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Scoping Report

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ORANA WIND FARM
SCOPING REPORT

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ORANA WIND FARM
SCOPING REPORT

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ACKNOWLEDGMENT OF COUNTRY

Aboriginal people have had a long and continuous association with the region for thousands of years. We would like to acknowledge and pay respects to the Traditional Owners of the Country which is encompassed by the project, the Gamilaroi and Wiradjuri peoples.

Prepared by

Ramboll Australia Pty Ltd

Applicant

ACCIONA Energy Australia Global Pty Ltd

EXECUTIVE SUMMARY

Introduction to the project

ACCIONA Energy Australia Global Pty Ltd (ACCIONA Energia) is proposing to construct and operate the Orana Wind Farm (the project), within the Central-West Orana Renewable Energy Zone of New South Wales. The proposed wind farm would be located in the Warrumbungle Shire and Mid-Western Regional Shire local government areas, close to Birriwa and Tallawang, and approximately three kilometres south of Dunedoo at its closest point.

The project would consist of approximately 92 wind turbines and supporting infrastructure and would connect to the Central-West Orana Renewable Energy Zone transmission line, which is being developed by the Energy Corporation of New South Wales. The project has been identified as one of the 11 major renewable energy generation projects with planned connection to the CWO-REZ transmission line and would supply approximately 524 megawatts of electricity into the National Electricity Market.

In addition, the project would include the following infrastructure:

- wind turbine hardstands approximately 120 metres by 70 metres
- electrical infrastructure including:
    - up to three substations
    - overhead and underground electrical reticulation connecting the wind farm elements
    - up to two Battery Energy Storage System (BESS) facilities with a capacity of up to 100 megawatts, and storage of up to 200 megawatt hours
- other permanent onsite ancillary infrastructure including:
    - operations and maintenance facility
    - permanent meteorological monitoring masts up to 148 metres high
    - internal access tracks
    - security fencing and landscaping
- temporary construction ancillary infrastructure including:
    - construction compounds
    - laydown areas
    - concrete batching plants
    - potential quarry sites for construction material (rock for access tracks and hardstands)
    - potential construction workforce accommodation.

The project is expected to require up to 580 full-time employees during peak construction and approximately 12 full-time employees would be required during operation and ongoing maintenance of the wind farm.

The wind farm site would primarily be accessed from the north via Tucklan Road off the Golden Highway, and via Tucklan Road off the Castlereagh Highway from the east. The Tucklan Road / Castlereagh Highway intersection would need to be upgraded to accommodate over size over mass vehicle movements. Some other upgrades would be required for public roads to facilitate construction traffic.

Ongoing refinement of the proposed layout and technology would continue throughout the environmental impact statement process in response to engineering design refinements, landholder negotiations and outcomes of environmental and social assessments, to minimise potential environmental, social and amenity impacts to the extent possible.

Strategic context

The project is supported by strategic planning policies at local, State and Federal levels, and provides an opportunity to:

- support Australia's commitments to reduce greenhouse gas emissions
- contribute to New South Wales achieving net-zero emissions by 2050
- deliver on commitments in the Federal Government's Renewable Energy Target Scheme
- assist in meeting energy demand and improving energy security and reliability for New South Wales
- contribute to achieving the target of three gigawatts of renewable energy generation from the Central-West Orana Renewable Energy Zone.

The project forms an important part of Australia's transition to renewable energy generation and would positively contribute to meeting Commonwealth and State targets. The project would enhance the reliability and security of electricity supply by helping to fill the anticipated capacity gaps in the electricity market following the closure of major coal-fired power generators within New South Wales.

Statutory context

The capital investment value would be over $30 million and the project is considered State Significant Development under Part 4 of the *Environmental Planning and Assessment Act 1979* and the *State Environmental Planning Policy (Planning Systems 2021)*. The project is also being referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water for potential impacts to Matters of National Environmental Significance protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed assessment of impacts

This report presents a preliminary assessment of the potential impacts of the project to identify matters requiring further assessment in the environmental impact statement. Matters that have been identified as requiring further assessment for the environmental impact statement have been separated into 'key issues' and 'other issues'. This report has identified the following categorisation of assessment matters:

- key issues:
    - landscape character and visual
    - noise and vibration
    - traffic and access
    - biodiversity
    - Aboriginal heritage
    - social.
- other issues:
    - hazards and risks
    - land
    - water
    - historic heritage
    - air
    - economic
    - waste and resources.

Cumulative impacts have also been considered, noting that there are a number of large-scale renewable energy projects either existing or proposed in the Central-West Orana Renewable Energy Zone, as well as other major projects and infrastructure development proposed for the region.

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GLOSSARY

Term	Definition
Host dwellings / properties	Dwellings or properties on which the wind turbines or other project infrastructure are located i.e. directly impacted by the project
Associated dwellings / Associated properties	Dwellings or properties who have entered into an agreement with the project but are not hosting project infrastructure i.e. neighbouring properties
Battery energy storage system	A technology developed for storing electric charge by using specially developed batteries
Central-West Orana Renewable Energy Zone (abbreviated to CWO-REZ)	A geographic area of approximately 20,000 square kilometres centred by Dubbo and Dunedoo and extending west to Narromine and east beyond Mudgee and to Wellington in the south and Gilgandra in the north, that will combine renewable energy generation, storage and high voltage transmission infrastructure to deliver energy to electricity consumers
Micrositing	The process of determining the exact position of project infrastructure
Non-associated dwellings/ Non-associated properties	Dwellings or properties outside the land on which the wind turbines or other project infrastructure are located i.e. indirectly impacted by the project
Proponent	ACCIONA Energy Australia Global Pty Ltd (abbreviated to ACCIONA Energia)
Substation	A facility used to increase or decrease voltages between incoming and outgoing electrical transmission lines
The project	The proposed Orana Wind Farm
The wind farm site	The land on which the project is located identified in **Figure 2-2**

ACRONYMS

Abbreviation	Definition
ABN	Australian Business Number
ACHAR	Aboriginal Cultural Heritage Assessment Report
ADGC	Australian Dangerous Goods Code
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
Biodiversity and Conservation SEPP	*State Environmental Planning Policy (Biodiversity and Conservation) 2021*
BOM	Bureau of Meteorology
BOS	Biodiversity Offset Scheme
BSAL	Biophysical Strategic Agricultural Land
CASA	Civil Aviation Safety Authority
CEECs	Critically Endangered Ecological Communities
CIA	Cumulative Impact Assessment
Code of Practice	*Code of Practice for the Investigation of Aboriginal Objects in New South Wales*
dB	Decibel
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DG	Dangerous Goods
DP	Deposited Plan
DPE	NSW Department of Planning and the Environment
DPI	Department of Primary Industries
EEC	Endangered Ecological Communities
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
FM Act	*Fisheries Management Act 1994*

Abbreviation	Definition
GRP	Gross Regional Product
GW	Gigawatt
Heritage Act	*Heritage Act 1977*
IBRA	Interim Biogeographic Regionalisation of Australia
ICNG	*Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009)
ISP	Integrated System Plan
km	Kilometre
kV	Kilovolt
LALC	Local Aboriginal Land Council
LCUs	Landscape Character Units
LEP	Local Environmental Plan
LGA	Local Government Area
LGCs	Large-Scale Generation Certificates
LRET	Large-Scale Renewable Energy Target
m	Metre
Mid-Western Regional DCP	Mid-Western *Regional Development Control Plan 2015*
Mid-Western Regional LEP	*Mid-Western Regional Local Environmental Plan 2012*
MNES	Matters of National Environmental Significance
MW	Megawatt
Native Title Act	*Native Title Act 1993*
NEM	National Electricity Market
NES	New South Wales Electricity Strategy
NGER	National Greenhouse and Energy Reporting
Noise Bulletin	*Wind Energy: Noise Assessment Bulletin for State Significant Wind Energy Development* (Department of Planning and Environment, 2016c)
NPI	*NSW Noise Policy for Industry*
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OSOM	Over Size and Over Mass
PADs	Potential Archaeological Deposits
PCT	Plant Community Types
PHA	Preliminary hazard analysis

Abbreviation	Definition
Planning Systems SEPP	*State Environmental Planning Policy (Planning Systems 2021)*
PMST	Protected Matters Search Tool
POEO Act	*Protection of Environment Operations Act 1997*
RAPs	Registered Aboriginal Parties
Resilience and Hazards SEPP	*State Environmental Planning Policy (Resilience and Hazards) 2021*
RET	Renewable Energy Target
REZ	Renewable Energy Zone
RFS	Rural Fire Service
RNP	Road Noise Policy
Scoping Report Guideline	*State Significant Development Guidelines – Preparing a Scoping Report (Appendix A)* (Department of Planning, Industry and Environment, 2021c)
SEARs	Secretary Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TECs	Threatened Ecological Communities
Transport and Infrastructure SEPP	*State Environmental Planning Policy (Transport and Infrastructure) 2021*
UNFCCC	United Nations Framework Convention on Climate Change
Visual Bulletin	*Wind Energy: Visual Assessment Bulletin for State Significant Wind Energy Development* (Department of Planning and Environment, 2016b)
Wind Guideline	*Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning and Environment, 2016a)
ZVI	Zone of Visual Influence

1. INTRODUCTION

1.1 Background

ACCIONA Energy Australia Global Pty Ltd (ACCIONA Energia) is proposing to construct and operate the Orana Wind Farm (the project), within the Central-West Orana Renewable Energy Zone (CWO-REZ) of New South Wales (NSW). The proposed wind farm would be located in the Warrumbungle Shire and Mid-Western Regional Shire local government areas (LGAs), close to Birriwa and Tallawang, and approximately three kilometres south of Dunedoo at its closest point (refer to **Figure 1-1**).

The project would consist of approximately 92 wind turbines and supporting infrastructure and would connect to the CWO-REZ transmission line, which is being developed by the Energy Corporation of NSW (EnergyCo) (refer to **Section 1.2.5** for further detail). The project has been identified as one of the 11 major renewable energy generation projects with planned connection to the CWO-REZ transmission line. The project would supply approximately 524 megawatts of electricity into the National Electricity Market (NEM).

The capital investment value is over $30 million and the project is considered State Significant Development (SSD) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *State Environmental Planning Policy (Planning Systems 2021)* (Planning Systems SEPP).

The project is also being referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) for potential impacts to Matters of National Environmental Significance (MNES) protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Should DCCEEW determine that the project is a controlled action under Section 75 of the EPBC Act, the project would require assessment and approval under the EPBC Act.

It is anticipated that potential impacts to MNES would be assessed in accordance with the NSW Assessment Bilateral Agreement, which allows the NSW Department of Planning and the Environment (DPE) to manage the assessment of the project on behalf of the Commonwealth, including the issuing of the assessment requirements for the environmental impact statement (EIS).

1.2 Introduction to the project

1.2.1 Project overview

The project is a proposed wind farm that would include up to 92 wind turbine generators (WTG), with an estimated capacity of approximately 524 megawatts. The type of wind turbines to be used is subject to further design, availability of components, and the procurement process, however a maximum tip height of up to 271.5 metres and a rotor diameter of up to 183 metres would be expected.

In addition, the project would include the following infrastructure:

- wind turbine hardstands approximately 210 metres by 70 metres
- electrical infrastructure including:
    - up to three substations
    - overhead and underground electrical reticulation connecting the wind farm elements

    - up to two Battery Energy Storage System (BESS) facilities with a capacity of up to 100 megawatts, and storage of up to 200 megawatt hours
- other permanent onsite ancillary infrastructure including:
    - operations and maintenance facility
    - permanent meteorological monitoring masts up to 148 metres high
    - internal access tracks
    - security fencing and landscaping
- temporary construction ancillary infrastructure including:
    - construction compounds
    - laydown areas
    - concrete batching plants
    - potential quarry sites for construction material (rock for access tracks and hardstands)
    - potential construction workforce accommodation.

The project is expected to require up to 580 full-time employees during peak construction and approximately 12 full-time employees would be required during operation and ongoing maintenance of the wind farm.

The wind farm site would be accessed from the north via Tucklan Road off the Golden Highway, and via Tucklan Road off the Castlereagh Highway from the east. The Tucklan Road / Castlereagh Highway intersection would need to be upgraded to accommodate over size over mass (OSOM) vehicle movements during construction and the delivery of large components such as turbine blades and substations. A third access point would be provided via Spring Ridge Road in the west.

Some other upgrades would be required for public roads to facilitate construction traffic. These would be confirmed during the EIS, but it is expected that these would include Tucklan Road, Corishs Lane, Brooklyn Road, and Upper Laheys Creek Road.

Ongoing refinement of the proposed layout and technology would continue throughout the EIS process in response to engineering design refinements, landholder negotiations and outcomes of environmental and social assessments, to minimise potential impacts where possible.

The operational lifespan of the project would be around 30 years, unless the facility is re-permitted and re-powered at the end of its operational life. At the end of its practical life, the wind farm would be decommissioned, and the site rehabilitated in consultation with the affected landholders.

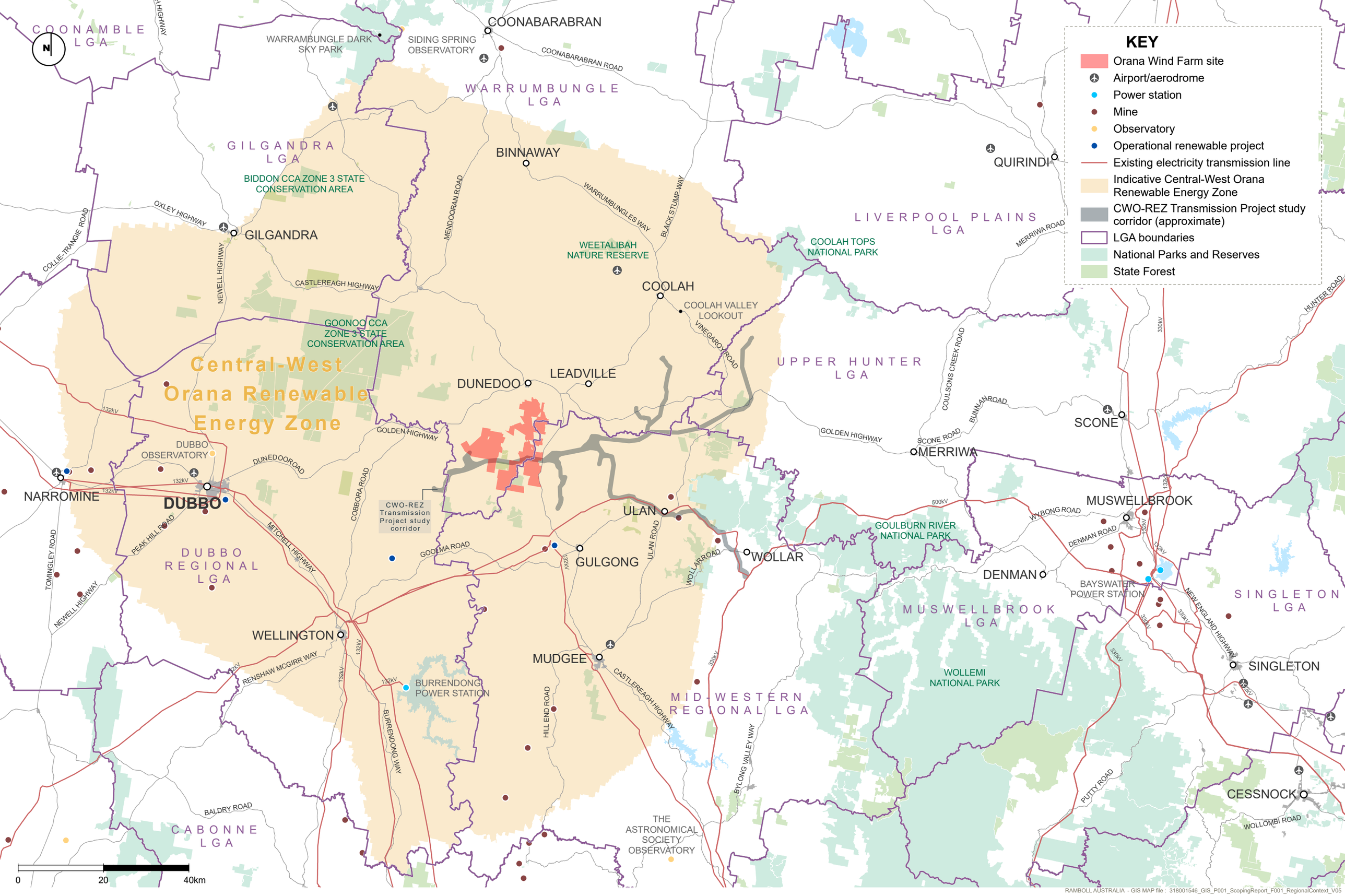

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Figure 1-1 | Regional context

1.2.2 Site information

The wind farm site is shown in **Figure 1-1**, and a summary of contextual information is provided in **Table 1-1**.

Table 1-1: Summary of site information

Item	Details
Local government area	Warrumbungle Shire and Mid-Western Regional
Suburb	Dunedoo, Tallawang, Birriwa, Cobbora
Size	16,770 hectares
Lot details	Located on 241 lots (refer to list in **Appendix 1**)

1.2.3 Project objectives

The objectives of the project are to:

- produce electricity from a clean and renewable source and assist in meeting energy demand and improving energy security for NSW
- contribute to achieving the target of three gigawatts of renewable energy generation from the CWO-REZ
- support Australia's commitments to reduce greenhouse gases and contribute to NSW achieving net-zero emissions by 2050 as set out in the NSW Climate Change Policy Framework, and help deliver on commitments in the Federal Government's Renewable Energy Target (RET) Scheme
- develop an energy generation project which minimises impacts to the environment and local community where possible
- develop a trusted relationship and provide for positive outcomes for the communities affected by the project
- create job opportunities and economic benefits for the region.

1.2.4 Project background and history

ACCIONA Energia have been investigating the potential to develop a renewable energy project at the wind farm site since 2021. ACCIONA Energia commissioned the development of a Fatal Flaws Report (Attexo, 2022) in early 2022 to determine the suitability of the project to progress to the next stage of development with specific consideration given to:

- applicable Commonwealth, State and local legislation and guidelines to identify the relevant regulatory and permitting requirements
- environmental and planning constraints that would influence the design and development of the proposed layout, including siting of wind turbine generators, access tracks and other project elements
- the social acceptability of the wind farm by the local community.

Further assessments and refinements to the project were undertaken during preparation of the scoping report and in consultation with DPE (refer to discussion in **Section 4.6.3**).

Ongoing refinement of the project with consideration of the above will continue through the development of the EIS, with a specific focus on reducing social, biodiversity, visual and noise impacts.

1.2.5 Related development

Central-West Orana Renewable Energy Zone Transmission Project
EnergyCo, a NSW Government statutory authority, has been appointed under the *Electricity Infrastructure Investment Act 2020* as the Infrastructure Planner responsible for delivering the CWO-REZ. EnergyCo is responsible for coordinating REZ transmission, generation, firming and storage projects to deliver efficient, timely and coordinated investment.

EnergyCo is seeking approval for the construction and operation of the Central-West Orana Renewable Energy Zone Transmission Project, referred to as the 'CWO-REZ Transmission Project', which includes new high voltage electricity transmission, energy hubs and switching stations. The infrastructure will connect new energy generation and storage projects within the CWO-REZ to the NEM. A scoping report and request for Secretary Environmental Assessment Requirements (SEARs) was submitted to DPE by EnergyCo in September 2022.

The CWO-REZ Transmission Project includes the construction of new twin double circuit 500 kilovolt transmission lines and associated infrastructure including within a generally one-kilometre-wide study corridor that traverses the wind farm site (refer to **Figure 1-1**) (Energy Corporation of NSW, 2022). The project is proposing up to two connections to this transmission line.

It is expected that construction of the CWO-REZ Transmission Project would commence in the second half of 2024 and take approximately three years to complete with initial operations commencing around mid-2027.

Temporary meteorological mast
A temporary meteorological mast was installed at the wind farm site on 23 December 2022. The temporary meteorological mast is approximately 123 metres tall and would remain for a period of up to two years and does not form part of the SSD project approval.

1.3 Proponent

The proponent for the project is ACCIONA Energy Australia Global Pty Ltd (ACCIONA Energia). ACCIONA Energia is an Australian business entity of ACCIONA, a Spanish multinational organisation that specialises in providing sustainable solutions for major infrastructure, water and renewable energy projects.

ACCIONA Energia has been a global leader in the renewable energy sector for over 25 years, working exclusively with renewable energy technology. They own and operate over 13 gigawatts of capacity in 20 countries, comprising wind (230 operational wind farms with 6,500 turbines), solar photovoltaic, solar thermal, hydro and pumped hydro, biomass, BESS, hydrogen and other assets.

ACCIONA Energia has been established in Australia since 2002 and has invested more than AUD $1.5 billion through local investment opportunities, specialising in a variety of projects including energy. ACCIONA Energia's current projects in Australia are shown on **Figure 1-2**.

ACCIONA Energia currently employs over 200 people across Australia dedicated to renewable energy development.

In Australia, ACCIONA Energia owns and operates five farms, one in a joint venture. The wind farms include Waubra, Mt Gellibrand and Mortlake South in Victoria, Gunning in NSW and

Cathedral Rocks in South Australia. Collectively these wind farms produce over 600 megawatts of renewable energy, equivalent to the energy needs of 322,000 households.

ACCIONA Energia's most recent project is the 1,000-megawatt MacIntyre Wind Farm Precinct in Queensland, currently under construction.

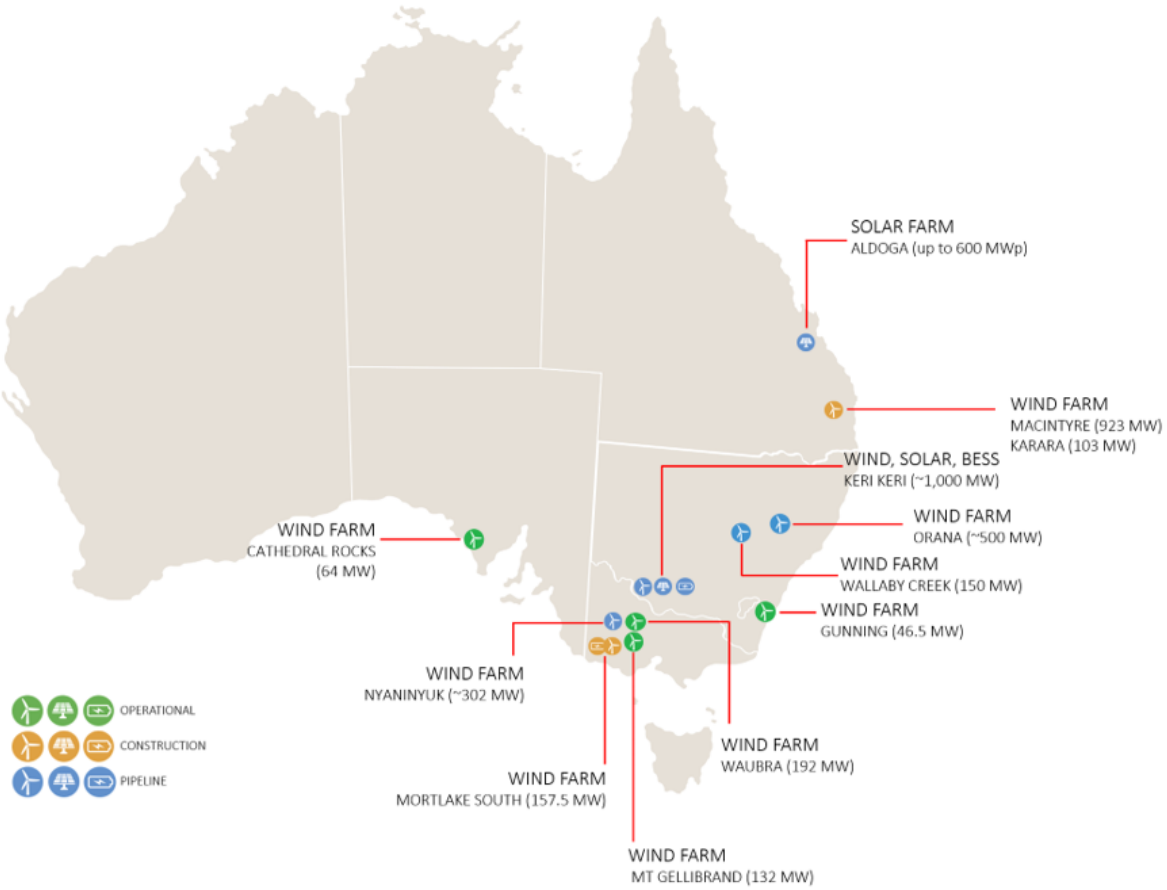


Figure 1-2: ACCIONA Energia projects in Australia

Details of the proponent are provided in **Table 1-2**.

Table 1-2: Details of the proponent

Item	Details
Proponent name	ACCIONA Energy Australia Global Pty Ltd
Australian Business Number (ABN)	54 600 910 647
Postal address	Level 38, Melbourne Central Tower 360 Elizabeth Street Melbourne, Victoria 3000

1.4 Document purpose

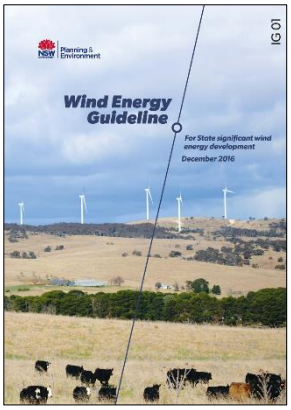
This scoping report has been prepared to support a request for SEARs that would guide preparation of an EIS as part of a development application under Division 4.1 of Part 4 of the EP&A Act.

This report has been prepared in accordance with:

- *Preparing a Scoping Report Guidelines for State Significant Projects* (Department of Planning, Industry and Environment, 2021c)
- *Undertaking Engagement Guidelines for State Significant Projects* (Department of Planning, Industry and Environment, 2021d)
- *Social Impact Assessment Guideline for State Significant Projects* (Department of Planning, Industry and Environment, 2021e)
- *Cumulative Impact Assessment Guidelines for State Significant Project* (Department of Planning, Industry and Environment, 2021f).

This report has also given consideration of the Wind Energy Guideline for SSD, comprising:

- *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning and Environment, 2016a) (Wind Guideline)
- *Wind Energy: Visual Assessment Bulletin for State Significant Wind Energy Development* (Department of Planning and Environment, 2016b) (Visual Bulletin)
- *Wind Energy: Noise Assessment Bulletin for State Significant Wind Energy Development* (Department of Planning and Environment, 2016c) (Noise Bulletin)
- Standard SEARs (Department of Planning and Environment, 2016d).



2. SITE AND REGIONAL CONTEXT

2.1 Regional context

The regional context of the wind farm site is shown on **Figure 1-1**. The wind farm site is located in the CWO-REZ, an area identified by the NSW Government as a priority area for the delivery of new renewable energy generation and storage, supported by transmission infrastructure, to facilitate the transition from an energy system dominated by large coal-fired generators. The CWO-REZ is approximately 20,000 square kilometres centred by Dubbo and Dunedoo, on the land of the Wiradjuri, Wailwan and Kamilaroi peoples (Australian Energy Market Operator, 2022).

The wind farm would be in the Central-West region of NSW, which has an estimated population of 212,962 (Australian Bureau of Statistics, 2021a). The region's population is expected to grow to more than 306,000 by 2040, requiring an additional 18,992 homes (Department of Planning, Industry and Environment, 2021).

The key economic activities within the Central-West region are agriculture, forestry and fishing (6,594 business entities recorded in 2020 representing 32 per cent of all businesses) (Australian Bureau of Statistics, 2021a). The mining sector is also a key contributor to the economy with gold, silver and copper deposits, as well as rare earth deposits in Dubbo and Condobolin. Operational coal mines are also located within the Central-West region and contribute to the regional economy more broadly.

Key land uses in the local and broader Central-West region include agriculture, consisting primarily of sheep and cattle grazing and dry land cropping, with areas of mining, viticulture and production forestry located within the broader region (AAP Consulting, 2022). Renewable energy development is a growing land use in the area, with multiple renewable energy projects located in the vicinity and many more proposed due to the declaration of the CWO-REZ (refer to **Section 7.5** for a discussion on cumulative considerations for the project).

The project would be within the Warrumbungle Shire and Mid-Western Regional LGAs, and mostly in the Warrumbungle Shire. The Warrumbungle Shire covers a total area of 12,372 square kilometres and has an estimated population of 9,225 (Australian Bureau of Statistics, 2020c). The Mid-Western Regional Shire LGA covers a total area of 8,752 square kilometres and has an estimated population of 25,713 (Australian Bureau of Statistics, 2020b).

Major occupations within the broader region include professionals (17 per cent), managers (15.1 per cent), and technical and trades workers (14.6 per cent). Key industries of employment include hospitals (4.1 per cent), other social assistance services (3 per cent), aged care residential services (2.8 per cent), primary education (2.7 per cent), and supermarket and grocery stores (2.6 per cent) (Australian Bureau of Statistics, 2021a).

Major highways in the region include the Castlereagh Highway (B55) and the Golden Highway (B84). The Castlereagh Highway passes north-south through Birriwa east of the wind farm site. The Golden Highway passes east-west through Dunedoo north of the wind farm site (refer to **Figure 1-1**).

2.2 Local context

The project and surrounds are shown on **Figure 2-1**. The project would be close to Birriwa (east), Cobbora (northwest) and Tallawang (southeast), and approximately three kilometres from the township of Dunedoo (north) at its closest point. The larger population centre of Gulgong is also located approximately 15 kilometres southeast.

Dunedoo has a population of 1,097 (Australian Bureau of Statistics, 2021c). Primary industries for the town are agriculture, with significant mixed farming and cattle and sheep industries. The township is located at the junction of the Golden and Castlereagh Highways and is often a travel stopover location with a variety of accommodation offerings, local pubs, and the Dunedoo Museum (AAP Consulting, 2022).

Gulgong is a former gold mining town, with a population almost double the size of Dunedoo, being 2,680 people (Australian Bureau of Statistics, 2021). Today Gulgong's primary industry is coal mining, however the area also attracts notable tourist attention due to its rich settler history and reputation as the childhood home of the well-known Australian poet and writer Henry Lawson. The town holds a number of annual historical festivals and celebrations, including the Henry Lawson Heritage Festival in June, the Gulgong Folk festival in December, and the Gulgong Gold and mining Festival in October (AAP Consulting, 2022).

There are some small villages near the wind farm site including Birriwa, Cobbora and Tallawang. The locality of Birriwa has a population of 45 (Australian Bureau of Statistics, 2021), Cobbora has a population of 25 (Australian Bureau of Statistics, 2021) and Tallawang has a population of 165 (Australian Bureau of Statistics, 2021f).

There are 320 sensitive receivers within an eight-kilometre radius of the wind farm site (refer to **Figure 2-2**). Of these, 27 are associated with the project (under landholder agreement) and the remaining 293 are currently non-associated. ACCIONA Energia is currently in the process of negotiating further agreements with selected landholders.

National parks and nature reserves near the wind farm include:

- Yarrobil National Park located approximately 3.5 kilometres south of the wind farm site
- Dapper Nature Reserve located approximately 11 kilometres southwest
- Goulburn River National Park located approximately 34 kilometres east.

Additionally, there are a number of state conservation areas and forests near the wind farm site including:

- Tuckland State Forest located adjacent to the wind farm site in the south-west
- Goodiman State Conservation Area (Community Conservation Area (CCA) Zone 3) located adjacent to the wind farm site in the south
- Cobbora State Conservation Area CCA Zone 3 located approximately 10 kilometres west
- Goonoo State Conservation Area located approximately 22 kilometres west
- Durridgere State Conservation Area CCA Zone 3 located approximately 30 kilometres east.

2.3 Site context

Details of the lots within the wind farm site are provided in **Section 1.2.2** and a summary of the key site features is provided in **Section 2.4**.

Properties that would be directly involved with the wind farm are privately owned by 19 landholders. ACCIONA Energia have entered into land agreements with associated property owners.

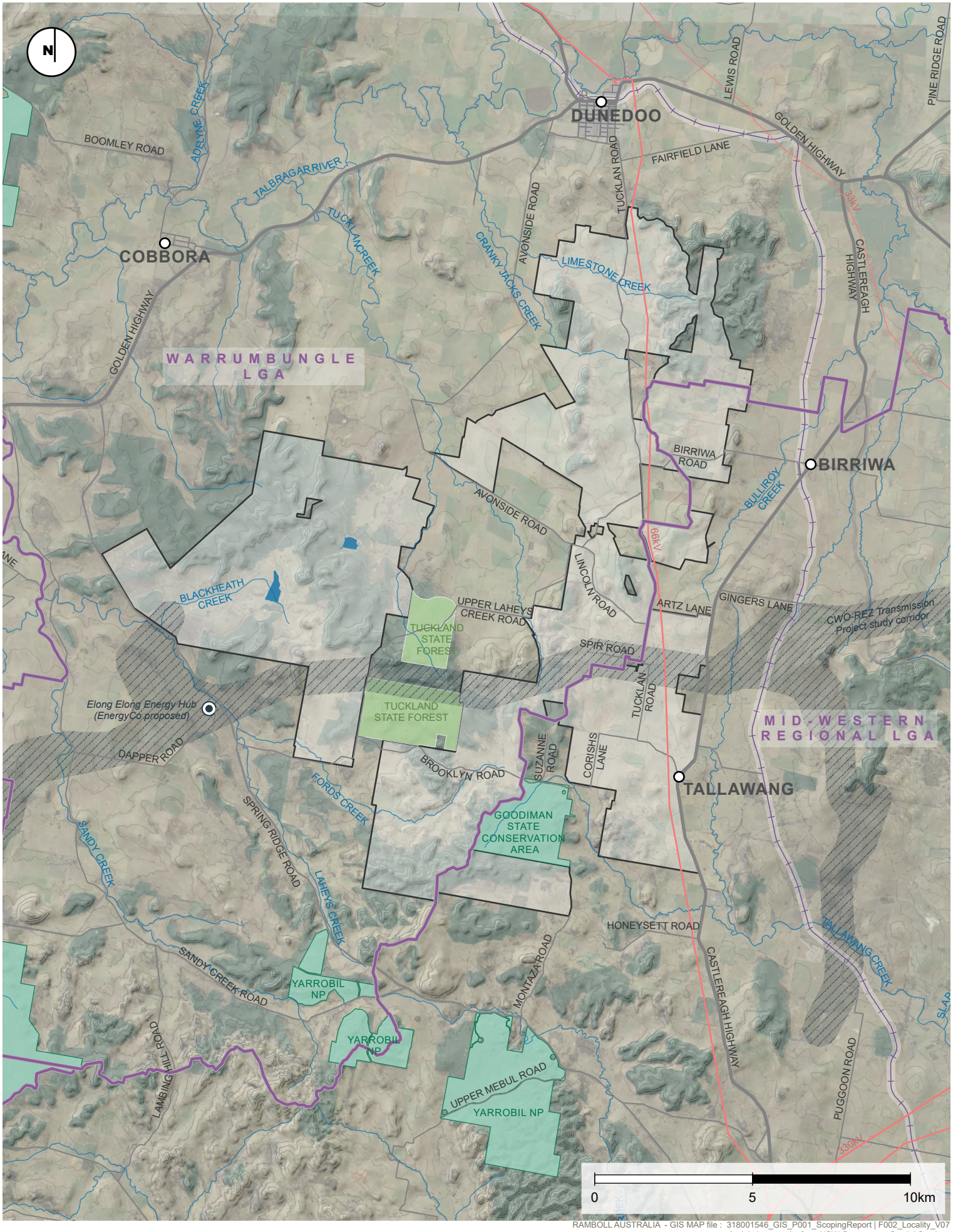
Land within the wind farm site is generally characterised by medium-sized cropping and pastoral landholdings and has generally been subject to extensive vegetation clearing associated with historic agricultural land uses. Land is predominately utilised for grazing activities, with some cropping and horticulture, although there are also forestry uses and areas of nature conservation (Attexo, 2022).

The wind farm site is traversed by a generally one-kilometre-wide study area for the proposed CWO-REZ Transmission Project, for the twin double circuit 500 kilovolt transmission lines. A 66-kilovolt distribution line also bisects the eastern side of the wind farm site, running north-south.

The wind farm would be accessed via Tucklan Road, which runs north-south through the eastern portion of the site, and Spring Ridge Road which provides access to the western portion. Tucklan Road connects to the Golden Highway in the north at Dunedoo, and Castlereagh Highway in the south. Spring Ridge Road connects to the Golden Highway in the north near Cobbora. Other minor roads within and adjoining the wind farm site include Corishs Lane, Brooklyn Road, Upper Laheys Creek Road, Spir Road, Artz Lane, and Avonside Road.

Topography is variable, with ridgelines generally ranging between 400 metres Australian Height Datum (AHD) and 500 metres AHD. The highest point is located south of the Goodiman State Conservation area at 600 metres AHD, and the lowest points at Laheys Creek and Blackheath Creek at around 400 metres AHD.

The project is in the Macquarie-Bogan River catchment. The Talbragar River lies approximately four kilometres north of the wind farm and runs east-west to the north of Dunedoo. Hydrology consists mostly of the headwaters and upper reaches of creeks and tributaries that join the Talbragar River in the west or north, and the Cudgegong River to the south. The most substantial waterways within the wind farm site include Fords Creek, Blackheath/Laheys Creek, Tucklan Creek, Limestone Creek, Patricks Creek, Cranky Jacks Creek and Bulliroy Creek.

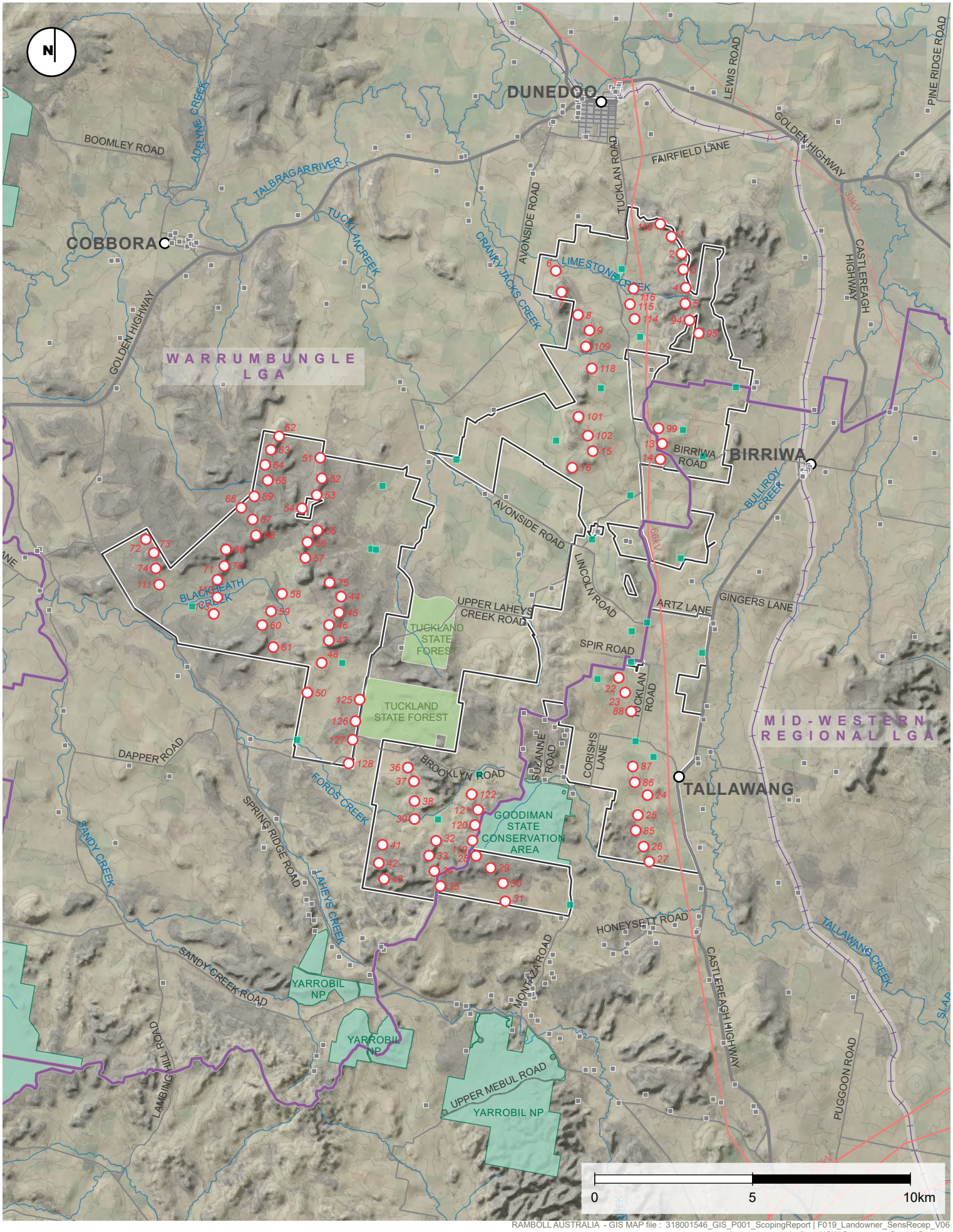


RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F002_Locality_V07
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Existing electricity transmission line
- CWO-REZ Transmission Project study corridor (approximate)
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 2-1 | Locality Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F019_Landowner_SensRecep_V06
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Indicative turbine location
- Existing electricity transmission line
- Associated dwelling
- Non-associated dwelling
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 2-2 | Sensitive receptors

Plate 2-1: Site context - 1

Plate 2-2: Site context - 2

Plate 2-3: Site context - 3

Plate 2-4: Site context - 4

Plate 2-5: Site context - 5

Plate 2-6: Site context - 6

2.4 Summary of key site features

The key property, community, built and natural features of the wind farm site and broader locality are portrayed below.

