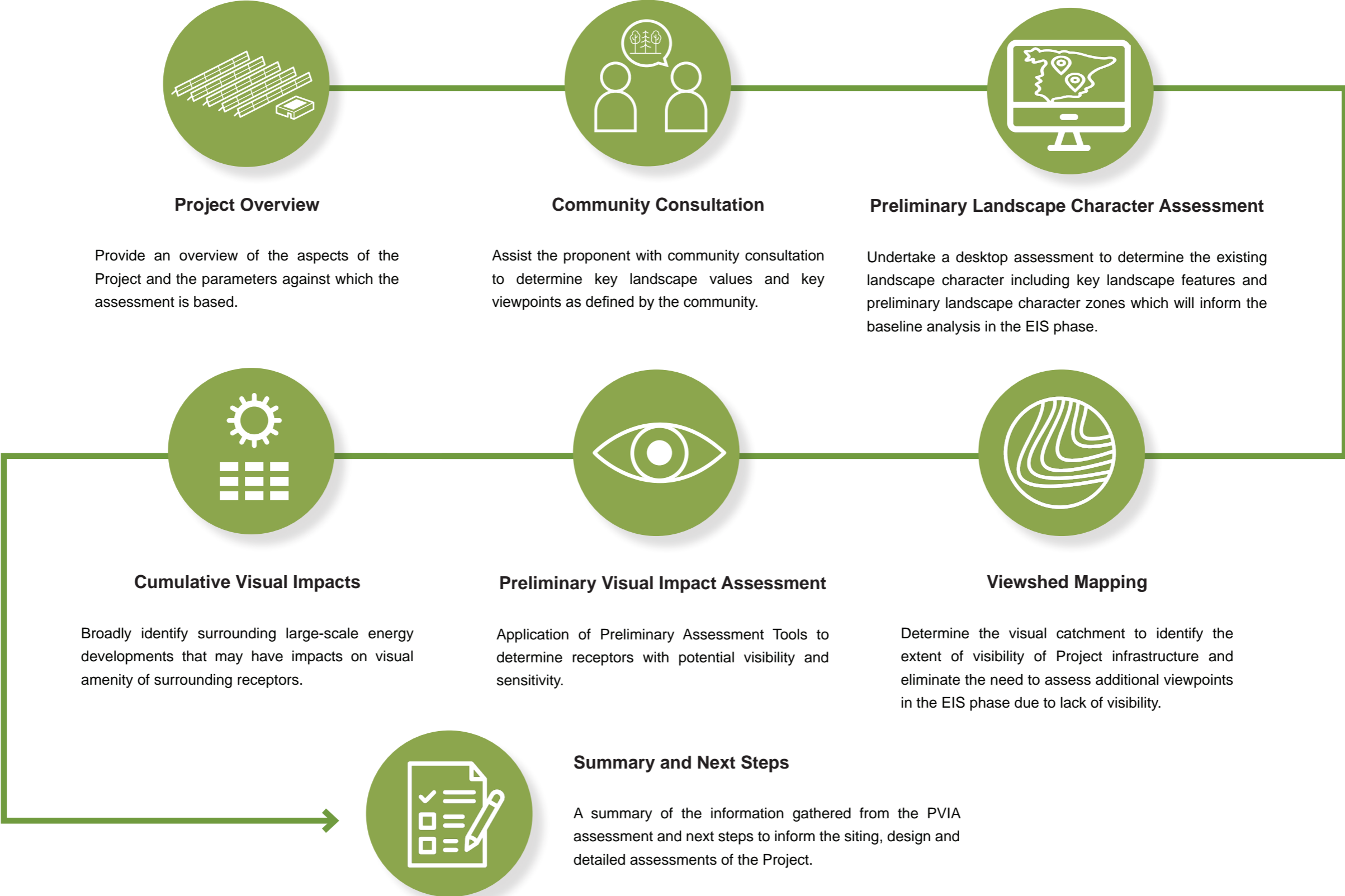
The baseline analysis should identify and describe (...) the location of any existing operational or approved large-scale energy developments within a regional and local context, including projects which may have the potential to create direct or indirect cumulative impacts with the project.

Section 8.0: Summary and Next Steps

Table 1 Overview of Report Structure

2.3 Steps Undertaken for PVIA

The following process has been undertaken to develop this PVIA:



3.0 Project Overview

3.1 The Project

The Wattle Creek Energy Hub Project Area (referred to hereafter as the 'Project Area') covers an area of approximately 6,200 hectares (ha). It is located 7.5 kilometres (km) northeast of Brayton, 8.5 km west of Canyonleigh and 12 km northeast of Marulan in the Upper Lachlan Shire Local Government Area (LGA). All land within the Project Area is owned by the University of Sydney. **Figure 1** shows the existing context around the Project Area.

The Wattle Creek Solar Farm (referred to hereafter as 'the Project') is comprised of a large scale solar photovoltaic (PV) facility with a generation capacity of approximately 265 MW (AC). The solar farm also includes associated infrastructure elements such as access tracks, operations and maintenance (O&M) facilities, test bed area, construction compounds and collector substation. The area that encompasses all proposed infrastructure related to the Project is referred to as the 'Development Corridor' in this PVIA. It covers an area of approximately 1199 hectares (ha).

The preferred point of connection of the Project to Transgrid's network is via the existing Marulan Substation, which is located on the lot adjacent to the Project Area on Canyonleigh Road, Brayton. An overhead transmission line will connect the Project's on-site collector substation to Marulan Substation. The final layout and capacity of the Project will be investigated during the preparation of the EIS and will be selected based on environmental constraints identification, outcomes of stakeholder engagement, engineering assessments and the final design of project infrastructure.

The Project will comprise of approximately 490,000 PV panels spread across an area of approximately 1,195 ha as shown in **Figure 2**. The modules will be installed in parallel rows with an indicative spacing of 5 - 10 metres (m) between each row. The modules will be aligned in a north-south direction to allow rotation from east to west. The estimated maximum height of the PV modules will be up to 4.7 m above ground level in a 2P configuration. The lower edge of each PV module in the maximum tilt position will be 0.3 m above ground level.

This visual impact assessment has been prepared utilising the worst-case scenario, that is, the maximum tilt position of **4.7 m**. However, it is noted that it is unlikely the position of the solar panels will stay at the maximum vertical position, and will adjust throughout the day. The solar arrays will be mounted to steel structures and utilise single axis tracking systems.

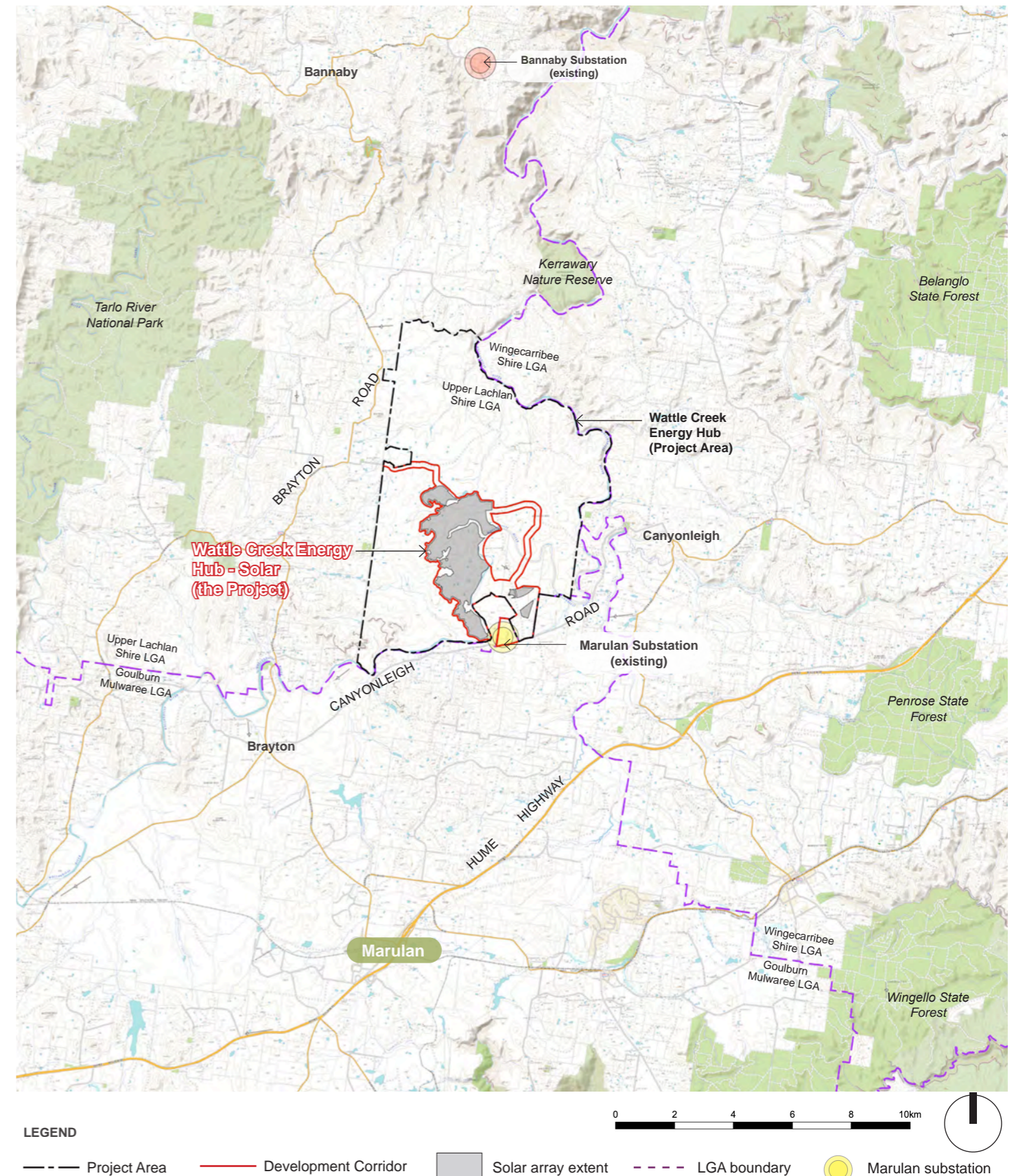


Figure 1 Site Context (Map Source: Six Maps 2013)

3.2 Key Project Components

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

- Approximately 490,000 PV modules (solar panels) using a single axis tracking system.
- Power conversion units (PCUs), a cable network and internal access tracks.
- Substation and transmission connection - including on-site collector substation and overhead powerlines to connect the solar farm to the electricity transmission network via Marulan Substation. An 80 m communication mast is also included at the substation location.
- Electrical connections – a combination of underground cables and overhead powerlines connecting solar facility to the on-site collector substation.
- O & M facility – including control rooms, O&M buildings, amenities, equipment sheds, storage and parking areas.
- Site access and internal access roads
- Road upgrades to facilitate the delivery of solar components to the development corridor on Canyonleigh Road.
- Temporary construction infrastructure to facilitate construction that is likely to include laydown and storage areas, and site offices.
- A research Test-Bed Facility – comprising of a 2 acre hardstand area, with a 200 kVA power supply and 100 kVA dummy load.

The proposed standalone BESS Project that forms part of the Wattle Creek Energy Hub will have a capacity of up to approximately 800 MW (AC or DC coupled) and will have provision for up to two (2) hours of storage (1600 MWh). Two potential locations are proposed however only one BESS will be constructed. The standalone BESS will be subject to a separate approval process, the potential cumulative impacts associated with this related development will be considered during the EIS phase.

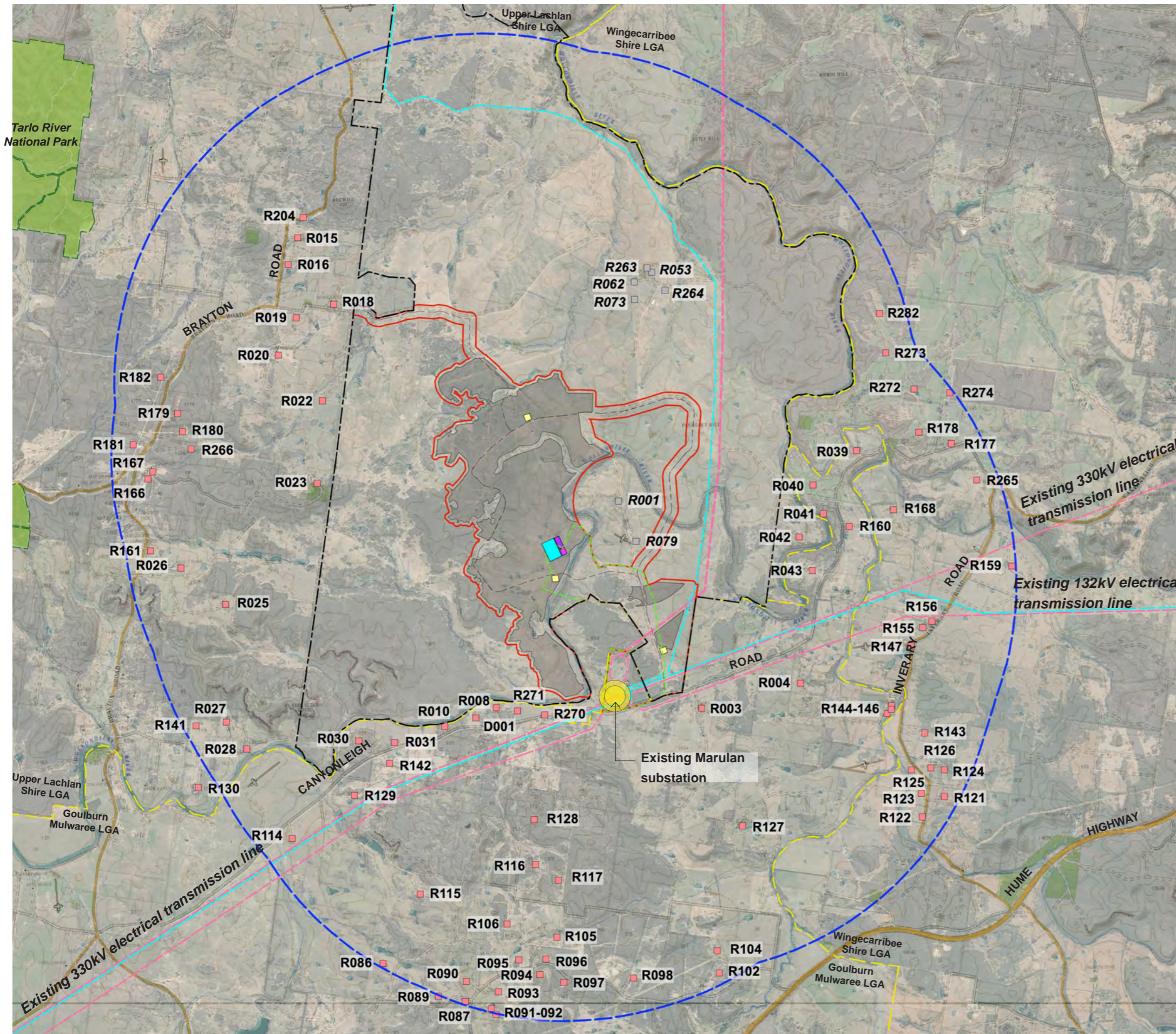
The Development Corridor will be accessed on the southern side via Canyonleigh Road. **Figure 2** provides a preliminary conceptual layout of the Project. Ongoing refinement of the proposed layout and technology will continue throughout the EIS process as a response to engineering design refinements, stakeholder negotiations and outcomes of environmental and social assessments, to minimise potential impacts where possible.

For the purposes of this report, 'Associated Dwellings' are defined as residences located within the Project Area on land hosting the proposed infrastructure. Associated dwellings are those located near the Project Area where the property owners have entered into an agreement with the Proponent. 'Non-associated Dwellings' are defined as residences near the Development Corridor that have not been the subject of an access licence and option agreement (landholder agreement) with the Proponent.

In accordance with the Technical Supplement, this report identifies the 'Study Area' as the land encompassed within 5 km of the proposed solar array extent which is shown in **Figure 2**.

Preliminary Project Layout

Wattle Creek Energy Hub - Solar



LEGEND

- Project Area
- Development Corridor
- Solar Array Extent
- Non-associated Dwellings
- Associated Dwellings
- Proposed Test Bed Area
- Proposed O&M facility location
- Proposed construction compound locations
- Proposed Collector Substation
- Proposed transmission easement corridor
- Proposed access track
- 5 km from the proposed solar array extent (defined as 'Study Area' in accordance with the Technical Supplement)
- Existing 132 kV electrical transmission line
- Existing 330 kV electrical transmission line
- Main Road
- Local Road
- Creeks and Gully Channels
- LGA boundary
- National Park
- Ridgelines
- Existing Marulan substation associated with gas fired power station



Figure 2 Preliminary Project Layout
(Map Source: ESRI Imagery 2023; Six Maps 2013)

4.0 Community Consultation

4.1 Preliminary Stakeholder Engagement and Consultation

The purpose of community consultation is to understand the current community perceptions in relation to the existing landscape features, scenic quality and to identify key public viewpoints. Community engagement will continue during the EIS phase of the Project and provide the community with opportunities to provide input into the LVIA. The intent is to:

- Undertake early and proactive community engagement with nearby residents and the wider community to identify and address any concerns.
- Ensure the layout of the Project will minimise potential visual impacts and reflect community feedback.
- Ensure mitigation measures proposed for the project are in consultation with the relevant landowners.

4.2 Results of Preliminary Stakeholder Engagement and Consultation

Community consultation has helped establish an understanding of stakeholder needs and potential issues. The Proponent circulated a community consultation questionnaire to ask respondents to identify distinctive landscape characteristics, key viewpoints, landscape values and opinions on reduction of visual impact for the overall Wattle Creek Energy Hub. The following section provides an overview of responses that are relevant to the Project.

4.2.1 Key landscape characteristics

There were twelve (12) responses to the question: ***“What are the landscape characteristics of your local area that make it distinct? What words would you use to describe how this place looks and feels to a friend?”***

Participants listed the following:

- *The area has the most magnificent views, offering far reaching and uninterrupted vistas to the west and south/south west, for as far as you can see.*
- *Wide open skies, similar to big sky country in America. Quiet roads with abundant wildlife. Watch out as you drive down the hill to Paddys river or the Wollondilly river for the echidnas coming out of the trees or the platypuses in the streams.*

- *Beautiful rolling countryside with outstanding views and large areas of bush land. Abundant and threatened local flora and fauna. Stunning escapements and wonderful bushwalks.*
- *Rural farming community*
- *Peaceful yet connected, pristine, quiet. Rare and valuable. Beautiful and hard to find.*
- *Gibraltar rocks*
- *Open green landscape. County feel. Peaceful and quiet*
- *Hills, gorges, trees and farms*

4.2.2 Key Public Viewpoints

Participants were asked the question: ***“What are the best lookouts/ public viewing areas in the area? If you have a visitor, where do you take them to showcase your local area?”***

A total of ten (10) responses were given. They included the following public locations:

- Canyonleigh Road
- Tugalong Road
- Mount Penang
- Baldy Billy Peak
- Guula Ngurra National Park

4.2.3 Landscape Features and Value

Participants were asked to respond to the question: ***“Are there any areas or landscape features surrounding or within the proposed Project site that are of significant value to yourself, your business, or your community?”***

Nine (9) responses were given. The following is a summary of what was listed:

- Grazing land, open paddocks and fields
- Unencumbered hills, ranges, plateaus, valleys and mountains
- Winding rivers
- Bushland, plants and nature

4.0 Community Consultation

- Open, 'big sky' country, without light pollution
- Gibraltar Rocks
- Wildlife

4.2.4 Visual Impact and Appeal

Participants were asked: ***“Are there things Spark Renewables could do to reduce the visual impact of the project to make it more visually appealing?”***

Eleven (11) responses were given. The following provides an overview of the responses:

- Have solar panels instead of turbines
- Consider another site in a more developed area

Additional consultation and further detailed assessment will be undertaken during the EIS phase.

5.0 Preliminary Landscape Character Assessment

5.1 Existing Visual and Landscape Character

The Technical Supplement states: *'the study area for the landscape character assessment should generally be approx. 5 km from the proposed development'* (DPE, 2022b).

For the purposes of this assessment, the 'Study Area' is defined as the land encompassed within 5 km of the proposed solar array extent as shown in **Figure 2 and 3**. The Study Area forms the basis for this Landscape Character Assessment.

The Project is proposed on the northern side of Canyonleigh Road and approximately 12 km northeast of Marulan within the Upper Lachlan Shire LGA. Canyonleigh Road is a local road that runs east and provides access to the Hume Highway. Other low use roads identified in the Study Area include:

- Arthursleigh Road which located to the northwest of the Project and runs further west to connect with Brayton Road.
- An unsealed public road that emerges from Canyonleigh Road provides access to the Wollondilly River Weir which is located on the eastern side of the Project .

The surrounding land parcels typically include modified land that support agricultural activities such as grazing over modified and native pastures. Topography is generally flat to gently undulating within the Development Corridor and within the northern and central parts of the Study Area. Hills with patchy vegetation that are predominantly used for grazing are visible to the north, east and west of the Development Corridor. Community consultation identified Gibraltar Rocks as a key landscape feature. The land encompassed by Gibraltar Rocks is currently categorised as *RU2 - Rural Landscape* as per the Upper Lachlan LEP 2010 (Upper Lachlan Shire Council, 2010). No recreational activity has been identified at this location.

The Study Area includes significant waterways such as Wollondilly River and Paddys River. A number of ephemeral creeks and waterways that drain into these rivers also exist within the Study Area. Wollondilly River had been identified as the most significant waterway that crosses the Development Corridor and meanders along the northwest as shown in **Figure 2**.

Sandy Creek and Island Creek emerge from Wollondilly River on the northern side of the Development Corridor. Gibraltar Creek also emerges from Wollondilly River and is located on the western side of the Development Corridor. Uringalla Creek runs generally north-south and merges with Paddys River

on the southern side of the Development Corridor. Vegetation generally follows the creeklines and waterway areas and is a key landscape feature when travelling through the Study Area.

Roadside vegetation is prominent along majority of Canyonleigh Road and Brayton Road. Vegetation along the stretch of Canyonleigh Road that is closest to the Development Corridor varies from dense to patchy as one travels from east to west. Wind break vegetation is visible in some areas surrounding residences.

The Goulburn Mulwaree LEP 2009 also identifies land parcels categorized as *C3 - Environmental Management* that are located further to the south of the Development Corridor. In accordance with the LEP, these areas have a limited range of development and have special ecological and scientific value (Goulburn Mulwaree Council, 2009).