Property	
Renewable energy zone	The project is within the CWO-REZ
Local government area	Warrumbungle Shire and Mid-Western Regional
Land zoning	Predominately zoned as RU1 (Primary Production) with one small area comprising seven lots) zoned as R5 (Large Lot Residential). No infrastructure is proposed on this parcel
Land ownership	Properties directly associated with the wind farm are privately owned by 19 landholders subject to land agreements with ACCIONA Energia
Crown Land	One crown land parcel (Lot 2 DP 1009802) and crown road reserves (paper roads) occur in the wind farm site.
Native title	The majority of the project area falls within the boundary of the Warrabinga-Wiradjuri #7 registered Native Title claim (NC2018/002)
Mining and exploration licences	Four exploration licences (EL8160, EL8366, EL8734, EL9138) intercept the wind farm site

The community	
Population centres	Dunedoo is located approximately three kilometres north at its closest point. A small number of residents reside in the suburbs surrounding the wind farm site including Birriwa (east), Cobbora (northwest) and Tallawang (southeast)
Sensitive receivers	There are 320 sensitive receptors within an eight-kilometre radius of the wind farm site
Land use character and identity	Land within the wind farm site is generally characterised by medium-sized cropping and pastoral landholdings. Land within and surrounding the wind farm site has been subject to extensive vegetation clearing associated with historic agricultural land uses and is predominately utilised for grazing activities, with some cropping, horticulture, forestry and areas of nature conservation (Attexo, 2022)
Aborignal heritage	There are no known Aboriginal Places or Indigenous Protected Areas that would be affected by the wind farm, but there are 130 known Aboriginal heritage sites within the wind farm site

Built features	
Roads	Major highways in the region include the Castlereagh Highway (B55) and the Golden Highway (B84). Other minor roads within and adjoining the wind farm site include Tucklan Road, Spring Ridge Road, Corishs Lane, Brooklyn Road, Upper Laheys Creek Road, Spir Road, Artz Lane, and Avonside Road
Transmission lines	The wind farm site is traversed by a generally one-kilometre-wide study area for the proposed CWO-REZ Transmission Project twin double circuit 500 kilovolt transmission lines. A 66-kilovolt distribution line bisects the eastern side of the wind farm site, running north-south
Historic heirtage	Local heritage items occur near the wind farm, with the closest being the Spring Ridge Homestead (I385) and the Niven's Springridge Hotel House (I387) located one kilometre south

Natural features	
Area of biodiversity value	The wind farm would not be located within a known area of *outstanding biodiversity value*, however, contains areas identified on the Biodiversity Value Map which are associated with the creeks throughout the wind farm site (Department of Planning and Environment, 2022b)
National parks and nature reserves	National parks and nature reserves near the wind farm include Tuckland State Forest adjacent to the wind farm site in the south-west), Goodiman State Conservation Area CCA Zone 3 (adjacent to the wind farm site in the south), Yarrobil National Park (approximately 3.5 kilometres south)
Rivers and waterways	Talbragar River lies approximately four kilometres north of the wind farm site. The most substantial waterways within the site include Fords Creek, Blackheath/Laheys Creek, Tucklan Creek, Limestone Creek, Patricks Creek, Cranky Jacks Creek and Bulliroy Creek
Topography	Ridgelines generally ranging between 400 metres AHD and 500 metres AHD
Vegetation	A significant portion of the wind farm site contains a mix of woodlands and forests consistent with threatened ecological communities (TECs) listed under both the BC Act and the EPBC Act
Habitat	The site may contain habitat for bat species, Regent Honeyeater, Glossy Black-cockatoo, Little Eagle, Barking Owl, Powerful Owl, Squirrel Glider, Superb Parrot, Masked Owl, Koala, and flora species. Mapped key fish habitats and protected riparian lands also occur within the wind farm site
Groundwater dependent ecosystems	High, moderate and low potential terrestrial groundwater dependent ecosystems occur within the wind farm site, with the majority being low potential

3. STRATEGIC CONTEXT

3.1 Strategic plans and policies

The project is supported by strategic planning policies at local, State and Federal levels. At a strategic level, the project provides an opportunity to:

- support Australia's commitments to reduce greenhouse gas emissions
- contribute to NSW achieving net-zero emissions by 2050
- help to deliver on commitments in the Federal Government's RET Scheme
- assist in meeting energy demand and improving energy security and reliability for NSW
- contribute to achieving the target of three gigawatts of renewable energy generation from the CWO-REZ.

A high-level discussion of the key strategic plans and policies and alignment with the project is provided in **Table 3-1**.

Table 3-1: Project alignment with strategic plans and policies

Strategy, plan, or policy	Description and purpose	Project alignment
National and international context		
The 2015 United Nations Framework Convention on Climate Change (UNFCCC) "Paris Agreement"	The Paris Agreement is a legally binding international treaty to combat climate change. The goal of the agreement is to limit global temperature rise this century to well below two degrees Celsius and to attempt to limit temperature increase to 1.5 degrees Celsius compared to pre-industrial levels (United Nations Framework Convention on Climate Change, 2022). The Australian Government has committed to reduce emissions by 26–28 per cent compared to 2005 levels by 2030.	The project would contribute to meeting Australia's commitments through the generation of renewable energy and resultant annual reduction in greenhouse gas emissions.
Large-Scale Renewable Energy Target Scheme	The Large-Scale Renewable Energy Target (LRET) incentivises the development of renewable energy power stations in Australia, through a market involving the creation and sale of certificates known as Large-Scale Generation Certificates (LGCs). The LRET involves the generation of an additional 33,000 gigawatt hours of additional renewable energy annually under the *Renewable Energy (Electricity) Amendment Bill 2015* (Clean Energy Regulator, 2022b).	Once operational, the project would generate up to 1,600 gigawatt hours of electricity annually contributing to the LRET target.
Integrated System Plan 2022	The Integrated System Plan (ISP) provides an integrated roadmap for the development of the NEM over the next 20 years. The most recent ISP was released on 30 July 2022. The key objective of the ISP 2022 is to support Australia's highly complex and rapid energy transformation towards net zero emissions, enabling low-cost renewable energy and essential transmission to provide consumers with reliable, and secure and affordable power. The ISP 2022 identifies actionable and future projects that can achieve Australia's power needs (Australian Energy Market Operator, 2022). This includes the locations of proposed REZs in Australia that can connect to existing transmission networks.	The project would contribute to addressing the objective of supplying renewable energy to provide consumers with reliable, and secure and affordable power. The project is located in the CWO-REZ, which has been identified in the ISP 2022.
State context		
Net Zero Plan Stage 1: 2020-2030	The *Net Zero Plan Stage 1: 2020-2030* is the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050. It outlines the NSW	The project would contribute to meeting Australia's commitments through the generation of renewable energy and

Strategy, plan, or policy	Description and purpose	Project alignment
	Government's plan to grow the economy, create jobs and reduce emissions over the next decade.	resultant annual reduction in greenhouse gas emissions.
New South Wales Electricity Strategy 2019	The *New South Wales Electricity Strategy* (NES) aims to address key challenges in providing *"a reliable, affordable and sustainable electricity future that supports a growing economy"*. The strategy supports approximately $8 billion of private investment in the NSW electricity system over a 10-year period, including $5.6 billion in regional NSW. The plan also aims to generate 1,200 jobs, predominantly in regional NSW (Department of Planning, Industry and Environment, 2019).	The project is consistent with the NES as it provides renewable energy that, in combination with other renewable projects, is expected to result in lower cost of power in comparison to wholesale prices.
NSW Electricity Infrastructure Roadmap 2020	The *Electricity Infrastructure Roadmap* is the NSW Government's plan to transform our electricity system into one that is affordable, clean and reliable. The roadmap emphasises the need for NSW to transition to renewable energy and aims to replace NSW's ageing coal-fired power stations with a coordinated portfolio of energy generation, storage and network investment. The roadmap is expected to help reduce NSW electricity emissions by 90 million tonnes by 2030 and support NSW to deliver on its net zero by 2050 ambitions (NSW Energy, 2020).	The project would contribute to achieving the vision of the roadmap by producing renewable energy to replace NSW's ageing coal fired power stations and would contribute to annual reductions in greenhouse gas emissions, in combination with other renewable projects.
Regional context		
Central-West and Orana Regional Plan 2041	The *Central-West and Orana Regional Plan* guides NSW Government's land use planning priorities and decisions for the region through to 2041. The vision or the Central-West and Orana region to be "*the most diverse regional economy in NSW with a vibrant network of centres leveraging the opportunities of being at the heart of NSW*". (Department of Planning and Environment, 2017a). The plan outlines five parts, each supported by objectives. The five parts are: 1. Region-shaping investment 2. A sustainable and resilient place 3. People, centres, housing and communities 4. Prosperity, productivity and innovation 5. Local government priorities.	The project directly aligns Objective 2 of Part 1: Support the State's transition to Net Zero by 2050 and deliver the Central–West Orana Renewable Energy Zone. Other objectives relevant to the project include: • Objective 6: Support connected and healthy communities • Objective 9: Ensure site selection and design embraces and respects the region's landscapes, character and cultural heritage • Objective 10: Protect Australia's first Dark Sky Park.

Strategy, plan, or policy	Description and purpose	Project alignment
Dark Sky Planning Guideline 2016	The *Dark Sky Planning Guideline* is a matter for consideration for all development under the EP&A Act before development consent is granted within the local government areas of Coonamble, Dubbo, Gilgandra and Warrumbungle. It aims to provide guidance and technical information regarding lighting design to preserve the cultural identity of the dark Sky Region (Department of Planning and Environment, 2016).	The project falls within the Dark Sky Region which consists of the land within a 200-kilometre radius of Siding Spring Observatory. Lighting impacts would be considered as part of the EIS.
Local context		
Warrumbungle Shire Development Control Plan 2015	The *Warrumbungle Shire Council Development Control Plan 2015* (Warrumbungle DCP) compliments the *Warrumbungle Local Environmental Plan 2013* (Warrumbungle LEP) and provides detailed requirements to guide development in the LGA. Section 5 of the Warrumbungle DCP applies to RU1 Primary Production Zones and R5 Large Lot Residential Zones. It is a requirement under Section 5 that "*Any new residence or residential accommodation should be located a minimum distance of 2km from any active or proposed wind turbine, unless suitable measures are taken in the design and construction of the dwelling to ameliorate any noise or other impacts*.".	Any future residential development applications near the wind farm would need to consider Section 5 of the Warrumbungle DCP and the project.
Mid-Western Regional Development Control Plan 2013	The *Mid-Western Regional Development Control Plan 2015* (Mid-Western Regional DCP) compliments the *Mid-Western Regional Local Environmental Plan 2012* (Mid-Western Regional LEP) and provides detailed requirements to guide development in the LGA. Section 6.3 of the Mid-Western Regional DCP relates to commercial wind farms (those with an output greater than 10 kilowatts). This section outlines the design controls that must be considered for a wind farm project including minimising impacts to farming/grazing land, visual impacts, land degradation, bushfire hazards, spread of noxious plants and animals and pollution of groundwater.	The project would have consideration to Section 6.3 of the Mid-Western Regional DCP.

3.2 Key risks or hazards

Known key risks or hazards in the area, that have the potential to affect the wind farm are outlined below.

Flooding	A review of LEP flood planning maps did not identify any flood planning areas in or in the vicinity of the wind farm site (refer to **Section 7.4.1**).
Bushfire	Large areas of the wind farm site are mapped as Bushfire Prone Land (refer to **Section 7.4.1**).
Contamination	No known contaminated sites have been identified within or near the wind farm site (refer to **Section 7.4.1**).
Climate change	The wind farm site is projected to experience a 0.71 degrees Celsius increase in the daily average temperature in the near future (2020-39) and a 2.09 degrees Celsius increase in the far future (2060-79) (AdaptNSW, 2022). Rainfall is projected to change by +0.21 per cent per year in the near future (2020-39) and by +10.58 per cent per year in the far future (2060-79) (AdaptNSW, 2022). The number of high fire danger days per year is expected to increase by 0.48 days per year in the near future (2020-39) and by 1.32 days per year in the far future (2060-79) (AdaptNSW, 2022).

3.3 Cumulative considerations

The wind farm would be within the CWO-REZ, which is an area of focus for other existing and proposed large scale renewable energy projects, as well as other developments. When all existing and proposed developments are considered as a whole, it would be expected that the region would be subjected to cumulative effects.

The major operational wind farms within 100 kilometres of the wind farm site include:

- Bodangora Wind Farm (approximately 55 kilometres southwest)
- Crudine Ridge Wind Farm (approximately 95 kilometres south).

Additionally, the following wind farms are planned to be developed in the future:

- Barney's Reef Wind Farm (approximately 13 kilometres southeast)
- Spicers Creek Wind Farm (approximately 15 kilometres west)
- Valley of the Winds Wind Farm (approximately 25 kilometres northeast)
- Uungula Wind Farm (approximately 50 kilometres southwest)
- Liverpool Range Wind Farm (approximately 50 kilometres northeast)
- Burrendong Wind Farm (approximately 70 kilometres southwest)
- Kerrs Creek Wind Farm (approximately 80 kilometres south).

There are also a number of solar farms (existing or planned) in the area including:

- Birriwa Solar Farm (approximately 1.7 kilometres east) (planned)
- Sandy Creek Solar Farm (approximately 2.3 kilometres southwest) (planned)
- Tallawang Solar Farm (approximately 4 kilometres southeast) (planned)

- Dunedoo Solar Farm (approximately 5 kilometres north) (planned)
- Bellambi Heights Solar Farm (approximately 9.5 kilometres southeast) (planned)
- Stubbo Solar Farm (approximately 12 kilometres southeast) (planned)
- Beryl Solar Farm (approximately 13 kilometres southeast) (existing)
- Cobbora Solar Farm (approximately 50 metres southwest) (planned).

Consideration of the cumulative impacts for the project is included in **Section 7.5**.

3.4 Site selection and justification

A summary of the key technical, functional and environmental factors considered as part of the site selection is presented in **Table 3-2**.

Table 3-2: Key factors consideration in site selection

Factor	Considerations and justification
Technical feasibility	
Quality of wind resource	The wind resource within the wind farm site has shown that the area has potential for a wind farm to productively generate electricity. Data has been extrapolated to calculate a prevailing wind speed from an easterly direction of approximately eight metres per second at a height of 148 metres (ACCIONA, 2022)
Suitability of land topography for wind turbines and associated infrastructure	Gentle ridgelines provide for flexibility for micrositing of turbines, enabling siting that responds to environmental, heritage and visual constraints
Landholder discussions and property constraints	All turbines are proposed to be located on freehold land. Unformed Crown roads, waterways and parcels of Crown land would be avoided where practical
Availability and capacity of connection to the NEM	The project would connect to the proposed CWO-REZ Transmission Project
Site and environmental constraints	
Renewable Energy Zones	The wind farm site is located within the CWO-REZ
Proximity to regional centres	The wind farm site is located approximately three kilometres south of Dunedoo at its closest point and 60 kilometres northeast of Dubbo. Gulgong is located approximately 15 kilometres southeast of the wind farm site
Visibility and topography	Siting of wind turbines and other project infrastructure would be determined with consideration of visual impacts to sensitive receptors
Biodiversity	Large areas of the site are disturbed/grazing and improved pastures. Biodiversity constraints will be considered further in ongoing development of the project layout, with the view to avoid and minimise impacts to biodiversity and remnant vegetation

Factor	Considerations and justification
Aboriginal heritage	The most likely landforms where Aboriginal objects may be recorded is on lower elevations landforms. The wind turbines are generally located on higher ground predominately along ridgelines with potential to avoid or minimise impact on sensitive land through design refinement
Land use	The indicative turbine layout enables continuation of current farming practices to occur between the turbines
Cumulative considerations	The project is located nearby to other renewable energy projects and proposed infrastructure associated with the CWO-REZ. The key issues that would be subject to specific cumulative impact assessment relate to visual, traffic, noise, biodiversity, social and land use

3.5 Project need

2022 has seen electricity prices in NSW and Australia significantly rise. In May 2022, the NSW short-term wholesale price of electricity was reportedly 80 per cent higher than in 2021 while National wholesale energy prices had increased 140 per cent in 12 months. The Australian Energy Regulator announced an 18.3 per cent increase to benchmark electricity price, taking effect in July 2022, expected to further increase the price of electricity (AAP Consulting, 2022).

In June 2022, the Australian Energy Market Operator (AEMO) suspended wholesale spot market trading on the East Coast of Australia to ensure reliable supply. Price caps implemented by AEMO to limit rising electricity costs, resulted in unprofitable conditions for electricity generators. Consequently, electricity generators withdrew from the energy market, reducing supply in a period of notably high demand. This nexus of high demand and high energy production cost has highlighted vulnerabilities within the East Coast energy market (AAP Consulting, 2022).

A key driver in State and National electricity prices has been the increasing cost of fossil fuel energy sources. Instability and restriction of global supply chains, exacerbated by conflict in the Ukraine, have led to market prices for fossil fuels to increase notably in Australia. Renewable energy and energy storage have been identified as an appropriate measure to reduce energy prices and reduce State and National vulnerability to global instability (AAP Consulting, 2022).

NSW is currently undergoing an energy sector transformation. The NEM (managed by the AEMO) is transitioning from a system dominated by a small number of large coal-fired generators to one of diverse renewable and distributed energy generation and storage. Modelling indicates that 14 gigawatts (60 per cent of current coal capacity) may be withdrawn by 2030 and all coal generation could withdraw by 2040 (Australian Energy Market Operator, 2022).

The closure of large coal-fired power stations has the potential to put pressure on the future supply of energy, particularly when considering that electricity consumption in NSW is forecast to increase in the future (Australian Energy Market Operator, 2022). This highlights the urgent need to develop and connect new renewable energy to the NEM, noting that more renewables are required to replace conventional generators because of their lower capacity factors due to the intermittency of the electricity that they produce (Australian Energy Council, 2017).

Australia's vast natural capital means that it has one of the best solar and wind resources on the planet, setting viable foundations for a strong renewable sector, particularly in rural environments. The construction of wind farms in Australia forms part of the wider transition toward renewable energy and a more sustainable future for the country (AAP Consulting, 2022).

The NSW Government is leading the development of REZs across NSW. Five REZs have been announced in NSW, of which two have been formally declared. In November 2021, the NSW Government formally declared Australia's first REZ, the CWO-REZ, where the project is located. The project is one of 11 major renewable generation projects identified by EnergyCo that will connect to the CWO-REZ Transmission Project (refer to **Section 1.2.5**).

The project is justified because:

- it would be located in the CWO-REZ, which has been identified by the NSW Government as a priority area for the delivery of new renewable energy generation and storage, supported by transmission infrastructure
- it is suitably located in a region with ideal climatic and physical conditions for large-scale wind energy generation
- it is close to the proposed CWO-REZ transmission line providing a connection to dispatch electricity to the NEM
- it would largely affect agricultural land uses that are compatible with large-scale wind energy generation
- it would not result in significant social or economic impacts
- it would create employment opportunities and benefits to the local and regional economy.

The consequences of not proceeding with the project would include:

- loss of opportunity to reduce greenhouse gas emissions and move towards cleaner electricity generation
- loss of a renewable energy supply that would assist in reaching the RET
- loss of additional electricity generation and supply into the NEM
- loss of social and economic benefits created through the provision of direct and indirect employment opportunities during the construction and operation of the project, as well as flow on social and economic benefits.

4. THE PROJECT

4.1 Project components

4.1.1 Project overview

The project would include the following infrastructure:

- up to 92 wind turbines, with an estimated capacity of up to approximately 524 megawatts.
- wind turbine hardstands approximately 120 metres by 70 metres
- electrical infrastructure including:
  - up to three substations
  - overhead and underground electrical reticulation connecting the wind farm elements
  - up to two BESS facilities with a capacity of up to 100 megawatts, and storage of up to 200 megawatt hours
- other permanent onsite ancillary infrastructure including:
  - operations and maintenance facility
  - permanent meteorological monitoring masts up to 148 metres high
  - internal access tracks
  - security fencing and landscaping
- temporary construction ancillary infrastructure including:
  - construction compounds
  - laydown areas
  - concrete batching plants
  - potential quarry sites for construction material (rock for access tracks and hardstands)
  - potential construction workforce accommodation.

4.1.2 Project layout

An indicative project layout has been developed following preliminary constraints assessments completed in early 2022 (Attexo, 2022) and further preliminary assessments completed throughout the remainder of 2022 to early 2023 as part of the scoping phase. The layout is presented in **Figure 4-1**. Key constraints considered in defining the project layout include:

- optimisation of the wind resource
- increasing distance from neighbouring large lot residential properties to minimise potential visual and noise impacts
- maximising distance from Dunedoo to minimise visual impacts to residences
- avoidance of known Aboriginal heritage items
- avoidance of land zoned as R5 Large Lot Residential for siting of infrastructure.

Further refinement of the project layout will continue throughout the EIS phase as potential environmental, social and amenity impacts are identified through detailed technical assessments and landholder and community consultation.

4.1.3 Wind turbine generators

The project would include approximately 92 turbines arranged in two clusters, all connected electrically. The number of turbines within each cluster includes:

- eastern cluster – approximately 53 turbines
- western cluster – approximately 39 turbines.

The indicative layout of the turbines is shown in **Figure 4-1**. Collectively, the turbines would have a total energy generation capacity of approximately 524 megawatts.

The type of wind turbines to be used is subject to further design, availability of components, and the procurement process, however a maximum tip height of up to 271.5 metres and a rotor diameter of up to 183 metres would be expected. The wind turbines would likely use the Nordex N163-5.X 5.7 megawatt turbine model. The Nordex N163-5.X 5.7 megawatt turbine model has a cut-in wind speed of three metres per second and a cut-out wind speed of up to 26 metres per second.

4.1.4 Battery energy storage system

Large-scale battery storage is also proposed to support stabilising the supply of electricity to the NEM. A centralised BESS facility would be constructed in the eastern cluster with a capacity of up to 100 megawatts, with 200-megawatt hours storage. A secondary BESS may also be constructed in the western cluster. The BESS facilities are expected to be housed in a secure compound and would likely utilise lithium-ion technology.

4.1.5 Substations, switch stations, electrical reticulation and grid connection

The project would include up to three substations, one located in the east and one located in the west. The purpose of the substation is to transform the electricity generated by the turbines into a higher voltage, for dispatch to the NEM. The substations would likely include:

- indoor switch room to house the medium voltage switchboard and circuit breakers
- outdoor switch yard to house the transformer(s)
- gantries and associated infrastructure
- buried earth grid
- operational facilities building
- lighting
- lightening protection
- onsite diesel generator and/or batteries to maintain network communications and electrical protection
- crushed rock and concrete slab ground cover
- parking
- security fence around the substation to maintain site security, public safety and exclude livestock.

The substations would be located to minimise access distance and electrical losses, to reduce their visibility from surrounding public viewpoints, and to allow the provision for a 20-metre asset protection zone surrounding the infrastructure.

Overhead and underground electrical reticulation (up to 33 kilovolts) would be installed to connect the turbines to the substations. The substation would include a step-up facility to upgrade the electricity to 330-kilovolts. A 330-kilovolt overhead steel lattice-type transmission line would be constructed to connect the substations to the CWO-REZ transmission line.

The final electrical layout would depend on the ease of excavation, ground stability and cost. Where ground conditions or localised topography mean that undergrounding the reticulation is not feasible, consideration would be given to including some sections of overhead transmission lines for the internal reticulation. This would be determined during detailed design.

4.1.6 Other permanent onsite ancillary infrastructure

The permanent onsite ancillary infrastructure that would be required for the project includes:

- operation and maintenance facility
- meteorological masts.

The operation and maintenance facility would generally comprise a control room (offices, monitoring equipment, stores and amenities), storage and maintenance facilities, laydown areas, and parking.

Up to four permanent meteorological masts would be included in the project providing continuous monitoring of meteorological conditions. These would be up to 148 metres high and comprise free standing towers.

A temporary meteorological mast was installed in December 2022 to monitor ongoing wind and weather conditions during the detailed design phase. The temporary mast is approximately 123 metres high and would be removed no later than 24 months after its erection (i.e. by 23 December 2024) (refer to **Section 1.2.5**).

4.1.7 Access tracks, roads and parking

The wind farm site would be accessed via Tucklan Road off the Golden Highway at the north of the wind farm site and via Tucklan Road off the Castlereagh Highway at the east of the wind farm site. The Tucklan Road / Castlereagh Highway intersection would be upgraded to accommodate OSOM vehicle movements. A third access point would be via Spring Ridge Road in the west.

Public roads that would likely be upgraded for the project include Tucklan Road, Corishs Lane, Brooklyn Road, and Upper Laheys Creek Road. Road upgrades would be confirmed during the EIS.

The project would also require an internal access track network connecting the turbines and associated infrastructure. The access tracks would be established for construction and maintained for use as operational access tracks.

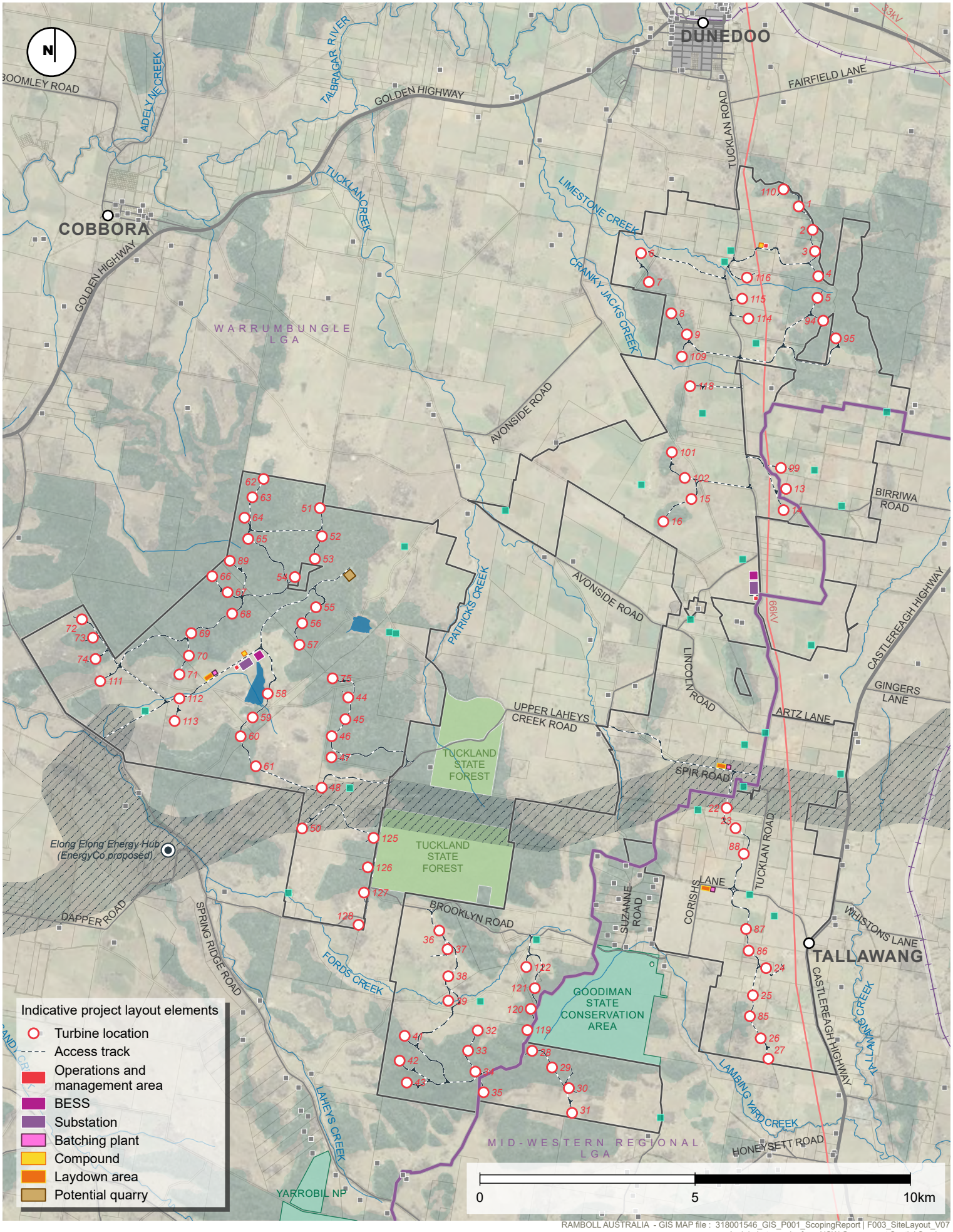
Expected public road upgrades and the internal access track network is indicatively shown in **Figure 4-1**.

4.2 Project staging, timing and sequencing

The anticipated staging and timing of the project is summarised in **Table 4-1**.

Table 4-1: Project staging and indicative timing

Stage	Indicative timing
Planning and approvals process	In progress with the aim to be completed by 2024
Construction	2025-2027
Operations	2027-2057 (unless the facility is re-powered at the end of its operational life)
Decommissioning	At the end of its operational life



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Aerial photography from NSW Government Spatial Services

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- State forest

Figure 4-1 | Project Layout

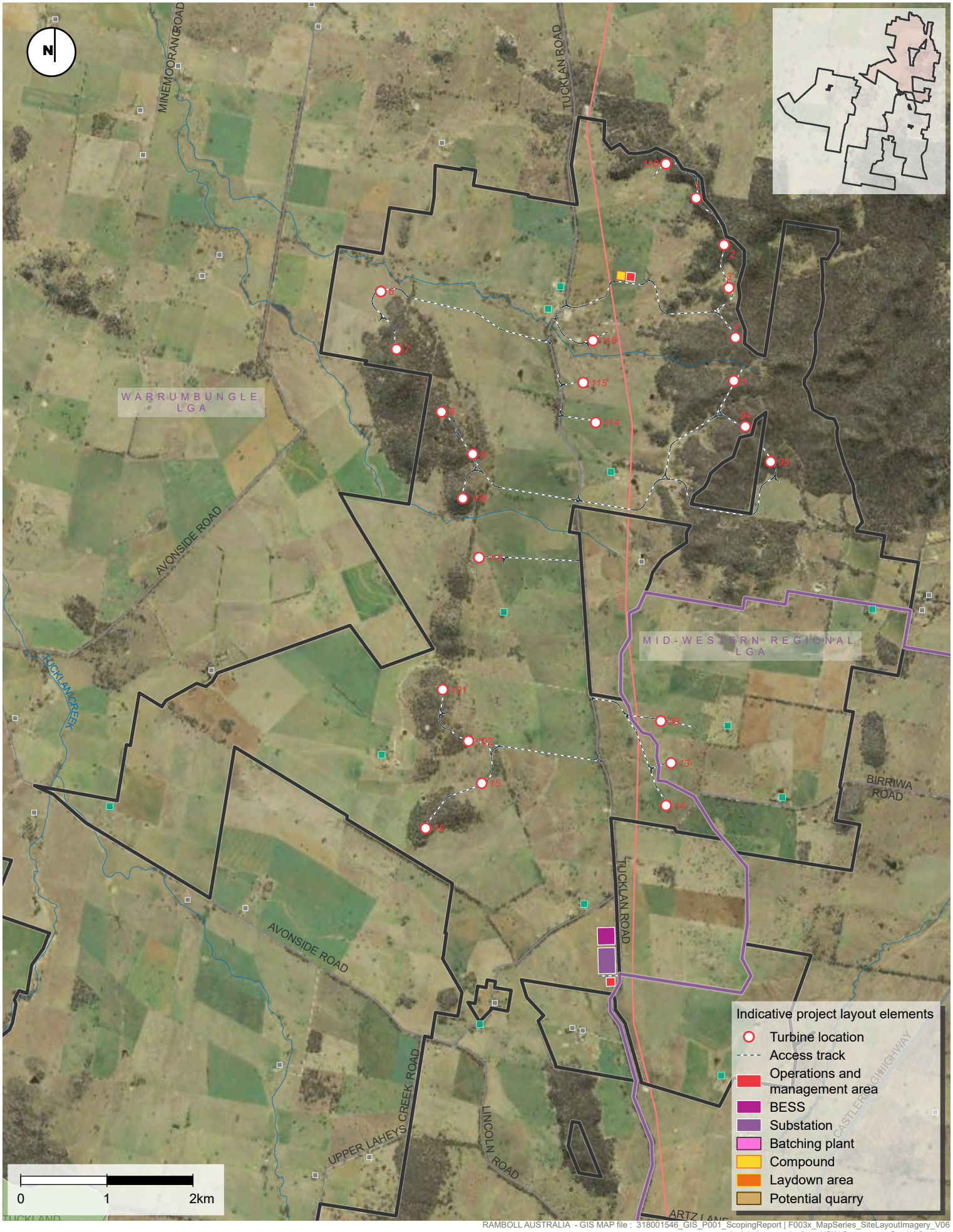

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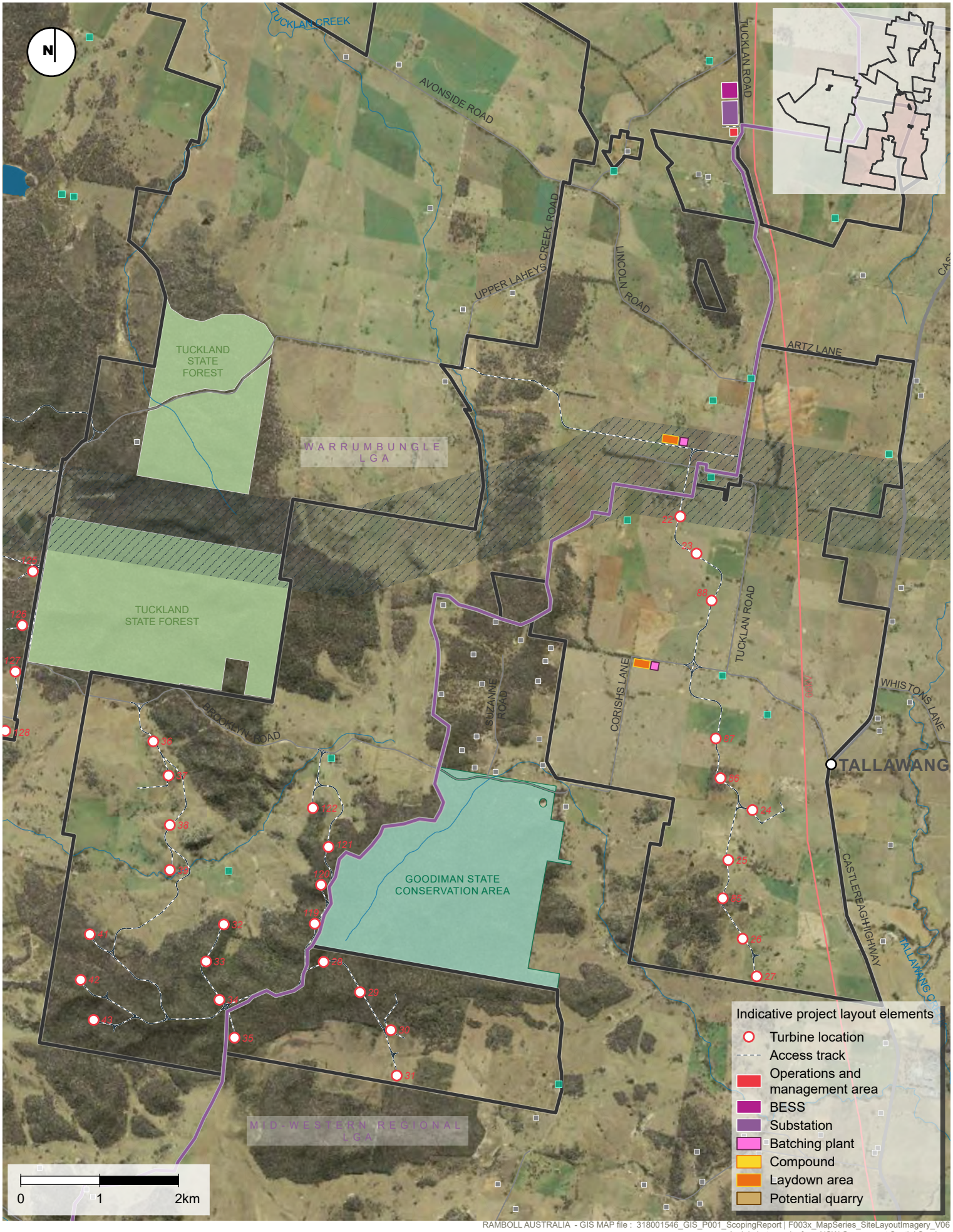
Figure 4-1a | Project Layout



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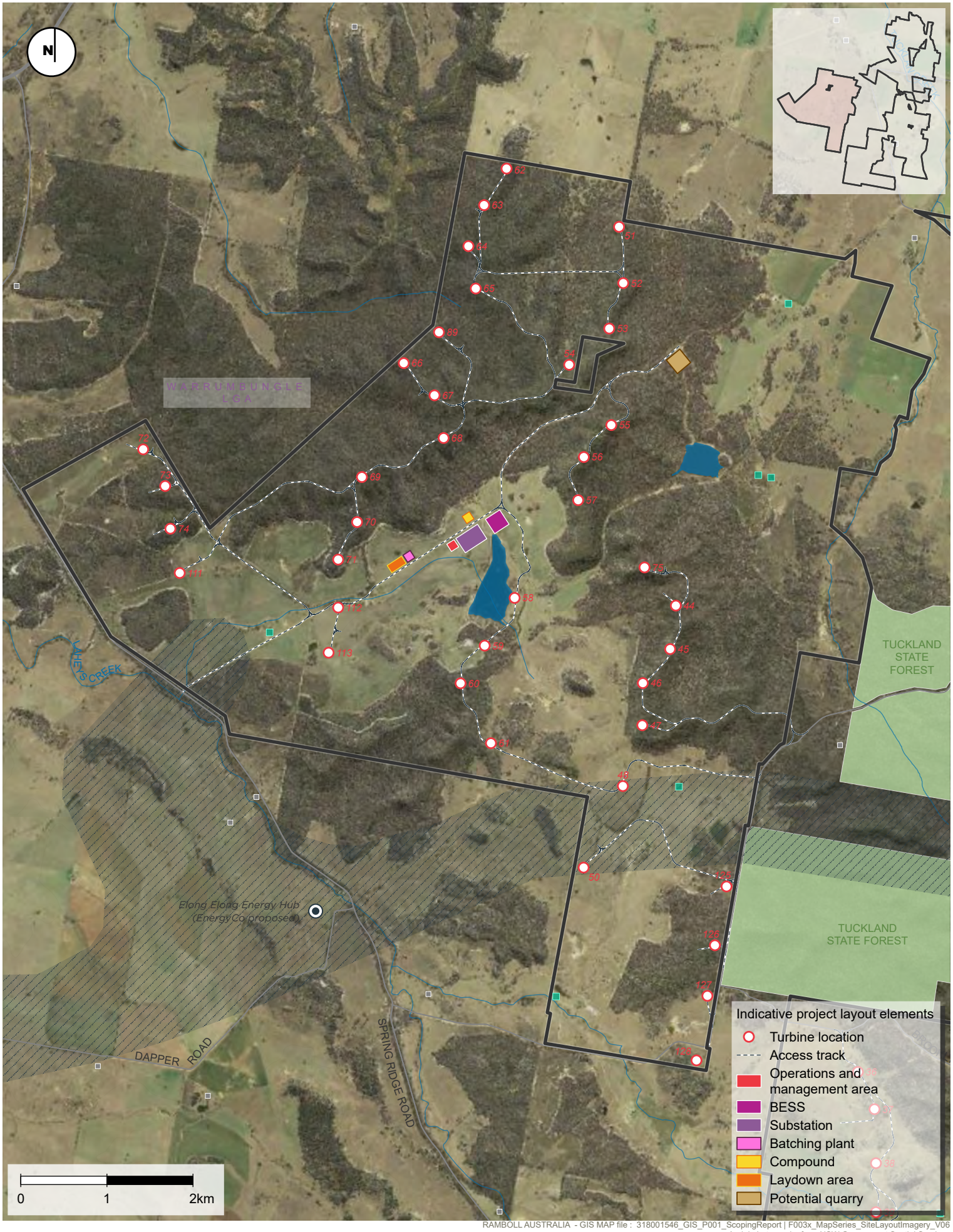
KEY

- Orana Wind Farm site
- Existing electricity transmission line
- CWO-REZ Transmission Project study corridor (approximate)
- Associated dwelling
- Non-associated dwelling
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 4-1b | Project Layout



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F003x_MapSeries_SiteLayoutImagery_V06
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Existing electricity transmission line
- CWO-REZ Transmission Project study corridor (approximate)
- Associated dwelling
- Non-associated dwelling
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 4-1c | Project Layout

4.3 Construction

4.3.1 Construction phases

Construction of the project would be undertaken in the following phases:

- **Phase 1. Detailed design and site investigations**: Detailed design, including the design of electrical reticulation, geotechnical design, and other project elements
- **Phase 2. Site preparation**: Pre-construction activities such as site preparation and vegetation clearing, installation of environmental management measures (such as erosion and sediment controls) and protection mechanisms for watercourses and exclusion zones, utility adjustments, erection of site and workers compounds, and upgrades to public roads
- **Phase 3. Main construction works**: Onsite civil works including access tracks and permanent drainage works, wind turbine construction, BESS and electrical infrastructure construction, installation of electrical reticulation and ancillary infrastructure
- **Phase 4. Commissioning**: Activities to be undertaken prior to operation such as testing of turbines and energising substations.