5.2 Existing Landscape Character Zones

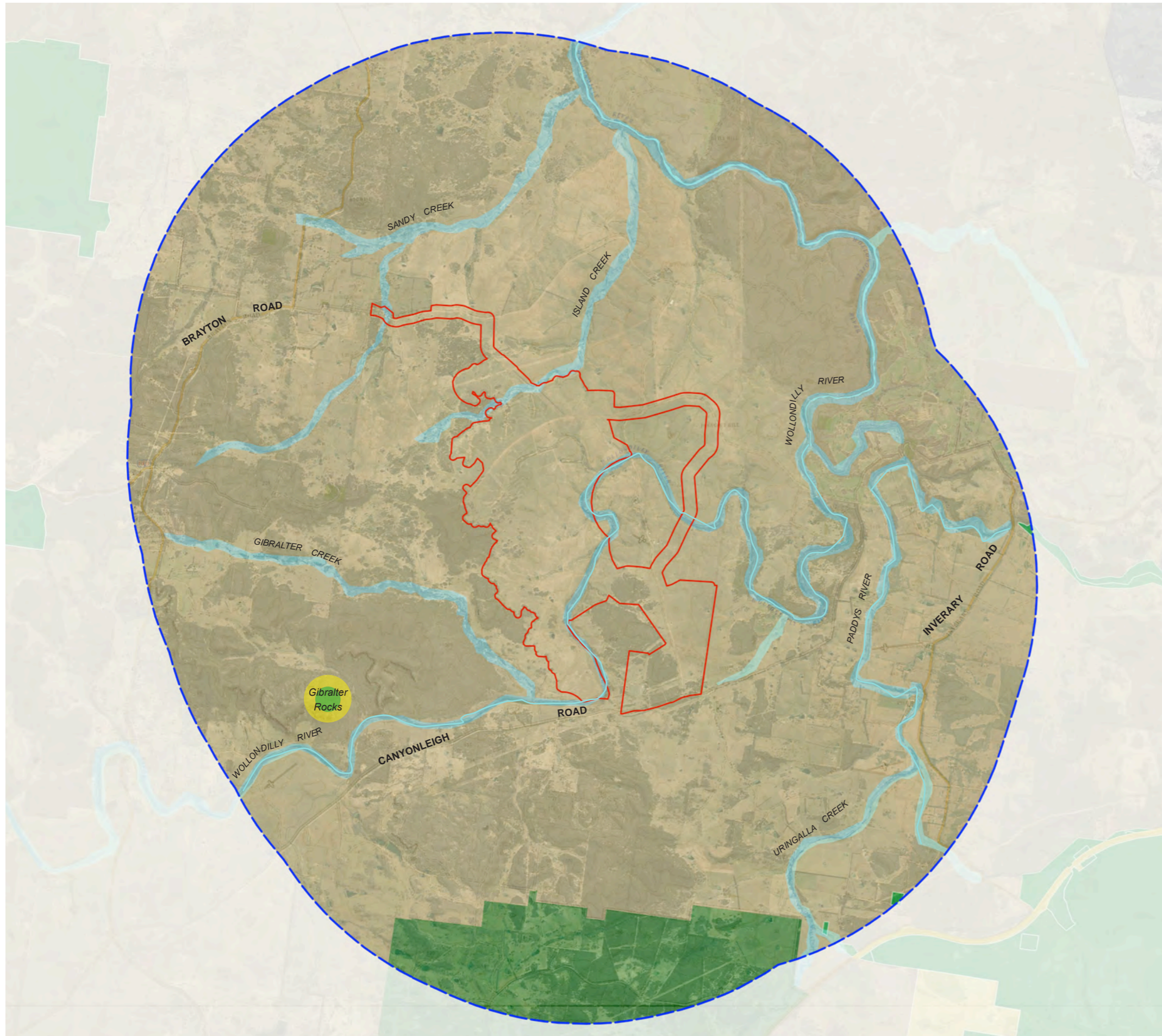
The Technical Supplement states: *'If the landscape includes distinct areas that have different qualities, the study area should be broken down into different character zones. Landscape character zones (LCZs) should divide the landscape based on common distinguishing visual characteristics. These patterns are formed by combinations of vegetation, water bodies, landforms and land use, from which key landscape features can also be identified.'*

A preliminary desktop assessment indicates typical existing LCZ identified within the Study Area form a precursory baseline for character assessment which will be assessed in detail in the EIS.

Figure 3 indicates the preliminary LCZ's identified through a desktop assessment. A summary of the preliminary LCZ's identified is provided in **Table 2** below.

Preliminary Landscape Character Zones	
Code	Name
LCZ01	Grazing
LCZ02	Waterways
LCZ03	Native Forests and Conservation Areas

Table 2. Overview of Landscape Character Zones



Preliminary Landscape Character Zones

Wattle Creek Energy Hub - Solar

LEGEND

- Development Corridor
- Main Road
- Local Road
- 5 km from the proposed solar array extent (defined as 'Study Area' in accordance with the Technical Supplement)
- LCZ01: Grazing
- LCZ02: Waterways
- LCZ03: Native Forests and Conservation Areas
- Key Landscape Feature



Figure 3 Landscape Character Zones
(Map Source: ESRI Imagery 2023, Six Maps 2013)

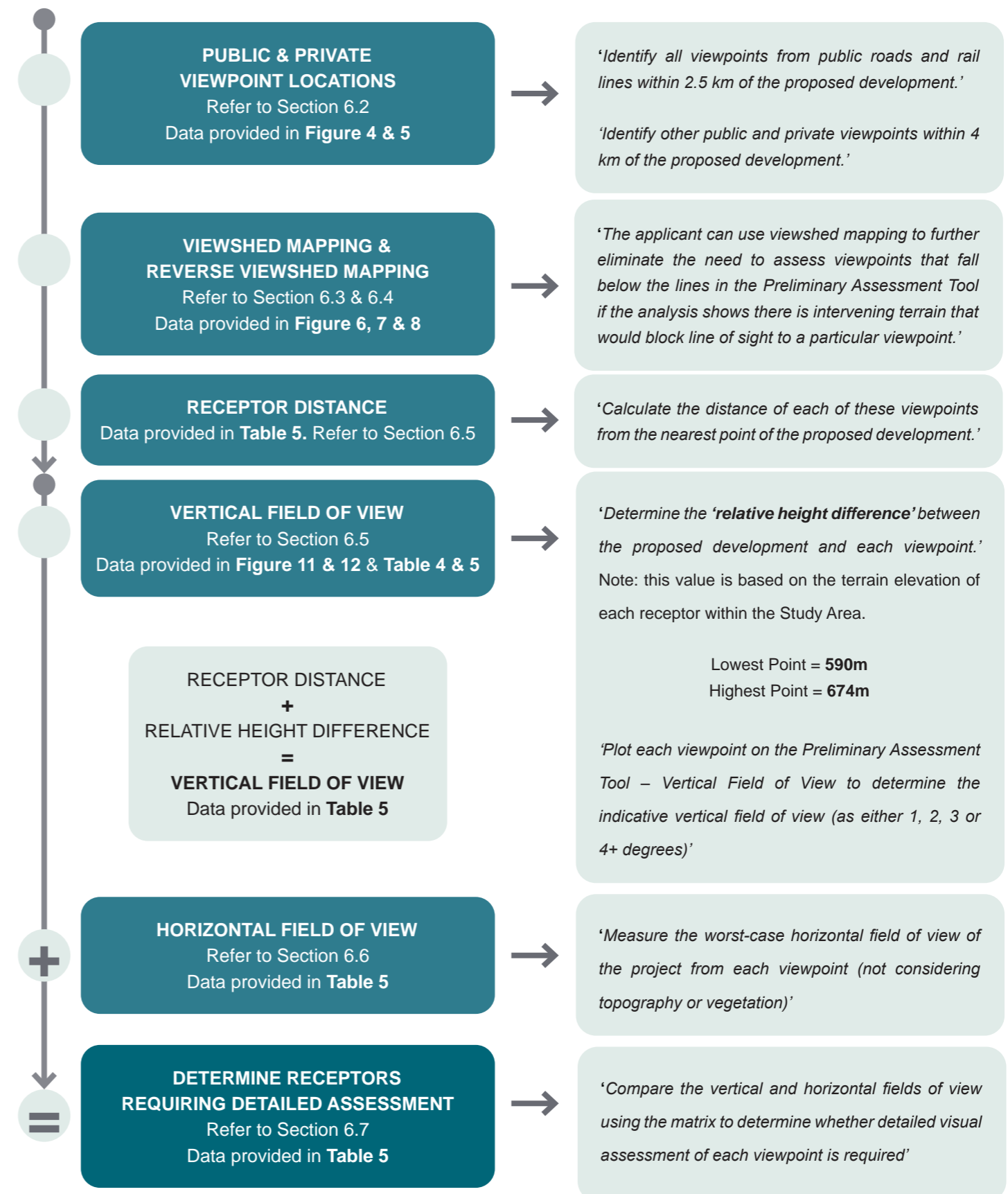
6.0 Preliminary Visual Impact Assessment

6.1 Preliminary Visual Impact Assessment

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

The preliminary assessment tools must be used to identify viewpoints that require detailed assessment in the EIS. The tools can be used to eliminate the need to assess viewpoints that are likely to experience very low impacts. This is assessed using on the vertical and horizontal field of view that a development is likely to occupy when viewed from each viewpoint and is influenced by distance, height elevation changes, and width of a project (DPE, 2022). The flowchart provides an overview of the requirements of the Preliminary Assessment (in accordance with the Section 3.1.1 of the Technical Supplement) and the relevant sections of the report where these have been addressed.

49 residences were identified within 4 km of the proposed solar array extent. Of these, seven (7) residences within the Project Area and have been identified as ‘Associated Dwellings’. The remaining 42 were identified as ‘Non-associated Dwellings’.



6.2 Viewpoint Selection and Preliminary Assessment Tool

The following provides an overview of the viewpoint selection process. Selected viewpoints have been illustrated in **Figure 4**. Further refinement of the viewpoints will be undertaken in the preparation of the LVIA.

Public Roads and Rail Lines:

In accordance with the Technical Supplement, all viewpoints from public roads and rail lines within 2.5 km of the proposed solar array extent must be assessed. A total of seven (7) public viewpoints have been selected to represent roads within 2.5 km of the proposed solar array extent.

Other public and private viewpoints:

In accordance with the Technical Supplement, other public and private viewpoints within 4 km of the proposed solar array extent must be identified and assessed. 49 residences were identified within 4 km of the Project. Of these, seven (7) residences were identified as 'Associated Dwellings' and 42 were identified as 'Non-associated Dwellings'. It should be noted that some dwellings located on the southern and eastern sides of the proposed solar array extent are surrounded by dense vegetation.

Additional viewpoints:

The Technical Supplement states: *"Additional viewpoints should be considered if ancillary infrastructure, such as substations, have the potential to cause impacts beyond the distances prescribed in the tool."* (DPE, 2022b). It should be noted that the viewpoints selected for assessment also consider the proposed location of associated infrastructure. However, it is noted that this will be assessed once associated infrastructure layout has been confirmed.

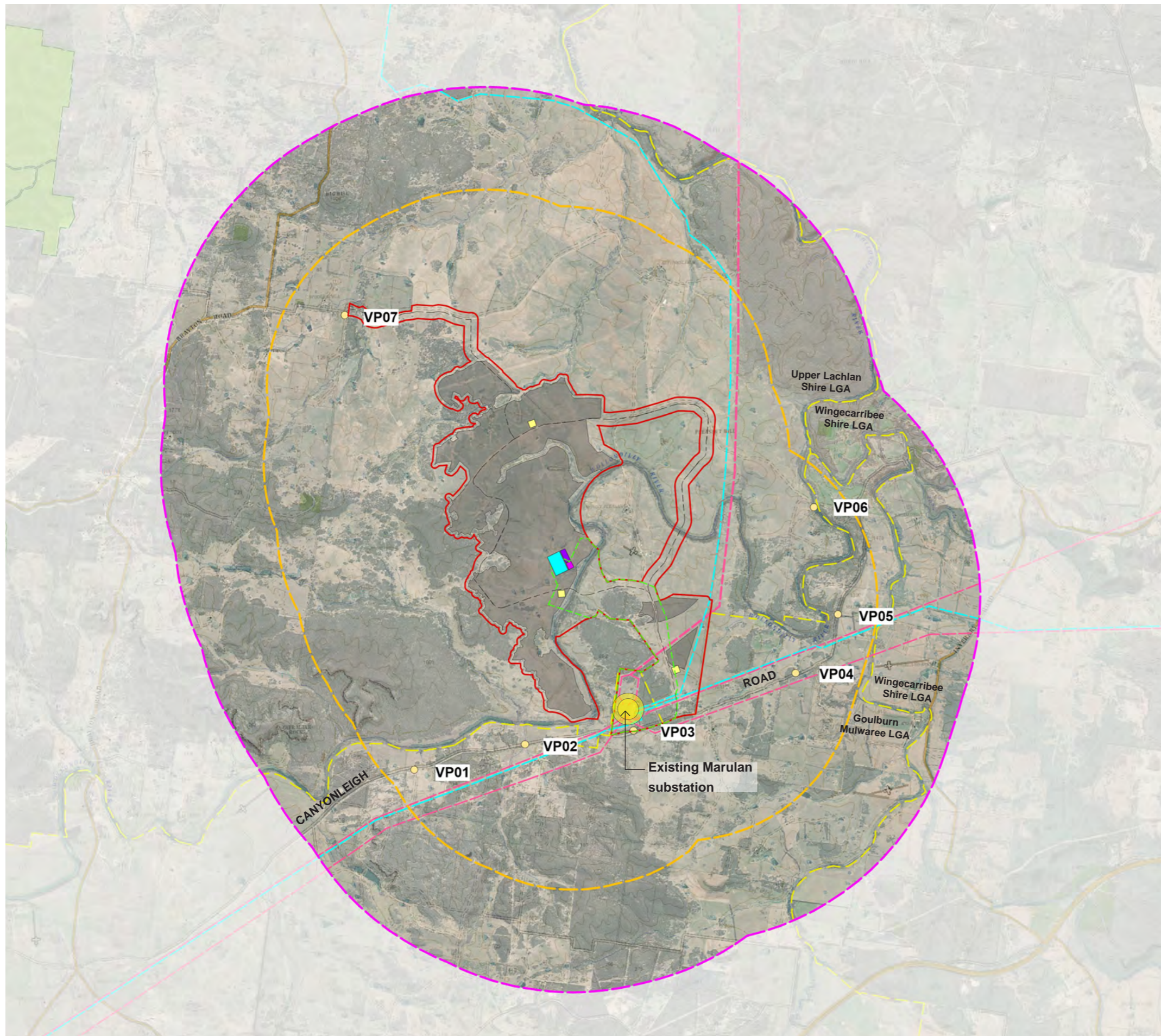
Assessment Parameters:

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

Moir LA have considered 2.5 km and 4 km buffers from the proposed solar array extent to identify preliminary visual impacts for a more refined approach. Assessment will be refined in the LVIA and will account for any further revisions to the solar array extent.

Public Viewpoint Locations

Wattle Creek Energy Hub - Solar



LEGEND

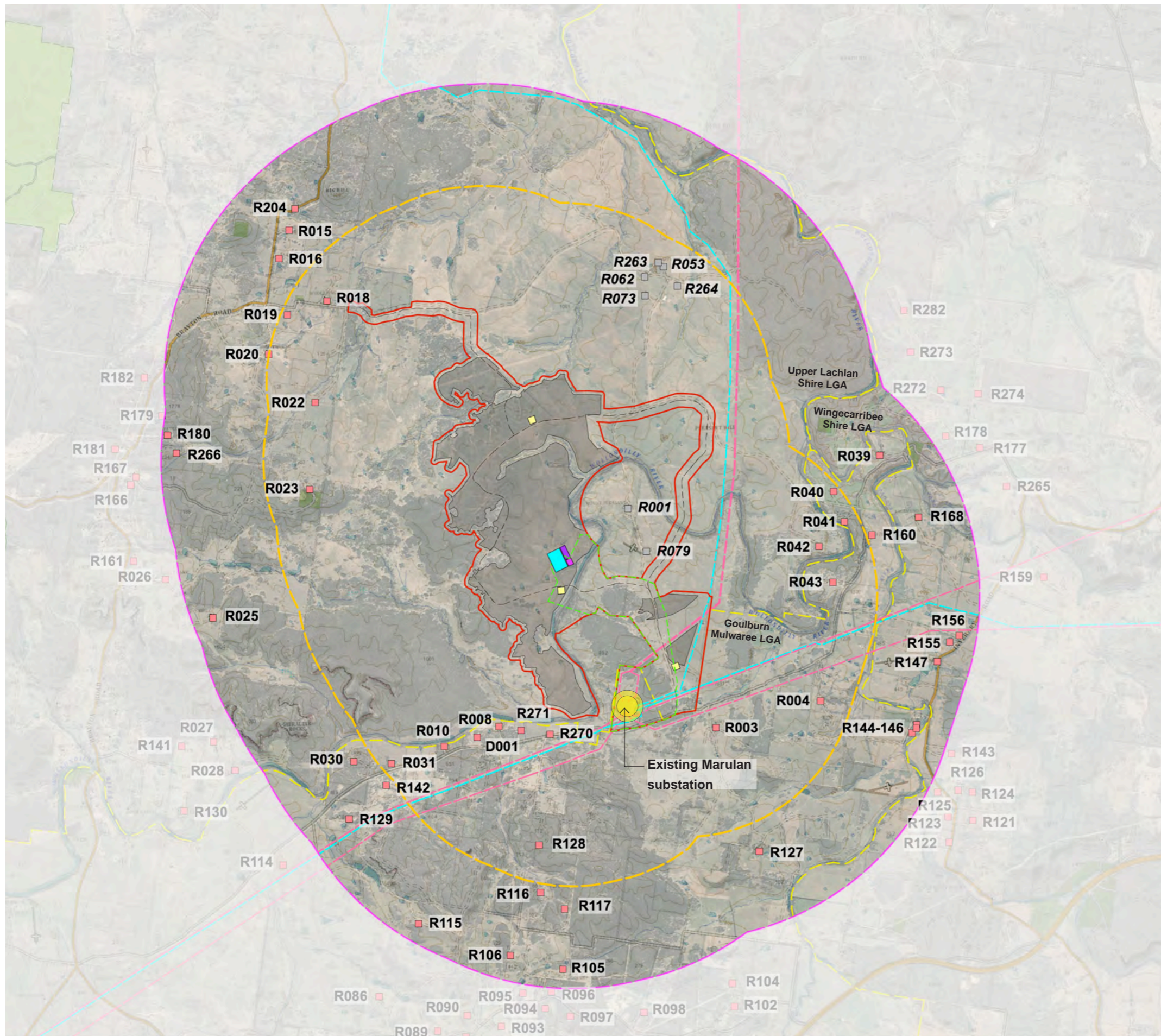
- Development Corridor
- Solar Array Extent
- VP01 Public Road Viewpoint Locations
- 2.5 km from the proposed solar array extent
- 4 km from the proposed solar array extent
- Proposed Control Room location
- Proposed O&M facility location
- Proposed construction compound locations
- Proposed Collector Substation
- Proposed transmission easement corridor
- Proposed access track
- Existing 132 kV electrical transmission line
- Existing 330 kV electrical transmission line
- Main Road
- Local Road
- Creeks and Gully Channels
- LGA boundary
- Ridgelines
- Existing Marulan substation associated with gas fired power station



Figure 4 Public Viewpoint Locations
(Map Source: ESRI Imagery 2023, Six Maps 2013)

Private Viewpoint Locations

Wattle Creek Energy Hub - Solar



LEGEND

- Development Corridor
- Solar Array Extent
- Non-associated Dwellings
- Associated Dwellings
- 2.5 km from the proposed solar array extent
- 4 km from the proposed solar array extent
- Proposed Control Room location
- Proposed O&M facility location
- Proposed Collector Substation
- Proposed construction compound locations
- Proposed transmission easement corridor
- Proposed access track
- Existing 132 kV electrical transmission line
- Existing 330 kV electrical transmission line
- Main Road
- Local Road
- ~ Creeks and Gully Channels
- LGA boundary
- Ridgelines
- Existing Marulan substation associated with gas fired power station

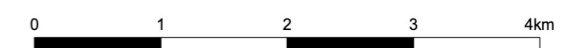


Figure 5 Private Viewpoint Locations
(Map Source: ESRI Imagery 2023, Six Maps 2013)

6.3 Viewshed Mapping

A viewshed map identifies all areas from which a development may be viewed. Viewshed mapping can be achieved by using geographic information systems (GIS) that account for topography and line of sight between viewpoints and the Project. The purpose of the viewshed map is to further eliminate the need to assess viewpoints that fall below the lines in the Preliminary Assessment Tool if the analysis shows there is intervening terrain that would block line of sight to a particular viewpoint.

Viewshed mapping was undertaken to eliminate viewpoint locations that will not have a line of sight to the proposed solar panels (refer to **Figure 6** and **7**). It is important to note that the viewshed map provides an assessment based on topography alone and does not take into account intervening elements such as vegetation and structures. The viewshed map, therefore, represents a theoretical worst case scenario.

Viewshed mapping has been undertaken based on a maximum panel height of 4.7 m

Summary of Viewshed Map:

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

- Due to the gently undulating terrain within the Study Area and its surrounds, the viewshed map indicates that the proposed solar array extent has the potential to be visible, to varying degrees, in areas surrounding the Development Corridor. Views towards a larger proportion of the proposed solar array extent may be available to the east and south of the Development Corridor, as well as areas that are elevated and located south of Canyonleigh Road.
- The viewshed map indicates that areas generally to the north, west, southwest and further to the east along Canyonleigh Road and Inverary Road have the potential to experience views of between 1-25% of the proposed solar array extent.
- Approximately 26 Non-associated Dwellings surrounding the proposed solar array extent were identified as having the potential to view the proposed solar panels. The remaining 16 Non-associated Dwellings will not be able to view the proposed solar panels.
- Areas that have the potential to view the majority of the solar array extent include a section of Canyonleigh Road located immediately south of the Development Corridor near the existing Marulan substation and Non-associated Dwelling R128 which is located at higher elevation. Non-associated Dwellings such as R155 and R156 may view up to 25 - 50% of the proposed solar array extent.

- Areas further to the northwest near Big Hill and southeast near Paddys River and Uringalla Creek are not likely to have any views of the proposed solar array extent due to topographic changes.

6.4 Reverse Viewshed Mapping

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

Figure 8 represents a reverse viewshed map that takes into account a total of 42 Non-associated Dwellings located within 4 km of the nearest proposed solar array panel. This figure shows parts of the proposed solar array extent that are likely to be visible from these Non-associated Dwellings. This assessment also represents a bare ground scenario, i.e., a landscape without intervening elements such as vegetation and structures.