4.3.2 Temporary construction ancillary facilities

Several temporary construction ancillary facilities would be required during construction. These would likely include:

- construction compounds inclusive of site offices, car parking and amenities
- laydown areas suitable for plant and equipment
- concrete batching plants (up to three)
- quarry sites for construction material (rock for access tracks and hardstands)
- potential construction workforce accommodation
- construction access tracks and associated infrastructure such as gates and fencing.

4.3.3 Construction program, hours and workforce

The timing of construction would be dependent on project approval, however, is expected to commence in 2025 and run for a period of approximately two to three years.

The project would likely require up to approximately 580 full time equivalent construction workers during peak periods, which are expected to be during Phase 3 of the project when the main construction works would be undertaken. Opportunities would be available for local construction workers to maximise the local workforce onsite.

The construction program, hours and workforce would be subject to detailed design, construction methodology, community consultation and scheduling. Further details would be included in the EIS, including a consideration of the potential cumulative impacts associated with accommodation, infrastructure, and services as part of the social impact assessment.

4.3.4 Ancillary activities

The project may also include the following ancillary activities:

- geotechnical investigations to inform the siting and location of project layout and infrastructure
- sourcing of water for construction (this may include offsite or onsite water sourcing including the construction of bores or dams)
- subdivision and boundary adjustments relating to lease arrangements, where required
- visual screening, where required.

Ancillary activities would be subject to further assessment as part of the EIS.

4.4 Operation

The wind farm would likely operate 24 hours per day, seven days per week with the operations and maintenance team attending site during standard working hours, unless responding to an alarm, fault, or undertaking major maintenance works. Up to approximately 12 full time equivalent employees would be required to operate and maintain the wind farm on site.

Ongoing monitoring and maintenance would be required, including maintenance of the wind turbines, associated infrastructure, vegetation, and internal access tracks.

The expected operating life for the wind farm is 30 years before any major replacements or refurbishments would be required. At a point in time prior to the end of the projects operating life, and according to equipment performance, equipment condition and project viability, ACCIONA Energia would consider whether to either re-permit and repower or decommission the project at the end of the project's life.

4.5 Decommissioning

Should it be determined that the project would be decommissioned, associated above ground infrastructure would be decommissioned and removed. Land impacted by the project would be appropriately rehabilitated in consultation with the affected landholders.

4.6 Alternatives considered

4.6.1 Do nothing

The 'do nothing' option represents the option of not developing a wind farm project, and not investing in other renewable projects. This option would avoid all the impacts of the project however, would also not deliver the potential benefits of the project (refer to **Section 3.5**).

4.6.2 Alternate renewable energy projects

Consideration was given to the type of development that would best suit the environmental conditions, whilst having regard to the local community and other environmental constraints. The local topography lends itself to wind energy due to the moderately complex terrain and elevation, facilitating high average wind speeds when compared to the surrounding lower elevation locations within NSW.

4.6.3 Alternate layouts

Alternate turbine layouts have been considered for the project, with refinements made to avoid or minimise environmental and social constraints such as removing selected turbines to reduce visual impacts.

Specifically, 14 wind turbines were relocated in late 2022 to reduce disturbance of intact vegetation from turbines, tracks and reticulation. Following discussions with DPE, a further 14 turbines were removed from the project to minimise potential visual and noise impacts.

Further refinements to the turbine layout will be made during preparation of the EIS in response to the findings of detailed assessments and feedback from engagement with the view to avoid or minimise environmental, social and amenity impacts.

5. STATUTORY CONTEXT

The key statutory considerations for the project under the EP&A Act and other relevant NSW and Commonwealth legislation are outlined in **Table 5-1**. The relevant statutory requirements for the project would be outlined in further detail within the EIS.

Table 5-1: Statutory requirements for the project

Matter	Requirements for the project
Power to grant consent	The project meets the threshold for Sate Significant Development and is subject to assessment under Part 4 of the EP&A Act. Approval for the project would be sought under Part 4, Division 4.7 of the EP&A Act. Under Section 4.36(2) of the EP&A Act, a State Environmental Planning Policy (SEPP) may declare any development, or any class or description of development, to be SSD. Under the provisions of Clause 2.6(1) of the Planning Systems SEPP, a development is classified as SSD if: *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and* *(b) the development is specified in Schedule 1 or 2.* Schedule 1, Clause 20 of the Planning Systems SEPP determines 'electricity generating works' to be SSD if it meets the following criteria: *Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that:* *(a) has a capital investment value of more than $30 million.* The project is a development for the purpose of electricity generation and exceeds the threshold for SSD with a capital investment value of more than $30 million. Under Division 4.2, Section 4.5 of the EP&A Act the consent authority for SSD is the Independent Planning Commission (if the development is of a kind for which the Commission is declared the consent authority by an environmental planning instrument) or the Minister for Planning and Homes (if the development is not of that kind).
Permissibility	The permissibility of wind farm developments in NSW is determined by the Transport and Infrastructure SEPP. Clause 2.36(1) of the Transport and Infrastructure SEPP provides 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 (including RU1 Primary Production zone). The project site is predominately located on land zoned as RU1 Primary Production under the Warrumbungle Shire LEP and Mid-Western Regional LEP and is permitted with consent. Clause 2.42 sets provisions that the consent authority must have regard to when determining a development application for solar or wind electricity generating works on land in a regional city. A regional city means an area of land identified as "subject land" on the Regional Cities Map. The wind farm site is not mapped on the Regional Cities Map. Under Clause 2.7(1) of the Transport and Infrastructure SEPP, the provisions of the SEPP prevail where there are inconsistencies with other environmental planning instruments, including local environmental plans.

Matter	Requirements for the project
Other approvals	**Approvals not required for SSD** Clause 4.41 of the EP&A Act clarifies that development consent for SSD includes authorisations under the following statutory provisions, meaning that separate planning approval processes do not apply for: • a permit under section 201, 205 or 219 of the *Fisheries Management Act 1994* (FM Act) • an approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977* • an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the *National Parks and Wildlife Act 1974* • a bushfire safety authority under section 100B of the *Rural Fires Act 1997* • a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000.*
	EPBC Act Approval Any action which could have a significant impact on any MNES must be referred to the Minister for the Environment and Energy. The nine MNES protected under the EPBC Act are: • 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. A search of the Commonwealth Protected Matters Search Tool (PMST) was completed on 7 October. A referral to DCCEEW for potential impacts to MNES under the EPBC Act is required.
	Environmental protection licence Under Section 48 of the *Protection of Environment Operations Act 1997* (POEO Act), an Environment Protection Licence (EPL) from the NSW Environmental Protection Authority (EPA) is required for scheduled activities listed in Schedule 1. Schedule 1, Clause 17 of the POEO Act lists includes "electricity works (wind farms)". Accordingly, an EPL would be required for the project.
	Road approvals An approval is required under Section 138 of the *Roads Act 1993* to permit the erection of a structure or carry out a work in, on or over a public road. These would be obtained prior to the commencement of relevant works. Any road upgrades required for the project and impact assessment of the upgrades would be assessed and identified in the EIS.

Matter	Requirements for the project
	Biodiversity Offsets Scheme Entry into the Biodiversity Offset Scheme (BOS) is automatically triggered for SSD projects. The biodiversity assessment which would be prepared to accompany the EIS would provide a discussion of the management and protection of listed threatened species of native flora and fauna and threatened ecological communities (TECs) and assess biodiversity offsets consistent with the BOS.
	Water access licences Water access licenses may be required for the project. Water sources for construction and operations would be identified and quantified within the EIS. Detailed investigations would be carried out as part of the EIS to determine whether proposed earthworks would impact on aquifers or groundwater. Relevant license and approvals would be obtained prior to the commencement of construction.
	Native title Under the *Native Title Act 1993* (Native Title Act), native title claimants can make an application to the Federal Court to have their native title recognised by Australian law. Preliminary investigations indicate the wind farm site falls within the boundary of the Warrabinga-Wiradjuri #7 registered Native Title claim (NC2018/002). Native Title is expected to have been extinguished on all freehold parcels and road reserves within the wind farm site. Parcels of Crown Land and a traveling stock reserve have been intentionally excluded from the wind farm site to the extent possible.
	Crown land Under the *Crown Land Management Act 2016*, consent from the Land Division, Department of Primary Industries (DPI) is required for works over Crown Land. Preliminary searches indicate parcels of Crown land to be present near the wind farm site, which have been intentionally excluded from the wind farm site where possible. This would be further investigated in the EIS and the Department of Planning and Environment (Crown Land) would be consulted during the assessment process.
	Lease of premises and subdivision The project would require a lease from the owners of the affected land. Lease of a wind farm site is treated as a lease of premises regardless of whether the lease would be for more or less than 25 years. Subdivision consent is not required under Section 23G of the *Conveyancing Act 1919*. However, Section 23G of the Conveyancing Act 1919 may apply if subdivision for the purpose of construction, operation and maintenance of a substation is required.
	Dangerous Goods Dangerous goods transportation licences would be required under the *Dangerous Goods (Road and Rail Transport Act) 2008* for vehicles and drivers if more than 500 litres or 500 kilograms of dangerous goods are required to be delivered to the wind farm site. Dangerous goods required to be transported during construction and operations would be identified and quantified within the EIS, and all required licences and approvals obtained prior to the commencement of relevant construction activities.

Matter	Requirements for the project
	Heavy Vehicle National Law Approvals would be required should the project require the transport of any infrastructure by OSOM vehicles. This would be further discussed in the EIS.
Pre-conditions to exercising the power to grant consent	No pre-conditions to exercising the power to grant approval have been identified for the project. An EIS would be prepared in accordance with relevant legislative requirements and guidelines.
Mandatory matters for consideration	**Environmental Planning and Assessment Act 1979** The project is consistent with the Section 1.3 objectives of the EP&A Act, which are: *a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,* *b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,* *c) to promote the orderly and economic use and development of land,* *d) to promote the delivery and maintenance of affordable housing,* *e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,* *f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),* *g) to promote good design and amenity of the built environment,* *h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,* *i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,* *j) to provide increased opportunity for community participation in environmental planning and assessment.* 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 wind farm site, any submissions received, and the public interest. These would be considered in the EIS.
	Biodiversity Conservation Act 2016 The Minister for Planning and Homes is required to take into account the impact of the development on biodiversity values as assessed in the Biodiversity Development Assessment Report (BDAR). The Minister may (but is not required to) further consider under the Act the likely impact of the proposed development on biodiversity values.

Matter	Requirements for the project
	National Parks and Wildfire Act 1974 Governance, care, control and management of national parks, nature reserves, Aboriginal areas and historic sites are detailed under the *National Parks and Wildlife Act 1974* (NPW Act). The objectives of the NPW Act include the conservation of nature, objects, places or features such as habitats, biological diversity, landforms and places of Aboriginal, social or historical value. These objectives are achieved by applying principles of ecologically sustainable development. Impacts to biodiversity and heritage values would be assessed in more detail as part of the EIS.
	Heritage Act 1977 The *Heritage Act 1977* (Heritage Act) provides for the conservation of environmental heritage items in NSW. It is used to regulate the impacts of development on the State's European and Aboriginal heritage assets. Administered by the NSW Heritage Office, the Heritage Act details the statutory requirements for protecting historic buildings and places and includes any place, building, work, relic, movable object or precinct, which may be of historic, scientific, cultural, social, archaeological, natural or aesthetic value. A heritage impact assessment would be included in the EIS consistent with the requirements of the Heritage Act.
	Fisheries Management Act 1994 The FM Act is in place to conserve fish stocks, habitats and threatened species, populations and communities, to preserve fishery resources for future generations. The FM Act requires consideration of proposed construction and operation of the project which may affect fish passage or cause adverse impact to threatened fish species. Mapped key fish habitats and protected riparian lands occur within the wind farm site. Potential for direct impacts to aquatic habitats would be primarily associated with access track and transmission line crossings of waterways and would be assessed in the EIS.
	Rural Fires Act 1997 The *Rural Fires Act 1997* aims to prevent, mitigate and supress bush and other fires whilst protecting people, property and infrastructure from damage and having regard to the principles of ecological sustainable development. Consultation is required to be undertaken with the Rural Fire Service (RFS) and local Fire Brigades to determine the features required to minimise the threat of fire both to and from the project. Based on bushfire prone land mapping, the wind farm site contains vegetation that is categorised as a bushfire hazard and is identified as vegetation category 1 and category 2. Bushfire risk would be considered in the context of the *Rural Fires Act 1997* at all levels of the development process, from project design through to decommissioning and would be assessed in more detail as part of the EIS.

Matter	Requirements for the project
	Contaminated Land Management Act 1997 The *Contaminated Land Management Act 1997* establishes a process for investigating and where appropriate, remediating land that the EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3. Under Section 60, a person whose activities have contaminated land or a landowner whose land has been contaminated is required to notify the EPA when they become aware of the contamination. Preliminary searches indicate the project does not contain land listed on the Contaminated Lands Register.
	Soil Conservation Act 1938 The *Soil Conservation Act 1938* allows for conservation of soil resources and erosion management. Notices can be issued under Section 15A to control erosion or degradation. The construction of the project would follow best practice methods and a management plan would be prepared to guide soil management during construction to minimise sedimentation of downstream waterways. This would be documented further in the EIS.
	State Environmental Planning Policy (Resilience and Hazards) 2021 Part 3 of Chapter 3, 'Hazardous and Offensive Development', applies to any development which falls under the policy's definition of 'potentially hazardous industry' or 'potentially offensive industry'. As the project would include up to two BESS facilities with a maximum capacity of approximately 200 megawatt hours, the EIS would include a preliminary risk screening in accordance with *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) and *Applying SEPP 33* (Department of Planning, 2011). If the preliminary risk screening indicates the development is "potentially hazardous", a preliminary hazard analysis (PHA) would be prepared in accordance with *Multi-Level Risk Assessment* (Department of Planning, 2011). The EIS would include an assessment of potential hazards and risks including but not limited to bushfire, risks from/to aviation, electromagnetic interference, human health (electromagnetic fields) and blade throw. These potential hazards are discussed in **Section 7.4.1**.
	State Environmental Planning Policy (Biodiversity and Conservation) 2021 The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity and Conservation SEPP) consolidates *State Environmental Planning Policy (Koala Habitat Protection) 2020* and *State Environmental Planning Policy (Koala Habitat Protection) 2021*. Both the Warrumbungle Shire LGA and the Mid-Western Regional LGA are listed under Schedule 1 of *State Environmental Planning Policy (Koala Habitat Protection) 2020* as areas to which the SEPP applies. As such, the environmental assessment would need to consider impacts to koala habitat as part of the EIS.

Matter	Requirements for the project
	Warrumbungle Shire Local Environmental Plan 2013 The relevant provisions of the Warrumbungle Shire LEP for consideration include: • Clause 2.3 – Zone objectives and land use table • Clause 4.1 – Minimum subdivision lot size • Clause 5.10 – Heritage conservation • Clause 6.3 – Terrestrial biodiversity • Clause 6.4 – Groundwater vulnerability • Clause 6.5 – Riparian lands and watercourses. The requirements outlined in the above clauses would be considered in the EIS as they relate to the project.
	Mid-Western Regional Local Environmental Plan 2012 The relevant provisions of the Mid-Western Regional LEP for consideration include: • Clause 2.3 – Zone objectives and land use table • Clause 4.1 – Minimum subdivision lot size • Clause 5.10 – Heritage conservation • Clause 6.4 – Groundwater vulnerability • Clause 6.5 – Terrestrial biodiversity • Clause 6.11 – Temporary workers' accommodation. The requirements outlined in the above clauses would be considered in the EIS as they relate to the project.

6. ENGAGEMENT

6.1 Community and Stakeholder Consultation Plan

ACCIONA Energia's Community and Stakeholder Engagement Plan, Orana Wind Farm (Acciona Energy, 2022)) documents the communications and consultation framework and proposed engagement activities for the project. This plan is intended to establish proactive communication and engagement with stakeholders in the community and help to ensure that their concerns or issues are clearly understood and resolved to the fullest extent possible.

ACCIONA Energia's community engagement program process is illustrated in **Figure 6-1**.

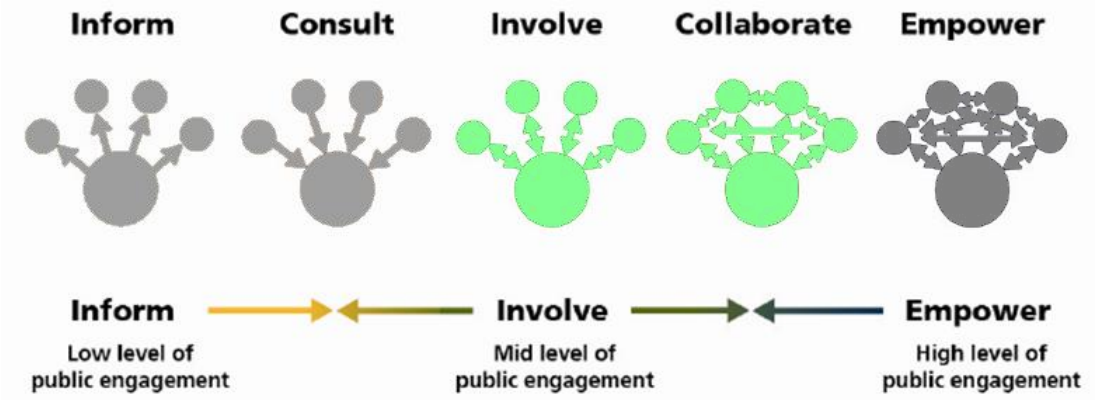


Figure 6-1: ACCIONA Energia's community engagement program

6.2 Consultation objectives

The objectives of stakeholder and community engagement are to:

- identify and engage with the local community and key stakeholders
- build a foundation of strong relationships and community support
- ensure stakeholders are informed, consulted and involved
- wherever possible, activities would continue to be conducted with emphasis on stakeholder collaboration and empowerment
- uphold the four principles set by the Clean Energy Council (accepted rules of conduct) of community engagement which include openness, inclusiveness, responsiveness and accountability
- provide an accessible complaints management process as a mechanism for feedback to ACCIONA Energia.

6.3 Consultation guidance

The stakeholder and community engagement strategy is guided by the requirements of relevant policies and guidelines including:

- *Undertaking Engagement Guidelines for State Significant Projects* (Department of Planning, Industry and Environment, 2021d)
- *Social Impact Assessment Guideline for State Significant Projects* (Department of Planning, Industry and Environment, 2021e)
- *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning and Environment, 2016a) (Wind Guideline)
- Clean Energy Council's *Community Engagement Guidelines for the Australian Wind Industry* (Clean Energy Council, 2018c)
- Clean Energy Council's *Best Practice Charter for Renewable Energy Projects* (Clean Energy Council, 2018a)

- Clean Energy Council's *Community Engagement Guidelines for Building Powerlines for Renewable Energy Development* (Clean Energy Council, 2018b).

6.4 Stakeholders

Stakeholders may be affected groups or individuals that:

- live, work, or recreate near the project
- have an interest in the proposed action or change
- use or value a resource associated with the project
- are affected by the project.

A stakeholder identification process was undertaken during the scoping phase for the project to support the planning and delivery of community and stakeholder consultation to inform the broader EIS, including the social impact assessment (refer to **Section 7.3.6**). Key stakeholder groups identified during the scoping phase are outlined in **Figure 6-2** (AAP Consulting, 2022).

Figure 6-2: Identified project stakeholders

6.5 Engagement to date

6.5.1 Scoping phase consultation activities

Details of consultation undertaken with the community during the scoping phase is outlined in **Table 6-1**.

Table 6-1: Summary of scoping phase consultation activities undertaken

Stakeholder	Date	Method	Engagement activities
Individuals			
Host landowners	Various 2021-ongoing	Phone / email / letters / face to face and one-on- one meetings	Discussions on the project, updates, land agreements and potential impacts
Neighbours	02/09/22 – 31/01/23	Letterbox drop	Letters and Factsheet distributed to over 100 residents within five kilometres from the project to introduce the project and notify of the upcoming Community Information Sessions held in Dunedoo on 20 and 21 September 2022
	Various	Phone / email / meetings	General responses to queries
	01/08/22 – 17/03/23	Phone / door knocking/ Face-to-face and one-on-one meetings	Discussions on the project, neighbour agreements, and potential impacts
	15/03/23	Letters (mailed)	Letters to introduce the project and the project team were mailed to 33 neighbours via Mid-Western Council. 50% of the neighbours do not reside in the local area
General community	20/09/22	Community information session	Two community information sessions were held at Dunedoo as part of the EnergyCo information sessions
	11/02/22	Project information stand at the Dunedoo Show	Introduction to the project and discussions on potential impacts
	17/11/22	Community information sessions	Two community information sessions were held at Gulgong and Dunedoo
	Ongoing	Website	Project website and community hub for ongoing updates on the project:

Stakeholder	Date	Method	Engagement activities
			https://community.acciona.com.au/orana-wind-farm
	Ongoing	Email	Project email address for enquires: Orana@acciona.com
Local Indigenous groups			
Warrabinga Native Title Group	18/10/22	Email	Invitation for meeting on the project
	16/11/22	Meeting (in person)	Discussion on the project
	25/11/22	Email	Registered for consultation on the project for the EIS
Mudgee LALC	11/10/22	Phone / email	Invitation for meeting on the project
	16/11/22	Meeting (in person)	Discussion on the project
Local businesses			
Art Unlimited	10/10/22	Email	Sponsorship for Art Unlimited 2023
Dunedoo Show	24/11/22 – 11/02/23	Email and in person	Major sponsor of the 2023 Dunedoo Show. Project Information Stand at the show on 11 February 2023
Local Councils			
Warrumbungle Shire Council	03/02/22	Meeting (virtual)	Early introductory meeting
	23/09/22	Meeting (in person)	Presentation briefing on the project
	08/11/22	Meeting (virtual)	Update presentation on the project to Councillors
	03/02/23	Meeting (in person)	Update presentation on the project to Council Executives
Mid-western Regional Council	21/03/22	Meeting (virtual)	Early introductory meeting
	21/09/22	Meeting (in person)	Presentation briefing on the project
	17/11/22	Meeting (in person)	Update presentation on the project to Councillors
	02/02/23	Meeting (virtual)	Update presentation on the project to Council Executive
Dubbo Regional Council	07/02/23	Meeting (virtual)	Introduction and presentation briefing on the project

Stakeholder	Date	Method	Engagement activities
State Government Departments			
EnergyCo	Various	Meeting (face-to-face and virtual)	Regular fortnightly meetings
AEMO	Various	Meeting (face-to-face and virtual)	Regular meetings
DPE	18/10/22	Meeting (virtual)	Pre-scoping meeting
	02/11/22	Meeting (virtual)	Social impact assessment discussion and project introduction
	28/02/23	Meeting (virtual)	Discussion on the draft scoping report submitted to DPE
	02/03/23	Phone call	Update on scoping report
	17/03/23	Meeting (virtual)	Meeting to discuss progress and updates to the scoping report
BCS	15/12/22	Meeting (virtual)	Meeting to discuss potential biodiversity impacts and assessment methodology
National Parks and Wildlife Service	01/12/22	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to National Parks and Wildlife Services with a request for a meeting to further discuss the project
	15/12/22	Meeting (virtual)	Meeting to discuss potential biodiversity impacts and assessment methodology
Civil Aviation Safety Authority (CASA)	01/12/22	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to CASA with a request for a meeting to further discuss the project
Airservices Australia	01/12/22	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to the Airservices Australia with a request for a meeting to further discuss the project
	13/01/23	Email	Formal notification regarding installation of temporary meteorological mast

Stakeholder	Date	Method	Engagement activities
Transport for NSW	01/12/22	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to Transport for NSW with a request for a meeting to further discuss the project
Crown Lands	01/12/22	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to Crown lands with a request for a meeting to further discuss the project
Environment Protection Authority	01/12/22	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to the EPA with a request for a meeting to further discuss the project
Fire and Rescue NSW	01/12/22	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to Fire and Rescue NSW with a request for a meeting to further discuss the project
Heritage NSW	13/01/23	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to Heritage NSW with a request for a meeting to further discuss the project
Forestry Corporation NSW	03/03/23	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to Forestry Corporation NSW with a request for a meeting to further discuss the project in relation to Tuckland State Forest
Federal Government Departments			
DCCEEW	TBC	TBC	Meeting to discuss the EPBC Referral
Department of Defence	1/12/22	Email	A project overview including details on proposed timing of the submission of the scoping report was emailed to the Department of Defence with a request for a meeting to further discuss the project

Stakeholder	Date	Method	Engagement activities
Other			
Bowdens Silver	11/10/22	Email	Notification of the project and it's interactions with EL8160. Invitation to provide comment on the project and any potential issues that should be considered in the environmental impact assessment
Sultan Resources	11/10/22	Email	Notification of the project and it's interactions with EL8734. Invitation to provide comment on the project and any potential issues that should be considered in the environmental impact assessment
The Hon Dugald Saunders, MP	07/02/23	Meeting (Virtual)	Presentation briefing on the project

6.5.2 Outcomes of consultation

Near neighbours

Considerable effort has been made by ACCIONA Energia to contact all neighbouring landowners within approximately five kilometres of the project. This has included letter box drops and door knocking on eight occasions. Despite these efforts, there are a mix of largely unoccupied (either weekender's or abandoned) residences in the area, or residences without letterboxes or safe access to the property. ACCIONA Energia continues to attempt contact with these landholders, with Mid-Western Regional Council assisting to distribute mail to alternate addresses where available.

Local Councils

Warrumbungle Shire Council and Mid-Western Regional Council raised a number of key issues which they requested be addressed in the EIS for the project. These issues and how they will be assessed or managed during the EIS phase are included in **Table 6-2**.

Table 6-2: Key Council concerns and proposed approach

Issue raised	Proposed approach
Warrumbungle Shire Council	
Construction worker accommodation Requested an accommodation strategy to be clearly stated in the EIS and also discuss how the workforce will be sourced and opportunities for training and upskilling locals.	An accommodation strategy would be developed for the project and included within the project description of the EIS. The strategy would be based on the outcomes of the technical assessments, specifically the social impact assessment. The EIS would assess the potential impacts associated with the final accommodation strategy.
Employment of locals	The social impact assessment would consider the availability of local workers and propose an approach to upskilling of local workforce as well

Issue raised	Proposed approach
Noted that benefits need to be flowing to the local region, however there is also a workforce shortage. The source of the workforce should be considered in the EIS.	as the requirements for sourcing of workforce from outside the region.
Roads and traffic Require full details on number of vehicles, types of vehicles (and size), swept paths and potential damage. Expect to be consulted early and often regarding proposed upgrades. Ancillary traffic movements associated with transport of aggregate and waste etc should be included in the traffic and transport assessment for the project.	The traffic and transport assessment would include consideration of comments raised by Council and provide the requested detail and level of assessment.
Waste The landfill at Coonabarabran is not licensed and cannot take any waste from the project.	The EIS would provide detail on the expected quantity and proposed destination for waste associated with construction and operation of the project. The strategy for waste management would be developed in consultation with local councils.
Water and wastewater Council expects that the EIS would detail the quantities of water and wastewater required and produced including detail on the proposed sources and destination. Council noted that the local wastewater treatment facilities would be unable to accept wastewater associated with the project.	The EIS would provide detail on the expected water requirements for the project and detail the source of the water. The EIS would also include detail of the quantity of and proposed destination for wastewater associated with construction and operation of the project.
Cumulative impacts Detailed cumulative assessment should be included in the EIS with any impacts associated with the REZ addressed.	As discussed in **Section 7.5**, the EIS would include a detailed cumulative impact assessment in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Project* (Department of Planning, Industry and Environment, 2021f).
Planning agreement Council outlined its expectations for a VPA, to be administered by Council.	ACCIONA Energia would continue to consult with Council regarding the VPA with the intention of reaching agreement prior to lodgement of the EIS.
Mid-Western Regional Council	
Workforce accommodation Council expect proponents to provide a solution to accommodation as part of the EIS.	An accommodation strategy would be developed for the project and included within the project description of the EIS. The strategy would be based on the outcomes of the technical assessments, specifically the social impact

Issue raised	Proposed approach
	assessment. The EIS would assess the potential impacts associated with the final accommodation strategy.
Waste Council does not have the landfill capacity to accept waste from the project. The EIS should include waste quantities and how it will be managed.	The EIS would provide detail on the expected quantity and proposed destination for waste associated with construction and operation of the project. The strategy for waste management would be developed in consultation with local councils.
Water and wastewater Council expects that the EIS would detail the quantities of water and wastewater required and produced including detail on the proposed sources and destination. Council noted that the local wastewater treatment facilities (in their current form) would be unable to accept wastewater associated with the project.	The EIS would provide detail on the expected water requirements for the project and detail the source of the water. The EIS would also include detail of the quantity of and proposed destination for wastewater associated with construction and operation of the project.
Employment of locals Noted that unemployment in the region is very low. The source of the workforce should be considered in the EIS.	The social impact assessment would consider the availability of local workers and propose an approach to upskilling of local workforce as well as the requirements for sourcing of workforce from outside the region.
Planning agreement Council outlined its expectations for a VPA, to be administered by Council.	ACCIONA Energia would continue to consult with Council regarding the VPA with the intention of reaching agreement prior to lodgement of the EIS.

State government agencies

A meeting was held with National Parks and Wildlife Service which included attendance by BCS personnel. Key items raised included:

- intact vegetation clearance
- flight paths between Goodiman State Conservation Area and Tuckland State Forest
- land categorisation methodology
- bird and bat monitoring and assessment methodology
- instillation of song metres

The proposed approach to the biodiversity assessment is discussed in **Section 7.3.4** and gives consideration to comments raised in this meeting. ACCIONA Energia will continue to consult with National Parks and Wildlife Service and BCS throughout development of the EIS.

Community views

Consultation undertaken during the scoping phase has provided valuable early input into the understanding of stakeholder needs and potential issues. A summary of the outcomes of consultation undertaken to date is provided in **Table 6-3**.

Table 6-3: Summary of community feedback

Aspect	Feedback	Where addressed
Visual	• Concerns about visual impacts from turbines	**Section 7.3.1**
Noise	• Want to understand the potential noise impacts	**Section 7.3.1**
Social	• Concerns about where construction workers will be accommodated • Questions around community benefits from the project • Consultation fatigue from other major project developers in the region	**Section 7.3.6**
Hazards and risks	• Enquiries about potential health impacts • Concerns about fire management	**Section 7.4.1**
Land	• Land use impacts on farmers	**Section 7.4.2**
Water	• Concerns around access to water supplies	**Section 7.4.3**
Waste	• Concerns around waste management	**Section 7.4.7**
Cumulative impacts	• Concerns around the number of projects planned for the region	**Section 7.5**

Community information session outcomes

A Community Information Session was held in Dunedoo on 17 November 2022 to inform and seek feedback on the project. The session was attended by approximately 20 people. Most attendees had concerns about the cumulative impact of multiple renewable energy projects within the Central West and the close proximity to Dunedoo. Other issues and/or questions raised included:

- Impacts on farming operations from turbines
- accommodation for workforce
- community benefits
- fire management
- access to water
- turbine height
- limited education opportunities in town
- cumulative impacts from the REZ
- consultation fatigue.

A separate Community Information Session was held in Gulgong on 17 November 2022 to inform and seek feedback from the community about the proposed wind farm. The session was attended by two residents. Both had concerns about the cumulative impacts of multiple renewable energy projects in the area. The attendees were interested to learn about community benefits and how the company will support the community.

Aboriginal stakeholder engagement

Separate meetings were held in Mudgee on 16 November 2022, with the Mudgee LALC and the Warrabinga Native Title Group. Both groups were keen to work with ACCIONA Energia in relation to cultural heritage assessments and surveys and other potential opportunities relating to cultural heritage and environmental management. They expressed positive sentiment towards the project and requested to be kept informed as the project progresses.

6.6 Proposed engagement during EIS

Details of stakeholder consultation that would be undertaken during the preparation of the EIS is outlined in
Table 6-4.

Table 6-4: Proposed environmental impact statement phase consultation

Engagement activity	Stakeholders	Consultation level
Social impact assessment	• General community • Local residents • Key stakeholders	Involve
Community information sessions	• General community • Local residents • Key stakeholders	Consult
Newsletters	• All neighbours within five kilometres of the wind farm site • General community • Interested business owners	Inform
Community surveys	• All stakeholders	Consult
Project-specific website and on-line Community Hub, email address, and free call 1800 community hotline	• All stakeholders	Inform
Information Hub at Dunedoo	• All stakeholders	Consult
Personal visits	• Host landowners	Collaborate
Personal visits and letters	• Neighbours	Collaborate
Project briefings and presentations	• Councillors and staff – Mid Western Regional Council and Warrumbungle Shire Council • Courtesy Briefing – Dubbo Regional Council • Department of Planning and Environment • Department of Regional NSW • NSW Office of Environment and Heritage • Transport for NSW • Civil Aviation Safety Authority • Gulgong Chamber of Commerce • Dunedoo District Development Group	Consult
	• Members of Parliament – Dugald Saunders (MP – Dubbo), Roy Butler (MP – Barwon)	Inform Consult
	• NSW Rural Fire Service	Collaborate

Engagement activity	Stakeholders	Consultation level
	• Essential Energy	
	• Local media – radio, newspaper, television	Inform
Cumulative impacts consultation	• Other developers or contractors undertaking construction in the area	Consult Collaborate
Management of cultural heritage	• Warrabinga-Wiradjuri • Registered Aboriginal Parties (RAPs)	Collaborate
Potential tours of other wind farms	• Host landowners • Local residents	Involve
Pre-vocational training, traineeships and apprenticeships	• Local employment and training providers	Collaborate

7. PROPOSED ASSESSMENT OF IMPACTS

7.1 Scoping methodology

In accordance with the Scoping Report Guideline, the following factors were considered to identify matters requiring further assessment in the EIS:

- the **scale** and **nature** of the likely impacts of the project and the **sensitivity of the receiving environment** (refer to **Figure 7-1**)
- whether the project is likely to generate **cumulative impacts** with other relevant projects in the area
- the ability to **avoid**, **minimise** and/or **offset** the impacts of the project, to the extent known at the scoping stage. This includes consideration of factors that could be incorporated into the detailed design and potential for mitigation measures and landholder agreements to address residual impacts
- the **complexity of the technical assessment** including data and investigations required, methods and any uncertainties.

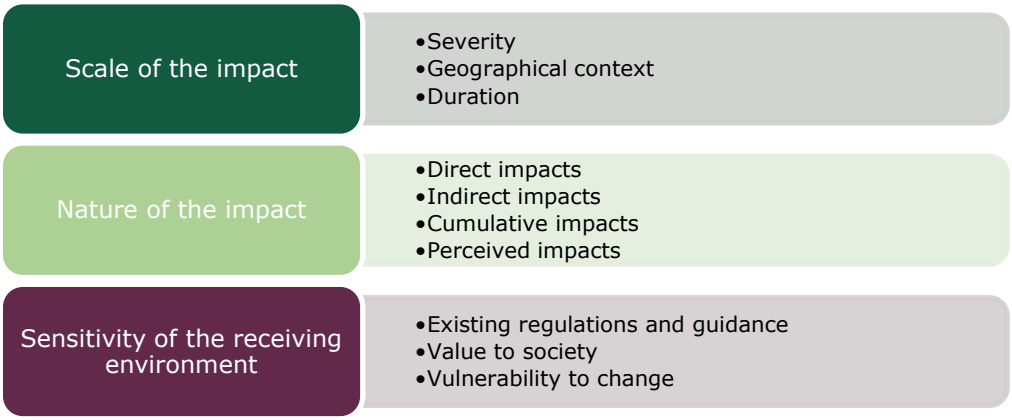


Figure 7-1: Key factors to consider during scoping – Appendix C of the Scoping Report Guideline

A scoping summary table for the project is provided in **Appendix 2**. The scoping summary table provides an overview of the expected issues and proposed assessment approach for the issues requiring further assessment in the EIS, and lists the relevant legislation, plans, policies, or guidelines that would be relevant to the proposed assessment. This table also highlights whether any specific community engagement would be undertaken and if a cumulative impact is anticipated.

Matters that have been identified as requiring further assessment for the EIS have been separated into 'key issues' and 'other issues'. These are presented in **Section 7.2** and **Section 7.4** respectively.

Key issues are those that have the potential to cause material impact based on the information that is currently available. Other issues are those that have been determined as unlikely to have a material impact based on existing available information. However, this may change through the preparation of more detailed assessments as part of the EIS, and as community and stakeholder engagement progresses.

This chapter also outlines those matters that have been identified to require no further assessment in the EIS. These are presented in **Section 7.6**.

7.2 Categorisation of assessment matters

Each matter and its proposed level of assessment (detailed or standard) is identified in **Table 7-1**. The matters considered in the assessment are consistent with those listed in Appendix B of the Scoping Report Guideline, with additional matters added as relevant to the project.

Additional or grouped matters are indicated in blue in **Table 7-1**. Specific matters have also been grouped or separated where relevant.

Table 7-1: Categorisation of assessment matters summary

Level of assessment	Assessment matter
Detailed	• Amenity – visual (landscape character and visual) • Amenity – noise and vibration • Access – traffic and parking, access to property (traffic and access) • Biodiversity – terrestrial flora and fauna, conservation areas, aquatic flora and fauna • Heritage – Aboriginal • Social – way of life, community, accessibility, culture, health and wellbeing, surroundings, livelihoods
Standard	• Hazards and risks – bushfire, dangerous goods, hazardous and offensive development, battery storage, electromagnetic fields, electromagnetic interference, blade throw, aviation • Land – stability, land capability, topography, land use, biosecurity, land contamination, private property, public land • Water – hydrology, flooding, water quality, water availability • Heritage – historic • Air – atmospheric emissions, gases, particulate matter • Economic – natural resource use, livelihood • Waste and resources
Matters requiring no further assessment	• Access – port and airport facilities, road and rail facilities • Amenity – odour • Built environment – public infrastructure, design quality • Economic – opportunity cost • Hazards and risks – coastal hazards, dams safety, groundwater contamination, land movement, environmental hazards • Land – soil chemistry • Heritage – natural • Social – decision-making systems

7.3 Key issues

7.3.1 Landscape character and visual

Preliminary investigations

A preliminary landscape character and visual assessment was completed by Moir Landscape Architecture (Moir LA) and is included in **Appendix 3**. The purpose of the assessment was to:

- apply preliminary assessment tools to determine receptors with potential sensitivity
- prepare a preliminary Zone of Visual Influence (ZVI) to establish a theoretical zone of visibility of the project
- identify key viewpoints and landscape features using available mapping and background documents
- undertake a preliminary visual impact assessment in accordance with the Visual Bulletin (Department of Planning and Environment, 2016b) from the wind farm operation to inform future planning stage assessments.

Photographic survey work for the assessment was undertaken by Moir LA in September 2022 to carry out a preliminary assessment of the existing landscape character from publicly accessible land within the wind farm site.

Community consultation has been undertaken through the scoping phase of the project, with the results of this used to gain perspective on the landscape values held by the community to inform the preliminary visual impact assessment (refer to **Section 6.5**). Community engagement will continue through the EIS phase and provide the community with further opportunities to provide input into the landscape and visual impact assessment.

Existing environment

Sensitive receivers

Sensitive receivers located near the project are shown in **Figure 2-2**. This includes 27 associated receivers and 293 non-associated receivers.

Landscape features

A summary of the key landscape features surrounding the wind farm site is provided in **Table 7-2**.

Table 7-2: Key landscape features

Feature	Description
Rivers and creeks	• Talbragar River – running in a generally east west direction to the north of the wind farm site • Cudgegong River – a perennial stream of the Macquarie Catchment located approximately 12 kilometres to the southeast of the wind farm site • Sandy Creek – a tributary of the Talbragar River, located to the west of the wind farm site • Laheys Creek – located to the west of the wind farm site • Other small creeks – occuring throughout and adjacent to the wind farm site

Feature	Description
Nature reserves, state forests and national parks	• Goodiman Zone 3 SCA – borders the project to the south • Tuckland State Forest – located adjacent to the wind farm site in the south-west • Yarrobil National Park – located approximately 3.5 kilometres south of the wind farm site
Ridge lines, high points and landform	• Flat to gently undulating agricultural land surrounded by vegetated • ridge lines associated with the Northern Ranges located on the northeastern side of the project • Undulating and heavily vegetated hillsides generally associated with the Tuckland State Forest and Goodiman Zone 3 SCA
Scenic lookouts, walking tracks and points of interest	• Generally, recreational associations occur in nearby towns including Dunedoo and the historic Gulgong
Items of heritage significance	• Various heritage items that have been identified in the area (refer to **Section 7.4.4**)

The key landscape features surrounding the wind farm site identified by the community during consultation includes:

- natural hills and ridgelines
- flora and fauna
- rivers and creeks
- farming land
- historical aspects of the area.

Some members of the community expressed concern of the potential change to the visual aspect of the landscape from the proposed turbines. This was in relation to the number and size of turbines proposed and cumulative impacts from similar scale projects in the vicinity.

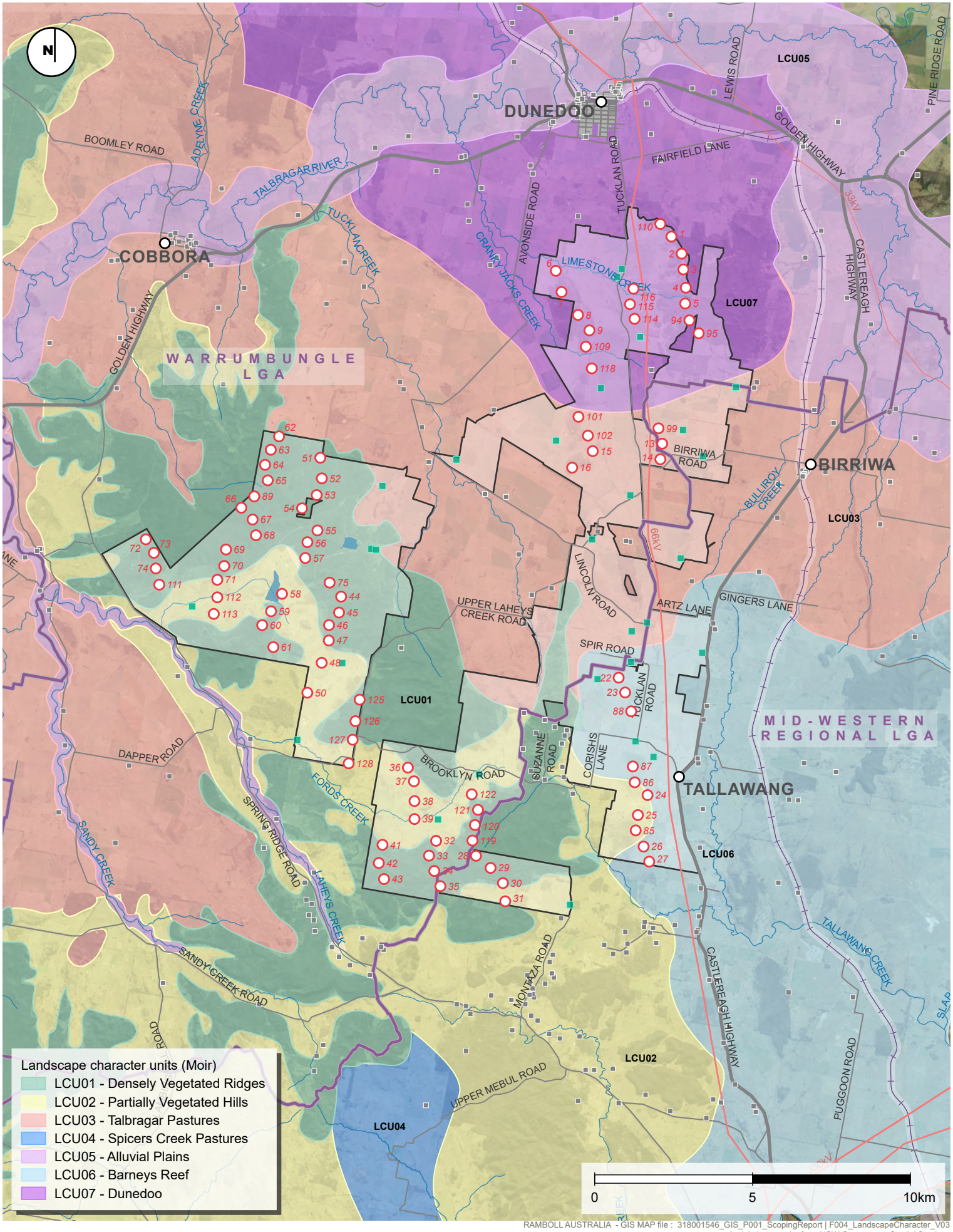
Landscape character

An assessment of existing land use and landscape features suggests that the wind farm site and its surrounds exhibit a strong agricultural history of grazing and cropping along with ecological associations of the surrounding State Forests, State Conservation areas and Nature Reserves.

Seven Landscape Character Units (LCUs) have been identified as part of the preliminary landscape character and visual assessment (refer to **Figure 7-2**). A description of these LCUs and the preliminary Scenic Quality Ratings is provided in **Table 7-3** in accordance with the Visual Bulletin. Photos are provided in **Appendix 3**.

Table 7-3: Preliminary landscape character units

LCU	Name	General character	Preliminary Scenic Quality Rating
LCU01	Densely Vegetated Ridges	Densely vegetated undulations associated with the project and surrounding conservation areas	Moderate
LCU02	Partially Vegetated Hills	Undulating hills with scattered vegetation alongside cleared flat areas and densely vegetated hillsides	Moderate
LCU03	Talbragar Pastures	Includes gently undulating to flat cleared grazing and cropping lands and large lot rural residences associated with the Talbragar River, throughout the wind farm site	Moderate
LCU04	Spicers Creek Pastures	Predominately defined by generally flat to gently undulating land to the south of the wind farm site	Moderate
LCU05	Alluvial Plains	Alluvial plains associated with the Talbragar River to the north of the project	Low
LCU06	Barneys Reef	Vegetated hills and undulating, cleared grazing land	Moderate
LCU07	Dunedoo	Dunedoo Township and rural residential land to the north of the wind farm site	Low



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F004_LandscapeCharacter_V03
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Indicative turbine location
- Existing electricity transmission line
- Associated dwelling
- Non-associated dwelling
- Railway
- Waterway
- LGA boundary

Figure 7-2 | Landscape character and visual - preliminary landscape character units

Visual catchment

The area from which the project is theoretically visible defines the 'visual catchment'. To assist in defining the visual catchment, preliminary assessment tools have been developed and involve the analysis of two key visual parameters in accordance with the Visual Bulletin:

- visual magnitude threshold
- multiple wind turbine tool.

The visual magnitude threshold is based on the height of the proposed wind turbines to the tip of the blade and distance from dwellings or key public viewpoints. The preliminary analysis for the project was based on a tip height of 271.5 metres. The analysis nominated all non-associated dwellings between 3,610 metres (black line of visual magnitude) and 5,350 metres (blue line of visual magnitude) of the nearest turbine. The visual magnitude threshold tool from the Visual Bulletin with the project thresholds delineated is provided in **Figure 7-3**.

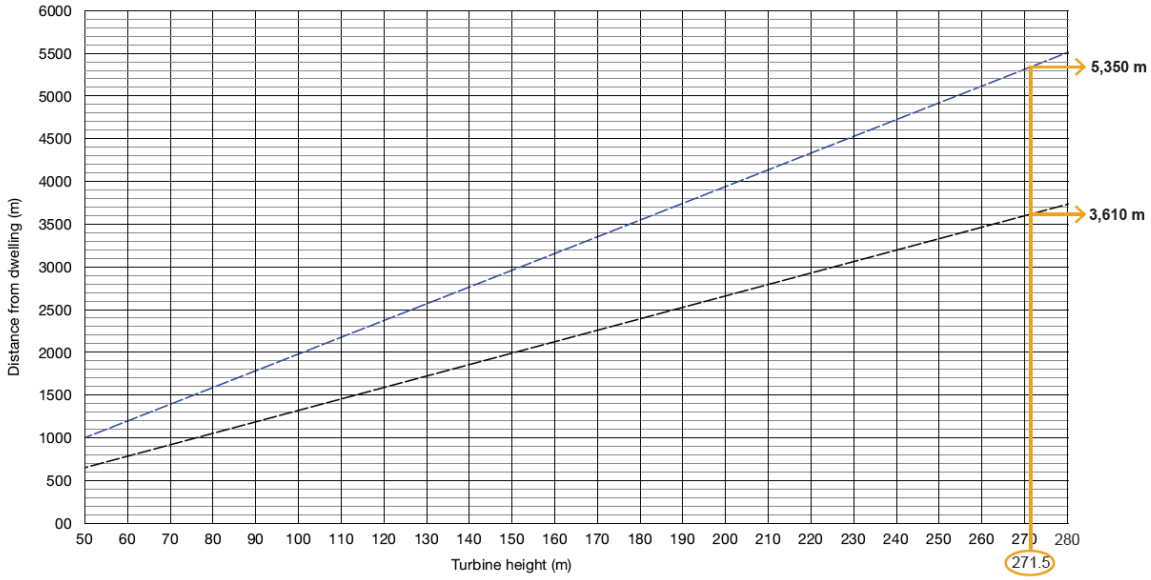


Figure 7-3: Landscape character and visual – visual magnitude thresholds for the project

The multiple wind turbine tool gives an indication of potential cumulative impacts arising from the project. This assessment tool requires the mapping of the horizontal viewpoints of each dwelling or key public viewpoints into six 60-degree sectors. Where wind turbines are visible within the horizontal views of three or more 60-degree sectors, within eight kilometres, a detailed assessment of these dwellings or viewpoints is required (see **Figure 7-4**).

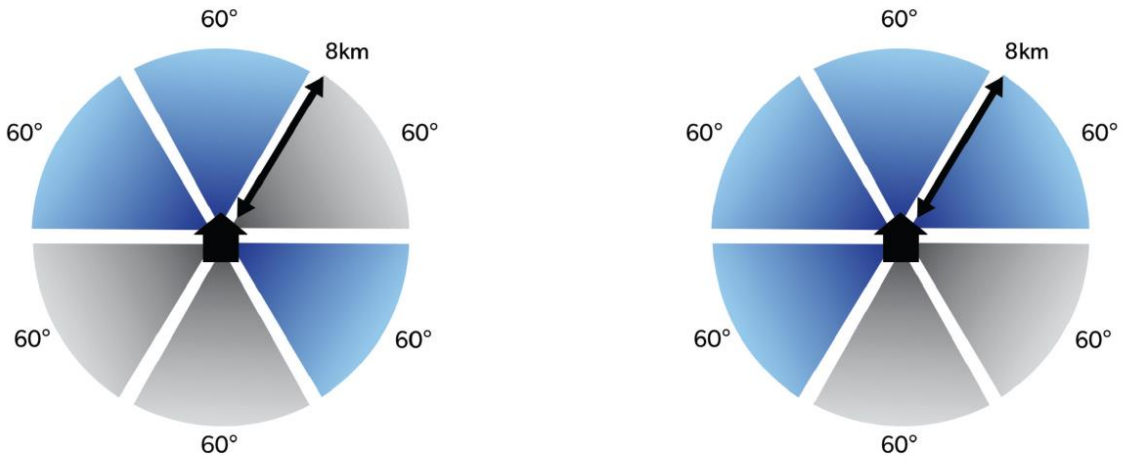


Figure 7-4: Landscape character and visual – multiple wind turbine tool

Potential impacts

Landscape character

Table 7-4 provides a brief overview of the potential visibility of the project from each of the LCUs.

Table 7-4: Preliminary visual impact assessment - landscape character units

LCU	Name	Preliminary visual impact assessment
LCU01	Densely Vegetated Ridges	The project is located within sections of this LCU and will be visible from the land within the LCU. Due to the topography and dense vegetation typical of the LCU, views toward the project are likely to be limited from densely vegetated areas
LCU02	Partially Vegetated Hills	Parts of this LCU are located within the wind farm site and will be visible from the land within the LCU. Views to the project are likely to available from locations outside of the wind farm site due to its proximity. However, vegetation typical of this LCU along with existing vegetation associated with the dwellings are likely to reduce the potential visibility from a number of dwellings within this LCU
LCU03	Talbragar Pastures	Views to the project are likely to be available from areas and roads located at close proximity to the turbines. Views are mostly open but filtered by vegetation in certain areas. Existing roadside vegetation, creekline vegetation and planting associated with dwellings are likely to reduce visibility in those areas
LCU04	Spicers Creek Pastures	Views to the project are likely to be available from the land within this LCU, particularly from land closest to the project. Views are mostly open to expansive but contained in certain areas due to existing roadside vegetation and creekline vegetation. Distance from the project, vegetation and topographical changes are likely to reduce visibility in certain areas

LCU	Name	Preliminary visual impact assessment
LCU05	Alluvial Plains	Views to the project are likely to be available to the south and west of the LCU. Land in this area has a low number of residential dwellings
LCU06	Barneys Reef	Some turbines are located within the LCU and will be visible from the land within the LCU. Existing roadside vegetation and planting surrounding dwellings is likely to reduce the visibility
LCU07	Dunedoo	Views to the project are likely to be available due to the proximity to the LCU. Intervening built structures and associated vegetation will likely filter some views of the project from land within the LCU.

Visual magnitude assessment

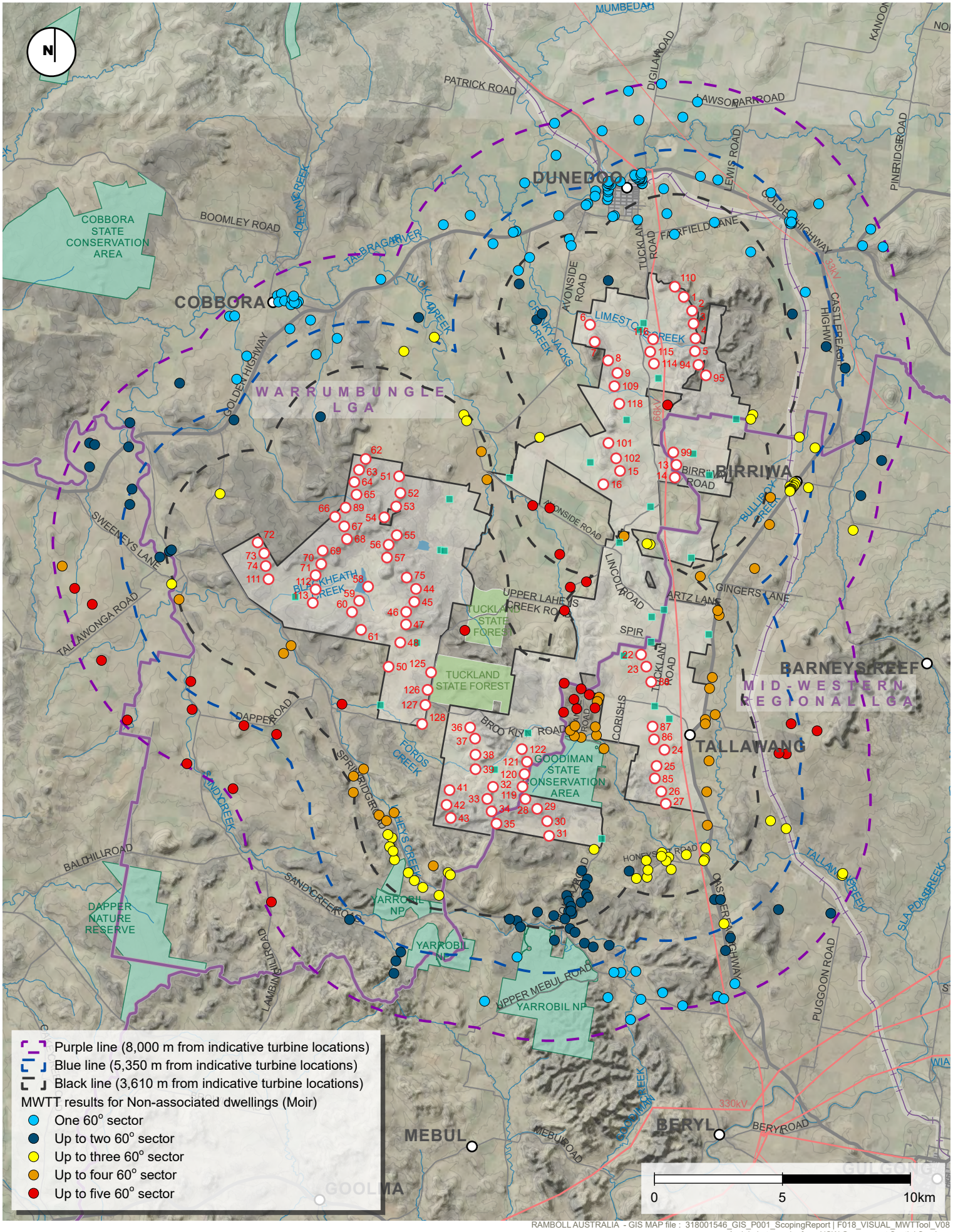
There are 114 non-associated dwellings within 3,610 metres (black line of visual magnitude) and 92 non-associated dwellings within 5,350 metres (blue line of visual magnitude). A preliminary assessment of 37 representative sensitive receptors within 5,350 metres of the proposed turbines have been included in Appendix A of **Appendix 3** and 19 representative sensitive receptors have been included in Appendix C of **Appendix 3.**

Preliminary multiple wind turbine tool assessment

The multiple wind turbine tool identified 284 non-associated dwellings with views of multiple turbines. The multiple wind turbine tool identified 137 non-associated dwellings with views of turbines from more than one project. The multiple wind turbine tool identified that 160 non-associated dwellings within eight kilometres of the project would have views of turbines in up to two 60 degree sectors (one and two sectors), which is deemed acceptable in accordance with the Visual Bulletin. Results of the preliminary assessment for remaining sectors are summarised in **Table 7-5** and shown on **Figure 7-5**. This considers cumulative impacts to dwellings located within eight kilometres of the project and either the Spicers Creek Wind Farm or Barneys Reef Wind Farm.

Table 7-5: Preliminary multiple wind turbine tool assessment results

	Project + Spicers Creek Wind Farm	Project + Barneys Reef Wind Farm	Project + Valley of the Wind	Project only	Total
One 60-degree sectors	0	1	0	98	**99**
Two 60-degree sectors	16	10	1	34	**61**
Three 60-degree sectors	13	37	0	6	**56**
Four 60-degree sectors	11	24	0	2	**37**
Five 60-degree sectors	12	12	0	7	**31**
Six 60-degree sectors	0	0	0	0	**0**
Total	**52**	**84**	**1**	**147**	**284**



Purple line (8,000 m from indicative turbine locations)
Blue line (5,350 m from indicative turbine locations)
Black line (3,610 m from indicative turbine locations)
MWTT results for Non-associated dwellings (Moir)
One 60° sector
Up to two 60° sector
Up to three 60° sector
Up to four 60° sector
Up to five 60° sector

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Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Indicative turbine location
- Existing electricity transmission line
- Associated dwelling
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-5 | Landscape character and visual - preliminary multiple wind turbine tool (MWTT) results

Zone of visual influence

The zone of visual influence illustrates the theoretical visibility of the wind farm from land surrounding the project. Results of the preliminary zone of influence assessment are shown on **Figure 7-6**. The preliminary assessment does not consider intervening elements such as vegetation and structures.

Due to the undulating topography that characterises the landscape, there are large areas of land surrounding the wind farm site from which the project will be screened by topography, particularly on the eastern side of the project along Castlereagh Highway and to the south. The majority views of the project are likely to be available in the north and west. Some views of the project are also likely to be available in the south.

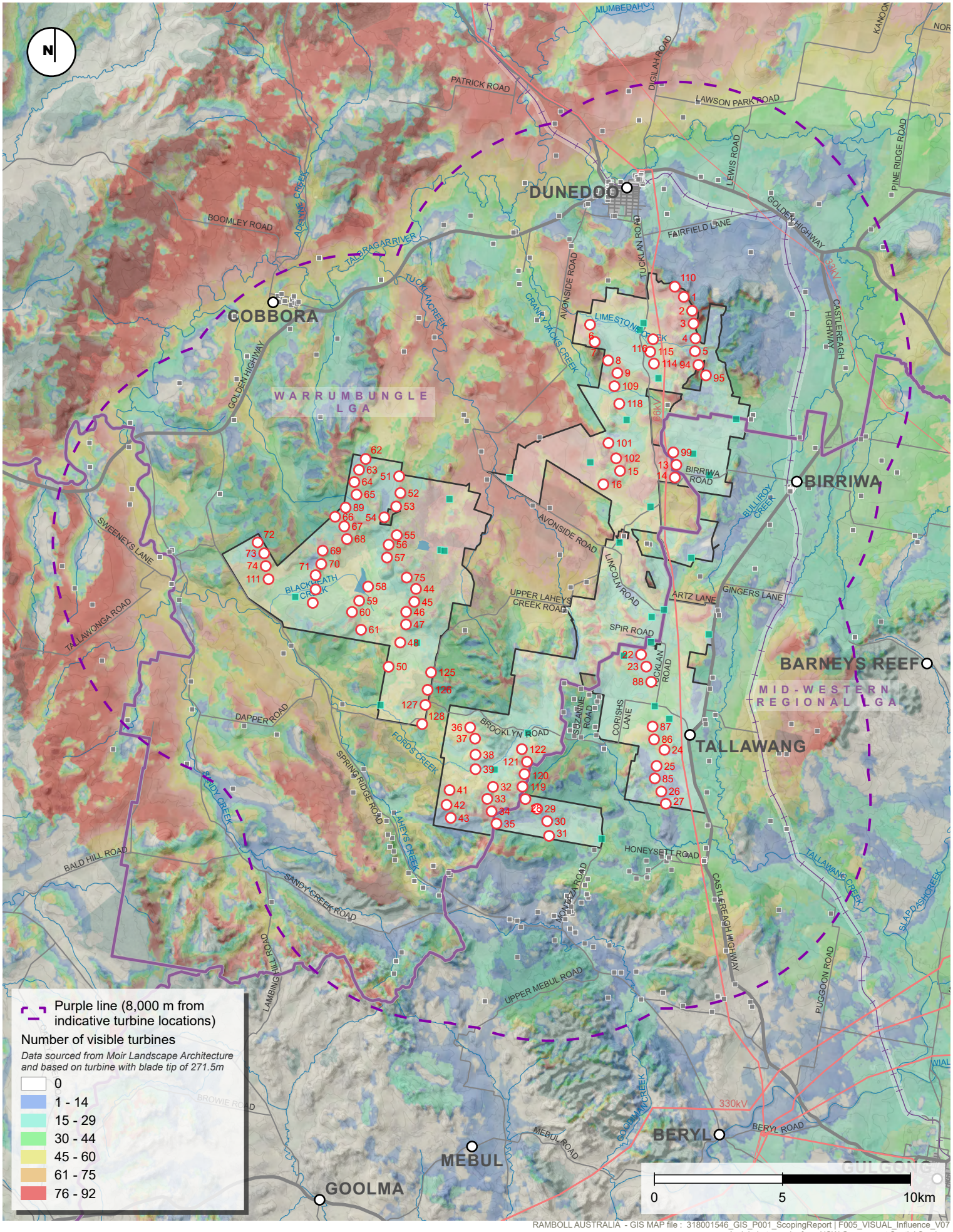
Non-associated dwellings within the communities of Dunedoo, Tallawang, Cobbora and Gulgong, are likely to see clusters or parts of the project, however views will be influenced by other visual factors such as built form, existing infrastructure and vegetation.

Dwelling and viewpoint assessment

The preliminary dwelling assessment identified 37 dwellings that were considered to be representative of non-associated dwellings. This assessment is included in **Appendix 3**. Of the 37 representative non-associated dwellings that were assessed, 19 were found to have a lack of intervening elements, such as existing structures and dense vegetation, which would reduce the potential visual impacts from the project.

A preliminary assessment from public viewpoints is provided in **Appendix 3**. A total of 29 preliminary public viewpoints were selected to illustrate the varying landscape character typologies throughout the wind farm site and provide a preliminary assessment of the potential visibility of the project. No key public viewpoints were identified within eight kilometres of the nearest turbine.

The preliminary viewpoint assessment identified that highest visibility of the project is likely to occur along low use farm roads such as Suzanne Road, Laheys Creek Road, Montaza Road and Sandy Creek Road. These roads are generally used for farm or dwelling access, and are not subjected to high volumes of traffic. Most of these routes are also characterised by dense roadside vegetation which would help reduce views of the project.



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F005_VISUAL_Influence_V07
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Indicative turbine location
- Existing electricity transmission line
- Associated dwelling
- Non-associated dwelling
- Railway
- Waterway
- LGA boundary

Figure 7-6 | Landscape character and visual - preliminary zone of influence

A summary of the potential landscape character and visual impacts from the project is provided in **Table 7-6**.

Table 7-6: Potential impacts – landscape character and visual

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Temporary reduction in visual amenity from construction infrastructure	Moderate / Short term	Direct	Sensitive (social value)	Y	• Minimise – locate temporary construction infrastructure away from sensitive receptors where possible
Operation	Reduction in visual amenity from visible wind turbines	High / Long term	Direct	Sensitive (social value)	Y	• Avoid – avoid placing turbines in locations where high visual impacts would be perceived • Minimise – establish vegetation planting to provide visual screening
Operation	Changes to the landscape character from agricultural to electrical infrastructure	High / Long term	Direct	Sensitive (social value)	Y	• Minimise – locate turbines in less publicly visible areas
Operation	Shadow flicker	Moderate / Long term	Indirect	Sensitive (social value)	Y	• Avoid – avoid placing turbines in locations where shadow flicker impacts would occur • Minimise – install screening structures to block shadow casts by the wind turbines

Assessment level and approach

A landscape character and visual impact assessment would be completed for the project in accordance with the Visual Bulletin. The assessment would also include consideration of the Dark Sky Planning Guideline (Department of Planning and Environment, 2016).

In accordance with the Visual Bulletin, the landscape character and visual impact assessment would include:

- a baseline study that includes analysis of the landscape character, scenic quality and visibility from viewpoints of different sensitivity levels
- establishment of visual influence zones from viewpoints using data collected in the baseline study
- assessment of the proposed layout against visual performance objectives
- design review and refinements based on outcomes of assessment
- include a detailed dwelling assessment at sensitive non-associated dwellings to assess sensitivity (accounting for screening factors such as topography, vegetation) and determine mitigation measures to reduce visual impacts
- include graphical representations of the project via photomontages
- justification for the final proposed layout and identification of mitigation and management measures.

The landscape character and visual impact assessment would also consider cumulative visual impacts with the Spicers Creek Wind Farm and Barneys Reef Wind Farm.

7.3.2 Noise and vibration

Preliminary investigations

A preliminary noise and vibration assessment was completed by Resonate Consultants (Resonate) and is included in **Appendix 4**. The purpose of the assessment was to:

- identify noise and vibration sources associated with the project
- identify relevant noise and vibration criteria that would apply to the project
- undertake a preliminary assessment of noise in accordance with the Noise Bulletin (Department of Planning and Environment, 2016c) from the wind farm operation to inform future planning stage assessments.

Existing environment

Sensitive receivers

Sensitive receivers located near the project are shown on **Figure 2-2**. This includes 27 associated receivers and 293 non-associated receivers. A list of receivers and their distance to the nearest turbine is included in **Appendix 4**.

Wind turbine sound power levels

The project would likely use the Nordex N163/5.X wind turbine. The overall sound power levels with hub height wind speed for the Nordex N163/5.X wind turbine are summarised in **Table 7-7** based on the manufacturer specification document.

Table 7-7: Sound power levels for the Nordex N163/5.X wind turbine model

Wind speed (m/s)	4.6	6.1	7.6	≥ 9.2
Sound power level (dB L_{WA})	97.5	100.8	105.7	109.2

As is normal for modern pitch-controlled wind turbines, the sound power levels for the Nordex N163 wind turbine increase from the cut-in wind speed before levelling off at a wind speed close to the wind speed at which the turbines reach rated power.

Noise criteria

Background noise level monitoring has not been undertaken for the project at this stage. A summary of the noise criteria that would apply to construction and operational activities is provided in **Table 7-8**.

Table 7-8: Noise criteria that would apply to the project

Guidelines	**Criteria**
Construction activities	
Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009)	Noise management measures are required to be implemented where predicted or measured construction noise level ($L_{eq,15min}$) exceeds: • **During standard hours** (7am to 6pm Monday to Friday, 8am to 1pm Saturday): – Noise affected – rating background level (RBL) + 10 decibels (dB) – Highly noise affected – 75 dB • **Outside standard hours**: – RBL + 5 dB.
Construction road traffic	
Road Noise Policy (Department of Environment and Climate Change, 2011) (RNP)	Recommended that road traffic noise levels at sensitive receivers are limited to: • 60 dB $L_{Aeq,15h}$ during the daytime (7am to 10pm) • 55 dB $L_{Aeq,9h}$ during the night time (10pm to 7am). Where the above criteria are already exceeded, the RNP recommends limiting the increase in road traffic noise levels to no more than 2 dB.
Operational wind turbine noise	
Wind Energy: Noise Assessment Bulletin (Department of Planning and Environment, 2016c) *Wind farms environmental noise guidelines* (SA EPA, 2009)	The following criteria applies: • for noise-sensitive receivers not associated with the wind farm: – 35 dB or – the background noise level (L_{A90}) plus 5 dB whichever is the greater for each integer wind speed from cut-in to rated power • for residential receivers associated with the wind farm with a suitable noise agreement in place: – 45 dB or

Guidelines	Criteria
	– the background noise level (L_{A90}) plus 5 dB whichever is the greater for each integer wind speed from cut-in to rated power.
Ancillary infrastructure noise	
NSW *Noise Policy for Industry* (NPI)	The NPI establishes project noise trigger levels as the lower of the following: • **Amenity level**: a criterion established with reference to the land zoning of an area and with the aim of not increasing industrial noise levels in an area. In the area surrounding project, it is likely that the amenity level would be 35 dB at night • **Intrusiveness level**: 5 dB above the RBL for each time of day. The minimum intrusiveness criterion that can apply is 35 dB at evening and night.

Vibration criteria

Vibration criteria that would apply to the construction of the project would include:

- **Cosmetic and structural damage to buildings**: *German Standard DIN 4150-3*
- **Human comfort**: *NSW Assessing Vibration – A Technical Guideline* (Department of Environment & Conservation, 2006).

Potential impacts

Construction noise and vibration

Construction noise and vibration would be assessed in the EIS. Given the distance between the wind farm site and the nearest sensitive receivers, it is expected that construction noise and vibration from the project, including decommissioning works, would be able to be appropriately controlled to minimise any impacts to an acceptable level.

Operational wind turbine noise

To predict the potential noise levels from the project, an environmental noise model was developed in SoundPlan version 8.2 environmental noise prediction software. The noise model was based on the sound power levels presented in **Table 7-7** and assumed the turbines are operating at rated power, and that the receiver is located downwind of the wind farm. Further detail on the noise model assumptions are included in **Appendix 4**.

A noise contour map showing the predicted 45 dB and 35 dB noise level contours for the preliminary layout is included as **Figure 7-7**. Results of the preliminary noise model indicates operational noise from the project would be able to comply with the minimum applicable noise criteria for associated receivers. One non-associated receiver (Receiver 577) is predicted to experience noise levels above the criterion of 35 dB L_{Aeq} (predicted to experience a noise level of 37.5 dB L_{Aeq}) and requires further investigation.

Further investigation for Reciever 577 is required to assess whether the project can achieve compliance with the applicable noise criteria and would be undertaken for the EIS. This investigation would consider:

- the directivity of wind turbine noise emissions. The noise predictions presented in the preliminary assessment are based on each receiver being simultaneously downwind of all wind turbines. Receiver 577, however, is located similar distances from wind turbines in a

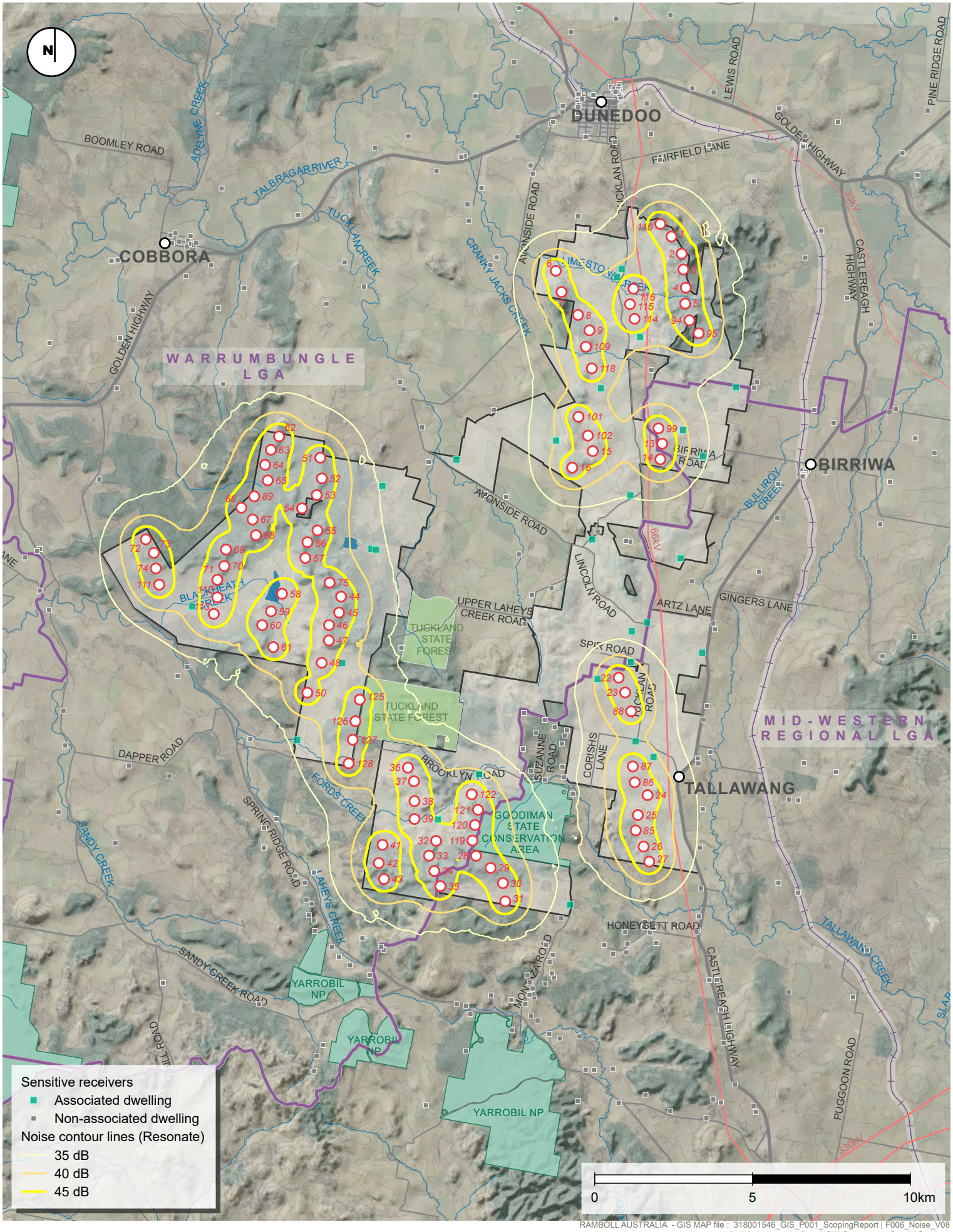
range of wind directions such that it is not possible for it to be simultaneously downwind of all turbines. As such, the actual noise levels would be somewhat lower than predicted

- background noise monitoring at the receiver to assess whether the background noise level-adjusted criteria are sufficiently high to allow for wind turbine noise levels in excess of 35 dB at higher wind speeds
- implementation of appropriate noise agreements with the identified receiver. ACCIONA Energia has offered a commercial agreement with the landowner which is currently under negotiation. Project refinements will be made in the case where an agreement is not reached and further investigations determine the receiver would still experience noise levels above the noise criteria
- refinement to the site design, including consideration of turbine locations and hub heights, to ensure predicted noise levels comply with the applicable criteria
- implementation of serrated trailing edges and/or a curtailment scheme on selected turbines such that wind turbine noise levels achieve compliance with the applicable noise criteria.

The low frequency noise characteristic is not expected to occur from the project in accordance with the Noise Bulletin.

Ancillary infrastructure noise

Given the relatively large extent of land available within the wind farm site, it is expected that ancillary infrastructure will be able to be installed to achieve compliance with the minimum applicable NPI trigger level of 35 dB by locating ancillary infrastructure as far away from noise-sensitive locations as reasonably practicable and selecting quieter ancillary infrastructure equipment. If necessary, contingency measures would be available in the form of shielding structures around key noise sources at ancillary infrastructure sites.



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F006_Noise_V08
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Indicative turbine location
- Existing electricity transmission line
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-7 | Noise and vibration – preliminary predicted noise level contours

A summary of the potential noise and vibration impacts from the project is provided in **Table 7-9**.

Table 7-9: Potential impacts – noise and vibration

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Noise and vibration impacts from the operation of construction equipment and machinery	Moderate / Short term	Direct	Sensitive (social value) Sensitive (environmental value)	Y	• Avoid – locate site compounds away from sensitive receptors • Minimise – use best available technologies to reduce noise and vibration emissions
Construction	Noise impacts from road traffic	Low / Short term	Direct	Sensitive (social value) Sensitive (environmental value)	Y	• Avoid – planning site access routes to minimise the impact on sensitive land uses as much as is feasible • Minimise – restricting deliveries to site to daytime hours where possible
Operation	Noise emissions from wind turbines	Low / Long term	Direct	Sensitive (social value) Sensitive (environmental value)	Y	• Avoid – locate wind turbines away from sensitive receptors where possible

Assessment level and approach

A noise and vibration assessment would be completed for the project in accordance with the Noise Bulletin. The assessment would also include consideration of:

- *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009)
- *NSW Road Noise Policy* (Department of Environment, Climate Change and Water, 2011)
- *Noise Policy for Industry* (Environment Protection Authority, 2017)
- *Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006)
- *British Standard BS7385.2 – 1993 Evaluation and Measurement for Vibration in Buildings, Part 2 – Guide to damage levels from ground borne vibration*
- DIN *4150: Part 3-1999 Structural vibration – Effects of vibration on structures 1999*.

The noise and vibration assessment would include the following methodology:

- undertake an initial desktop review to identify noise sensitive receivers from aerial photography
- undertake noise monitoring to determine ambient and background noise levels
- establish project noise goals for the construction and operation of the project
- identify the likely principal noise sources during construction and operation, and their associated noise levels including construction traffic noise
- assess the potential noise, vibration and sleep disturbance impacts associated with construction, operational and decommissioning aspects of the project using a noise prediction method
- design review and refinements based on outcomes of assessment
- provide feasible and reasonable noise and vibration mitigation and management measures where noise or vibration objectives may be exceeded.

Cumulative impacts with other projects in the locality would also be considered.

7.3.3 Traffic and access

Preliminary investigations

A preliminary traffic and access assessment has been completed and includes:

- review the surrounding road network to identify any potential traffic and transport related impacts likely to be caused by all types of traffic generated by the project during construction, operation and decommissioning
- review existing intersections and roads affected by the project to identify potential performance and capacity issues related to movements of heavy vehicles and OSOM vehicles during construction, operation and decommissioning. This includes identification of potential road upgrades that would be required to facilitate heavy vehicles and OSOM vehicle movements.
- review appropriate transport routes from 'port to site' to identify potential performance and capacity issues related to movements of heavy and OSOM vehicles during construction, operation and decommissioning that will need to be assessed in the EIS
- identify other potential traffic and transport related impacts that may be caused by the project during construction, operation and decommissioning, including active and passive transport, and public transport.