Summary of Reverse Viewshed Map:

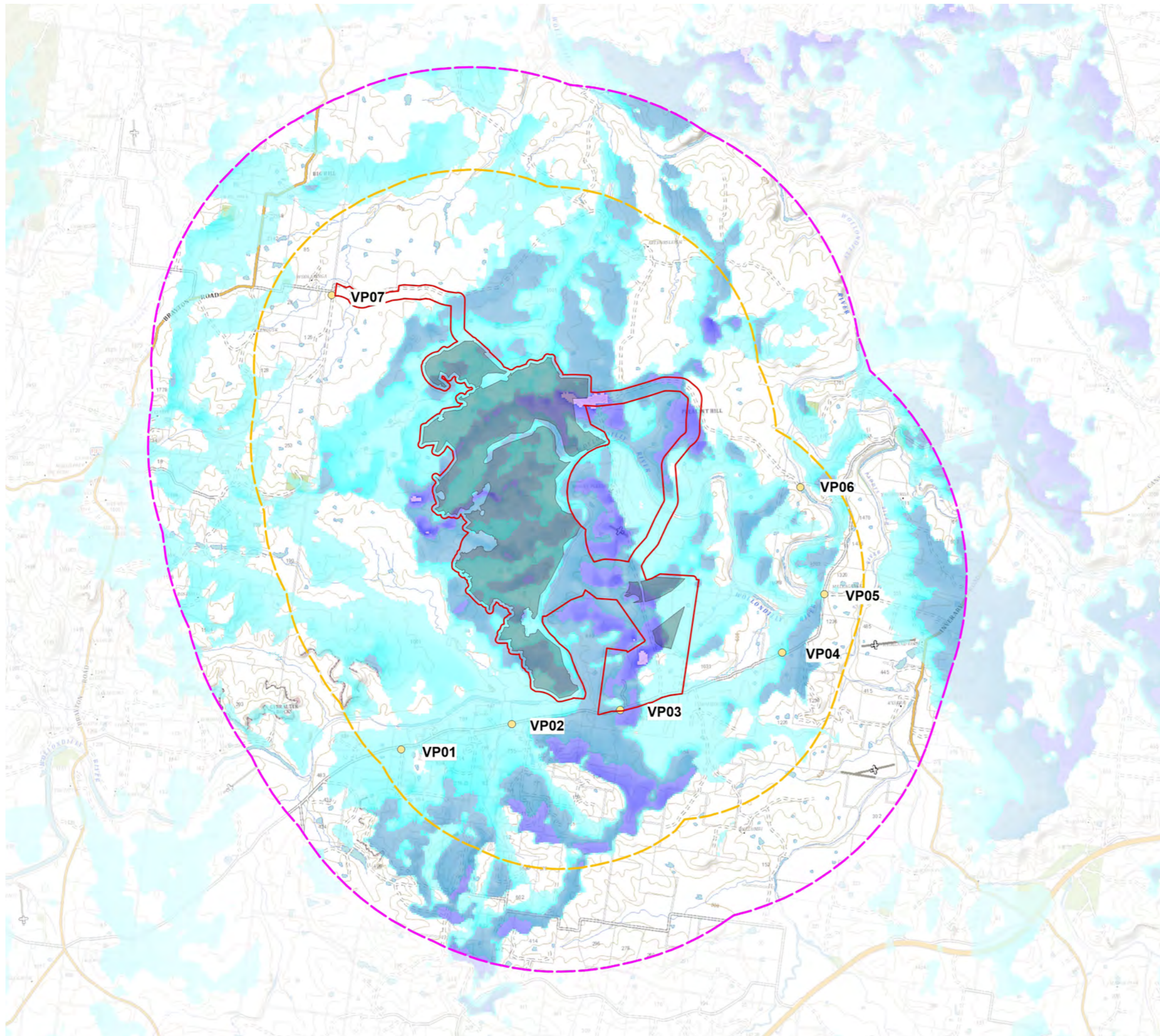
The following provides a summary of the reverse viewshed map prepared for the proposed solar array extent:

- Based on the reverse viewshed map, the majority of the proposed solar array extent has the potential to be visible from up to 10 Non-associated Dwellings.
- The highest number of receptors are likely to view the central part of the proposed solar panels located to the southeast of the Development Corridor. Up to 20 Non-associated Dwellings have the potential to view these areas.
- The northern and some central parts of the largest proposed area of solar arrays are likely to be least visible from the surrounding residences due to existing topographical conditions.

It is important to reiterate that the preliminary assessment are based on theoretical worst case scenario and does not consider the impact of vegetation or structures. Ground-truthing during field work will ascertain potential visibility by taking into account structures and vegetation.

Public Receptor Viewshed Map

Wattle Creek Energy Hub - Solar



LEGEND

- Development Corridor
- Solar Array Extent
- VP01 Public Road Viewpoint Locations
- - - 2.5 km from the proposed solar array extent
- - - 4 km from the proposed solar array extent
- Main Road
- Local Road
- ~ Creeks and Gully Channels
- - - Ridgelines

Viewshed Map (Based on 4.7 m Panel Height)

- No Visibility
- 1 - 25% Visibility
- 25 - 50% Visibility
- 50 - 75% Visibility
- 75 - 100% Visibility

NOTE

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

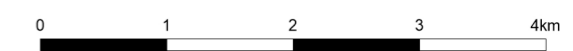
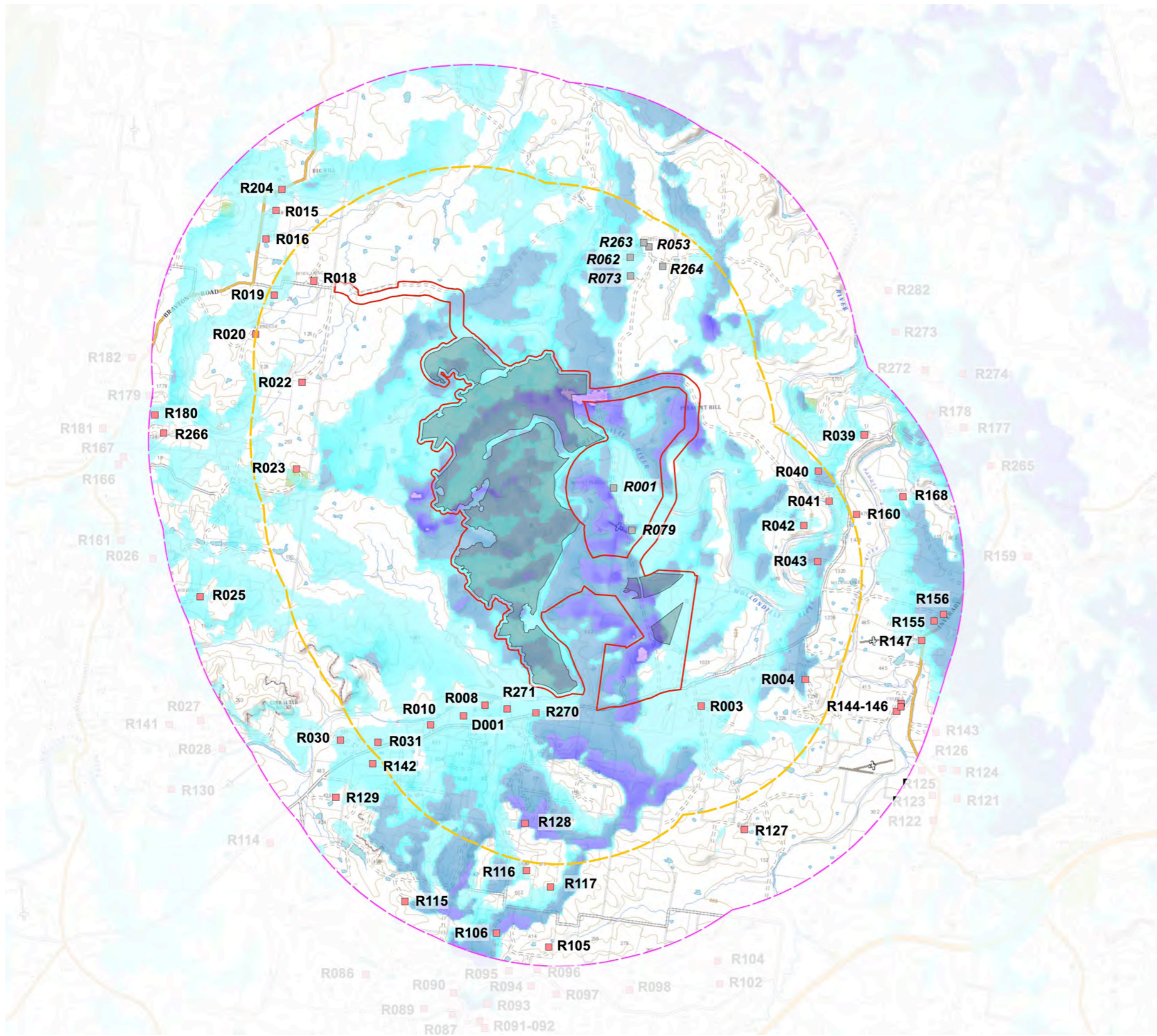


Figure 6 Public Receptor Viewshed Map
(Map Source: Six Maps 2013)

Private Receptor Viewshed Map

Wattle Creek Energy Hub - Solar



LEGEND

- Development Corridor
- Solar Array Extent
- Non-associated Dwellings
- Associated Dwellings
- 2.5 km from the proposed solar array extent
- 4 km from the proposed solar array extent
- Main Road
- Local Road
- ~~~~~ Creeks and Gully Channels
- ~~~~~ Ridgelines

Viewshed Map (Based on 4.7 m Panel Height)

- No Visibility
- 1 - 25% Visibility
- 25 - 50% Visibility
- 50 - 75% Visibility
- 75 - 100% Visibility