Existing environment

Surrounding road network

The road network surrounding the project is shown on **Figure 7-8** and includes private, local, and regional roads that will need to be assessed for potential impacts caused by light vehicles, heavy vehicles, and OSOM vehicles associated with the project. The surrounding road network includes the following key roads:

- **Golden Highway (B84)** – traversing east-west through Dunedoo on the northern boundary of the wind farm site
- **Castlereagh Highway (B55)** – traversing north-south through Birriwa on the eastern boundary of the wind farm site
- **Upper Laheys Creek Road**, **Brooklyn Road**, and **Corishs Lane** – traversing east-west through the southern portion of the wind farm site
- **Spring Ridge Road** – traversing north-south on the western boundary of the wind farm site
- **Tucklan Road** – traversing east-west, and north-south through the project area.

Rail

There are two railway crossings that project-related vehicles will need to navigate in Birriwa and Dunedoo. The railway crossing in Birriwa is located on Castlereagh Highway near Birriwa Road, and the railway crossing in Dunedoo is located on Castlereagh Highway/Golden Highway near Wargundy Street. Potential impacts to these railway crossings, particularly impacts related to the movement of OSOM vehicles, will need to be considered as part of the EIS.

Access routes

The wind farm site would primarily be accessed from the north via Tucklan Road off the Golden Highway from the north, and via Tucklan Road off the Castlereagh Highway from the southeast. A third access point would be via Spring Ridge Road in the west for light vehicle access only (refer to **Figure 7-8**. There are also multiple access tracks from Tucklan Road, Upper Laheys Creek Road, Brooklyn Road, and Corishs Lane.

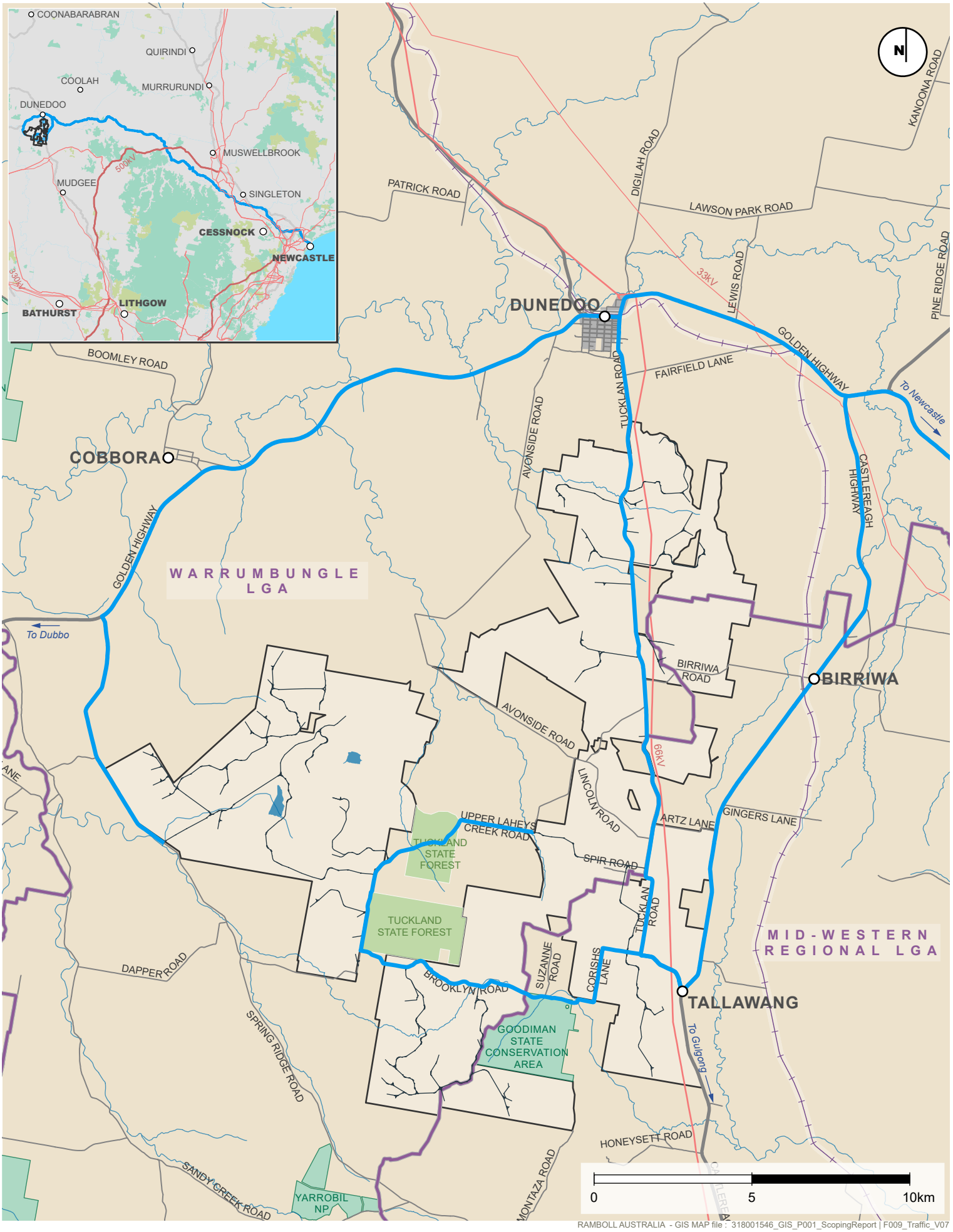
Large project components, such as turbine blades, would likely be transported to the wind farm site from the Port of Newcastle. The transport route from the Port of Newcastle to the wind farm site would likely follow:

- Selwyn Street > George Street > Industrial Drive > Maitland Road > New England Highway > John Renshaw Drive > Hunter Expressway > New England Highway > Golden Highway (to Dunedoo) > Sullivan Street > Wargundy Street > Tucklan Road > site
- Or from Golden Highway > Castlereagh Highway > Tucklan Road > site.

Road and intersection upgrades

The Tucklan Road / Castlereagh Highway intersection would need to be upgraded to accommodate OSOM vehicle movements. Some other upgrades to public roads are likely to be required to provide appropriate capacity and performance during construction. These would be confirmed during the EIS, but it is expected that these would include upgrades to Tucklan Road, Corishs Lane, Brooklyn Road, and Upper Laheys Creek Road.

The project would also require an internal access track network connecting the turbines and associated infrastructure. The access tracks would be established for construction and maintained for use as operational access tracks.



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F009_Traffic_V07

KEY

- Orana Wind Farm site
- Existing electricity transmission line
- Access route
- Proposed access track
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-8 | Traffic and access - proposed access route

Potential impacts

There are expected to be several potential traffic and transport impacts that will need to be assessed in detail, particularly associated with construction, and increased light vehicles, heavy vehicles and OSOM vehicles on the surrounding road network. These impacts may include:

- intersection impacts on the surrounding road network
- traffic performance on the surrounding road network
- temporary disruptions to traffic and active transport movements around the project including potential impacts to road user safety
- impacts on the condition of roads due to increase construction traffic.

During construction of the project, it is expected that potential impacts to the existing traffic on the local road network and transport within the wind farm site will be associated with the generation of light vehicles for worker movement, heavy vehicles for construction plant, equipment, materials, and waste removal and OSOMs for larger component movements (e.g. turbine blades).

Most vehicle movement is expected to be light vehicles for the movement of construction workers to, from, and throughout the site. They will likely be using the existing public road network surrounding the wind farm site.

If a centralised workforce accommodation is adopted for the project, it would be expected that this would result in reduced traffic impacts on the surrounding road network compared to regional distribution of accommodation as the workforce would be centrally located and may not need to travel to and from site daily. This would be investigated further in the EIS.

Heavy vehicles and OSOM vehicles will be using approved public roads as well as some internal roads in the wind farm site which will require appropriate assessment. For the movement of turbine blades, these OSOM vehicles are expected to be in the range of 85 to 95 metres long.

Based on the NSW Oversize Overmass Load Carrying Vehicle Network Map, there are sufficient OSOM routes available from the Port of Newcastle to the project. There are expected to be constraints to OSOM vehicle movements along parts of the proposed route, that include vertical clearance height and load limitations at Denman Bridge, near Muswellbrook that would prevent transportation of project components like nacelles.

Where these constraints are confirmed, alternative routes for vehicles used to transport these components would be developed as part of the EIS, and appropriate consultation undertaken with the relevant road authorities.

A summary of the potential traffic and access impacts from the project is provided in **Table 7-10**.

Table 7-10: Potential impacts – traffic and access

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Increased traffic on the local road network	Moderate / Short term	Direct Cumulative	Sensitive (environmental value)	Y	• Minimise – implementation of traffic controls
Construction	Temporary disruptions to traffic movements on the local road network	Moderate / Short term	Direct Cumulative	Sensitive (environmental value)	Y	• Minimise – implementation of traffic controls
Construction	Upgrades to roads and intersections required to accommodate OSOM vehicles	Low / Short term	Direct	Sensitive (environmental value)	Y	• Minimise – design of road and intersection upgrades will be undertaken in consultation with road authorities and councils
Construction	Encroachment on private land as part of road upgrade works	Moderate / Short term	Direct	Sensitive (environmental value)	N	• Minimise – design of road and intersection upgrades will be undertaken in consultation with road authorities and land owners

Assessment level and approach
A quantitative traffic and access assessment would be undertaken to determine the potential impacts of additional light and heavy vehicle movements on the local road network during construction. This would include consideration of cumulative traffic impacts with other projects and an assessment of OSOM vehicles that would be required to transport large project components, such as turbine blades and nacelles to site. The assessment would identify the requirements for any road upgrades required for the project.

Access to the wind farm site would be required by several types of vehicles and potential routes will need to be assessed for proposed access points into the wind farm site. The route assessments would include:

- identification of proposed vehicle movements within the wind farm site
- conducting swept path analysis for key identified intersections and road segments to assess OSOM vehicle movements and potential environmental impacts
- provision of recommendations and considerations from a traffic and transport perspective for the assessed routes in the wind farm site.

As part of the route assessment, swept path assessment would be undertaken for some key movements for OSOM vehicles. These movements have been identified to include:

- the intersection of Castlereagh Highway and Golden Highway, near Black Stump Way
- the intersection of Castlereagh Highway and Golden Highway, at Wargundy Street in Dunedoo
- the intersection of Castlereagh Highway and Tucklan Road
- several locations along Tucklan Road, Upper Laheys Creek Road, Brooklyn Road, and Corishs Lane
- all intersections for new access tracks to wind turbine locations, from local and State roads.

By assessing the above locations for OSOM vehicles, consideration will also be given to other vehicle movements required for the project, including light and heavy vehicles during construction, operation, and decommissioning.

If a centralised workers accommodation area is required for construction, two traffic and transport impact scenarios would be considered, so that potential impacts and management measures are identified accordingly. The first scenario would be a regional distribution of the workforce, where workers are assumed to be distributed across nearby localities. The second would be a centralised accommodation area, where workers are accommodated in purpose-built workforce accommodation.

As ongoing traffic impacts during operation are expected to be very minor, a qualitative assessment would be undertaken to assess broadscale impacts on local roads, access, public and active transport, and parking during operation.

7.3.4 Biodiversity

Preliminary investigations
A preliminary ecological survey of the wind farm site was completed by OzArk Environment & Heritage (OzArk) over four days between 16 and 18 March and 25 March 2022 as part of the fatal flaws report. This survey focused on detecting threatened species that might reasonably be

present and a vegetation assessment to determine Plant Community Types (PCTs) and any potential TECs.

A subsequent preliminary biodiversity assessment was completed by EcoLogical Australia (ELA) to support the scoping report and is included in **Appendix 5**. This included additional field surveys and desktop investigations completed 12 to 16 September 2022. The purpose of the preliminary assessment was to:

- identify biodiversity constraints from a detailed desktop assessment
- confirm the presence of some of these constraints through a rapid site inspection
- provide advice to avoid and minimise impacts
- provide advice on the requirements for SEARs.

Existing environment

Bioregions

The wind farm site is located at the north-eastern edge of the NSW South Western Slopes bioregion, within the Inland Slopes sub-bioregion and within the Talbragar Valley subregion of the Brigalow Belt South bioregion as per the IBRA (Department of Agriculture, Water and the Environment, 2012). Features of the subregions that apply to the wind farm site are described in **Table 7-11**.

Table 7-11: Characterisation of the subregions of the wind farm site

Feature	Description
NSW South Western Slopes – Inland Slopes	
Geology	Ordovician to Devonian folded and faulted sedimentary sequences with inter-bedded volcanic rocks and large areas of intrusive granites
Landform	Steep, hilly and undulating ranges and granite basins. Occasional basalt caps, confined river valleys with terrace remnants
Soils	Shallow stony soils on steep slopes, texture contrast soils grading from red subsoils on upper slopes to yellow subsoils on lower slopes. Alluvial sands, loams and clays
Vegetation	Open forests and woodlands. Red stringybark on upper slopes with black cypress pine, kurrajong, red ironbark, white gum, white box, yellow box and Blakely's red gum on lower slopes. Merging west to yellow box, grey box and white cypress pine. Rough-barked apple on flats with river oak on upper tributaries and river red gum on lower and larger streams
NSW Brigalow Belt South – Talbragar Valley	
Geology	Near horizontal Mesozoic quartz sandstone, conglomerates and shales with minor Tertiary basalt caps and extensive alluvial wash plains
Landform	Residual rocky hills, undulating long slopes and wash plains, wide valley floors with sandy streams
Soils	Thin stony loams and texture contrast soils over most of the landscape with deeper sands and brown earths on valley floors
Vegetation	Narrow-leaved ironbark, white cypress pine, white box on hills and slopes. Patches of black cypress pine, hill red gum, occasional kurrajong and scrubby

Feature	Description
	acacia in rocky outcrops. Grey box, yellow box, rough-barked apple on valley floors. River red gum on larger streams and river oak on tributaries

Vegetation

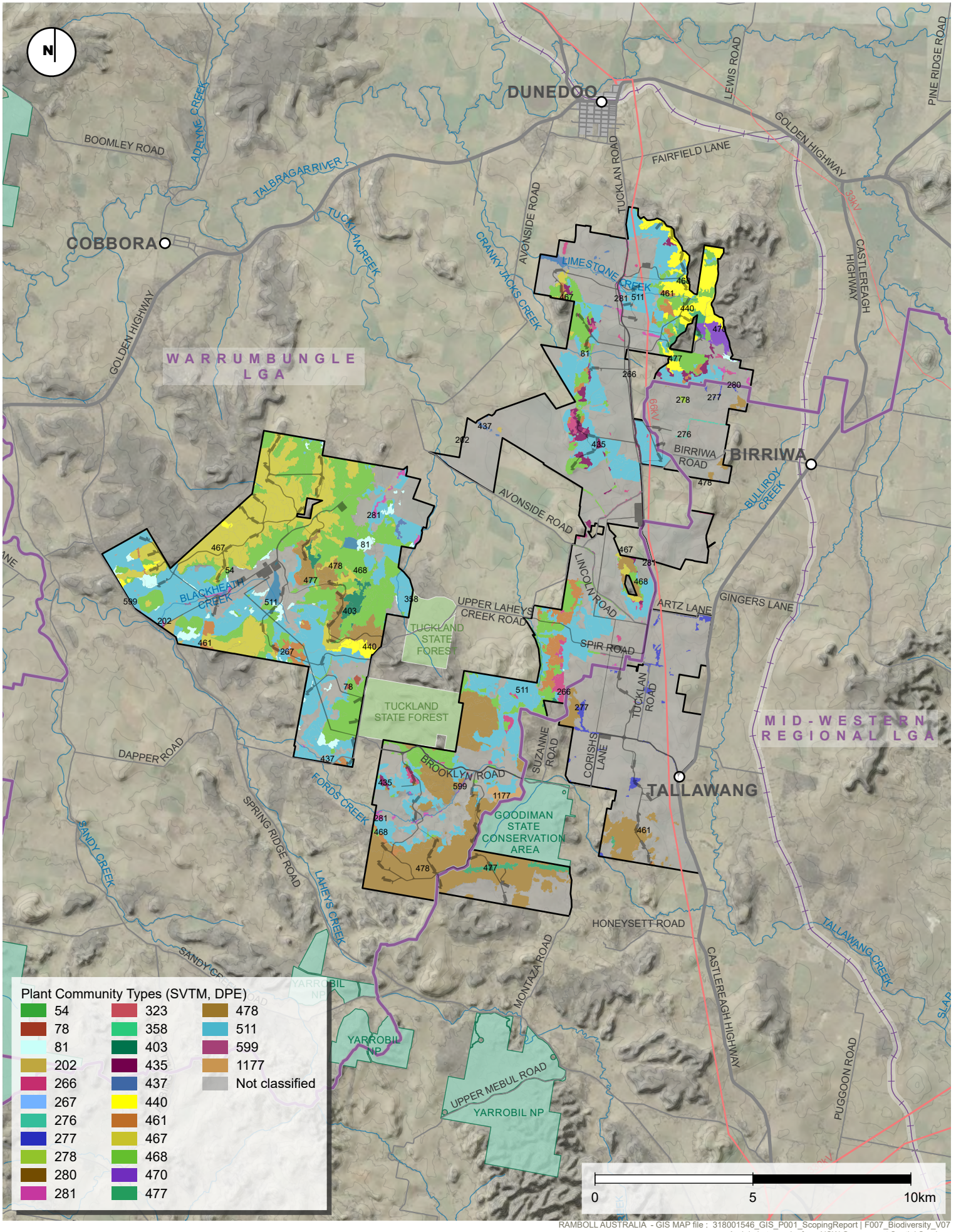
A significant portion of the project is located on rural land that contains a mix of woodlands and forests consistent with TECs listed under both the BC Act and the EPBC Act.

A preliminary PCT map has been developed by attributing the native vegetation extent with data collected during the 2022 field survey events (**Figure 7-9**). State Vegetation Type (SVT) mapping of PCT's prepared by DPE identified 21 potential PCTs within the wind farm study area, being a 100 metre buffer around the wind farm site (refer to **Appendix 5** for the full list). Of these, nine were identified within the wind farm site during the field surveys, including:

- Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
- Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
- White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
- White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
- Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
- Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion
- Blue-leaved Ironbark - Black Cypress Pine shrubby sandstone open forest in the southern Brigalow Belt South Bioregion (including Goonoo)
- Mugga Ironbark - Narrow-leaved Ironbark - Buloke - Black Cypress Pine shrub grass open forest in the Goonoo forests and surrounding region, southern Brigalow Belt South Bioregion
- Slaty Gum woodland of the slopes of the southern Brigalow Belt South Bioregion.

Of the vegetation communities observed the following TECs may occur within the wind farm site:

- White Box Yellow Box Blakely's Red Gum Woodland (BC Act Critically Endangered Ecological Community (CEEC)). Components of this TEC are consistent with the EPBC Act CEEC White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland)
- Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions which is listed as an endangered ecological community (EEC) under the BC Act. This TEC is not listed under the EPBC Act, although components of it may fit the description of Box Gum Woodland
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions which is listed as an EEC under the BC Act. This TEC is listed as an EEC under the EPBC Act as Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia, although components of it may fit the description of Box Gum Woodland.



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F007_Biodiversity_V07
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Existing electricity transmission line
- Approximate extent of disturbance footprint
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-9 | Biodiversity - preliminary vegetation mapping

Threatened flora

A database review within a 10-kilometre search radius around the wind farm site identified nine flora species known, or with the potential to occur. These are listed in **Table 7-12**, where:

- V = vulnerable
- E / E1 = endangered.

An additional five species were identified in the database search and are considered unlikely to occur. These are listed in Appendix A of **Appendix 5**.

Table 7-12: Preliminary flora species with the potential to occur in the wind farm site

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of occurrence
Acacia ausfeldii	Ausfeld's Wattle	V		Known
Commersonia procumbens		V	V	Potential
Dichanthium setosum	Bluegrass	V	V	Potential
Homoranthus darwinioides		V	V	Known
Pomaderris Queenslandica	Scant Pomaderris	E1		Potential
Swainsona sericea	Silky Swainson-pea	V		Potential
Thesium australe	Austral Toadflax	V	V	Potential
Tylophora linearis		V	E	Known
Zieria ingramii	Keith's Zieria	E1	E	Known

Threatened fauna

A database review within a 10-kilometre search radius around the wind farm site identified 42 threatened fauna known, likely or with the potential to occur. These are listed in **Table 7-13**, where:

- V = vulnerable
- E = endangered
- CE = critically endangered
- M = migratory

An additional 18 species were identified in the database search and are considered unlikely to occur. These are listed in Appendix A of **Appendix 5**.

Table 7-13: Preliminary fauna species with the potential to occur in the wind farm site

Scientific Name	Common Name	BC Act / FM Act Status	EPBC Act Status	Likelihood of occurrence
Aves				
Anthochaera phrygia	Regent Honeyeater	E	CE	Known
Apus pacificus	Fork-tailed Swift		M	Likely

Scientific Name	Common Name	BC Act / FM Act Status	EPBC Act Status	Likelihood of occurrence
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		Potential
Calidris acuminata	Sharp-tailed Sandpiper		M	Known
Callocephalon fimbriatum	Gang-gang Cockatoo	V	V	Likely
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	Known
Chthonicola sagittata	Speckled Warbler	V		Potential
Circus assimilis	Spotted Harrier	V		Likely
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V		Likely
Daphoenositta chrysoptera	Varied Sittella	V		Likely
Falco hypoleucos	Grey Falcon	E		Potential
Falco subniger	Black Falcon	V		Potential
Glossopsitta pusilla	Little Lorikeet	V		Likely
Grantiella picta	Painted Honeyeater	V	V	Known
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		Potential
Hieraaetus morphnoides	Little Eagle	V		Potential
Hirundapus caudacutus	White-throated Needletail		M	Potential
Lathamus discolor	Swift Parrot	E	CE	Likely
Lophoictinia isura	Square-tailed Kite	V		Likely
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V		Potential
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		Potential
Myiagra cyanoleuca	Satin Flycatcher		M	Potential
Neophema pulchella	Turquoise Parrot	V		Likely
Ninox connivens	Barking Owl	V		Known
Ninox strenua	Powerful Owl	V		Known
Oxyura australis	Blue-billed Duck	V		Likely
Petroica boodang	Scarlet Robin	V		Likely

Scientific Name	Common Name	BC Act / FM Act Status	EPBC Act Status	Likelihood of occurrence
Polytelis swainsonii	Superb Parrot	V	V	Likely
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V		Likely
Pycnoptilus floccosus	Pilotbird		V	Potential
Stagonopleura guttata	Diamond Firetail	V		Likely
Tyto novaehollandiae	Masked Owl	V		Known
Mammalia				
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Known
Chalinolobus picatus	Little Pied Bat	V		Likely
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Known
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Known
Nyctophilus corbeni	Greater Long-eared Bat	V	V	Likely
Petaurus norfolcensis	Squirrel Glider	V		Known
Phascolarctos cinereus	Koala	V	V	Likely
Pseudomys novaehollandiae	New Holland Mouse		V	Potential
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Potential
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		Likely

Habitat

Habitats for threatened bats are a significant development constraint of particular relevance to wind farm projects. Four bat species would require detailed assessment for the project:

- *Chalinolobus dwyeri* (Large-eared Pied Bat) – BC Act Vulnerable, EPBC Act Vulnerable
- *Miniopterus australis* (Little Bent-winged Bat) – BC Act Vulnerable
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat) – BC Act Vulnerable
- *Vespadelus troughtoni* (Eastern Cave Bat) – BC Act Vulnerable.

Along with the above bat species, all flora, as well Regent Honeyeater, Glossy Black-cockatoo, Little Eagle, Barking Owl, Powerful Owl, Squirrel Glider, Superb Parrot, Masked Owl, and Koala are species credit species whereby their habitats (or a component thereof) require detailed assessments and additional credit calculations.

Within the locality Key Fish Habitat has been identified for:

- Purple-spotted Gudgeon
- Eel-tailed Catfish.

Potential impacts

Vegetation

Of the TECs identified in the database assessment, only three are likely to occur within the biodiversity study area, all of which were identified during the site inspection. All native vegetation, regardless of TEC status, would require assessment at the EIS phase.

Native vegetation mapping was conducted for an indicative development footprint within the wind farm site which excluded potential road upgrades and other ancillary developments. There is a significant proportion of extant native vegetation, including both woodlands and forests. Of the 744 hectares within the indicative development footprint that have the potential to be impacted by the project:

- Dry sclerophyll forests – 298 hectares (40 percent)
- Grassy woodlands – 53 hectares (7 percent)
- Derived native grasslands – 117 hectares (16 percent)
- Cleared land – 276 hectares (37 percent).

The above impact assessment assumes a buffer of impacts around all infrastructure, which is likely an overestimate of the actual impacts of the project. Impacts related to the turbine locations and connecting infrastructure are more likely to be localised and can be planned around areas of biodiversity values.

Threatened flora

The assessment identified previous records of 14 flora species listed under the BC Act and/or EPBC Act. Of these species, nine listed flora species are known or have the potential to occur within the wind farm site. The most likely flora species to be impacted by the project is *Acacia ausfeldii* and *Zieria ingramii* which are common in the locality.

Threatened fauna

The assessment identified previous records of 59 fauna species listed under the BC Act and/or EPBC Act. Of these species, 41 listed fauna species are considered known, likely or with the potential to occur within the wind farm site. All of these species except for Squirrel Glider and Koala are aerial avian or Microchiropteran bat species that may be potentially impacted by the construction and operation of the project. The Glossy Black-cockatoo as well as Koala are likely to be high level constraints to the development of the project and will require careful consideration during the project planning.

Habitat

The wind farm site contains potential habitat for numerous threatened species, including Koala. Areas of woodland/forest vegetation provide habitat for threatened fauna species which can be impacted by the wind farm development and operation.

The wind farm site is within close proximity to areas of forest and sandstone cliffs that will provide habitat for birds and microchiropteran bats. Identifying the areas of greatest activity, through a landscape utilisation study, would allow the project to design around areas of high activity and minimise ongoing impacts from bird and bat strike.

Impacts to key fish habitat are unlikely to result from the project.

A summary of the potential biodiversity impacts from the project is provided in **Table 7-14**.

Table 7-14: Potential impacts – biodiversity

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Removal of terrestrial vegetation	High / Long term	Direct	Sensitive (environmental value)	Y	• Avoid – design the project to avoid high value vegetation • Minimise – minimise clearing of vegetation where practical • Offset – vegetated areas that cannot be avoided in clearing works would be offset through the BOS as required
Construction	Disturbance / loss of habitat	High / Long term	Direct	Sensitive (environmental value)	Y	• Avoid – design the project to avoid high value habitat • Minimise – minimise removal of habitat where practical • Offset – habitat that cannot be avoided in clearing works would be offset through the BOS as required
Construction	Indirect impacts to fauna (light, noise, vibration)	Moderate / Short term	Indirect	Sensitive (environmental value)	Y	• Avoid – undertake pre-clearing surveys to identify and relocate fauna prior to commencing works if required • Minimise – minimise light, noise and vibration emissions where practical through the implementation of best practice management
Operation	Bird / bat strike from turbine operation	Moderate / Long term	Direct	Sensitive (environmental value)	Y	• Avoid – locate wind turbines away from areas with high bird and bat utilisation • Minimise – develop a bird and bat adaptive management plan

Assessment level and approach
A BDAR would be prepared to meet the requirements of the Biodiversity Assessment Method (BAM) established under Section 6.7 of the BC Act.

The preparation of the BDAR would include the following methodology:

- desktop review of available background information, mapping, and publicly available databases
- field surveys of the wind farm site
- field surveys land subject to construction works outside the wind farm site such as road upgrade works
- continued refinement of project infrastructure to avoid and minimise potential impacts to biodiversity
- assessment of impacts to biodiversity values, determination of required biodiversity
- offsets for the project
- provision of management and mitigation measures to minimise identified impacts.

The project would also be referred to the DCCEEW for potential impacts to MNES protected by the EPBC Act.

7.3.5 Aboriginal Heritage

Preliminary investigations
Preliminary investigations of the wind farm site have included desktop investigations by OzArk in May 2022 and September 2022. A predictive model of landforms and the regional archaeological context was completed by OzArk to analyse existing and likely Aboriginal heritage constraints across the wind farm site.

A preliminary Aboriginal heritage constraints memo was completed by OzArk to support the scoping report, the findings of which have been incorporated into this section.

Existing environment
The wind farm site is within the boundaries of the Mudgee and Dubbo Local Aboriginal Land Councils (LALCs).

The local area has been subject to a high level of archaeological investigations related to coal and renewable energy projects, allowing the archaeological profile of the wind farm site to be somewhat predicted. Previous studies in the area (e.g. Pearson, 1981; Koettig, 1985; Haglund, 1985; EMM 2012; NGH Environmental 2017; and OzArk 2005, 2006, 2020 and 2021) indicate:

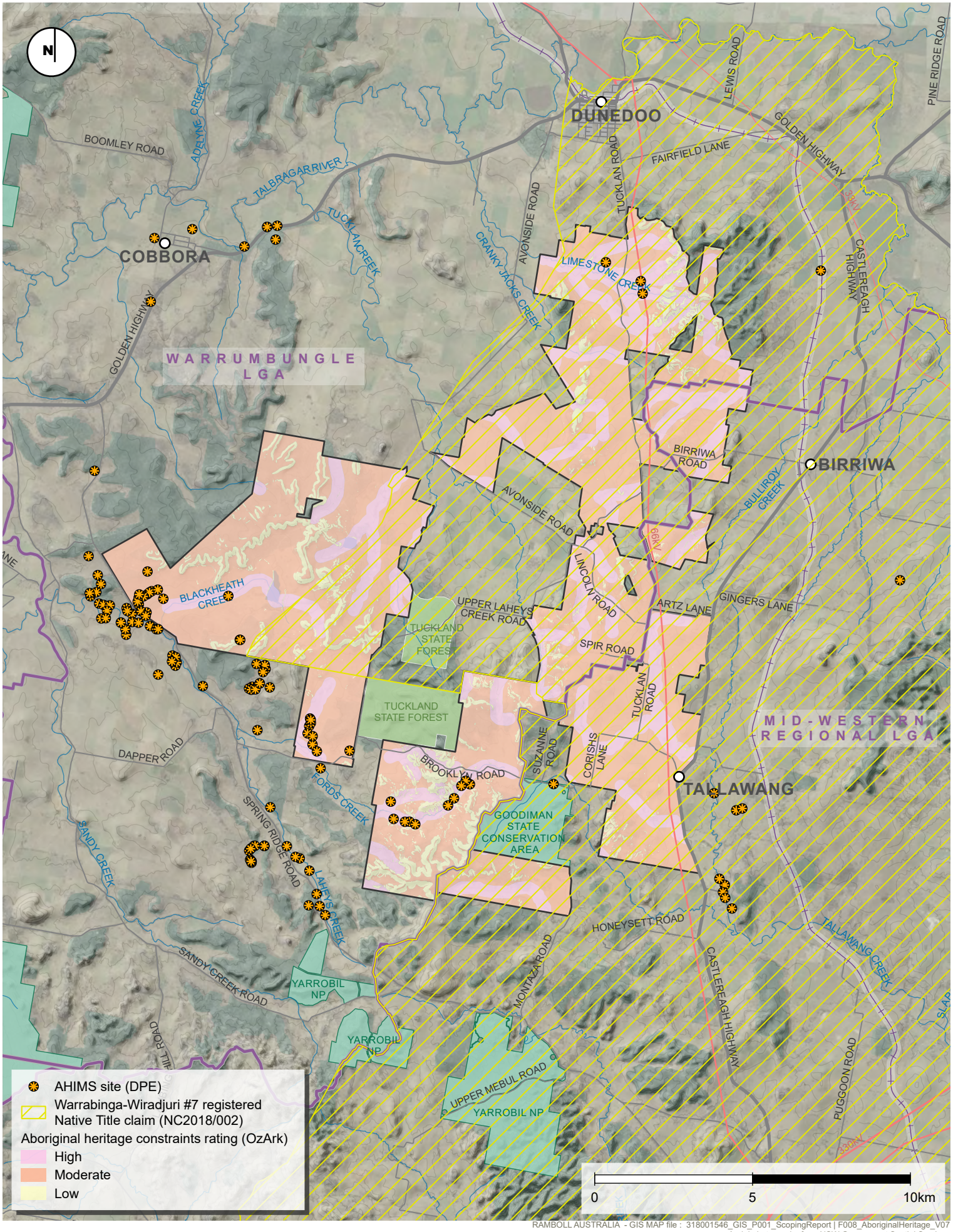
- stone artefact sites (isolated finds and artefact scatters) are the most frequent sites recorded in the area, especially in association with watercourses
- shelters are an expected site type in the general region and would likely be confined to the southwest of the wind farm site near mountainous areas where the necessary geological formations (i.e. sandstone overhangs) exist
- few scarred trees are recorded, reflecting the high degree of tree clearing in the region
- artefact assemblages recorded in the region consist largely of unmodified flakes with few formal tools
- quartz is likely to be the predominant material for stone artefacts in the area, although volcanic materials, silcrete, quartzite, mudstone, chert, and chalcedony could also be present

- less frequently recorded sites (grinding grooves, hearths and a fish trap) are recorded within the wind farm site, indicating that they could be present across the previously unassessed areas. Fish traps would only be present within drainage lines and grinding grooves are also most likely near creeks unless there are outcrops of suitable sedimentary rock further from water sources (OzArk, 2022).

A search of the Heritage NSW administered AHIMS database on 28 September 2022 returned 135 results for Aboriginal sites within a 25 kilometre by 25-kilometre area centred on wind farm site. Of these, 39 were within the wind farm site (refer to **Figure 7-10**). The most common site type found within, and near wind farm site are artefact scatters (48 per cent). Other site types identified include isolated finds (14 per cent), potential archaeological deposits (PADs) (10 per cent) and modified trees (10 per cent).

There is a high likelihood for further Aboriginal objects to be found within wind farm site. The most likely landforms where Aboriginal objects may be recorded are lower elevations landforms particularly nearby watercourses such as Laheys Creek, where there is an existing cluster of sites, as well as along Tucklan Creek and their tributaries. OzArk have developed a site predictive model for the wind farm site indicating the landforms likely to contain Aboriginal items, which is shown on **Figure 7-10**.

Due to the large wind farm site and comparably small disturbance footprints of the proposed project infrastructure, it is feasible that potential impacts to the landforms with identified Aboriginal objects can be minimised through design refinement.



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F008_AboriginalHeritage_V07
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Existing electricity transmission line
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-10 | Aboriginal heritage - preliminary identified sites and constraints mapping

Potential impacts

A summary of the potential Aboriginal heritage impacts from the project is provided in **Table 7-15**.

Table 7-15: Potential impacts – Aboriginal heritage

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Potential to impact on previously unrecorded Aboriginal objects, sites, or culturally modified trees	High / Long term	Direct	Sensitive (social value)	Y	• Avoid – siting of infrastructure would be designed to avoid known sites and sensitive landforms • Minimise – an unexpected find procedure would be developed and implemented during construction • Offset – any sites that cannot be avoided would be salvaged by an archaeologist
Construction and operation	Potential to impact on social or cultural values of the wind farm site	High / Long term	Perceived	Sensitive (social value)	Y	• Minimise – consultation with Aboriginal representatives to define and understand social and cultural values of the wind farm site

Assessment level and approach
The assessment of Aboriginal cultural heritage values would be addressed in an Aboriginal Cultural Heritage Assessment Report (ACHAR). Preparation of the ACHAR would include consultation with representatives from the RAPs and with the Native Title Claim group Warrabinga Wiradjuri #7(NC2018/008).

The assessment would follow the *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (Code of Practice), (Department of Environment, Climate Change and Water NSW, 2010a), the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs) (Department of Environment, Climate Change and Water NSW, 2010b).

The preparation of the ACHAR would include the following methodology:

- undertake background research to formulate a predicative model for wind farm site and land subject to disturbance outside the wind farm site (such as road upgrade locations)
- identify and record objects or sites of Aboriginal heritage significance within the wind farm site as well as any landforms likely to contain further archaeological deposits
- undertake an Aboriginal cultural values assessment in consultation with RAPs of tangible and intangible cultural heritage values that have potential to be impacted by the project
- undertake test excavation if warranted
- assess the significance of any recorded Aboriginal sites, objects, or places likely to be impacted by the project, in consultation with RAPs
- assess the likely impacts of the proposed work to Aboriginal cultural heritage and provide management recommendations, in consultation with RAPs.

7.3.6 Social

Preliminary investigations
A preliminary social impact assessment was completed by AAP Consulting to support the scoping report and is included in **Appendix 6**. The purpose of the preliminary assessment was to:

- gain an understanding of the project's social locality
- consider the characteristic of the communities within the social locality. This is described as the social baseline
- preliminary identification and evaluation of social impacts for different groups in the social locality and the level to which these impacts need to be addressed
- consider potential refinements or approaches in response to likely social impacts
- consider the remaining of the social impact assessment tasks including engagement.

Existing environment

Social baseline
The social baseline documents the existing social environment, conditions and trends relevant to the project and defines characteristics of the communities within the project's social locality, including any vulnerable groups. It considers any built or natural features on or near the project that could be affected and the intangible values that people may associate with these features.

To define the baseline of the social locality, the following aspects were considered:

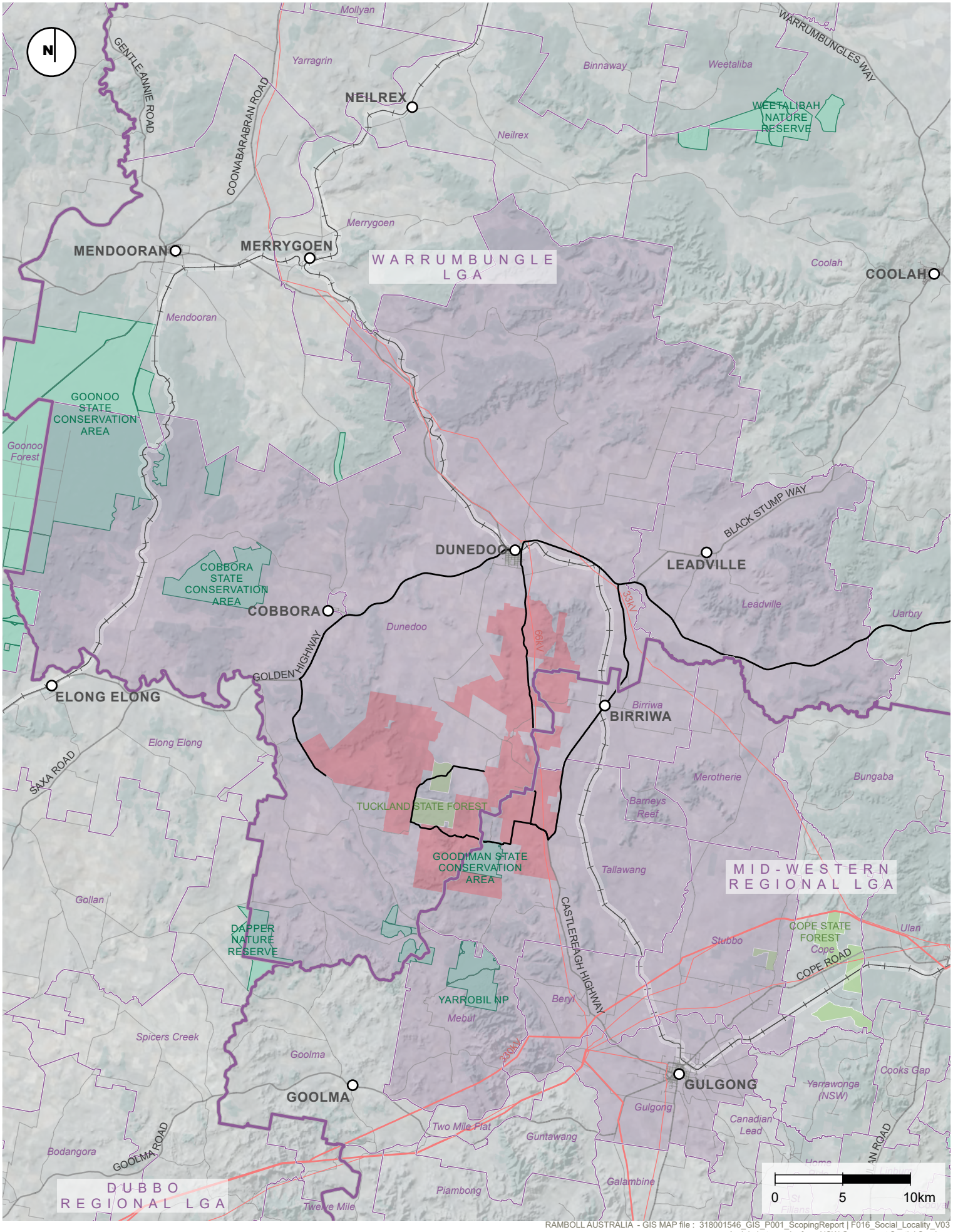
- the site and regional context (refer to **Chapter 2**)
- planning policies and strategies relevant to the region (refer to **Chapter 3**)

- the project context and activities (refer to **Chapter 4**)
- community opinions and sentient towards the project identified during engagement activities (refer to **Chapter 6**)
- the characteristics of surrounding communities and how positive and negative impacts may be reasonably perceived or experienced by different people, including those that may be vulnerable or marginalised
- the potentially affected built or natural features located near the project that have social value or importance (refer to **Section 2.4**)
- any relevant social, cultural, demographic trends or social change processes occurring now or in the past near the wind farm site
- the history of the proposed wind farm site and the broader area, and any similar experiences people near the project have had
- the broader (indirect) area of social influence of communities that will be impacted by future incoming workforces, business opportunities, construction access and supply chain routes
- cumulative impacts with other projects in the region (refer to **Section 7.5**).

A social baseline profile has been developed of the project's social locality, which for this project is defined as:

- landholdings, property owners and residents of associated dwellings and properties to be used for the project footprint including any ancillary facilities
- the suburbs and localities as per the ABS statistical areas of Tallawang, Cobbora, Beryl, Mebul, Dunedoo, Birriwa, Stubbo, Gulgong and Merotherie
- the host LGA of the Mid-Western Regional Council and the Warrumbungle Shire Council
- transportation routes along the Golden Highway and Castlereagh Highway, including the access to the site via Tucklan Road (heavy and light vehicles) and Spring Ridge Road (light vehicles only).

The social locality may extend beyond these areas as the project planning progresses to include places of residence of future construction and operational workforce and their primary dependents, and where materials may be sourced for the project. The social locality will be further refined as required during the EIS phase.



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F016_Social_Locality_V03
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Social locality
- Transport route
- LGA boundary
- Suburb and locality area (ABS 2021)
- Existing electricity transmission line
- Railway
- National Parks and Reserves
- State forest

Figure 7-11 | Social - social locality

Stakeholder identification

Stakeholders may be affected groups or individuals that:

- live, work, or recreate near the project
- have an interest in the proposed action or change
- use or value a resource associated with the project
- are affected by the project e.g., may be required to relocate because of the project.

A stakeholder identification process was undertaken during the scoping phase for the project to support the planning and delivery of community and stakeholder consultation to inform the broader EIS, including the social impact assessment. Key stakeholder groups identified during the scoping phase are identified in **Chapter 6**.

Characteristics of the social locality

The key characteristics of the social locality identified in the preliminary social impact assessment include:

- rural community with an ageing population
- notable economic growth and steady reliance on rural based industries
- strong social ties with higher-than-average volunteer rates
- strong connection to country, with Aboriginal persons accounting for a higher proportion of the population when compared to NSW
- strained access to reliable nearby health services.

Dunedoo is the nearest township to the project located approximately three kilometres to the north. The larger population centre of Gulgong is located approximately 15 kilometres south-east. The site is in proximity to the Castlereagh Highway and the Golden Highway giving the local area access to the Hunter region, the major metropolitan centre of Newcastle as well as inland links to south-east Queensland.

The Dunedoo community has a population of 1,097 and primary industries are agriculture, with significant mixed farming and cattle and sheep industries. The township is located at the junction of the Golden and Castlereagh Highways and is often a travel stopover location with a variety of accommodation offerings, local pubs, and the Dunedoo Museum. The Dunedoo Show and bush poetry festival attract visitors from across the region each year (Visit NSW, 2020).

Gulgong is a former gold mining town, with a population almost double the size of Dunedoo, with 2,680 calling Gulgong home. Today Gulgong's primary industry is coal mining, however the area also attracts notable tourist attention due to its rich settler history and reputation as the childhood home of the well-known Australian poet and writer Henry Lawson. The town holds a number of annual historical festivals and celebrations, including the Henry Lawson Heritage Festival in June, the Gulgong Folk festival in December, and the Gulgong Gold and mining Festival in October.

Key population statistics of the localities are provided in **Table 7-16**.

Table 7-16: Key population statistics

Suburbs and localities	Population 2021			Aboriginal Persons		
	2016	2021	Change	2016	2021	Change
Mid-Western Regional	24,076	25,713	+	5.4%	6.8%	+
Warrumbungle Shire	9,384	9,225	-	9.8%	10.7%	+

Suburbs and localities	Population 2021			Aboriginal Persons		
	2016	2021	Change	2016	2021	Change
Dunedoo	1,221	1,097	-	7.7%	8.8%	+
Tallawang	168	165	-	0%	1.8%	+
Gulgong	2,521	2,680	+	7.7%	8.1%	+
NSW	7,480,228	8,072,163	+	2.9%	3.4%	+

Vulnerabilities

Vulnerable groups have been identified for the project. These include:

- low-income earners
- the elderly
- property owners within the social locality
- First Nations, Aboriginal and Torres Strait Islanders
- those with a disability, or of ill-health, requiring medical attention.

Potential impacts

Key issues and opportunities for the social locality

The social baseline presents some of the strengths and challenges facing communities in the locality and it has been used as a basis, where possible, to assess the social impacts of the project. From a review of the baseline, key issues and opportunities identified for the social locality include:

- protecting key community values including:
  - local communities
  - rural lifestyle
  - social/community and recreation facilities and events
  - traditional community
  - family values
- developing more and diverse employment and training services/opportunities for local people including Aboriginal and Torres Strait Islanders
- improved access to education, community services, and quality health services for vulnerable people (e.g. low-income earners, the elderly, property owners, First Nations and Aboriginal and Torres Strait Islanders, and those with a disability or of ill-health, requiring medical attention)
- conservation of heritage and environment.

Vulnerabilities

An assessment of the key areas of community resilience and risk in the social locality was undertaken for the project. The key findings are summarised in **Table 7-17**. This identifies several population groups as potentially having vulnerability to the social or economic changes that the project, and the cumulative effects of other developments across the region, may bring.

Table 7-17: Social baseline summary

Strengths	Vulnerabilities	Potential implications for vulnerable groups
Diverse economy including growing renewable energy services to the area	• Temporary reduction in social amenity during construction which could have greater health impacts on the elderly or those living with illness or disability • Impact on livelihoods and existing industry due to changes in land use • Reduced community cohesion due to differing perceptions on renewable energy and distributive equity, and changes to the population due to the construction workforce	• Potential further restrictions to access to services for vulnerable groups due to influx of workers for major works • Improved livelihoods due to access to employment opportunities • Employment and training opportunities, and opportunities to strengthen community resilience to natural disasters such as drought and floods
Centrally located to Sydney and Newcastle, as well as other regional centres in NSW	• Public transport linkages to centres for those without access to a private vehicle or are unable to drive	• Those without access to a vehicle or a license, particularly First Nations, Aboriginal and Torres Strait Islander and the elderly have restricted access and limited provisions for assistance
Diverse natural capital, including diversity of natural resources, heritage items, agricultural lands, and national parks and reserves	• Competing land uses in the region and managing community perceptions	• Ongoing potential for conflict between different and similar industries utilising the natural capital of the area • Potential for project to cause intangible harm to Aboriginal communities through cultural and physical loss

Preliminary social impacts

The scoping of likely social impacts resulting from the project has been guided by the social impact assessment guideline and with reference to the social impact categories presented in **Table 7-18**.

Table 7-18: Social impact categories

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

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

The scoping phase determined a number of social impacts that required further investigation during the EIS phase. **Table 7-20** provides a summary of these impacts and demonstrates the interrelationships that exist between scoped impacts and the social impact categories.

Table 7-19: Scoped likely social impacts

Project activity	Social impact category	Impact to people	Affected people	Impact type
Construction of the project including ancillary facilities and access roads	Surroundings Way of life	Changes to amenity resulting from construction, affecting how people live (i.e., because of construction dust and noise).	Host landholders Near neighbour	Negative
	Culture	Likelihood of project to cause intangible harm through cultural and physical loss. Tangible harm to items of heritage and cultural significance.	Aboriginal and Torres Strait Islanders	Negative
	Livelihoods	Improved livelihoods of local business owners as result of economic stimulus resulting from the proposal procurement opportunities.	Local business	Positive
	Access	Reduced availability of local services/trades/materials for the local community due to the construction of the wind farm	Community within the social locality	Negative
Transport of wind turbines and other wide loads to and from site, including police escorts and road closures	Access Health and wellbeing	Increase in traffic in the locality and potential road closures or detours, causing day to day disruption for people in the locality due to increased travel times. Public safety risks due to an increase in heavy vehicles on the locality road network.	Road users within the locality	Negative
Increased construction traffic on local road network travelling to and from site	Access Health and wellbeing	Increase in traffic in the locality and potential road closures or detours, causing day to day disruption for people in the locality due to increased travel times. Public safety risks because of increased traffic and changed road conditions.	Road users within the locality	Negative
Intersection upgrades to accommodate increase in traffic and haulage of materials	Access	Potential road closures or detours, causing day to day disruption for people in the locality due to increased travel times.	Road users within the locality	Negative

Project activity	Social impact category	Impact to people	Affected people	Impact type
Payment to host landowners and nearby neighbours	Way of life	Changes to existing land use generating an alternate revenue stream for host landholders and to a lesser degree, nearby neighbours, leading to improved resilience through income diversification	Host landholders Nearby neighbours	Positive
Payment to host landowners and nearby neighbours	Community Livelihoods Health and wellbeing	Reduced community cohesion, speculation of project benefits affecting interpersonal relations and lack of distributional equity. The desire of nearby landholders to receive 'fair' compensation for the impacts they experience by living near the project, compounded by expectations created by nearby projects. Detrimental physical and mental health outcomes on near neighbours due to potential changes to the way they are used to experiencing their surroundings and conversations about what is fair and right compensation. This may be exacerbated by cumulative impacts of other nearby projects.	Host landholders Nearby neighbours Community within the social locality	Negative
Community contribution and benefits	Community	Community investment initiatives leading to improved sustainability and enhancing resilience.	Community within the social locality	Positive
Employment of workforce during construction and operation	Livelihoods	Enhanced wellbeing from job opportunities and training, including increased opportunities for vulnerable groups. Opportunities for small local businesses to increase services and flow on economic benefits during construction and operation.	Community within the social locality Aboriginal and Torres Strait Islanders Businesses	Positive

Project activity	Social impact category	Impact to people	Affected people	Impact type
Employment of workforce during construction and operations	Community	Changes to local population causing a decline in the composition and character of the community.	Community within the social locality	Negative
Employment of workforce during construction and operations	Community	Changes to community composition potentially leading to an increase in community resilience and changes to the way the community functions.	Community within the social locality	Positive
Employment of workforce during construction	Access	Decline in access to affordable housing, accommodation, and community services (including medical facilities) due to the temporary increase in population.	Community within the social locality	Negative
Public release of information and plans	Health and wellbeing	Increase in anxiety and stress regarding scale of development and perceived inability of people to influence change that may affect their lives.	Community within the social locality	Negative
Construction of wind turbines	Surroundings	Changes to the visual landscape affecting how people experience their rural surroundings	Host landholders Nearby neighbours	Negative
Operation of wind turbines and BESS	Surroundings	Operational noise generated by wind turbines, causing a decline in social amenity and how people experience their rural surroundings Changes to the existing land use resulting in potential loss of native flora and fauna, particularly due to bird and bat strikes, changing how people experience their environment	Host landholders Nearby neighbours	Negative
	Livelihoods	Changes to land use affecting the availability of land for agricultural purposes Fear that the presence of the project will devalue properties	Host landholders Nearby neighbours	Negative

Project activity	Social impact category	Impact to people	Affected people	Impact type
			Community within the social locality	
	Way of life	Benefits of intergenerational equity due to windfarms being used as an alternate energy source.	Community within the social locality	Positive
Project planning	Decision-making systems	Procedural fairness and people's capacity to influence change that may affect their lives	Community within the social locality	Negative

Cumulative impacts

The scoping phase found that almost all the scoped social impacts identified in **Table 7-20** are likely to combine with other impacts from either this project (i.e. noise or dust) or with impacts from other projects (refer to list of projects in **Section 7.5**). This is primarily due to the implications of the REZ and the likelihood that concurrent projects may be constructed and be in operation over similar timeframes.

A summary of the potential social impacts from the project is provided in **Table 7-20**.

Table 7-20: Potential impacts – social

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Impacts to items of heritage value and cultural significance	High / Long term	Direct	Sensitive (social value)	Y	• Avoid – siting of infrastructure would be designed to avoid known sites and sensitive landforms • Minimise – consultation with Aboriginal representatives to define and understand social and cultural values of the wind farm site
Construction	Changes to traffic conditions and public safety risks	Moderate / Short term	Direct Cumulative	Sensitive (social value) Sensitive (environmental value)	Y	• Minimise – implementation of traffic controls
Construction and operation	Reduced community cohesion	Moderate / Short term	Perceived	Sensitive (social value) Vulnerable to change	Y	• Minimise – strong community engagement throughout the duration of the project
Construction and operation	Increase in anxiety and stress	Moderate / Short term	Perceived	Sensitive (social value)	Y	• Minimise – strong community engagement throughout the duration of the project
Construction and operation	Changes to community composition	Moderate / Short term	Indirect	Sensitive (social value) Vulnerable to change	Y	• Minimise – adopt workplace strategies that encourage the integration of incoming populations with local communities
Construction and operation	Changes to existing land uses	Moderate / Short term	Direct	Sensitive (social value)	Y	• Minimise – minimise the disturbance footprint of the project
Construction and operation	Changes to the amenity (visual, noise, dust, traffic)	Moderate / Long term	Direct	Sensitive (social value)	Y	• Avoid – locate project infrastructure away from sensitive receptors where possible • Minimise – use best available technologies to reduce air, noise and vibration emissions

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction and operation	Distributive equity in landholder compensation	Low / Short term	Direct	Sensitive (social value) Sensitive (economic value)	N	• Avoid – adopt neighbouring property benefit sharing scheme
Construction and operation	Decline in access to affordable housing, accommodation and community services	Moderate / Long term	Indirect	Sensitive (social value) Vulnerable to change	Y	• Minimise – provide temporary accommodation onsite for construction workforce
Construction and operation	Economic stimulus in the locality	Low / Short term	Indirect	Sensitive (economic value)	Y	• n/a
Construction and operation	Community investment initiatives	Low / Short term	Indirect	Sensitive (social value) Sensitive (economic value)	N	• n/a

Assessment level and approach

The social impact assessment would be undertaken in accordance with the *Social Impact Assessment Guideline for State Significant Projects* (Department of Planning, Industry and Environment, 2021e).

The social impact assessment will include:

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

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

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

7.4 Other issues

7.4.1 Hazards and risks

Existing environment

Battery storage

Appendix 3 of the *Applying SEPP 33* (Department of Planning, 2011) lists the industries that may fall within the Resilience and Hazards SEPP (former SEPP 33), which do not include wind farms or energy storage facilities. However, the BESS facilities proposed for the project are likely to utilise lithium-ion batteries, which are listed as Class 9 – Miscellaneous dangerous goods. While Class 9 materials are excluded from the SEPP 33 screening test, the hazards related to these materials should be considered in accordance with the Applying SEPP 33 Guidelines.

Electromagnetic fields

Electromagnetic field associated with the generation, distribution and use of electricity is classified as extremely low frequency electromagnetic field. Short term exposure to very high levels of electromagnetic field can be detrimental to human health. As the electrical equipment would be designed and installed in accordance with the relevant guidelines for EMF exposure, the EMF levels produced by the project would be expected to be within the recommended exposure limits at all publicly accessible locations.

Electromagnetic interference

The operation of a wind farm has the potential to interfere with the electromagnetic signals associated with telecommunication services. Existing telecommunication services in the vicinity of the project include mobile phone services, radio communication services, television and radio broadcast services, and aircraft navigation services.

Blade throw

Blade throw refers to the risk of wind turbine blades breaking during operation, typically caused by the failure of the turbine rotor, which may result in human injury or potential damage to infrastructure. The most common causes are lightning strikes, storms, material fatigue or poor operation and maintenance practices.

Blade throw is generally considered to be a low risk during the operation phase of the project, which would utilise wind turbine technology that has been proven to be both safe and reliable. Modern turbines also have an automatic braking system when wind speeds exceed a set value (Attexo, 2022). Further, the nearest associated dwelling based on the current layout is located approximately 600 metres from a turbine. The nearest non-associated dwelling is located approximately 630 metres from a turbine based on the current layout.

Aviation

Four aviation facilities are located within the vicinity of the wind farm site, these are:

- **Coolah Aerodrome** – a registered Code 2 non-instrument aerodrome located approximately 35 kilometres northeast of the nearest turbine and is owned and operated by Warrumbungle Regional Council
- **Bodangora airstrip** – located 40 kilometres southwest of the wind farm site. This airstrip is owned and operated by Dubbo Regional Council. It has one sealed runway, and one unsealed runway
- **Mudgee Airport** – a certified aerodrome located approximately 40 kilometres south-southeast of the wind farm site. Mudgee Airport is owned and operated by Mid-Western Regional Council and has one sealed runway and one grass runway
- **Dubbo airport** – located over 60 kilometres west of the wind farm site and is operated and maintained by Dubbo Regional Council, providing access to Sydney, Brisbane, Melbourne and Newcastle by air. The airport is home to the Royal Flying Doctor Service and NSW Rural Fire Control Centre and Training Academy. The airport has two sealed runways.

In addition to the above identified aviation facilities, there is a high probability of other aviation activities associated with privately owned, unlicensed air strips within the locality (Attexo, 2022).

Bushfire

Large areas of the wind farm site are mapped as Bushfire Prone Land (refer to **Figure 7-12**). These areas generally align with vegetated areas and are identified as Category 1 and Category 2 areas, with Category 1 being the highest risk of bushfire and Category 2 being lower risk.

In the past the Warrumbungle Shire in particular has been significantly impacted by natural hazards including bushfires. In 2013 the Wambelong Fire swept through the Warrumbungle National Park, burning more than 55,000 hectares of land (Warrumbungle Shire Council, 2013). Following this in 2017 another catastrophic fire known as the 'Sir Ivan Fire' swept through the shire and burnt approximately 55,000 hectares of land (Warrumbungle Shire Council, 2017).

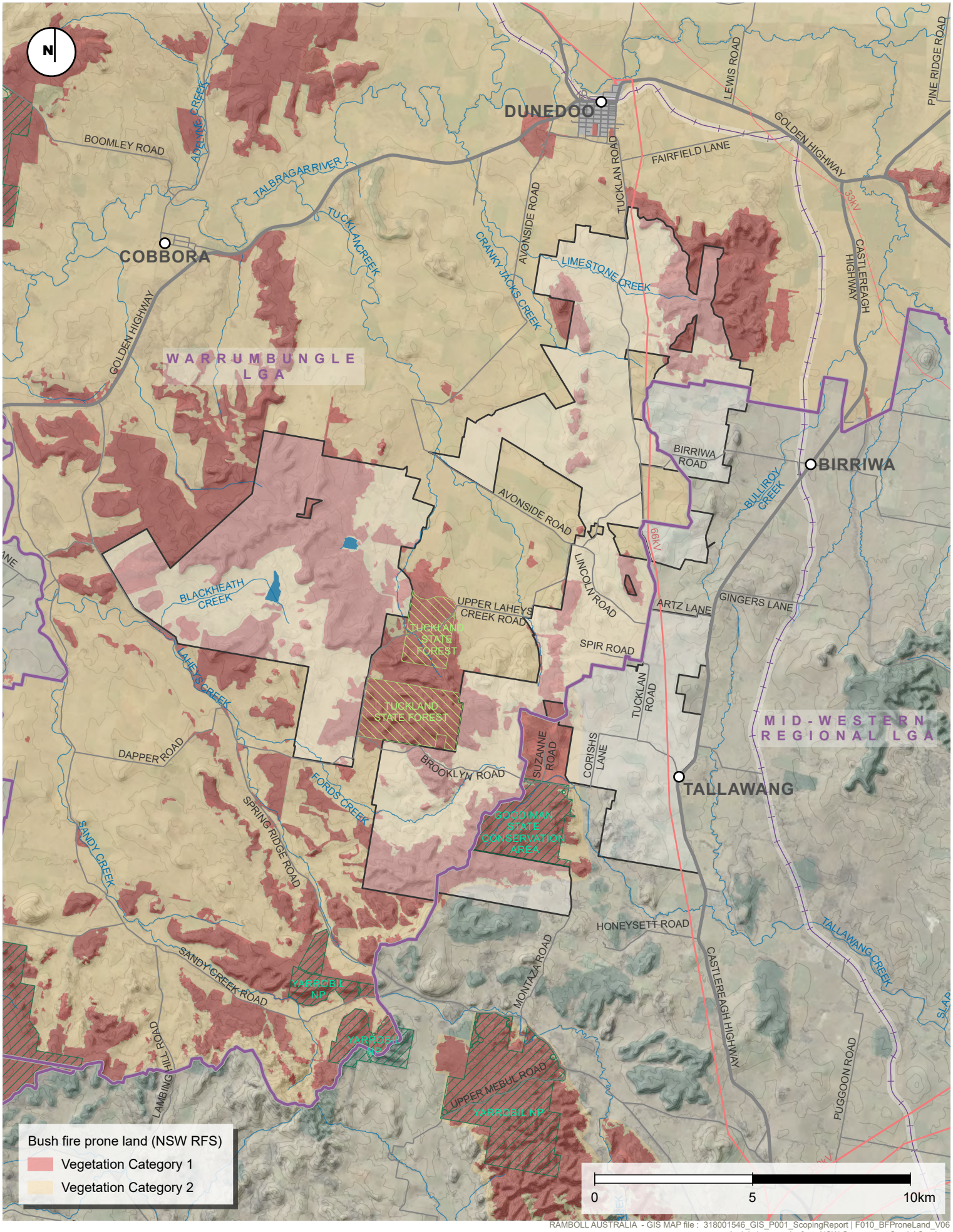
Bushfire protection zones around critical infrastructure would be required to be established as part of the project.

Dangerous goods

'Hazardous materials' are defined in *Applying SEPP 33* (Department of Planning, 2011), as substances that fall within the classification of the Australian Dangerous Goods Code (ADGC) and have a Dangerous Goods (DG) classification. The project would likely include the use of dangerous goods such as liquified petroleum gas, refrigerants and gasoline.

Potential impacts

A summary of the potential hazards and risks associated with the project is provided in **Table 7-21**.



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F010_BFProneLand_V06
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Electricity transmission line
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-12 | Hazards and risks - bushfire prone land mapping

Table 7-21: Potential impacts – hazards and risks

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Battery storage						
Operation	Failure of BESS safety features resulting in electric shock, fire, flash burns, explosion or exposure to hazardous chemicals and released gases	High / Short term	Indirect	Sensitive (environmental value)	N	• Avoid – locate BESS away from sensitive receptors where possible • Minimise – design BESS in accordance with relevant guidelines and standards • Minimise – the BESS would be monitored during operations and regularly maintained
Electromagnetic fields						
Operation	Short term exposure to very high levels of electromagnetic field can be detrimental to human health	High / Short term	Direct	Sensitive (social value)	Y	• Avoid – locate electrical infrastructure away from sensitive receptors where possible • Minimise – design electrical infrastructure in accordance with relevant guidelines and standards
Electromagnetic interference						
Operation	Potential to impact on communication links through near-field effects, diffraction, and reflection or scattering effects	Moderate / Long term	Direct	Vulnerable to change	N	• Avoid – locate wind turbines away from flight paths • Minimise – consult with communication providers about potential interference

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Blade throw						
Operation	Risk of wind turbine blades breaking which may result in human injury or potential damage to infrastructure	Low / Short term	Indirect	Sensitive (social value) Sensitive (economic value)	N	• Avoid – locate wind turbines away from sensitive receptors and other infrastructure where possible • Minimise – ongoing monitoring and maintenance of wind turbines to prevent failure
Aviation						
Operation	Potential for wind turbines to impact flight paths and aerial operations including aerial firefighting operations	Moderate / Long term	Direct	Vulnerable to change	N	• Avoid – locate wind turbines away from flight paths • Minimise – install aviation markers on wind turbines
Bushfire						
Construction	Potential for bushfire starting from construction activities or potential for construction to be affected by an external bushfire	High / Long term	Indirect	Sensitive (environmental value) Vulnerable to change	N	• Avoid – avoid operating machinery with the potential to spark near vegetated areas • Minimise – management of the wind farm site to reduce available fuel loads during high fire danger periods

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Dangerous goods						
Construction and operation	Risks to public safety from incorrect transport, handling, storage and use of hazardous materials	Low / Short term	Indirect	Sensitive (social value)	N	• Avoid – minimise the quantity of hazardous materials kept onsite • Minimise – transport, store and handle materials in accordance with EPA guidelines

Assessment level and approach

The Resilience and Hazards SEPP defines the process for determining if a development is "potentially hazardous", and, if it is, what level of assessment is required. *Applying SEPP 33* (Department of Planning, 2011) and supporting guidelines define the assessment process.

The assessment approach for each matter to be considered in the hazards and risks assessment is outlined in **Table 7-22**.

Table 7-22: Assessment approach – hazards and risks

Matter	Assessment approach
Battery storage	A PHA would be undertaken for the project in accordance with *Hazard Industry Planning Advisory Paper No. 6 –Guidelines for Hazard Analysis* (Department of Planning, 2011) and *Multi-Level Risk Assessment* (Department of Planning, 2011). The assessment would consider risks from the BESS such as electric shock, fire, flash burns, explosion or exposure to hazardous chemicals and released gases.
Electromagnetic fields	An electromagnetic fields assessment would be prepared to assess the potential impacts and risks to human health associated with the electromagnetic fields generated by the wind turbines and associated electrical infrastructure.
Electromagnetic interference	The electromagnetic interference assessment would consider the potential impacts of the project on telecommunications services. It would involve the preparation of a detailed desktop assessment of existing electromagnetic services within the area, and recommended measures to avoid or minimise potential impacts to telecommunications services during construction and operation of the project.
Blade throw	The blade throw risk assessment would include: • assessment of the likelihood of occurrence for a blade throw event • assessment of theoretical distance radii for a blade throw event • review of distances between turbines and nearby dwellings • review of historical blade throw occurrences in Australian wind farms • provision of relevant mitigation measures for project implementation.
Aviation	The aviation assessment would include: • identification of all aerodromes within 30 nautical miles of the wind farm site and their approach and landing procedures • nominate air routes, air space classifications and radar navigation systems relevant to the wind farm site • review of the project's potential impact on operational air space including the need for aviation safety lighting, heights procedures, radar and communication systems and navigation aids, and potential impacts on aerial emergency services. Stakeholder consultation would be undertaken with the Civil Aviation Safety Authority (CASA), other aviation regulators (consisting of Airservices Australia and other Part 173 procedure designers if applicable, and the Department of Defence), and aerodrome operators of the nearby

Matter	Assessment approach
	aerodrome/s to seek endorsement of the project to change instrument procedures (if applicable).
Bushfire	The bushfire assessment would consider environmental factors that increase the risk of fire (fuel quantity and type, topography and weather patterns), as well as specific activities (such as hot works and construction activities) or infrastructure components that exacerbate combustion or ignition risks (such as transmission lines and other electrical components). The assessment would aim to demonstrate that the proposed windfarm can be designed, constructed and operated to minimise ignition risks and provide for asset protection consistent with the NSW Rural Fire Service Guidelines – *Planning for Bushfire Protection 2019*.
Dangerous goods	Dangerous goods required to be transported during construction and operations would be identified and quantified within the EIS and all required licences and approvals obtained prior to the commencement of relevant construction activities. This EIS would evaluate the likely risks to public safety, by focusing on the transport, handling and use of hazardous materials.

7.4.2 Land

Existing environment

Land zoning

The wind farm site is predominately zoned as RU1 (Primary Production) under both the Warrumbungle Shire LEP and the Mid-Western Regional LEP. A small area of land (comprised of 7 lots) is zoned as R5 (Large Lot Residential) under the Mid-Western Regional LEP (refer to **Figure 7-13**). No infrastructure is proposed on this parcel of land.

The objectives of the RU1 (Primary Production) are:

- to encourage sustainable primary industry production by maintaining and enhancing the natural resource base
- to encourage diversity in primary industry enterprises and systems appropriate for the area
- to minimise the fragmentation and alienation of resource lands
- to minimise conflict between land uses within this zone and land uses within adjoining zones.

Mid-Western Regional Council has also included the following additional land zone objectives:

- to maintain the visual amenity and landscape quality of Mid-Western Regional by preserving the area's open rural landscapes and environmental and cultural heritage values
- to promote the unique rural character of Mid-Western Regional and facilitate a variety of tourist land uses.

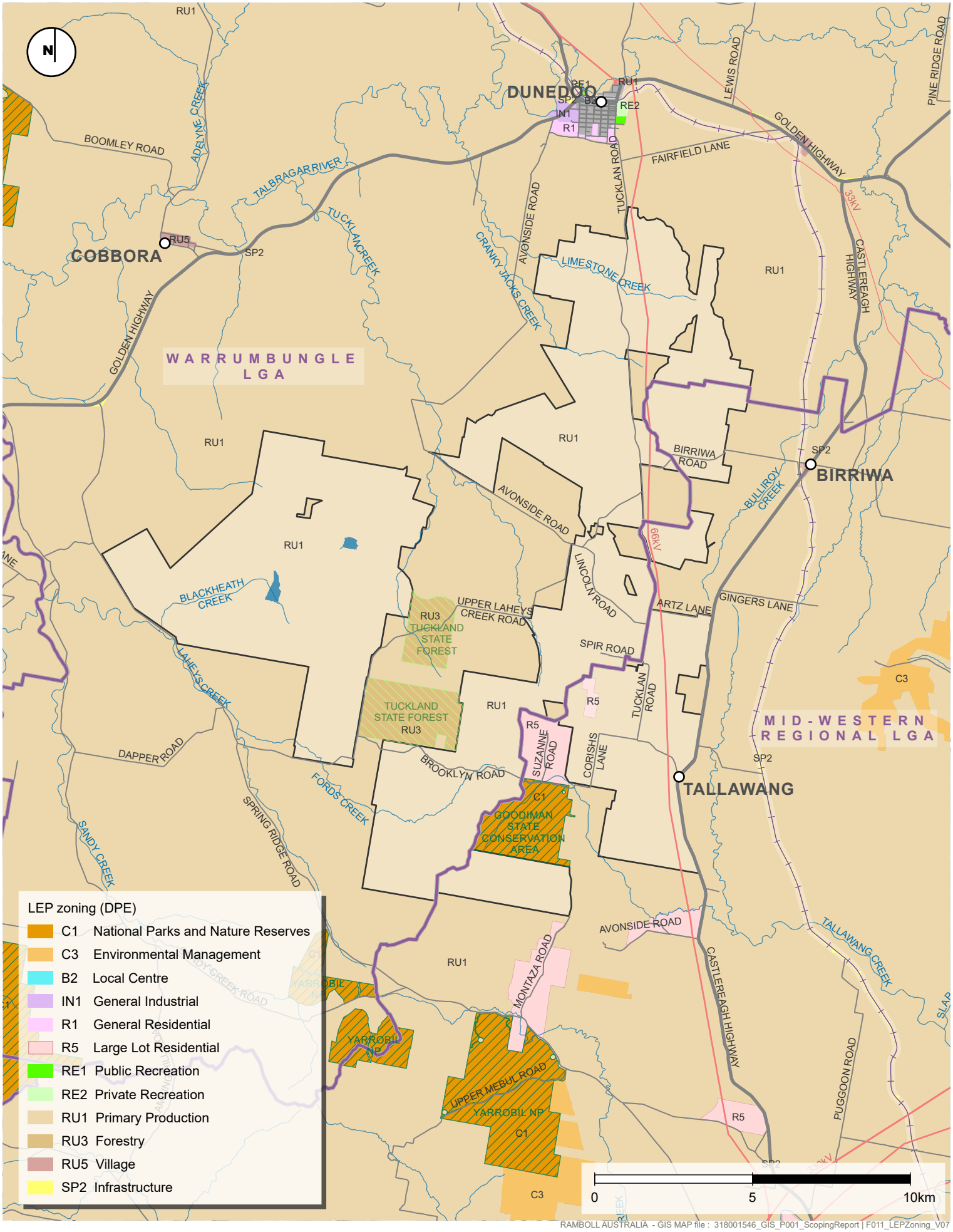


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Figure 7-13 | Land - land zoning

Other land use zones within the locality include:

- **R5 Large lot residential** – some areas located east of wind farm site
- **RU5 Village** – small village of Birriwa located east of wind farm site
- **RU3 Forestry** – the Tuckland State Forest adjacent to wind farm site
- **C1 Conservation** – the Goodiman State Conservation Area located adjacent to the southern boundary of wind farm site
- **SP2 Infrastructure** – classified road being the Golden Highway and the rail corridor for the Wallerawang Gwabegar Railway.

Land use

Land within wind farm site is generally characterised by medium-sized cropping and pastoral landholdings and is privately owned. Land within and surrounding the wind farm has been subject to extensive vegetation clearing associated with historic agricultural land uses and is predominately utilised for grazing activities, with some cropping, horticulture, forestry and areas of nature conservation (Attexo, 2022).

Land parcels located within the wind farm site are also utilised for dryland cropping. These areas are largely flat, cleared and open with extensive agricultural associations. Isolated and densely vegetated undulations feature throughout the wind farm site and within the nearby surrounds and are defined as 'minimal use' areas. Creeklines within the surrounding undulating landscape serve as drainage channels for the elevated areas draining water into the surrounding grazing pastures (Moir Landscape Architecture, 2022).

Agriculture is the primary land use within the Warrumbungle Shire LGA, with 565,766 hectares of the LGA (45.7 per cent) being agricultural land (Warrumbungle Shire Council, 2019). Cattle and sheep production and cereal cropping are the main activities. Other crops include canola, pulses (chickpeas, mung beans, faba beans), cotton and pasture. The Warrumbungle Shire has several piggeries, a large thoroughbred horse stud and several viticultural, horticultural and apiary producers (Warrumbungle Shire Council, 2019).

The Mid-Western Regional LGA's economy is dominated by the mining, retail trade, agriculture, forestry and fishing, tourism and manufacturing sectors. The region also has multiple renewable energy projects in stages of construction and approval (Mid-Western Regional Council, 2018).

Small towns and villages occur around the wind farm site, including:

- **Dunedoo** which is located approximately three kilometres north and has a population of 1,097 (Australian Bureau of Statistics, 2021c)
- **Birriwa** which is located approximately immediately east of the wind farm site has a population of 45 (Australian Bureau of Statistics, 2021)
- **Tallawang** which is located immediately southeast of the wind farm site and has a population of 165 (Australian Bureau of Statistics, 2021f)
- **Cobbora** which is located approximately six kilometres north-west of the wind farm site and has a population of 25 (Australian Bureau of Statistics, 2021)
- **Beryl** which is located approximately 8.5 kilometres southeast of the wind farm site and has a population of 117 (Australian Bureau of Statistics, 2021a)
- **Gulgong** which is located approximately 15 kilometres southeast of the windfarm site and has a population of 2,680 people (Australian Bureau of Statistics, 2021).

The Goodiman State Conservation Area is located adjacent to the southern boundary of the wind farm site and covers an area of 569 hectares. The area was established to protect the upper tributaries of Lambing Yard Creek which flows to Cudgegong River through Tallawang Creek and was a former state forest used primarily for logging ironbark for commercial timber production.

The area protects remnant native vegetation and a mix of plant species and provides links to Yarrobil National Park in the south and Tuckland State Forest in the north (NSW National Parks & Wildlife Service, 2014). The Tuckland State Forest is also located adjacent to the wind farm site in the southwest managed by the NSW Forestry Corporation.

Crown land

Crown land within the wind farm site is limited to one parcel (Lot 2 DP 1009802) and crown road reserves (paper roads). Additionally, there are four crown parcels that although are excluded from the wind farm site, are fully surrounded by the project. These are:

- Lot 111 DP750774 (public utility)
- Lot 43 DP754289 (trigonometric station)
- Lot 111 DP727135 (future public requirements)
- Lot 113 DP724695 (trigonometric station).

The project will be refined to avoid crown land where possible.

Native title

Much of wind farm site falls within the boundary of the Warrabinga-Wiradjuri #7 registered Native Title claim (NC2018/002). Native Title is expected to have been extinguished on all freehold parcels and road reserves within wind farm site.

Mining and exploration licences

Exploration licenses intercept the wind farm site including:

- EL9138 – Exploration Licence for Group 1 (metallic minerals) held by Gilcore metals Pty Ltd (expiration 15/4/2025)
- EL8734 – Exploration Licence for Group 1 (metallic minerals) held by Colossus Metals Pty Ltd (expiration 16/4/2025)
- EL8366 – Exploration Licence (for Group 1 (metallic minerals) held by Munro Geological Services Pty Ltd expiration 30/4/2023)
- EL8160 – Exploration Licence for Group 1 (metallic minerals) held by Bowdens Silver Pty Limited (expiration 29/08/2025).

There are no coal, petroleum or gas exploration or production tenements that affect the wind farm site.

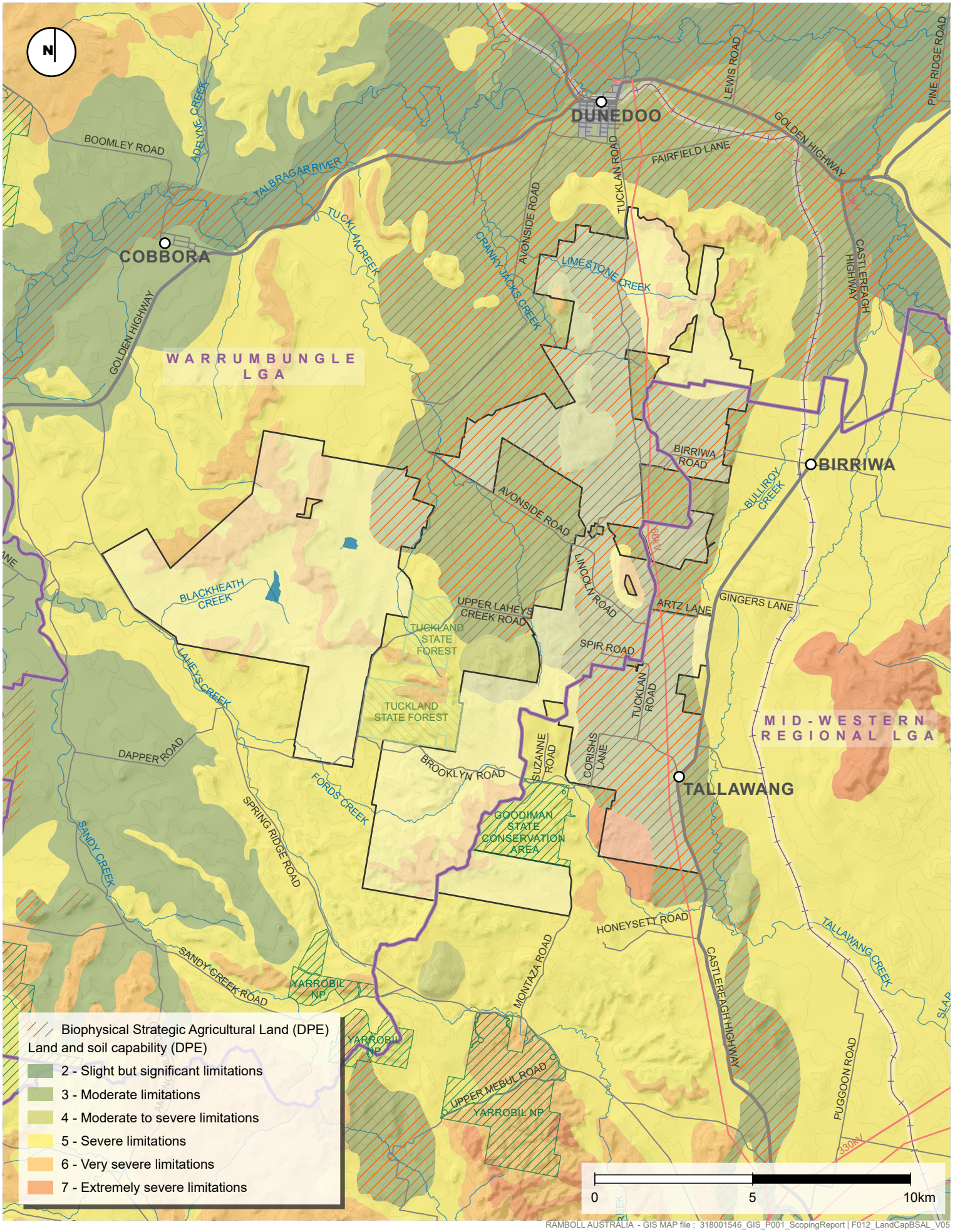
Land and soil capability

The land and soil capability classes outlined in the Land and Soil Assessment Capability Scheme (Office of Environment and Heritage, 2012) range from class 1 (extremely high capability land which has no limitations and requires no special land management practices), to class 8 (extremely low capability land with limitations that are so severe that the land is incapable of sustaining any land use aside from natural conservation).