NOTE

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

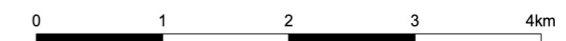
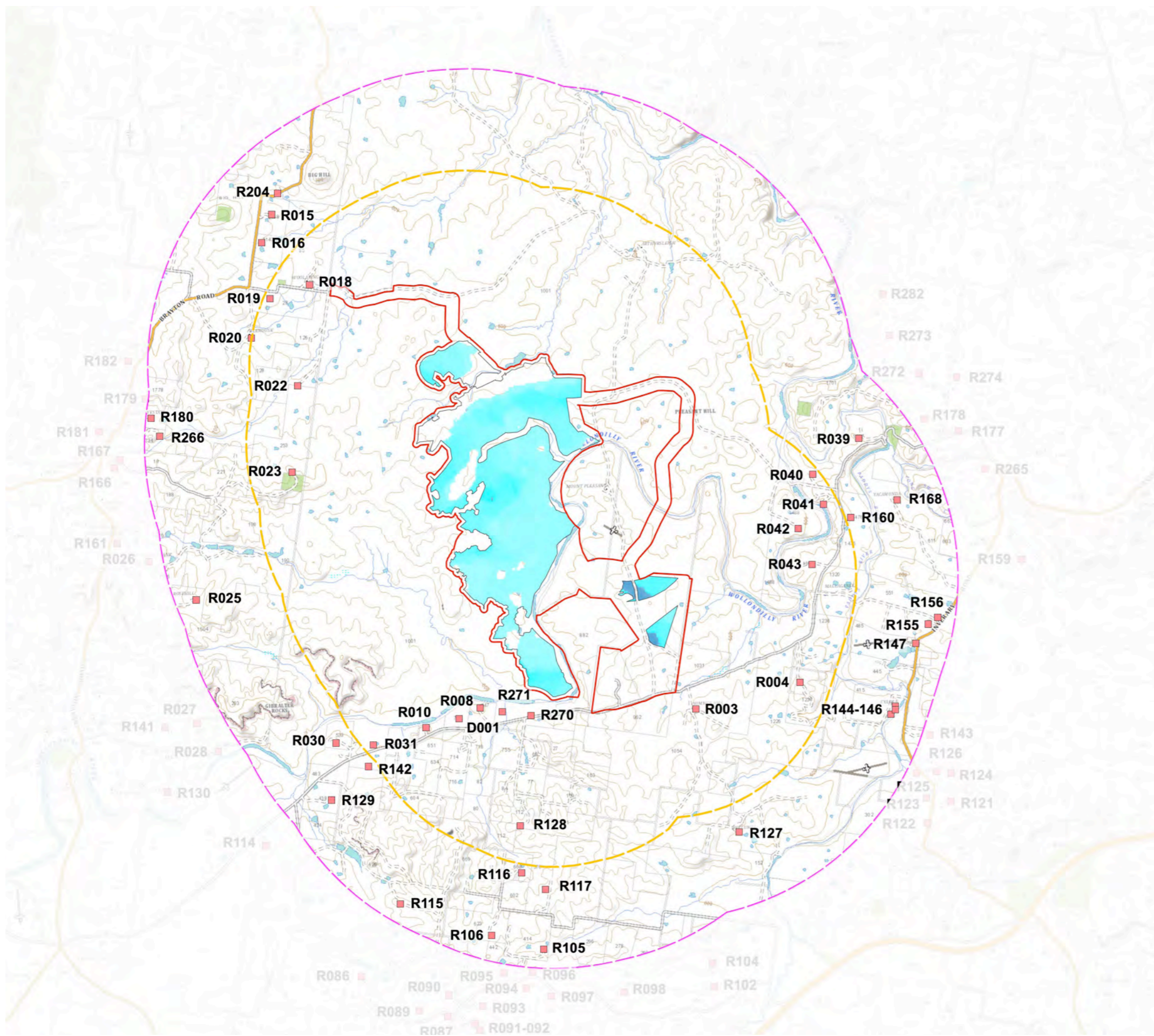


Figure 7 Private Receptor Viewshed Map
(Map Source: Six Maps 2013)

Reverse Viewshed Map

Wattle Creek Energy Hub - Solar



LEGEND

- Development Corridor
- Solar Array Extent
- Non-associated Dwellings
- 2.5 km from the proposed solar array extent
- 4 km from the proposed solar array extent
- Main Road
- Local Road
- Creeks and Gully Channels
- Ridgelines

Reverse Viewshed Map (Based on 4.7 m Panel Height)

- No Visibility
- 1 - 10 Visibility
- 10 - 20 Visibility
- 20 - 30 Visibility
- 30 - 42 Visibility

NOTE

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



Figure 8 Reverse Viewshed Map
(Map Source: Six Maps 2013)

6.5 Vertical Field of View Calculation

As stated in the Technical Supplement, **Figure 9** below illustrates the method of calculation for the relative height difference for each viewpoint location. Plotting viewpoints on **Figure 11** and **12** quantifies the vertical field of view combining the receptor distance and the relative height difference.

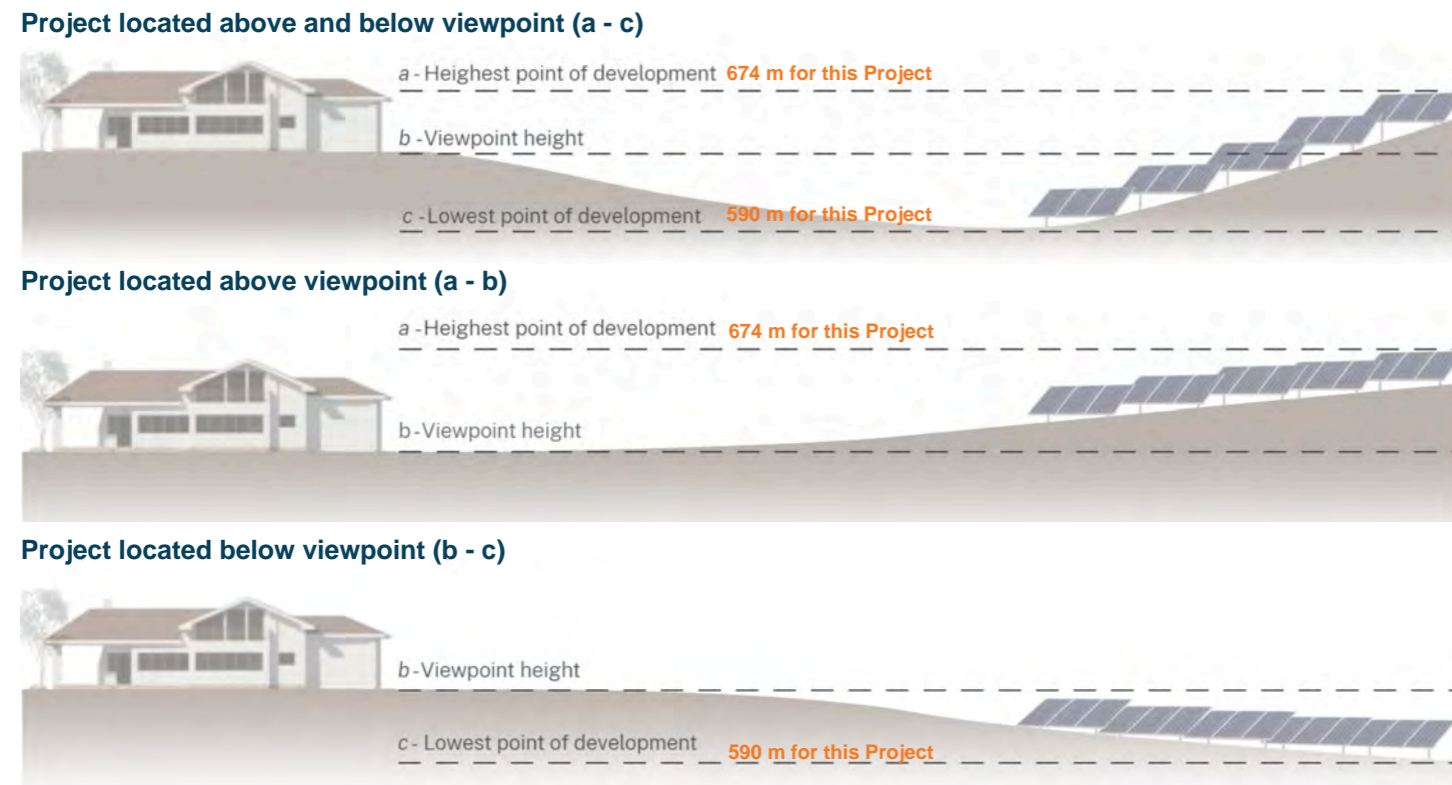


Figure 9 Relative Height Difference Calculation (Source: DPE, 2022b)

6.6 Horizontal Field of View Calculation

As stated in the Technical Supplement, **Figure 10** below illustrates the method of calculation for the horizontal field of view for each viewpoint location. The findings of these calculations can be found in **Table 4** and **Table 5**.

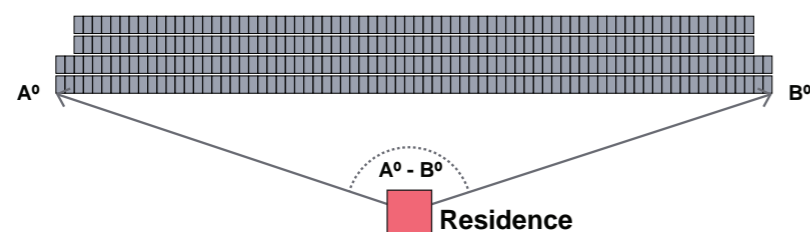


Figure 10 Horizontal Field of View (Source: MLA, 2023)

6.7 Assessment Requirements

Table 3 below demonstrates the vertical and horizontal field of views matrix as per the Guideline (DPE, 2022b). The matrix has been used to determine whether a detailed visual assessment for each viewpoint is required. The results of which can be found in **Table 4** and **Table 5**.

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

Table 3 Preliminary Visual Assessment Tool - Assessment Requirements (Source: Technical Supplement, DPE, 2022)

Preliminary Visual Assessment Tool - vertical field of view

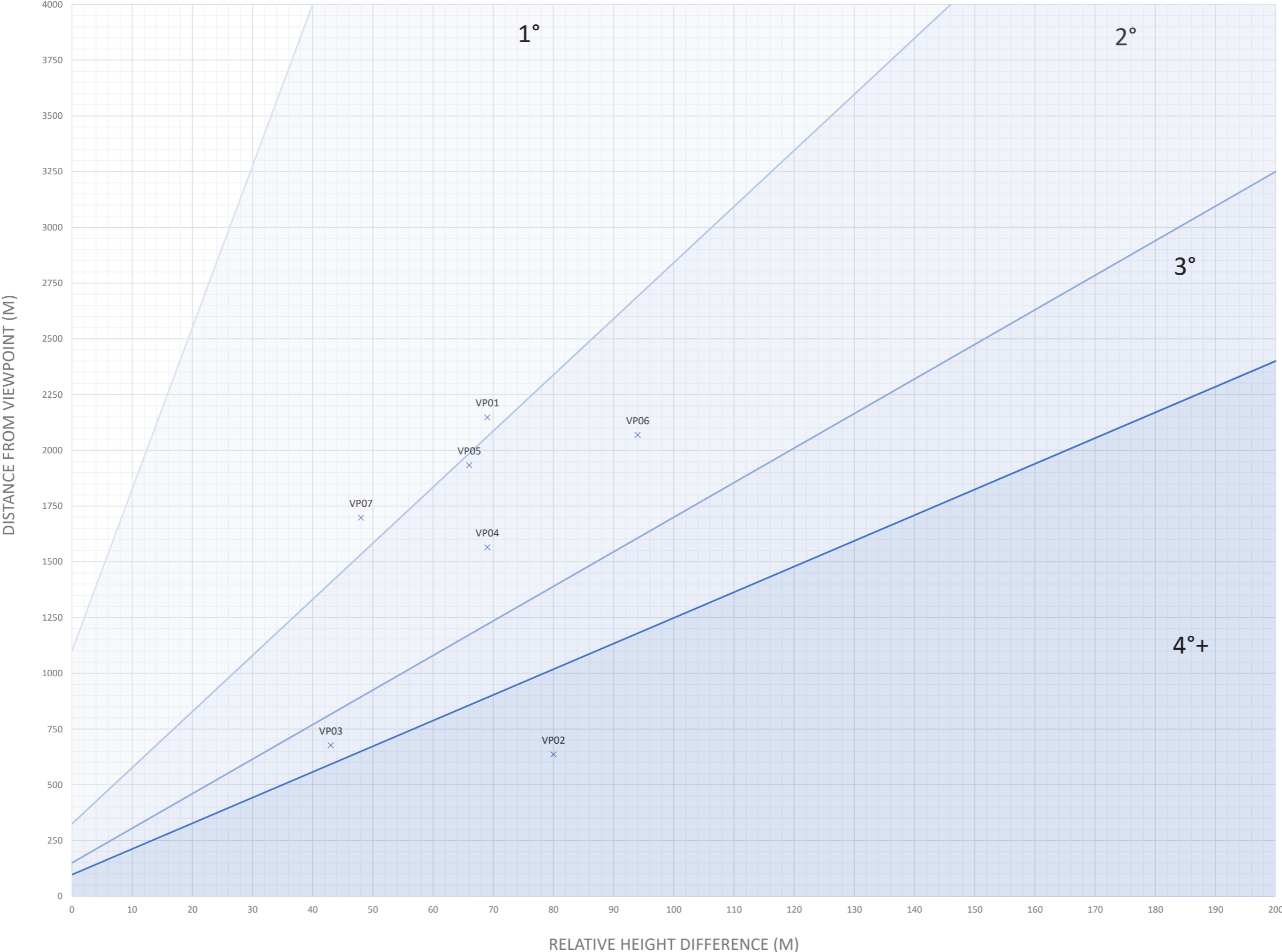


Figure 11 Preliminary Assessment Tool applied to public viewpoint locations – vertical field of view for the Development Corridor (Source: DPE, 2022b)