The wind farm site includes land mapped between land and capability class 3 (high capability land) and class 7 (very low capability land) (Department of Planning, Industry and Environment, 2021a) (refer to **Figure 7-14**).

Biophysical strategic agricultural land

Large portions of the eastern sections of the wind farm site are mapped as biophysical strategic agricultural land (BSAL) (refer to **Figure 7-14**). BSAL is defined as land that has high quality soil and water resources that is capable of sustaining high levels of productivity. A total of 2.8 million hectares of BSAL have been mapped across the state (NSW Department of Planning, Industry and Environment, 2019).



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KEY

- Orana Wind Farm site
- Electricity transmission line
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-14 | Land - land capability and BSAL

Biosecurity

If not adequately managed, the project has the potential to introduce and transport weeds as a result of the increase in vehicle movements to and from the wind farm site during construction. This could lead to the further invasion of weeds to the local area, thereby resulting in changes to vegetation communities over time and associated loss of habitat for native species.

The *Central West Regional Strategic Weed Management Plan 2017-2022* (NSW Local Land Services, 2017) provides a framework for regional weed management and supports the implementation of the *Biosecurity Act 2015* at a regional level. The plan identifies a large number of priority high risk weeds and the development of the regional priority weed list for the region. These would be considered in the EIS.

The project may also encourage pest animals to the local area as a result of potential increase in food sources associated with the construction activities and ground disturbance. The Forestry Corporation has recently (May 2022) conducted wild dog and fox baiting programs in the Tuckland State Forest located adjacent to the wind farm site (NSW Forestry Corporation, 2022).

Mitchell Landscapes

The wind farm site includes four Mitchell Landscapes, with the predominate one being the Gulgong Ranges (refer to **Figure 7-15**). Other landscapes include Talbragar - Upper Macquarie Terrace Sands and Gravels, Goonoo Slopes, and Cope Hills Granite (Department of Planning and Environment, 2017b). A description of the Mitchell Landscapes is provided in **Table 7-23**.

Table 7-23: Characterisation of the Mitchell Landscapes in the wind farm site

Landscape	**Description** (Mitchell, 2002)
Gulgong Ranges	
Geology	Strike ridges with steep slopes and long debris aprons on complexly folded steep dipping Silurian lithic sandstone, quartzite and phyllite, Devonian sandstone, siltstone, shale, rhyolite and dacite
Landform	General elevation 550 to 980 metres, local relief 350 metres
Soils	Shallow stony red and yellow texture-contrast soils with stony uniform loams on steep slopes
Vegetation	Large areas of dense black cypress pine (*Callitris endlicheri*) on slopes, red stringybark (*Eucalyptus macrorhyncha*) and white gum (*Eucalyptus rossii*) on ridges. Blakely's red gum (*Eucalyptus blakelyii*), narrow leaved peppermint (*Eucalyptus radiata*) and white box (*Eucalyptus albens*) on lower slopes grading to yellow box (*Eucalyptus melliodora*)
Talbragar - Upper Macquarie Terrace Sands and Gravels	
Geology	Sandy Quaternary alluvial sediments on the floodplains and terraces of the Talbragar River
Landform	General elevation 350 to 500 metres, local relief 30 to 40 metres
Soils	Red-brown and red-yellow earthy sands with some yellow texture-contrast soils on the valley margins

Landscape	Description (Mitchell, 2002)
Vegetation	River red gum (*Eucalyptus camaldulensis*) along the channels, yellow box (*Eucalyptus melliodora*) and rough-barked apple (*Angophora floribunda*) with white cypress pine (*Callitris glaucophylla*) on the plain
Goonoo Slopes	
Geology	Extensive undulating to stepped low hills with long slopes on sub-horizontal Triassic/Jurassic quartz sandstone, conglomerates, siltstone, shale and some coal
Landform	General elevation 300 to 500 metres with overall westerly slope, poorly defined drainage network, local relief to 30 metres
Soils	Stony yellow earths with sandstone outcrop on ridgelines to yellow harsh texture-contrast soils in shallow valleys
Vegetation	Broad-leaved ironbark (*Eucalyptus fibrosa ssp. fibrosa*) and black cypress pine (*Callitris endlicheri*) on ridges, broad-leaved ironbark, narrow-leaved ironbark (*Eucalyptus crebra*), red ironbark (*Eucalyptus sideroxylon*), fringe myrtle (*Calytrix tetragona*), spur-wing wattle (*Acacia triptera*), dainty phebalium (*Phebalium obcordatum*), daphne heath (*Brachyloma daphnoides*) on slopes with patches of green mallee (*Eucalyptus viridis*), Dwyer's mallee gum (*Eucalyptus dwyeri*) and broombush (*Melaleuca uncinata*). Grey box (*Eucalyptus microcarpa*), red ironbark (*Eucalyptus sideroxylon*), red stringybark (*Eucalyptus macrorhyncha*), fuzzy box (*Eucalyptus conica*) and Blakely's red gum (*Eucalyptus blakelyi*) with knob sedge (*Carex inversa*), and tall sedge (*Carex appressa*) along streams
Cope Hills Granite	
Geology	Undulating and rolling hills on Carboniferous granite and granodiorite
Landform	General elevation 500 to 740 metres, local relief 150 metres
Soils	Gritty gradational red earth and red texture-contrast soils
Vegetation	Forest of yellow box (*Eucalyptus melliodora*), Blakely's red gum (*Eucalyptus blakelyii*), red stringybark (*Eucalyptus macrorhyncha*), apple box (*Eucalyptus bridgesiana*), mountain gum (*Eucalyptus dalrympleana*) and black cypress pine (*Callitris endlicheri*)

Soil landscapes

The predominant soil landscape within wind farm site is Tucklan (refer to **Figure 7-15**), which consists of strongly structured red clay soils on less steep slopes and flats, with less well-structured brown podzolic soils at higher elevations. These soil types have low general erodibility, but the long consistent slopes of the result in moderate erosion risk in the area (Murphy, 1998).

Other soil landscapes within the wind farm site include Spring Ridge, Dapper Hill, Laheys Creek, Surface Hill and Burrendong (Department of Planning, Industry and Environment, 2020).

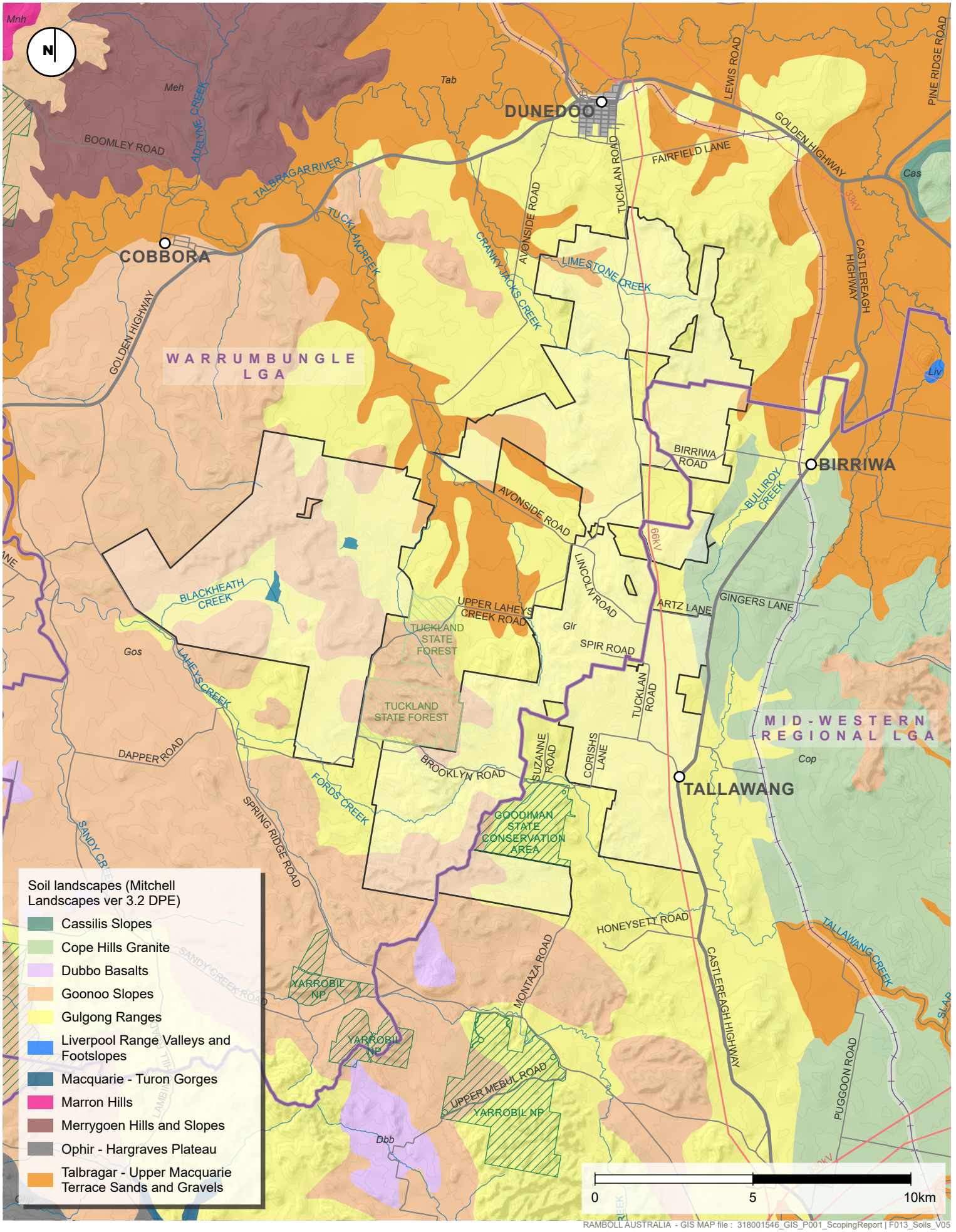


Figure 7-15 | Land - Mitchell and soil landscapes

Acid sulfate soils

The wind farm site is characterised as having an extremely low probability / low confidence of containing acid sulfate soils (CSIRO, 2013). A review of the DPE soil profile and soil map information website, 'eSPADE', indicates there is a very low probability for the presence of acid sulfate soils in the area.

Land contamination

A search of the EPA's contaminated land public record of notice and list of sites notified to the EPA under Section 60 of the *Contaminated Land Management Act 1997* undertaken in September 2022, did not return any information on reported contamination or any regulatory notices issued for the land within the wind farm site.

Historic rural activities throughout the area may mean that there are former cattle dips, unregistered land fill sites or other such potential contaminated land. The primary chemicals of concern associated with these historic land uses include organochlorine pesticides and arsenic.

Potential impacts

A summary of the potential land impacts from the project is provided in **Table 7-24**.

Table 7-24: Potential impacts – land

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Disturbance of soils / sediments	Low / Short term	Direct	Sensitive (environmental value)	N	• Avoid – avoid ground disturbance where possible • Minimise – install sediment and erosion controls in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004)
Construction	Compaction of soils	Low / Short term	Direct	Sensitive (environmental value)	N	• Avoid – use dedicated access tracks where possible
Construction and operation	Change in land use from agriculture to electricity generation	Moderate / Short term	Direct	Sensitive (social value) Sensitive (economic value)	Y	• Minimise – minimise the disturbance footprint of the project
Construction and operation	Removal of BSAL and high capability land	Moderate / Short term	Direct	Sensitive (economic value) Sensitive (environmental value)	Y	• Avoid – siting of infrastructure to avoid BSAL and higher capability land • Minimise – minimise the disturbance footprint of the project
Construction and operation	Removal of land for mining / extraction purposes	Low / Short term	Direct	Sensitive (economic value)	N	• Minimise – consult with title holders
Construction	Introduction of weeds as a result of the increase in vehicle movements to and from the wind farm site	Low / Short term	Indirect	Sensitive (environmental value)	N	• Minimise – implement site hygiene protocols such as washing down vehicles before entering or leaving the site

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Encouragement of pest animals to the local area as a result of potential increase in food sources associated with the construction activities and ground disturbance	Low / Short term	Indirect	Sensitive (environmental value)	N	• Avoid – remove food scraps from the wind farm site on a regular basis • Minimise – keep food scraps in a contained area to prevent odours from attracting fauna
Construction	Disturbance of unknown contaminated areas	Low / Long term	Direct	Sensitive (environmental value)	N	• Avoid – avoid ground disturbing activities where possible • Minimise – implement an unexpected finds protocol for the management of contamination if encountered

Assessment level and approach

The methodology for the land assessment would include:

- desktop review to define the existing environmental conditions of wind farm site including a review of relevant soil and geology mapping
- identification of any likely impacts to:
  - current land uses within and surrounding the wind farm site
  - Crown land
  - topography
  - soil quality and quantity
  - land stability and erosion potential
  - land and soil capability
  - BSAL
  - biosecurity
  - land contamination
- identification of land management measures required for the project.

A qualitative assessment of potential contamination risks at the wind farm site would be undertaken with consideration of past land uses and contamination risks that may be introduced as a result of the project.

7.4.3 Water

Existing environment

Hydrology

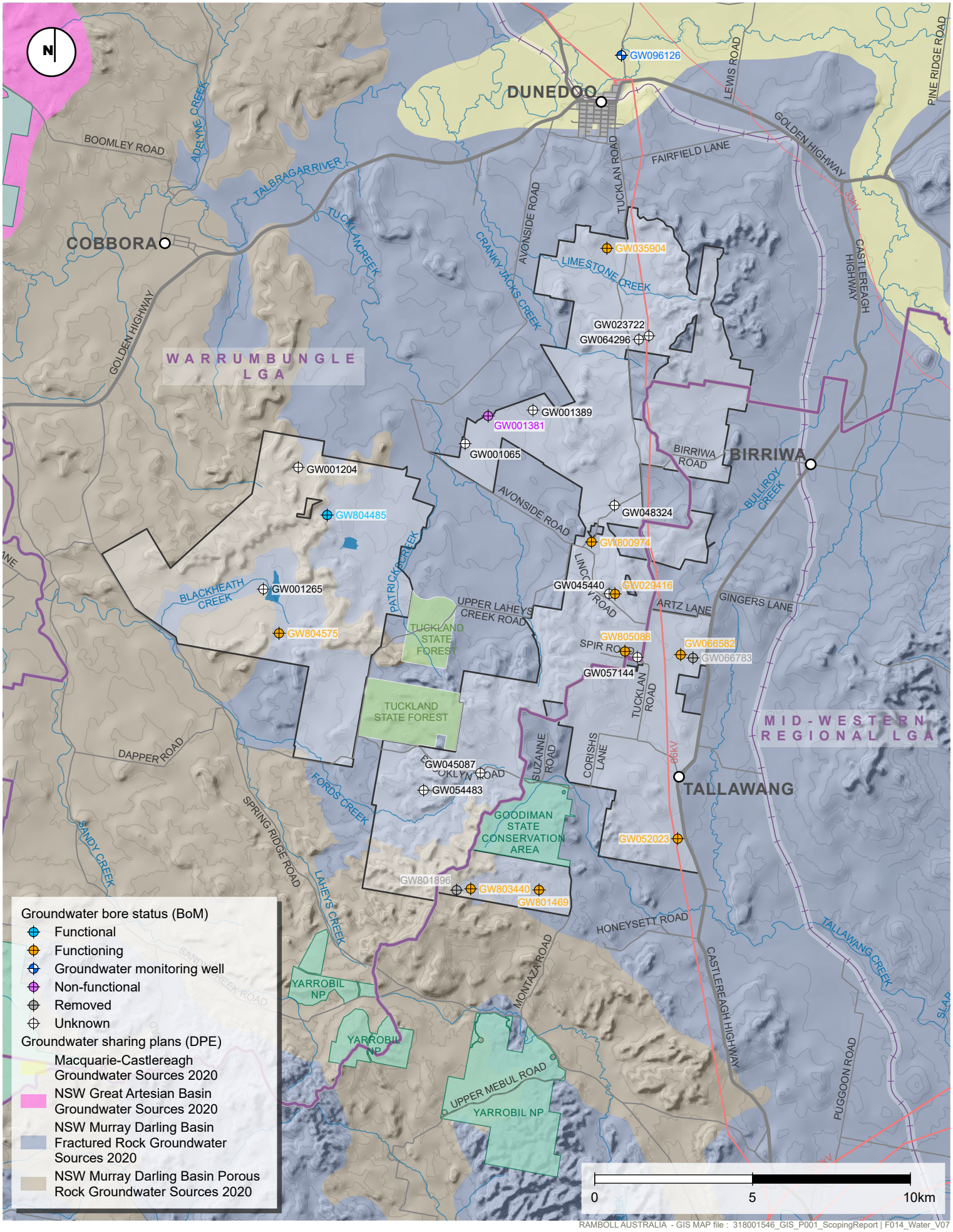
The project is in the Macquarie-Bogan River catchment, part of the Murray-Darling Basin. The Macquarie-Bogan catchment is 74,800 square kilometres and supports a range of water uses including local councils, water utilities, dryland agriculture, livestock grazing and some irrigated agriculture such as cotton. The headwaters of the Macquarie River originate in the Great Dividing Range south of Bathurst, with the river flowing north-westerly until it joins the Barwon River near Brewarrina (Department of Planning and Environment, 2022c).

The Talbragar River lies approximately four kilometres north of the wind farm site and runs east-west to the north of Dunedoo (refer to **Figure 7-16**). The river rises on the western side of the Liverpool Range on south slopes of Great Dividing Range, north of Cassilis and flows generally southwest, reaching its confluence with the Macquarie River near Dubbo. There are 15 tributaries that join the river over its 277 kilometres course.

The hydrology of the wind farm site consists mostly of the headwaters and upper reaches of creeks and tributaries that join the Talbragar River in the west or north, and the Cudgegong River to the south. The most substantial waterways within the site include Fords Creek, Blackheath/Laheys Creek, Tucklan Creek, Limestone Creek and Bulliroy Creek (refer to **Figure 7-16**).

Flooding

A review of LEP flood planning maps did not identify any flood planning areas in the wind farm site or its vicinity.



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KEY

- Orana Wind Farm site
- Existing electricity transmission line
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-16 | Water - watercourses and groundwater bores

Groundwater

Preliminary searches of the WaterNSW Real-Time Data database have identified one groundwater monitoring well (ID GW096126) located at Dunedoo approximately six kilometres north of the wind farm site. Data recorded at the monitoring well from 1 January 2001 to 1 January 2022, indicates the bore water level below measuring point varies from around six metres to 20 metres (WaterNSW, 2022a).

A further 25 groundwater monitoring bores were identified within the wind farm site on the BOM Groundwater Explorer (Bureau of Meterology, 2022). These are shown on **Figure 7-16**. Of these 10 are for water supply purposes, nine for stock and domestic use, one for irrigation, two for monitoring and three for unknown purposes.

Water sharing plans

Surface water within the wind farm site is managed under the *Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012*. Groundwater within the wind farm site is managed under the *NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020* and the *NSW Murray Darling Basin Porous Rock Groundwater Sources 2020*.

Water supply

Water required for the project would likely be sourced from:

- commercial suppliers of treated wastewater in the nearby region
- opportunistically sourced from farm dams located within the wind farm site
- sourced from town water.

The main water storage servicing the region is the Windamere Dam. Windamere Dam has a storage capacity of 366,989 megalitres and is currently 82.9 per cent full (WaterNSW, 2022b).

Water sources would be determined in consultation with suppliers and landholders and would be subject to availability. Further details on water supply requirements would be included in the EIS. Consultation would also be undertaken with Warrumbungle Shire and Mid-Western Regional councils, landholders and suppliers to determine the most appropriate water sources for the project.

Potential impacts

A summary of the potential water impacts from the project is provided in **Table 7-25**.

Table 7-25: Potential impacts – water

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction and operation	Increase to impervious fraction of the wind farm site	Low / Long term	Direct	Sensitive (environmental value)	Y	• Minimise – keep paved areas to a minimum to maximise site drainage potential
Construction	Mobilisation of sediments from ground disturbing activities which could enter waterways via runoff	Low / Short term	Direct	Sensitive (environmental value)	N	• Avoid – avoid ground disturbance where possible • Minimise – install sediment and erosion controls in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004)
Construction and operation	Water pollution risks (e.g. hydrocarbon spills, concrete spills, chemical use and storage)	Low / Short term	Direct	Sensitive (environmental value)	N	• Avoid –avoid hydrocarbon and chemical use and storage within 40 metres of any watercourses • Minimise – use spill protection
Construction and operation	Changes to surface water regimes leading to increased localised flooding	Low / Long term	Direct	Sensitive (environmental value)	Y	• Avoid – no artificial structures installed within 40 metres of any watercourses • Minimise – keep paved areas to a minimum to maximise site drainage potential
Construction	Interception of groundwater and impacts to the quality, quantity or recharge	Low / Short term	Direct	Sensitive (environmental value)	N	• Avoid – minimise depth of excavations where possible

Assessment level and approach

The methodology for the water assessment would include:

- desktop review to define the existing environmental conditions of the wind farm site including:
  - review of rainfall and evaporation data relevant to the wind farm site
  - identification of catchments, watercourses and water sources (surface and groundwater)
  - review of existing water quality data
- quantification of water demand and water supply arrangements
- identification of any likely impacts to:
  - waterfront land
  - water quality and quantity of surface and groundwater resources
  - other water users
- identification of water management measures required for the project
- a high-level qualitative assessment of the potential effects of the project on flood behaviour.

7.4.4 Historic heritage

Existing environment

Local heritage

The Dunedoo Heritage Conservation Area is located approximately 3.3 kilometres north of the wind farm site in Dunedoo.

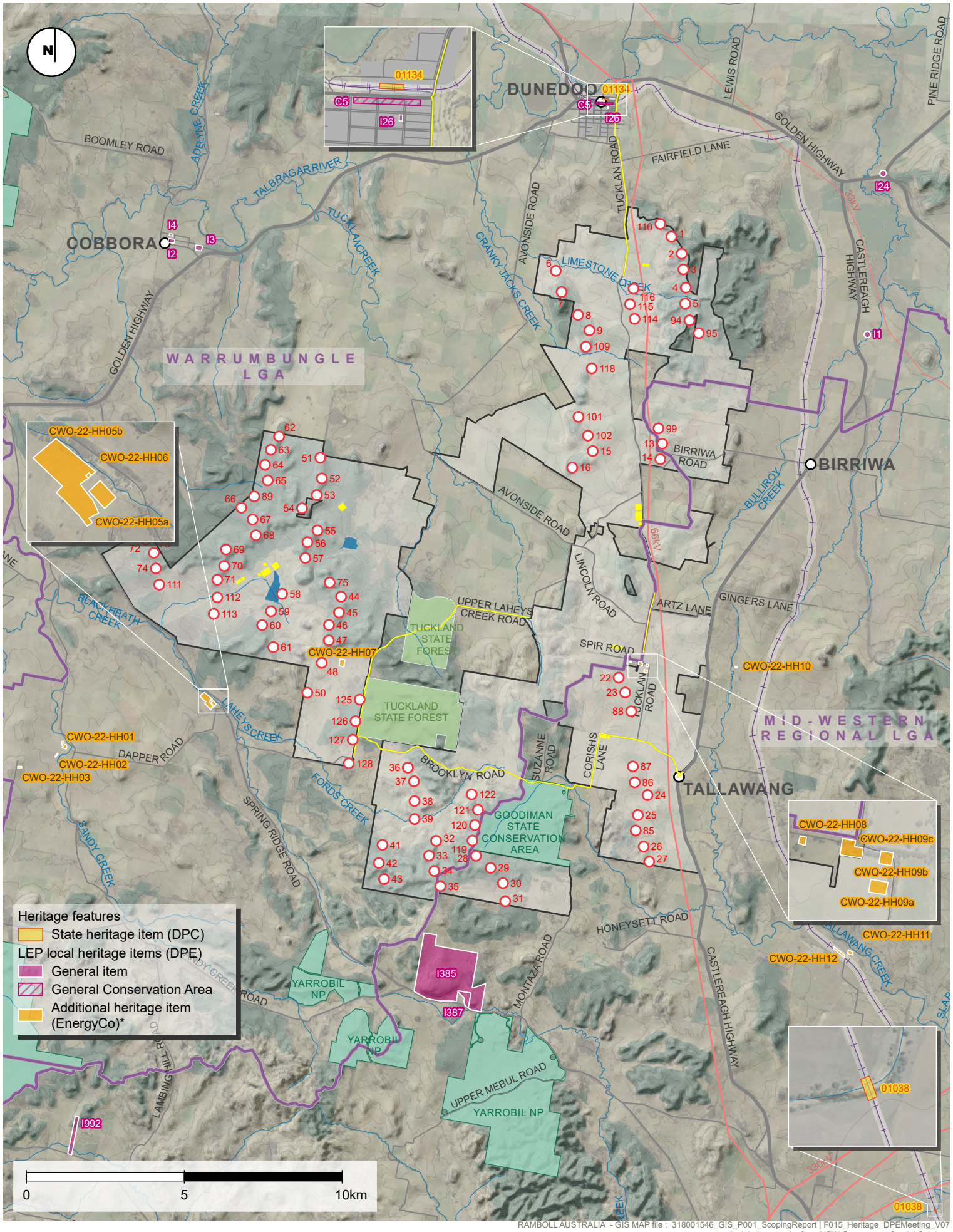
The relevant LEPs identify local heritage sites located in proximity to the wind farm site, including (refer to **Figure 7-17**):

- Spring Ridge Homestead (I385) located one kilometre south of the wind farm site on Lot 2 DP612712
- Niven's Springridge Hotel House (I387) located directly south of the Spring Ridge Homestead approximately three kilometres south of the wind farm site on Lot 1, DP591912 and Lot 112, DP721220
- Birriwa Private Cemetery (I1) located approximately 3.7 kilometres west of the wind farm site on Lot 2, DP839652
- Denison Town General Cemetery (I24) located approximately 5.6 kilometres northwest of the wind farm site on Lot 1, DP1133117
- Dunedoo Courthouse (126) located approximately three kilometres north of the wind farm site on Lot 1, DP758364 in the Dunedoo township
- Cobbora General Cemetery (I3) located approximately six kilometres northeast of the wind farm site on Lots 7305–7307, DP 1164776
- Cobbora School and Residence (I2) located approximately 6.6 kilometres northeast of the wind farm site on Lot 1, DP 125388
- Cobbora Police Station, Courthouse and Gaol (I4) located approximately 6.8 kilometres northeast of the wind farm site on Lot 106, Section 11, DP 754301
- Pineview Homestead and Woolshed (I992) located approximately 13 kilometres southwest of the wind farm site at 889 Gollan Road (no defined Lot).

Additionally, five potential unlisted historic heritage items were identified by EnergyCo, as part of the development of the EIS for the CWO-REZ Tranmission Line, within or enclosed by the wind farm site from (refer to **Figure 7-17**):

- Brampton Park Homestead (located within the wind farm site west of Tuckland State Forest)
- Tallawang Union Church (located within the wind farm site southeast of the Tuckland Road and Spir Road intersection)
- Tallawang (Upper) Public School (located within the wind farm site southeast of the Tuckland Road and Spir Road intersection)
- Spir Road Cottage (located on a lot excluded from the wind farm site near Spir Road)
- Tallawang Catholic Church (located on a lot excluded from the wind farm site near Spir Road).

The current wind farm layout avoids disturbance to these potential items. Further investigation will be undertaken during the EIS to confirm their presence and condition.



RAMBOLL AUSTRALIA - GIS MAP file : 318001546_GIS_P001_ScopingReport | F015_Heritage_DPEMeeting_V07
Aerial photography from NSW Government Spatial Services

KEY

- Orana Wind Farm site
- Indicative turbine location
- Electricity transmission line
- Orana Wind Farm infrastructure
- Railway
- Waterway
- LGA boundary
- National Parks and Reserves
- State forest

Figure 7-17 | Historic Heritage - heritage sites

**Information provided by EnergyCo as part of the development of the EIS for the CWO REZ Network Infrastructure*

State heritage

Two State heritage listed properties are close to the wind farm site:

- Dunedoo Railway Station and yard group - Wallerawang-Gwabegar railway Dunedoo located approximately 3.5 kilometres north of the wind farm site on Lot 4346, DP1216560 (refer to **Figure 7-17**)
- Gulgong railway bridge over Wialdra Creek – Wallerawang-Gwabegar railway Gulgong located approximately 14.8 kilometres southwest of the wind farm site on Lot 4327, DP1216542.

Commonwealth, National and World heritage

There are no Commonwealth, National or World heritage listed places located within or close to the wind farm site.

Section 170 Register

No Section 170 heritage places have been identified within or close to the wind farm site.

Potential impacts

A summary of the potential historic heritage impacts from the project is provided in **Table 7-26**.

Table 7-26: Potential impacts – historic heritage

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Potential to impact on previously unknown historical archaeological relics	Low / Long term	Direct	Sensitive (environmental value)	N	• Minimise – an unexpected find procedure would be developed and implemented during construction

Assessment level and approach

Historic heritage values would be assessed in a heritage impact assessment. The heritage impact assessment would meet the following objectives:

- to identify whether historical heritage items or areas are, or are likely to be, present within the survey boundary
- to assess the significance of any recorded historical heritage items or areas
- determine whether the project is likely to cause harm to recorded historical heritage items or areas
- provide management recommendations and options for mitigating impacts.

A field assessment of the wind farm site would be undertaken as part of the heritage impact assessment by an experienced and qualified archaeologist. The assessment would be undertaken in accordance with the Heritage Council's *Historical Archaeology Code of Practice* (Heritage Council, 2006).

7.4.5 Air

Existing environment

Climate

The area experiences distinct seasons with low humidity all year round, high diurnal temperature range, low rainfall, very hot summers are common with hot, dry winds, cool winters with cold dry winds (Australian Building Codes Board, 2019).

The nearest meteorological station that provides long-term climate statistics is the Bureau of Meteorology's (BOM) Dunedoo Post Office station (site number 064009), located approximately three kilometres north from the wind farm site. The station provides data from 1912 to 2022 (Bureau of Meterology, 2022b).

Data recorded from the BOM meteorological station indicates that temperatures are highest in January, with a mean maximum temperature of 32.2 degrees Celsius. Temperatures are lowest in July, with a mean minimum temperature of 2.1 degrees Celsius (Bureau of Meterology, 2022b).

Data recorded from the BOM meteorological station indicates that the average annual rainfall is 615.4 millimetres, with the highest mean monthly rainfall occurring in January (70.3 mm) and the lowest mean monthly rainfall occurring in August (40.2 mm) (Bureau of Meterology, 2022b).

The annual 9am and 3pm wind roses recorded at the BOM meteorological station are included as **Figure 7-18**. The prevailing winds are from the east in the morning period and the west in the afternoon period (Bureau of Meterology, 2022b).

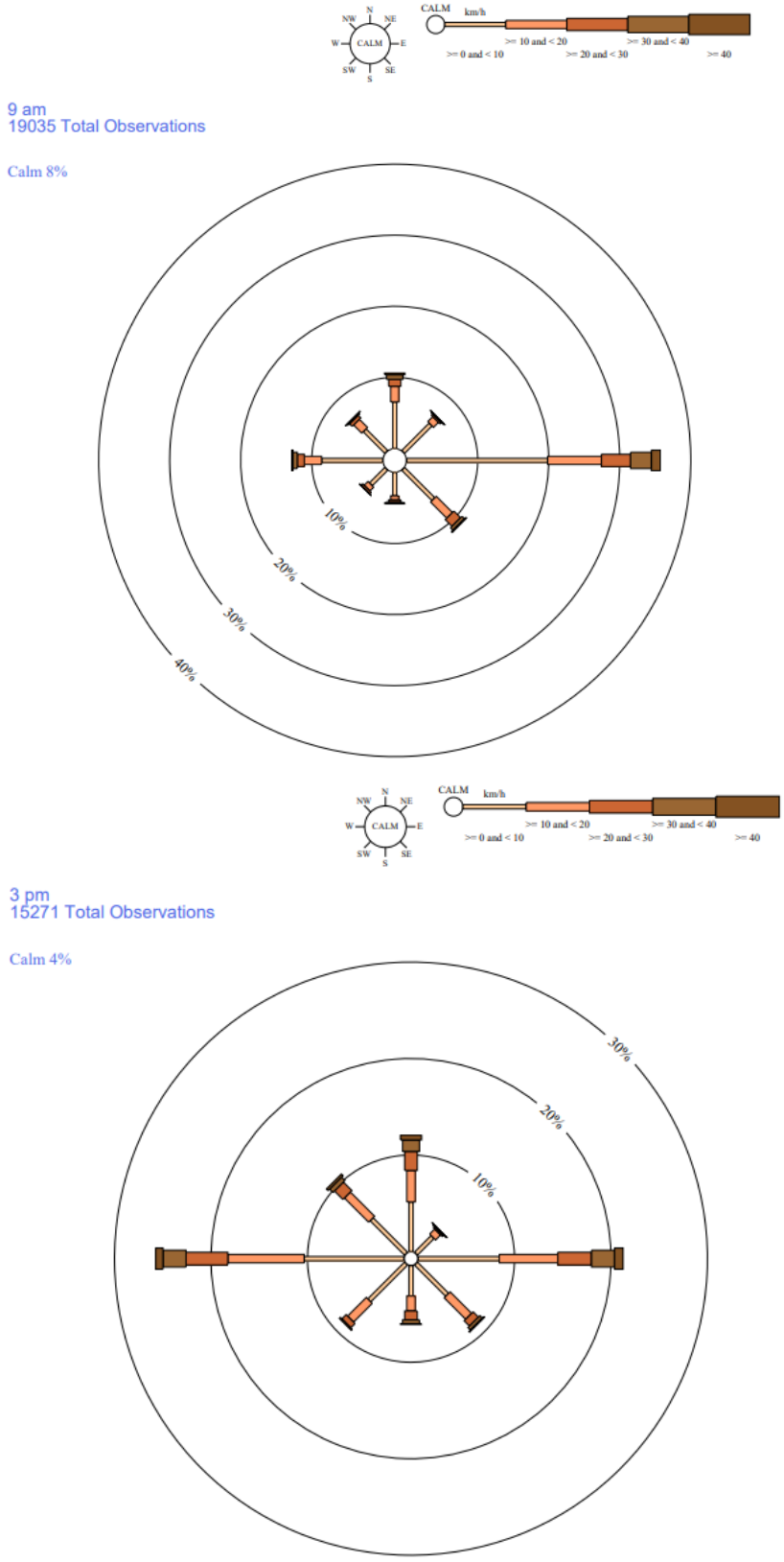


Figure 7-18: Air – annual 9am and 3pm wind rose

Particulate matter (dust)

Sensitive receptors within eight kilometres of the wind farm site are shown in **Figure 2-2**. Based on the prevailing winds recorded at the Dundeoo Post Office BOM meteorological station, dust emissions would generally be transported to the west in the morning period and to the east in the afternoon period.

The Orange air quality monitoring station maintained by DPE is the closest publicly accessible station to the wind farm site and is located approximately 117 kilometres south of the site. Data from the station reports an annual average particulate matter of less than 2.5 microns aerodynamic diameter ($PM_{2.5}$) of 9.1 µg/m^3 in 2020 and 6.6 µg/m^3 in 2021, and an annual average particulate matter of less than 10 microns diameter (PM_{10}) of 17.9 µg/m^3 in 2020 and 11.4 µg/m^3 in 2021 (Department of Planning and Environment, 2022a).

Greenhouse gas emissions

There are various State and Commonwealth initiatives aimed to increase the proportion of renewable energy within the Australian electricity market (refer to discussion in **Section 3.1**). These policies are primarily driven by the objectives to diversify the Australian market, ensure security of the network and to decrease greenhouse gas emissions generally associated with non-renewable energy sources to meet climate change agreements and targets such as the Paris Agreement and RET scheme.

Each year, Australian corporations that meet certain thresholds must report their emissions and energy information under the National Greenhouse and Energy Reporting (NGER) scheme. Each reporting year, the electricity sector has been the largest emitting industry in Australia, contributing 47.6 per cent of Australia's scope 1 emissions in the 2020-2021 reporting year (refer to **Figure 7-19** (adapted from (Clean Energy Regulator, 2022a)).

Renewables comprised 22.2 per cent of the primary fuel source for grid-connected designated generation facilities in the 2020-2021 reporting year (refer to **Figure 7-19** (adapted from (Clean Energy Regulator, 2022a)). This is an increase of 3.1 per cent on the 2019-2020 reporting year.

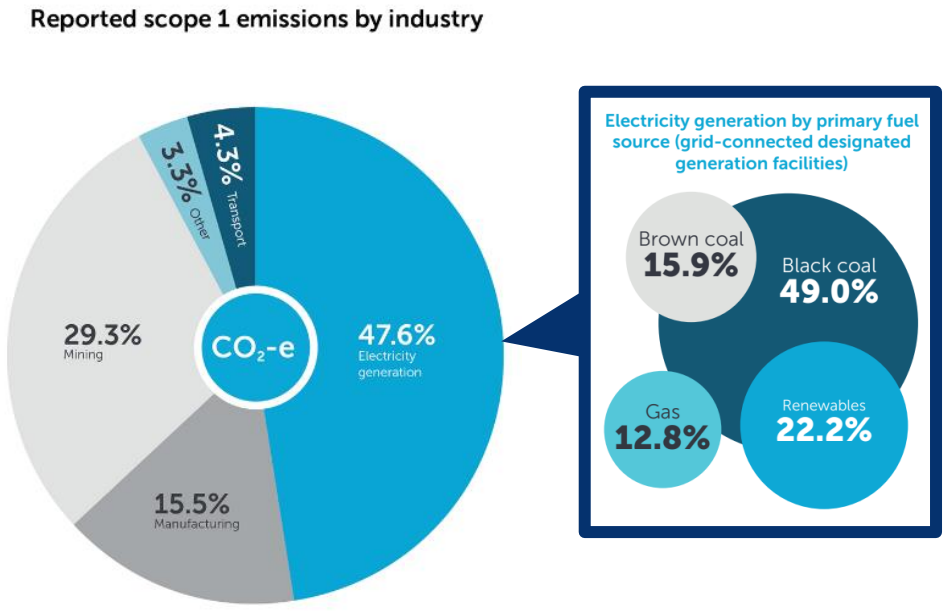


Figure 7-19: Air - reported scope 1 emissions by industry 2020-2021

Wind projects release the majority of their greenhouse gas emissions during construction and decommissioning. The average emissions intensity calculated for wind fuel sources is around 0.23 $tCO_{2\text{-}e}$ per megawatt hour (Clean Energy Regulator, 2021).

Potential impacts

A summary of the potential air impacts from the project is provided in **Table 7-27**.

Table 7-27: Potential impacts – air

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Generation of dust from construction activities	Moderate / Short term	Direct	Sensitive (environmental value) Sensitive (social value)	Y	• Avoid – cease construction activities during high wind periods • Minimise – implement best practice controls and management to minimise dust generation
Construction and operation	Release of emissions from use of construction vehicles and machinery	Low / Long term	Indirect	Sensitive (environmental value) Sensitive (social value)	Y	• Avoid – turn equipment and machinery off when not in use • Minimise – use low emission technology where possible
Operation	Wind erosion of exposed areas	Low / Short term	Indirect	Sensitive (environmental value)	Y	• Avoid – cover exposed surfaces to minimise exposure to wind

Assessment level and approach
Air quality and dust management will generally be assessed in accordance with relevant guidelines and policies including the National Greenhouse Accounts Factors (Australian Government, 2021) and NSW Climate Change Policy Framework (Office of Environment and Heritage, 2016).

The EIS will qualitatively consider the potential impacts to air quality and greenhouse gas, and propose appropriate management and mitigation measures during the construction and operational phases of the project.

7.4.6 Economic

Existing environment
The Warrumbungle Shire supports 3,108 jobs and has an annual economic output of $957.086 million. Warrumbungle Shire's Gross Regional Product (GRP) is estimated at $516.257 million (Remplan Economy, 2022). Mid-Western Regional supports 10,095 jobs and has an annual economic output of $5.902 billion. Mid-Western Regional's GRP is estimated at $3.165 billion (Remplan Economy, 2022).

Some of the key characteristics that contribute to the economic profile of the Warrumbungle Shire and Mid-Western Regional LGAs is summarised in **Table 7-28** (Australian Bureau of Statistics, 2020c); (Australian Bureau of Statistics, 2020b).

Table 7-28: Economic profile – key characteristics

Attribute	Units	Warrumbungle Shire	Mid-Western Regional
Population and people			
Population	No.	9,225	25,713
Working age population (aged 15-64 years)	%	54.5	65.1
Median age	No.	49	41.7
Unemployment rate	%	7.9	6.5
Income			
Median household weekly income	$	571	719
Average monthly household rent	$	687	1,122
Average monthly household mortgage	$	1,136	1,777
Occupations			
Managers	%	26.7	14.6
Professionals	%	14.1	13.1
Technicians and trades workers	%	10.2	17.2
Community and personal service workers	%	11.2	9.8

Attribute	Units	Warrumbungle Shire	Mid-Western Regional
Clerical and administrative workers	%	8.4	10.1
Sales workers	%	6.5	9.1
Machinery operators and drivers	%	6.5	12.6
Labourers	%	14.3	12
Inadequately described	%	1.9	1.4

The top five industries of employment in the Warrumbungle Shire LGA include:

- agriculture, forestry and fishing (27.6%)
- health care and social assistance (12.2%)
- education and training (11.5%)
- public administration and safety (7.8%)
- wholesale trade (7.7%).

Within the Mid-Western Regional LGA, the top five industries of employment are:

- mining (15%)
- wholesale trade (10.5%)
- health care and social assistance (9.9%)
- accommodation and food services (7.8%)
- education and training (7.6%).

The project would contribute to economic activity and diversity to the regional economy during both the construction and operation phase through direct and indirect employment and local business and service provider opportunities.

Potential impacts

A summary of the potential economic impacts from the project is provided in **Table 7-29**.

Table 7-29: Potential impacts – economic

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction and operation	Loss of economic activity from foregone potential agricultural activity	Moderate / Short term	Direct	Sensitive (economic value)	Y	• Minimise – continue agricultural activities around turbines • Offset – investment back into the local economy
Construction	Competition for skilled local labour force with other projects in the region	Moderate / Short term	Cumulative	Sensitive (social value)	Y	• Offset – support traineeship programs to bring new skilled personnel into the workforce
Construction and operation	Decline to value of neighbouring private land	Moderate / Short term	Indirect	Sensitive (economic value)	Y	• Minimise – minimise amenity impacts with potential to reduce property values • Offset – monetary compensation to directly affected landholders

Assessment level and approach
The following would be undertaken for the economic assessment:

- characterisation of the regional economy based on published data and statistics
- input-output analysis of the construction and operation of the project on the regional and State economy
- input-output analysis of the reduction in agricultural activity on the regional and State economy as a result of the project
- qualitative analysis of other economic issues, such as potential impact on land values, based on application of economic principles and review of the literature.

7.4.7 Waste and resources

Existing environment

Waste
The project would produce several waste streams during the construction and decommissioning phases. Minor quantities of waste would also continue to be generated by the day-to-day operation of the project.

The principal wastes expected to be generated during construction are:

- sewage
- domestic rubbish
- surplus topsoil and excavated material
- packaging material
- general construction debris.

Most wastes would be classified as general solid waste. Lithium-ion cell and batteries would be classified as a hazardous waste and would be required to be transported for disposal or recycling in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail.

ACCIONA Energia would engage with Warrumbungle Shire and Mid-Western Regional councils, suppliers servicing facilities in local regional centres such Dubbo and Muswellbrook to identify suitable recycling and landfill centres for the project. It is likely packing / transport materials for large components would be returned to the manufacturer.

Resources
The key resources required for the project would likely include:

- sand for bedding for cable trenches
- aggregate and concrete for foundations and general building construction
- road base for pavements
- steel for turbine foundation reinforcement
- water for dust suppression, use in construction and potable water for workers.

Potential impacts
A summary of the potential waste and resource impacts from the project is provided in **Table 7-30**.

Table 7-30: Potential impacts – waste and resources

Phase	Potential impact	Scale of impact	Nature of impact	Sensitivity of receiving environment	Cumulative impacts (Y/N)	Potential mitigation measures
Construction	Pollution of land and water resulting from poor management of wastes	Moderate / Long term	Indirect	Sensitive (environmental value)	Y	• Minimise – management of wastes in accordance with a waste management plan
Construction	Decreased availability of local resources including water, aggregate and sand etc	Low / Short term	Direct	Sensitive (economic value)	Y	• Minimise – consultation with Warrumbungle Shire and Mid-Western Regional councils to determine appropriate sources of resources
Construction and operation	Decreased amenity resulting from poor management of wastes	Low / Short term	Direct	Sensitive (social value)	Y	• Minimise – management of wastes in accordance with a waste management plan
Construction and operation	Disposal of wastes contributing to landfill	Low / Long term	Direct	Sensitive (environmental value)	Y	• Minimise – wastes would be recycled where possible
Decommissioning	Disposal of wind turbine components	Moderate / Long term	Direct	Sensitive (environmental value)	Y	• Minimise – consider reasonable and feasible alternative disposal methods for the wind turbine components based on the industry standards at the time of decommissioning

Assessment level and approach

An assessment of waste and resourcing impacts would be undertaken using a desktop assessment to understand the likely and potential waste and resourcing issues for the project. This would include:

- identifying the key resources required throughout the construction, operation and decommissioning phases of the project and their availability
- defining the statutory context for waste management
- identifying the waste streams that would be produced over the project lifecycle and their waste classification in accordance with relevant legislation
- identifying the existing waste management facilities in the vicinity and their capacity to accept different waste streams
- estimating quantities for key waste streams that would be produced
- consultation with Warrumbungle Shire and Mid-Western Regional councils to determine appropriate sources and disposal of resources and waste.

7.5 Cumulative impacts

7.5.1 Existing environment

Large-scale projects in the region

There are a number of proposed, approved or operational large-scale projects located in proximity to the wind farm site (considered to be 100 kilometres for the purpose of the scoping assessment). These projects are shown on **Figure 7-20**.

The cumulative impact assessment levels are defined in **Table 7-31.** Relevant cumulative impact assessment matters have been categorised in **Table 7-32** for each project, which is based on the cumulative impact assessment scoping summary table in Appendix B of the *Cumulative Impact Assessment Guidelines for State Significant Project* (Department of Planning, Industry and Environment, 2021f).

Table 7-31: Cumulative impact assessment level definitions

Assessment level	Description
Detailed assessment (D)	The project may result in significant impacts on the matter, including cumulative impacts. Detailed assessment is characterised by: • potential overlap in impacts between a future project (e.g. Project A) and the proposed project • potential for significant cumulative impacts as a result of the overlap, requiring detailed technical studies to assess the impacts • sufficient data is available on the future project to allow a detailed assessment of cumulative impacts with the proposed project for the relevant matter • uncertainties exist with respect to data, mitigation, assessment methods and criteria

Assessment level	Description
Standard assessment (S)	The project is unlikely to result in significant impacts on the matter, including cumulative impacts. Standard assessments are characterised by: • impacts are well understood • impacts are relatively easy to predict using standard methods • impacts are capable of being mitigated to comply with relevant standards or performance measures • the assessment is unlikely to involve any significant uncertainties or require any detailed cumulative impact assessment
N/A	No potential overlap in impacts between a future project (e.g. Project A) and the proposed project that would warrant any consideration in the cumulative impact assessment

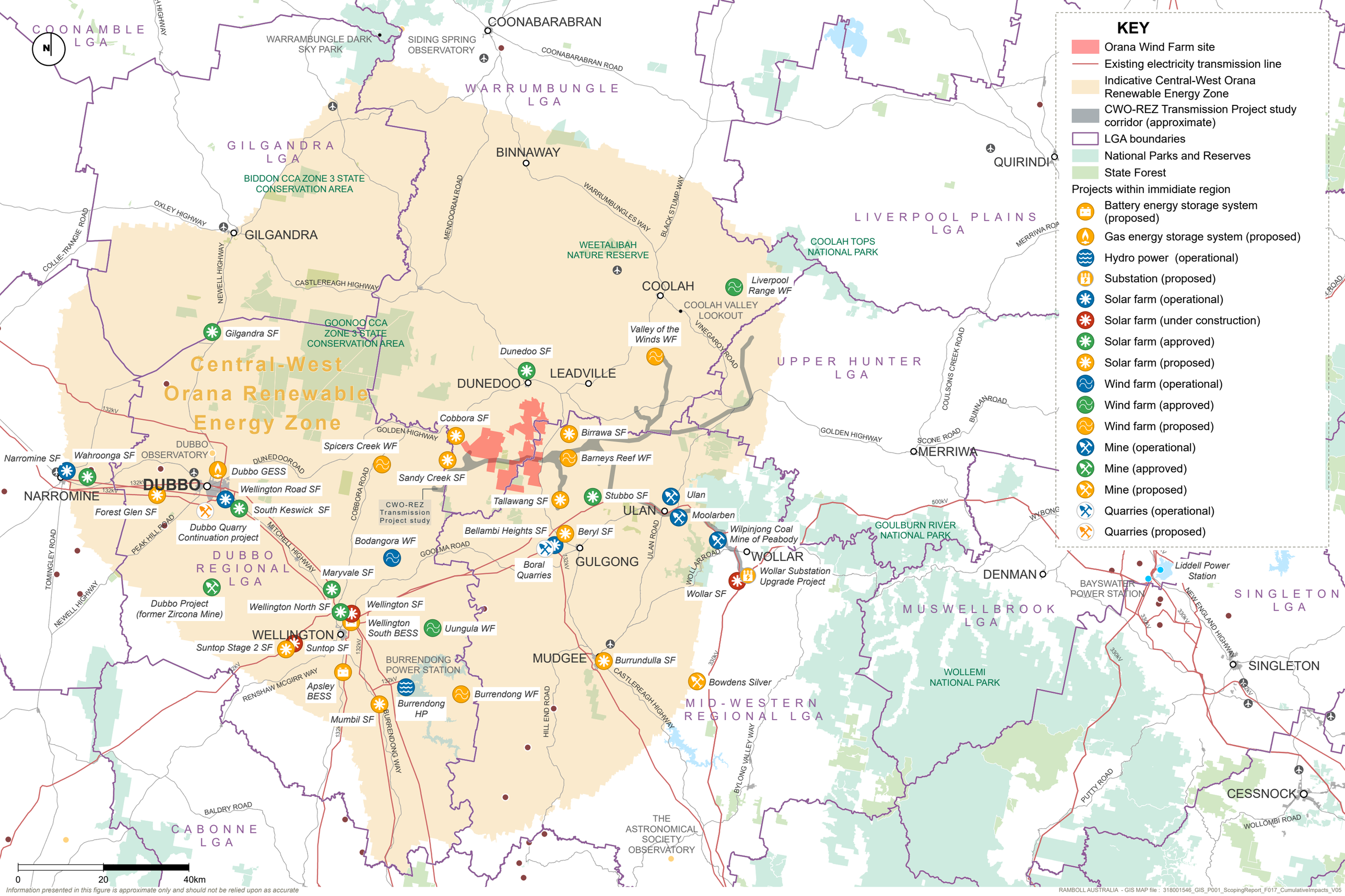


Figure 7-20 | Cumulative - projects considered for cumulative impact assessment

Table 7-32: Major projects in the locality and cumulative considerations

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
Existing projects														
Beryl Solar Farm	13 km southeast	Operational	• Operations overlap • Social and economic impacts to Gulgong and Beryl which are located between the two projects • Temporary changes from agricultural land use to electricity generation • Impacts to landscape character of the region	S	S	S	S	N/A	S	N/A	N/A	S	S	N/A
Boral Quarries, Gulgong	14 km southeast	Operational	• Operations overlap • Potential cumulative air quality emissions • Social impacts of cumulative large-scale project operations	N/A	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Ulan Coal Mine	27 km east	Operational	• Operations overlap • Social impacts of cumulative large-scale project operations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
Moolarben Coal Mine	30 km southeast	Operational	• Operations overlap • Social impacts of cumulative large-scale project operations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Wilpinjong Coal Mine	40 km southeast	Operational	• Operations overlap • Social impacts of cumulative large-scale project operations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Wellington Solar Farm	43 km southwest	Construction commenced December 2019	• Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Bodangora Wind Farm	55 km southwest	Operational	• Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Wollar Solar Farm	55 km southeast	Construction commenced July 2022	• Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
Burrendong Hydro Power Station	57 km southwest	Operational	• Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Suntop Solar Farm	60 km southwest	Operational	• Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Dubbo Quarry	63 km southwest	Operational (with expansion under assessment)	• Operations overlap • Social impacts of cumulative large-scale project operations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Crudine Ridge Wind Farm	95 km south	Operational	• Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Approved projects														
Dunedoo Solar Farm	5 km north	Approved (construction to commence in 2022)	• Operations overlap • Social and economic impacts to Dunedoo	S	S	S	S	N/A	S	N/A	N/A	S	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
			• Temporary changes from agricultural land use to electricity generation • Impacts to landscape character of the region											
Stubbo Solar Farm	12 km southeast	Approved	• Operations overlap • Social and economic impacts to Gulgong which is located south of the two projects • Temporary changes from agricultural land use to electricity generation • Impacts to landscape character of the region	S	S	S	S	N/A	S	N/A	N/A	S	S	N/A
Wellington North Solar Farm	44 km southwest	Approved (construction to commence 2022)	• Operations overlap • Cumulative traffic impacts during construction • Social impacts of cumulative renewable projects in the CWO-REZ	S	N/A	N/A	S	N/A	N/A	N/A	N/A	N/A	S	N/A
Uungula Wind Farm	50 km southwest	Approved	• Operations overlap • Cumulative traffic impacts during construction	S	N/A	N/A	S	N/A	N/A	N/A	N/A	N/A	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
			• Social impacts of cumulative renewable projects in the CWO-REZ											
Liverpool Range Wind Farm	50 km northeast	Approved (modification to increase capacity currently on exhibition)	• Operations overlap • Cumulative traffic impacts during construction • Social impacts of cumulative renewable projects in the CWO-REZ	D	N/A	N/A	S	N/A	N/A	N/A	N/A	N/A	S	N/A
Maryvale Solar Farm	46 km southwest	Approved (construction to commence in late 2023)	• Operations overlap • Cumulative traffic impacts during construction • Social impacts of cumulative renewable projects in the CWO-REZ	S	N/A	N/A	S	N/A	N/A	N/A	N/A	N/A	S	N/A
Suntop Solar Farm Stage 2	60 km southwest	Approved (construction to commence in 2022)	• Operations overlap • Cumulative traffic impacts during construction • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
Dubbo Zirconia Mine (Dubbo Project)	70 km southwest	Approved	• Operations overlap • Social impacts of cumulative large-scale project operations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Projects under assessment														
Cobbora Solar Farm	50 m southwest	SEARs issued	• Potential construction overlap • Operations overlap • Located immediately southwest of the project opposite Spring Ridge Road	D	S	D	D	N/A	S	S	S	S	S	N/A
Birriwa Solar Farm	1.7 km east	SEARs issued	• Potential construction overlap • Operations overlap • Impacts to Dunedoo which is located north of the two projects and Gulgong which is located south of the two projects	D	S	D	D	N/A	S	S	S	S	S	N/A
Sandy Creek Solar Farm	2.3 km southwest	SEARs issued	• Potential construction overlap • Operations overlap	D	S	D	D	N/A	S	S	S	S	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
			• Impacts to Dunedoo which is located north of the two projects and Gulgong which is located south of the two projects											
Tallawang Solar Farm	4 km southeast	SEARs issued	• Potential construction overlap • Operations overlap • Impacts to Dunedoo which is located north of the two projects and Gulgong which is located south of the two projects	D	S	D	D	N/A	S	S	S	S	S	N/A
Bellambi Heights Solar Farm	9.5 km southeast	SEARs issued	• Potential construction overlap • Operations overlap • Social and economic impacts to Dunedoo which is located north of the two projects and Gulgong which is located south of the two projects	S	S	S	S	N/A	S	N/A	N/A	S	S	N/A
Barney's Reef Wind Farm	13 km southeast	SEARs issued	• Potential construction overlap in 2024-2025	D	S	D	S	N/A	S	N/A	N/A	S	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
			• Operations would overlap for up to 30 years • Social and economic impacts to Dunedoo which is located north of the two projects and Gulgong which is located south of the two projects											
Spicers Creek Wind Farm	15 km west	SEARs issued	• Potential construction overlap in 2024-2025 • Operations would overlap for up to 30 years	D	S	D	S	N/A	S	N/A	N/A	S	S	N/A
Valley of the Winds Wind Farm	25 km northeast	Response to submissions	• Operations overlap • Social and economic impacts to Dunedoo which is located between the two projects	D	N/A	D	S	N/A	S	N/A	N/A	N/A	S	N/A
Apsley Battery Energy Storage System	50 km southwest	Response to submissions	• Potential construction overlap • Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	S	N/A	N/A	N/A	N/A	N/A	S	N/A
Mumbil Solar Farm	58 km southwest	Under development	• Potential construction overlap	N/A	N/A	N/A	S	N/A	N/A	N/A	N/A	N/A	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
			• Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ											
Dubbo Gas Energy Storage System	58 km southwest	Amend SEARs	• Potential construction overlap • Operations overlap • Social impacts of cumulative energy projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Bowdens Silver Mine	58 km southeast	Under assessment	• Operations overlap • Social impacts of cumulative large-scale project operations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Burrendong Wind Farm	70 km south	Request for SEARs lodged	• Potential construction overlap • Operations overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Forest Glen Solar Farm	71 km west	Under assessment	• Potential construction overlap • Operations overlap	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A

Project	Approx. distance to the project	Status	Indicative timing / potential overlap	Relevant cumulative impact assessment matters										
				Access	Air	Amenity	Biodiversity	Built environment	Economic	Hazards and risks	Heritage	Land	Social	Water
			• Social impacts of cumulative renewable projects in the CWO-REZ											
Kerrs Creek Wind Farm	85 km south	Status update not available	• Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Wollar Substation upgrade	50 km southeast	SEARs issued	• Potential construction overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Wellington south battery energy storage system	46 km southwest	SEARs issued	• Potential construction overlap • Social impacts of cumulative renewable projects in the CWO-REZ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	S	N/A
Related development to the project														
CWO-REZ Transmission Project	1 km (through the wind farm site)	Request for SEARs lodged	• Potential construction overlap in 2025-2027	D	S	S	S	S	N/A	N/A	N/A	S	D	S

Central-West Orana Energy Generators Group

ACCIONA Energia is part of the Generator Project Interface Group, which has been established to manage the interface and cumulative impacts of the major renewable energy generators and the proposed CWO-REZ Transmission Project. Other participants of the Generator Project Interface Group include:

- CWP Renewables
- Lightsource BP
- Marble Energy
- Origin Energy
- RES Group
- Tilt Renewables
- ACEN Australia.

EnergyCo is coordinating whole of the CWO-REZ studies including workforce accommodation, transport, and waste management, among others. These studies would identify measures to manage CWO-REZ-wide cumulative impacts and would inform the level of assessment required in the EIS.

Potential impacts

A summary of the potential cumulative impacts from the project is provided in **Table 7-33**.

Table 7-33: Potential impacts – cumulative

Phase	Potential impact	Scale of impact	Sensitivity of receiving environment	Potential mitigation measures
Landscape character and visual				
Operation	Changes to the regional landscape character and visual amenity from abundance of renewable projects	High / Long term	Sensitive (social value)	• Minimise – minimise visual impacts of infrastructure through strategic placement and screening
Noise and vibration				
Construction	Noise and vibration emissions from concurrently construction activities	Moderate / Short term	Sensitive (social value) Sensitive (environmental value)	• Minimise – coordinate with neighbouring developments to reduce operations occurring concurrently within the same locality
Construction	Increased traffic on local roads	Moderate / Short term	Sensitive (social value) Sensitive (environmental value)	• Avoid – avoid using the same local roads as other projects in the locality where possible
Biodiversity				
Construction and operation	Removal of vegetation and impacts to flora and fauna	Moderate / Short term	Sensitive (environmental value)	• Minimise – minimise vegetation clearing where possible

Phase	Potential impact	Scale of impact	Sensitivity of receiving environment	Potential mitigation measures
Social				
Operation	Social impacts of cumulative renewable projects in the CWO-REZ	High / Long term	Vulnerable to change	• Minimise – ongoing consultation with the local community
Land				
Operation	Reduction in agricultural land uses	Moderate / Short term	Sensitive (economic value)	• Minimise – landowners can continue agricultural activities around turbines
Air				
Construction	Dust emissions from concurrently construction activities	Moderate / Short term	Sensitive (social value) Sensitive (environmental value)	• Minimise – coordinate with neighbouring developments to reduce operations occurring concurrently within the same locality
Waste and resources				
Construction and operation	Availability of resources and waste disposal facilities with capacity to accept wastes	Moderate / Short term	Sensitive (environmental value)	• Minimise – reuse or recycle materials where possible • Minimise – outsource resources that may be in short supply in the locality

Assessment level and approach

Cumulative impacts would be assessed in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Project* (Department of Planning, Industry and Environment, 2021f). This process starts at the scoping phase.

The project-level cumulative impact assessment considers the following assessment approaches:

- **Incremental assessment**: this involves adding the incremental impacts of the project to the baseline condition of each relevant matter
- **Combined incremental assessment**: this is the combined effect of the different impacts of the project, normally on a sensitive area or receiver
- **Issue-specific CIA**: the cumulative impacts of the project on key matters with other relevant future projects
- **Combined CIA**: the combined effect of the different cumulative impacts of the project on key matters, sensitive receptors or important features with other relevant future projects.

The *Cumulative Impact Assessment Guidelines for State Significant Project* (Department of Planning, Industry and Environment, 2021f), guides the scope of the cumulative impact assessment for the EIS. Aspects to be considered are listed in **Table 7-34**, along with a response on the proposed scope of the assessment to be undertaken for the EIS.

Table 7-34: Key questions to answer in scoping the cumulative impact assessment

Question	Response
What to assess?	Key matters that would be considered in the CIA would include: • landscape character and visual amenity • noise and vibration • traffic and access • biodiversity • land use • air quality • social • 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?	The CIA would consider the life of the project including construction, operation and decommissioning. The relevant projects to consider as part of the CIA will be those within the relevant study area that have concurrent project timelines with the project through all phases of development.
What projects to include?	The CIA would consider the projects identified in **Table 7-32** and other proposed developments advertised in the public arena at the time of preparing the EIS. This would include changes to existing projects, approved projects or projects under assessment

Question	Response
What is the approach to assessment?	The CIA would be undertaken in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Project* (Department of Planning, Industry and Environment, 2021f) and with the approved assessment methods for relevant matters, e.g. the Visual Bulletin, the Noise Bulletin, and the BAM
What are the key uncertainties?	Key uncertainties to undertaking the CIAs will include availability and quality of data on proposed future projects at the time of preparation of assessments

7.6 Matters requiring no further assessment in the EIS

Matters that have been identified as requiring no further assessment in the EIS in accordance with the Scoping Report Guideline are presented in **Table 7-35**.

Table 7-35: Matters requiring no further assessment in the EIS

Matter	Justification
Access – port and airport facilities, road and rail facilities	The project does not involve the development of, or affect access to rail, port or airport facilities
Amenity – odour	The project would not produce odorous emissions
Built environment –public infrastructure, design quality	The project is located on privately owned rural land and would not impact on public infrastructure. Impacts to public roads and encroachment on public property would be assessed in the traffic and access assessment to be undertaken for the EIS
Economic – opportunity cost	The cost of the project would have a positive impact by stimulating investment in the region
Hazards and risks – coastal hazards	The wind farm site is not located near the coast, so coastal hazards are not relevant to the project
Hazard and risks – environmental hazards	Environmental risks associated with the project would be assessed in other relevant environmental assessments
Hazards and risks – dams safety	The project does not involve the construction of a dam
Hazards and risks – groundwater contamination	Direct impact to groundwater recharge is not considered likely based on the relatively small footprint of the construction and operational areas. Extraction of groundwater is not proposed for the project
Hazards and risks – land movement	The project presents a low risk of landslide. Erosion risks would be addressed in an assessment of soils and land capability to be undertaken for the EIS
Land – soil chemistry	The project would not involve activities that alter the soil chemistry of the wind farm site
Heritage – natural	The historic, aesthetic and social values of the land would be considered in the landscape character and visual assessment to be undertaken for the EIS

Matter	Justification
Social – decision-making systems	The project would have no impact on decision making systems but would be undertaken in accordance with those systems

8. CONCLUSION

This scoping report has outlined the proposed Orana Wind Farm project that would be assessed under Part 4 of the EP&A Act and the Planning Systems SEPP. The project forms an important part of Australia's transition to renewable energy generation and would positively contribute to meeting Commonwealth and State targets. The project would enhance the reliability and security of electricity supply by helping to fill the anticipated capacity gaps in the electricity market following the closure of major coal-fired power generators within NSW.

This scoping report has been prepared to assist the development of the SEARs for the project, which would guide the preparation of the EIS. The key environmental matters identified that would be considered in the EIS include:

- landscape character and visual
- noise and vibration
- traffic and access
- biodiversity
- Aboriginal heritage.

Other matters that would be considered include:

- hazards and risks
- land
- water
- historic heritage
- air
- social
- economic
- waste and resources.

Cumulative impacts with other projects (both existing and proposed) would also be considered and assessed.

The EIS would be prepared in accordance with the SEARs to be issued by the NSW Department of Planning and the Environment in response to this scoping report. All assessments (including specialist assessments) would be completed by taking into consideration consultation with stakeholders, industry best practice guidelines, and the experiences from other wind farm projects.

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APPENDIX 1
LOTS WITHIN THE WIND FARM SITE

Lot 1 DP1016050	Lot 25 DP754334	Lot 83 DP754334
Lot 1 DP1111266	Lot 26 DP750764	Lot 84 DP750764
Lot 1 DP1122475	Lot 26 DP754291	Lot 85 DP750764
Lot 1 DP1217733	Lot 26 DP754329	Lot 85 DP754334
Lot 1 DP1219910	Lot 26 DP754334	Lot 86 DP754334
Lot 1 DP1222357	Lot 27 DP754334	Lot 87 DP754334
Lot 1 DP1227664	Lot 28 DP754291	Lot 88 DP754334
Lot 1 DP1239728	Lot 29 DP750764	Lot 89 DP754334
Lot 1 DP1259291	Lot 3 DP1239728	Lot 9 DP1088464
Lot 1 DP130782	Lot 3 DP1259290	Lot 9 DP130757
Lot 1 DP209396	Lot 3 DP246474	Lot 90 DP754334
Lot 1 DP246474	Lot 3 DP586911	Lot 92 DP750764
Lot 1 DP456515	Lot 30 DP750764	Lot 92 DP754334
Lot 1 DP46845	Lot 30 DP754329	Lot 96 DP750764
Lot 1 DP528668	Lot 30 DP754334	Lot 98 DP750751
Lot 1 DP652903	Lot 31 DP750764	Lot 99 DP754334
Lot 1 DP722905	Lot 31 DP754329	Lot A DP383061
Lot 1 DP722906	Lot 31 DP754334	Lot B DP383061
Lot 1 DP754334	Lot 32 DP754334	Lot 72 DP754291
Lot 1 DP754334	Lot 33 DP750764	Lot 73 DP750764
Lot 10 DP1088464	Lot 33 DP754291	Lot 73 DP750774
Lot 10 DP130757	Lot 34 DP754291	Lot 74 DP754334
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Lot 100 DP750774	Lot 36 DP754289	Lot 76 DP750764
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Lot 11 DP130757	Lot 41 DP750764	Lot 24 DP754291
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Lot 110 DP750774	Lot 41 DP754291	Lot 25 DP750764
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Lot 114 DP750764	Lot 43 DP754291	Lot 6 DP130766
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Lot 116 DP750764	Lot 44 DP750764	Lot 6 DP754329
Lot 117 DP750764	Lot 44 DP754289	Lot 60 DP754291
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Lot 12 DP754291	Lot 44 DP754329	Lot 62 DP750764
Lot 120 DP750764	Lot 44 DP754334	Lot 62 DP754291
Lot 121 DP750764	Lot 45 DP754334	Lot 62 DP754334
Lot 121 DP754334	Lot 46 DP750764	Lot 63 DP750751
Lot 123 DP1078031	Lot 46 DP754334	Lot 63 DP750764
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Lot 126 DP750764	Lot 48 DP750764	Lot 64 DP750751
Lot 13 DP750764	Lot 48 DP750774	Lot 64 DP750764
Lot 13 DP754291	Lot 49 DP750751	Lot 64 DP754334
Lot 134 DP750764	Lot 49 DP750764	Lot 65 DP750751
Lot 14 DP754291	Lot 5 DP246474	Lot 65 DP750764
Lot 15 DP754291	Lot 5 DP754329	Lot 65 DP754334
Lot 16 DP750764	Lot 50 DP754291	Lot 66 DP754334
Lot 16 DP754329	Lot 51 DP754291	Lot 67 DP750751
Lot 17 DP754329	Lot 52 DP750764	Lot 67 DP754334
Lot 174 DP750764	Lot 53 DP750764	Lot 7 DP1088464

Lot 176 DP750751	Lot 54 DP750764	Lot 20 DP754329
Lot 179 DP750751	Lot 55 DP750764	Lot 20 DP754334
Lot 18 DP754329	Lot 55 DP750774	Lot 21 DP750764
Lot 18 DP754334	Lot 55 DP754334	Lot 21 DP754329
Lot 180 DP750751	Lot 2 DP1239728	Lot 21 DP754334
Lot 182 DP750764	Lot 2 DP1259291	Lot 22 DP754289
Lot 184 DP750764	Lot 2 DP246474	Lot 2 DP1009802
Lot 186 DP750751	Lot 2 DP355822	Lot 2 DP1016050
Lot 187 DP750751	Lot 2 DP456515	Lot 2 DP1042117
Lot 19 DP754291	Lot 2 DP586911	Lot 2 DP1111266
Lot 19 DP754329	Lot 193 DP750764	Lot 2 DP1122475
Lot 19 DP754334	Lot 194 DP750764	Lot 2 DP1217733
Lot 192 DP750764	Lot 2 DP1222357	

APPENDIX 2
SCOPING SUMMARY TABLE

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
Access					
Access to property	Detailed	N	Specific	• *Guide to Road Design Part 3: Geometric Design* (Austroads, 2016) • *Guide to Road Design Part 4: Intersections and Crossings: General* (Austroads, 2017)	**Section 7.3.2**
Traffic and parking	Detailed	Y	Specific	• *Guide to Traffic Generating Developments version 2.2* (Roads and Traffic Authority, 2002) • *Guide to Traffic Management Part 3: Transport Study and Analysis Methods* (Austroads, 2020) • *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings* (Austroads, 2020) • *Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments* (Austroads, 2020)	**Section 7.3.2**
Port and airport facilities	No further assessment	n/a	n/a	n/a	n/a
Road and rail facilities	No further assessment	n/a	n/a	n/a	n/a
Air					
Atmospheric emissions	Standard	Y	General	• *Protection of the Environment Operations Act 1997*	**Section 7.4.5**
Particulate matter	Standard	Y	General	• *Protection of the Environment Operations Act 1997*	**Section 7.4.5**
Gases	Standard	Y	General	• *NSW Climate Change Policy Framework* (Office of Environment and Heritage, 2016)	**Section 7.4.5**

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
				• *National Greenhouse Accounts Factors* (Australian Government, 2021)	
Amenity					
Noise	Detailed	Y	Specific	• *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009) • *NSW Road Noise Policy* (Department of Environment, Climate Change and Water, 2011) • *Noise Policy for Industry* (NPfI) (Environment Protection Authority, 2017) • *Wind Energy: Noise Assessment Bulletin 2016* (Department of Planning and Environment, 2016)	**Section 7.3.1**
Vibration	Detailed	N	General	• *Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006) • *British Standard BS7385.2 - 1993 Evaluation and Measurement for Vibration in Buildings, Part 2 - Guide to damage levels from ground borne vibration* • *DIN 4150: Part 3-1999 Structural vibration – Effects of vibration on structures 1999*	**Section 7.3.1**
Odour	No further assessment	n/a	n/a	n/a	n/a
Visual	Detailed	Y	Specific	• *Wind Energy: Visual Assessment Bulletin* (Department of Planning and Environment, 2016)	**Section 7.3.1**
Biodiversity					
Conservation areas	Detailed	N	General	• *Environment Protection and Biodiversity Conservation Act 1999*	**Section 7.3.4**

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
				• Commonwealth *EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance* (Commonwealth of Australia, 2013)	
Terrestrial flora and fauna	Detailed	Y	General	• *Biodiversity Conservation Act 2016* • *Environment Protection and Biodiversity Conservation Act 1999* • *Biodiversity Conservation Regulation 2017* • Biodiversity Offset Scheme • Biodiversity Assessment Methodology (Department of Planning, Industry and Environment, 2020) • Commonwealth *EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance* (Commonwealth of Australia, 2013)	**Section 7.3.4**
Aquatic flora and fauna	Detailed	N	General	• *Fisheries Management Act 1991* • *Biodiversity Conservation Act 2016* • *Environment Protection and Biodiversity Conservation Act 1999*	**Section 7.3.4**
Built environment					
Public infrastructure	No further assessment	n/a	n/a	n/a	n/a
Design quality	No further assessment	n/a	n/a	n/a	n/a
Economic					
Natural resource use	Standard	Y	General	Refer to scoping report for further discussion on approach to assessment	**Section 7.4.3** and **Section 7.4.7**

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
Opportunity cost	No further assessment	n/a	n/a	n/a	n/a
Livelihood	Standard	Y	Specific	Refer to scoping report for further discussion on approach to assessment	**Section 7.4.6**
Hazards and risks					
Bushfire	Standard	N	General	• *NSW Rural Fire Service Planning for Bushfire Protection 2019* (NSW Rural Fire Service, 2019)	**Section 7.4.1**
Coastal hazards	No further assessment	n/a	n/a	n/a	n/a
Dams safety	No further assessment	n/a	n/a	n/a	n/a
Dangerous goods	Standard	N	General	• *Dangerous Goods Act 1985* • *Dangerous Goods (Road and Rail Transport) Act 2008* • *Dangerous Goods (Road and Rail Transport) Regulation 2014* • *Australian Code for the Transport of Dangerous Goods by Road and Rail* (Commonwealth of Australia, 2018)	**Section 7.4.1**
Environmental hazards	No further assessment	n/a	n/a	n/a	n/a
Groundwater contamination	No further assessment	n/a	n/a	n/a	n/a

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
Hazardous and offensive development	Standard	N	General	• *Hazardous Industry Advisory Paper No. 4 – 'Risk Criteria for Land Use Safety Planning* (Department of Planning, 2011) • *Hazardous Industry Planning Advisory Paper No.6 – Guidelines for Hazard Analysis* (Department of Planning, 2011) • *Assessment Guideline - Multi-Level Risk Assessment* (Department of Planning and Industry, 2011) • *Hazardous and Offensive Development Application Guidelines Applying SEPP 33* (Department of Planning, 2011)	**Section 7.4.1**
Land movement	No further assessment	n/a	n/a	n/a	n/a
Battery storage	Standard	N	General	• *Hazardous Industry Advisory Paper No. 4 – 'Risk Criteria for Land Use Safety Planning* (Department of Planning, 2011) • *Hazardous Industry Planning Advisory Paper No.6 – Guidelines for Hazard Analysis* (Department of Planning, 2011) • *Assessment Guideline - Multi-Level Risk Assessment* (Department of Planning and Industry, 2011) • *Hazardous and Offensive Development Application Guidelines Applying SEPP 33* (Department of Planning, 2011)	**Section 7.4.1**
Electromagnetic fields	Standard	Y	General	• *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields* (International Commission on Non-Ionizing Radiation Protection, 2020)	**Section 7.4.1**

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
Electromagnetic interference	Standard	Y	General	• *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields* (International Commission on Non-Ionizing Radiation Protection, 2020) • *Australian Radio and Communications Act 1992*	**Section 7.4.1**
Blade throw	Standard	N	General	• *Wind turbine risk zoning handbook* (Rijksdienst voor Ondernemend Nederland, 2014) (the Dutch Handbook)	**Section 7.4.1**
Aviation	Standard	N	General	• *National Airports Safeguarding Framework Guideline D: Managing Wind Turbine Risk to Aircraft* (NASF Guideline D) • *Civil Aviation Regulations 1988* • *The Civil Aviation Safety Regulations 1998* • *ISO 31000:2018 Risk Management –Guidelines*	**Section 7.4.1**
Heritage					
Aboriginal	Detailed	N	Specific	• *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (Department of Environment, Climate Change and Water NSW, 2010) • *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (Office of Environment and Heritage, Department of Premier and Cabinet, 2011) • *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water, 2010)	**Section 7.3.5**
Historic	Standard	N	General	• *Burra Charter 2013* (Australia International Council on Monuments and Sites, 2013)	**Section 7.4.4**

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
				• Part 4 of the EP&A Act 1979 • *NSW Heritage Act 1977*	
Natural	No further assessment	n/a	n/a	n/a	n/a
Land					
Stability	Standard	N	General	• *Managing Urban Stormwater: Soils and Construction 4th Edition* (Landcom, 2004)	**Section 7.4.2**
Land capability	Standard	N	General	• *Land Use Conflict Risk Assessment Guide* (Department of Primary Industry, 2011) • *Agricultural Land Use Mapping Resources in NSW - User's guide* (Department of Primary Industries, February 2017) • *The land and soil capability assessment scheme* (Office of Environment and Heritage, October 2012)	**Section 7.4.2**
Soil chemistry	No further assessment	n/a	n/a	n/a	n/a
Topography	Standard	N	General	• *The land and soil capability assessment scheme* (Office of Environment and Heritage, October 2012)	**Section 7.4.2**
Private property	Standard	N	Specific	• n/a	**Section 7.4.2**
Public land	Standard	N	General	• n/a	**Section 7.4.2**
Biosecurity	Standard	N	General	• *Biosecurity Act 2015* • *Biosecurity Regulation 2016*	**Section 7.4.2**
Land contamination	Standard	N	General	• *Protection of the Environment Operations Act 1997* • *Contaminated Land Management Act 1997*	**Section 7.4.1**

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
				• *State Environmental Planning Policy (Resilience and Hazards) 2021* • *Guidelines on the Duty to Report Land Contamination* (Environment Protection Authority, 2015)	
Social					
Way of life	Detailed	Y	Specific	• *Social Impact Assessment Guidelines for State Significant Projects* (Department of Planning Industry and Environment, 2021) • *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning, Industry and Environment, 2016)	**Section 7.3.6**
Health and wellbeing	Detailed	Y	Specific	• *Social Impact Assessment Guidelines for State Significant Projects* (Department of Planning Industry and Environment, 2021) • *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning, Industry and Environment, 2016)	**Section 7.3.6**
Community	Detailed	Y	Specific	• *Social Impact Assessment Guidelines for State Significant Projects* (Department of Planning Industry and Environment, 2021) • *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning, Industry and Environment, 2016)	**Section 7.3.6**
Surroundings	Detailed	Y	Specific	• *Social Impact Assessment Guidelines for State Significant Projects* (Department of Planning Industry and Environment, 2021)	**Section 7.3.6**

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
				• *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning, Industry and Environment, 2016)	
Accessibility	Detailed	Y	Specific	• *Social Impact Assessment Guidelines for State Significant Projects* (Department of Planning Industry and Environment, 2021) • *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning, Industry and Environment, 2016)	**Section 7.3.6**
Livelihoods	Detailed	Y	Specific	• *Social Impact Assessment Guidelines for State Significant Projects* (Department of Planning Industry and Environment, 2021) • *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning, Industry and Environment, 2016)	**Section 7.3.6**
Culture	Detailed	Y	Specific	• *Social Impact Assessment Guidelines for State Significant Projects* (Department of Planning Industry and Environment, 2021) • *Wind Energy Guideline for State Significant Wind Energy Development* (Department of Planning, Industry and Environment, 2016)	**Section 7.3.6**
Decision-making systems	No further assessment	n/a	n/a	n/a	n/a
Water					
Hydrology	Standard	N	General	• *Water Management Act 2000* • *Protection of the Environment Operations Act 1997*	**Section 7.4.3**

Matter	Level of assessment	Cumulative impact (Y/N)	Level of Engagement	Relevant government plans, policies, and guidelines	Scoping report Section
				• *Managing urban stormwater: soils and construction* (Landcom, 2004)	
Water availability	Standard	Y	General	• *Water Management Act 2000*	**Section 7.4.3**
Water quality	Standard	Y	General	• *Water Management Act 2000* • *Protection of the Environment Operations Act 1997* • *Australian & New Zealand Guidelines for fresh & Marine Water quality*	**Section 7.4.3**
Flooding	Standard	N	General	• *State Environmental Planning Policy (Resilience and Hazards) 2021*	**Section 7.4.3**
Waste and resources					
Waste	Standard	N	General	• *Waste Classification Guidelines* (Environment Protection Authority, 2014) • *Protection of the Environment Operations (Waste) Regulation 2014* • *Waste Avoidance and Resource Recovery Act 2001*	**Section 7.4.7**

APPENDIX 3
PRELIMINARY LANDSCAPE CHARACTER AND VISUAL ASSESSMENT REPORT

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APPENDIX 4
PRELIMINARY NOISE AND VIBRATION ASSESSMENT REPORT

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APPENDIX 5
PRELIMINARY BIODIVERSITY ASSESSMENT REPORT

APPENDIX 6
PRELIMINARY SOCIAL IMPACT ASSESSMENT REPORT