Preliminary Visual Assessment Tool - vertical field of view

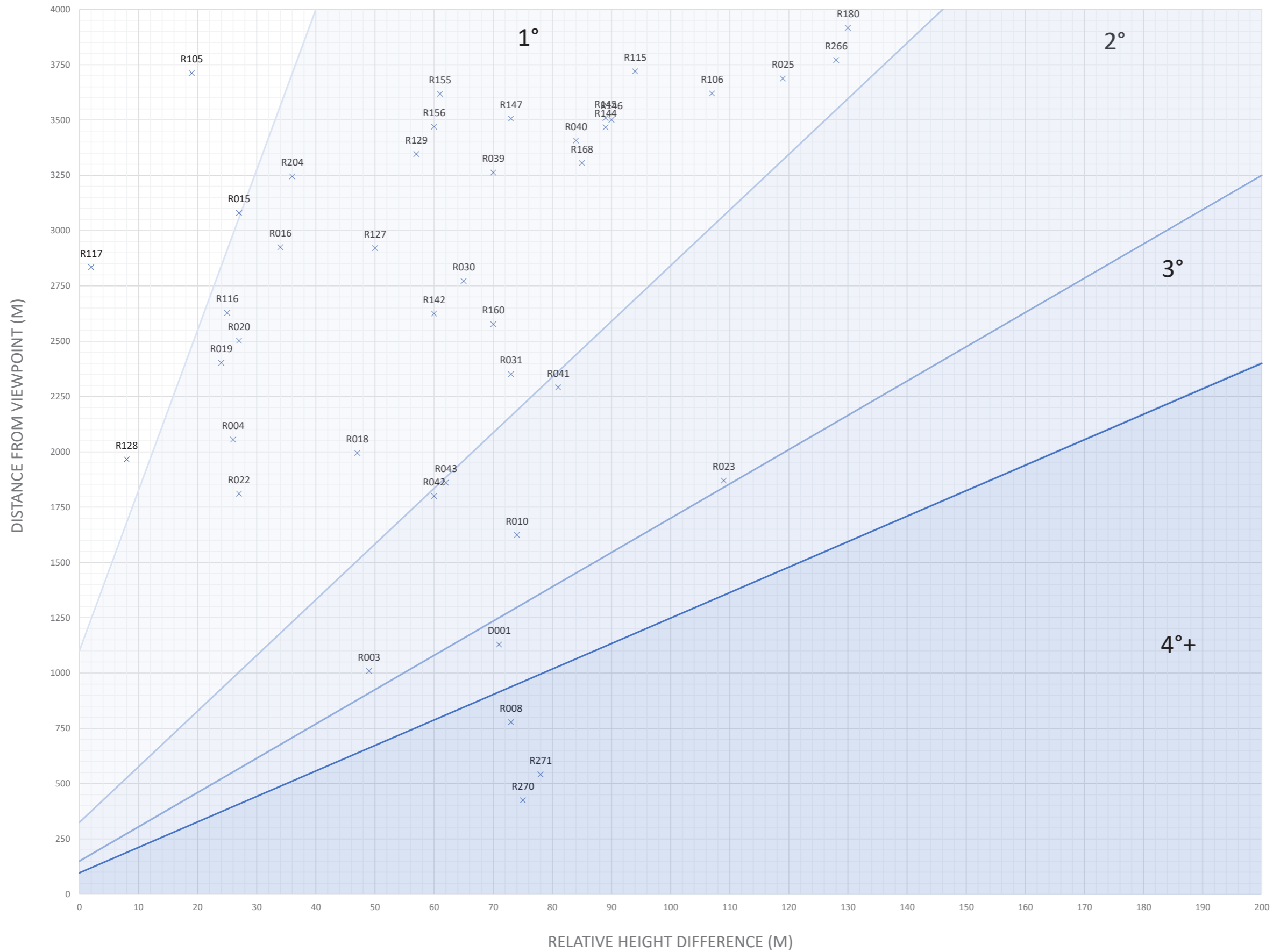


Figure 12 Preliminary Assessment Tool applied to both associated and Non-associated Dwellings – vertical field of view for Development Corridor (Source: DPE, 2022b)

6.8 Results of Preliminary Assessment Tool

The preliminary assessment tool identifies viewpoints (public and private) within 4 km of the proposed solar array extent.

Application of the preliminary assessment tool identified that of the 42 Non-associated Dwellings located within 4 km of the proposed solar array extent, 11 residences will require further detailed assessment.

Additionally, seven (7) road receptors were identified within 4 km of the proposed solar array extent. Of these, three (3) would require further detailed assessment in the LVIA. **Tables 4 and 5** provide a summary of these results.

Public Viewpoints:								
Receptor ID:	Distance to nearest panel (m):	Elevation of receptor (m):	Relative Height Difference (m):	Vertical field of view:	Horizontal extent of view:	Horizontal field of view:	Visible based on viewshed mapping:	Detailed Assessment Required?:
VP01	2148	605	69	1°	73° - 5°	68°	YES	NO
VP02	636	594	80	4+°	342° - 65°	277°	YES	YES
VP03	677	631	43	3°	282° - 38°	244°	YES	YES
VP04	1565	605	69	2°	328° - 262°	66°	YES	YES
VP05	1933	608	66	2°	314° - 250°	64°	NO	NO
VP06	2070	580	94	2°	280° - 220°	60°	NO	NO
VP07	1698	626	48	1°	157° - 107°	50°	NO	NO

Table 4 Results of Preliminary Viewpoint Assessment (public viewpoint locations)

Residential Viewpoints:										
Receptor ID:	Distance to nearest panel (m):	Elevation of receptor (m):	Relative Height Difference (m):	Vertical field of view:	Horizontal extent of view:			Horizontal field of view:	Visible based on viewshed mapping:	Detailed Assessment Required?:
R003	1009	625	49	2°	358°	-	276°	82°	YES	YES
R004	2055	648	26	1°	325°	-	269°	56°	NO	NO
R008	778	601	73	4+°	348°	-	82°	266°	YES	YES
R010	1624	600	74	2°	78°	-	0°	78°	YES	YES
R015	3080	647	27	0°	155°	-	119°	36°	YES	NO
R016	2925	640	34	1°	151°	-	114°	37°	NO	NO
R018	1995	627	47	1°	155°	-	109°	46°	NO	NO
R019	2402	650	24	1°	149°	-	105°	44°	NO	NO
R020	2502	648	27	1°	142°	-	92°	50°	NO	NO
R022	1811	647	27	1°	142°	-	77°	65°	NO	NO
R023	1870	699	109	2°	134°	-	51°	83°	YES	YES
R025	3687	709	119	1°	107°	-	45°	62°	YES	NO
R030	2772	609	65	1°	80°	-	14°	66°	YES	NO
R031	2351	601	73	1°	77°	-	8°	69°	YES	NO
R039	3262	604	70	1°	287°	-	224°	63°	YES	NO
R040	3407	590	84	1°	296°	-	222°	74°	YES	NO
R041	2291	593	81	2°	300°	-	230°	70°	YES	YES
R042	1800	614	60	2°	307°	-	229°	78°	YES	YES
R043	1860	612	62	2°	311°	-	243°	68°	YES	YES

Table 5 Results of Preliminary Viewpoint Assessment (Non-associated Dwellings)

Residential Viewpoints:										
Receptor ID:	Distance to nearest panel (m):	Elevation of receptor (m):	Relative Height Difference (m):	Vertical field of view:	Horizontal extent of view:			Horizontal field of view:	Visible based on viewshed mapping:	Detailed Assessment Required?:
R105	3712	655	19	0°	348°	-	24°	324°	NO	NO
R106	3620	697	107	1°	353°	-	32°	321°	NO	NO
R115	3720	684	94	1°	47°	-	4°	43°	YES	NO
R116	2628	649	25	1°	348°	-	33°	315°	YES	YES
R117	2834	672	2	0°	345°	-	28°	317°	YES	NO
R127	2921	625	50	0°	350°	-	307°	43°	NO	NO
R128	1966	666	8	0°	346°	-	40°	306°	YES	NO
R129	3346	617	57	1°	67°	-	13°	54°	NO	NO
R142	2625	614	60	1°	71°	-	9°	62°	YES	NO
R144	3467	585	89	1°	317°	-	273°	44°	NO	NO
R145	3509	585	89	1°	319°	-	275°	44°	NO	NO
R146	3501	584	90	1°	318°	-	274°	44°	NO	NO
R147	3506	601	73	1°	310°	-	263°	47°	YES	NO
R155	3618	613	61	1°	310°	-	263°	47°	YES	NO
R156	3470	614	60	1°	305°	-	260°	45°	YES	NO
R160	2577	604	70	1°	299°	-	236°	63°	NO	NO
R168	3305	589	85	1°	294°	-	238°	56°	NO	NO
R271	542	596	78	4+°	342°	-	76°	266°	YES	YES
R270	425	599	75	4+°	333°	-	64°	269°	YES	YES
D001	1129	603	71	3°	353°	-	78°	275°	YES	YES
R204	3245	638	36	1°	156°	-	123°	33°	YES	NO
R180	3916	720	130	1°	127°	-	77°	50°	NO	NO
R266	3771	718	128	1°	125°	-	74°	51°	YES	NO

Table 5 Results of Preliminary Viewpoint Assessment (Non-associated Dwellings - Continued)

7.0 Cumulative Visual Impacts

7.1 Overview of Potential Cumulative Impacts

The Wattle Creek Energy Hub project is located in the Southern Highlands region of NSW. Although the Project is not located within a proposed Renewable Energy Zone (REZ), the existing landscape character allows optimum harvest of renewable energy and as such, over time this has been utilised for the development of renewable energy projects in the region. **Figure 13** shows one (1) renewable energy project that is currently proposed within the 20 km of the Wattle Creek Energy Hub project.

The Wattle Creek Energy Hub Project also includes a standalone BESS facility with collector substations and transmission line connection that will connect the Wattle Creek Energy Hub Project to the existing grid. Two optional locations have been proposed for the standalone BESS facility within the proposed BESS development corridor (refer **Figure 13**). The standalone BESS will be subject to a separate approval process, and therefore, the associated cumulative visual impacts of the standalone BESS and the Project will be assessed in the EIS phase.

7.2 Nearby Large-Scale Renewable Energy Projects

Name of Project	Distance to Development Corridor	Current Status
Wattle Creek Energy Hub Project - BESS	Within Development Corridor	Proposed
Marulan Gas Fired Power Station	Adjacent to Development Corridor (south of the Project)	Approved
Marulan Solar Farm	Approx. 13 km south-west	Response to Submissions Phase

Table 6 Nearby Renewable Energy Projects (based on information available on NSW Major Projects website)

The Marulan Gas Fired Power Station (MGFPS) is proposed immediately to the south of the Development Corridor. The proposal for the gas fired power station has been approved and will involve the construction of a gas fired power station and gas pipeline (Energy Australia, 2020).

Marulan Solar Farm project (MSF) is a proposed solar farm located approximately 13 km southwest of the Project. MSF's preliminary layout includes construction, development and operation of a 150 MW solar farm, a BESS and associated infrastructure (Iris Pty Ltd, 2022). The EIS for the project has been prepared and the project is currently in the Response to Submissions Phase (DPE, 2023). It is likely that MSF and the Project will not be visible simultaneously due to the distance between the two projects.

No other energy projects were identified within 20 km of the Project.

7.3 Cumulative Impact on Broader Landscape Character

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

With respect to the Project, it is likely that the Marulan Gas Fired Power Station will be visible within proximity of the Project. No other projects will be visible due to the absence of other proposed energy projects in the region. Further assessment of the cumulative visual impact will be detailed in the EIS, along with potential mitigation and management measures that can be employed to reduce impacts.

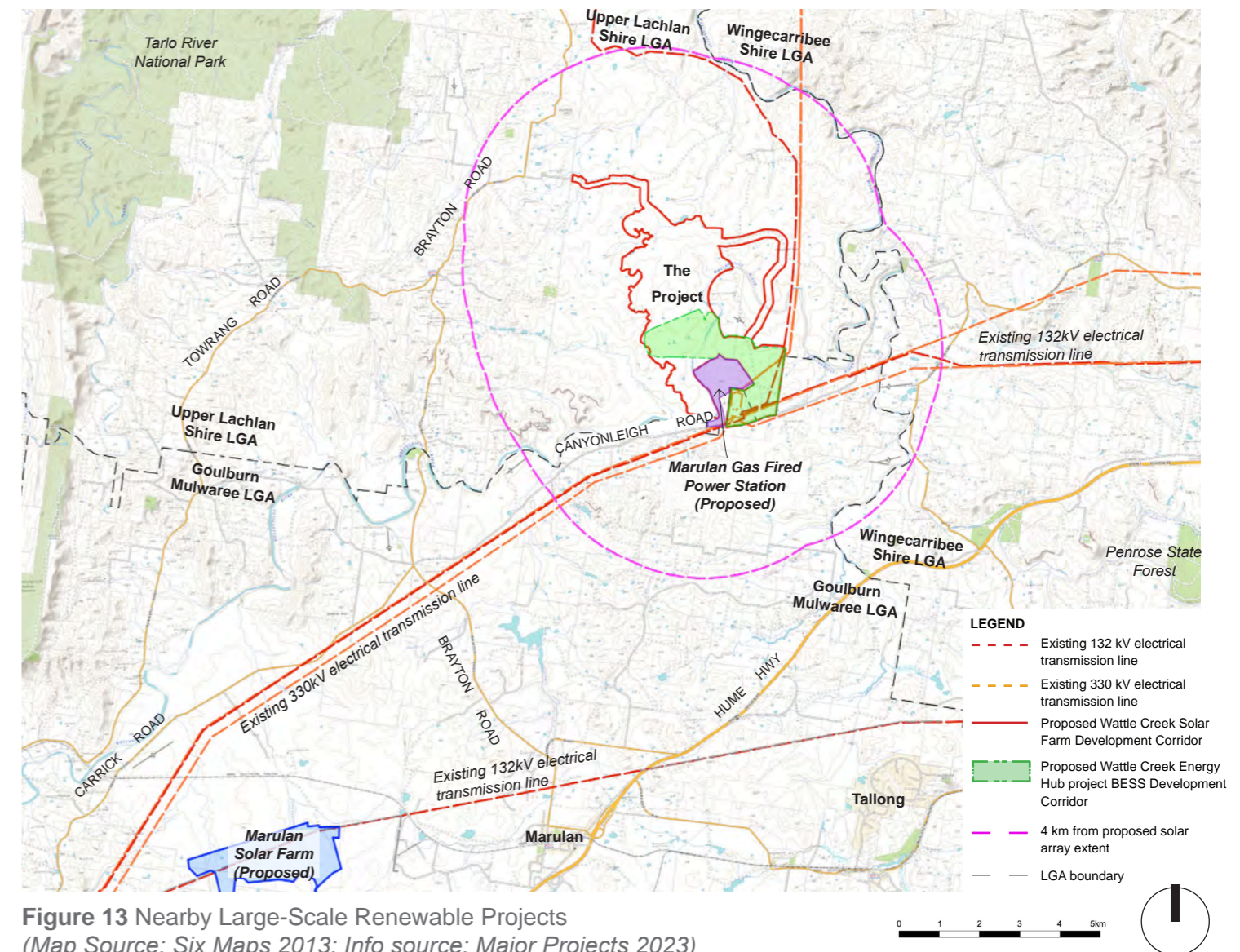


Figure 13 Nearby Large-Scale Renewable Projects (Map Source: Six Maps 2013; Info source: Major Projects 2023)

8.0 Summary & Next Steps

8.1 Summary of Findings

A preliminary desktop assessment identified three (3) existing LCZs within the Study Area. This will form a precursory baseline for character assessment to be assessed in detail in the EIS phase.

The preliminary visual assessment considered 2.5 km and 4 km buffers from the proposed solar array extent in order to identify preliminary visual impacts in accordance with the Guideline and the Technical Supplement. A total of seven (7) public viewpoints were selected to represent roads within 2.5 km of the Development Corridor. 49 residences, including 42 Non-associated Dwellings and seven (7) Associated Dwellings were identified within 4 km of the proposed solar array extent.

In accordance with the Guideline and Technical Supplement, a preliminary viewshed map was prepared for the region located within 4 km of the proposed solar array extent. This demonstrated that due to the gently undulating terrain within the Study Area and its surrounds, the proposed solar array extent has the potential to be visible, to varying degrees, in areas surrounding the Project. Generally, views towards a larger proportion of the proposed solar array extent may be available to the east and south of the Project along Canyonleigh Road and elevated areas located further south of Canyonleigh Road. Areas to the north, west, southwest and further east along Canyonleigh Road have the potential to experience views of between 1-25% of the proposed solar array extent. The viewshed map identified that 26 Non-associated Dwellings surrounding the proposed solar array extent have the potential to view the proposed solar array extent. The remaining 16 Non-associated Dwellings are not likely to be able to view the proposed solar array extent.

A preliminary reverse viewshed map was undertaken for the region located within 4 km of the nearest proposed solar panel. This found that the majority of the Development Corridor has the potential to be visible from up to 10 Non-associated Dwellings. The central parts of the panels proposed to the southeast were found to have the highest visibility to the surrounding residences.

Application of Preliminary Assessment Tools indicated that 11 Non-associated Dwellings within 4 km and three (3) public viewpoints would require detailed assessment in the EIS phase. A preliminary desktop analysis identified that intervening vegetation surrounding nearby residences, especially those located on the eastern and southern sides of the Development Corridor and along public roads such as Canyonleigh Road and Brayton Road may assist in limiting the potential views of the Project. Further detailed assessment and ground-truthing will be undertaken in the EIS phase of the Project to confirm potential visual impacts from identified residences and viewpoint locations, where a detailed summary of the potential visual impacts will be provided as apart of the LVIA.

One (1) renewable energy project and one (1) gas fire power station are located approximately 13 km southwest of the Project and immediately south of the Project. Further assessment of the cumulative visual impacts of the Project and related infrastructure such as the BESS will be detailed in the EIS.

8.2 Next Steps

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

- Large-Scale Solar Energy Guideline (DPE, 2022)
- Technical Supplement Landscape and Visual Impact Assessment - Large-Scale Solar Energy Guideline (DPE, 2022)
- Environmental Planning and Assessment Regulation (NSW Government, 2023)
- Upper Lachlan Local Environment Plan (LEP) 2010 (Upper Lachlan Shire Council, 2010)
- State Environmental Planning Policy (Transport and Infrastructure) 2021 (NSW Government, 2023)

The LVIA will include the development of a landscape character study that will be used as a baseline to assess the impact of the Project on the identified character areas and key landscape features.

The LVIA will also include an assessment of the landscape and visual impacts resulting from all associated infrastructure and ancillary structures. Specialised modelling tools, visualisations (including photomontages), public viewpoint analysis and dwelling assessments will be developed to illustrate potential visual impacts of the Project from key viewpoints identified through this report. Site inspections will be undertaken from key viewpoints identified as requiring further assessment in this PVIA.

Glint and Glare Assessment using industry standard methodology will be undertaken and assessed.

Community consultation will be ongoing to ensure and develop an understanding of the community's landscape values.

The cumulative impacts of surrounding energy projects will be assessed in the LVIA in order to identify impacts on the broader landscape character of the region.

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

References

Department of Planning and Environment [DPE] (2022a). *Large-Scale Solar Energy Guideline*. NSW: State of NSW through Department of Planning and Environment.

DPE (2022b). *Technical Supplement - Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline*. NSW: State of NSW through Department of Planning and Environment.

DPE (2022c). *State Significant Development Guidelines - Preparing a Scoping Report*. NSW Government.

DPE (2023). *Major Projects - Department of Planning and Environment*. [online] www.planningportal.nsw.gov.au. Available at: <https://www.planningportal.nsw.gov.au/major-projects>.

EnergyAustralia (2020). *Marulan Gas Fired Power Stations Project*.

Goulburn Mulwaree Council (2009). *Goulburn Mulwaree Local Environmental Plan 2009*. [online] NSW Government. Available at: <https://legislation.nsw.gov.au/view/html/inforce/current/epi-2009-0056> [Accessed 29 May 2023].

Iris Pty Ltd (2022). *Marulan Solar Farm Landscape and Visual Impact Assessment*. <https://www.planningportal.nsw.gov.au/major-projects/projects>.

Landscape Institute (2013). *Guidelines for Landscape and Visual Impact Assessment*, ISBN 9780415680042, Routledge, London.

NSW Government (2023). *State Environmental Planning Policy (Transport and Infrastructure) 2021*. [online] legislation.nsw.gov.au. Available at: <https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732>.

Renew Economy (2021). *Large Scale Solar Farm Map of Australia*. [online] RenewEconomy. Available at: <https://reneweconomy.com.au/large-scale-solar-farm-map-of-australia/>.

Upper Lachlan Shire Local Council (2010). *Upper Lachlan Local Environmental Plan 2010*. [online] NSW Government. Available at: <https://legislation.nsw.gov.au/view/whole/html/inforce/current/epi-2010-0368> [Accessed 29 May 2023].

Wingecarribee Shire Local Council (2010). *Wingecarribee Local Environmental Plan 2010*. [online] NSW Government. Available at: <https://legislation.nsw.gov.au/view/html/inforce/current/epi-2010-0245> [Accessed 29 May 2023].

Maps and Figures:

Arcgis. (2023). NSW Map. Arcgis.com. <https://www.arcgis.com/apps/View/index.html?appid=63fa2b441c2c49e4b726cffa89629e46>

ESRI 2023, 'Topographical Map - ArcGis Map Online', Esri.v

NSW Government Land and Property Information, Spatial Information Exchange SIX Maps, Accessed at: <http://maps.six.nsw.gov.au/> [Accessed between April – May 2023].

Google Earth Pro 2021 [Viewed April – May 2023] www.google.com/earth/index.html.