Prepared for Baldon Wind Farm Pty Ltd

Baldon Wind Farm

Environmental Impact Statement

Murray River and Hay Local Government Areas, NSW

July 2024

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- Biodiversity: NGH
- Social: NGH
- Visual: Moir Landscape Architecture
- Traffic: Amber
- Noise: Sonus
- Soil and agriculture: Minesoils
- PHA: Sherpa
- Aviation: Aviation Projects
- EMF/EMI: DNV-GL
- Blade Throw: DNV-GL

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We acknowledge the traditional owners of this land and pay our respect to Elders past, present and emerging. We recognise that the First Nations peoples of Australia have traditionally managed the resources of this land in a sustainable way, and that they are the original stewards of the Australian environment.

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REAP declaration

This Environmental Impact Statement has been prepared by NGH Pty Ltd for Baldon Wind Farm Pty Ltd with the assistance of a range of specialists.

Declaration of registered environmental assessment practitioner	
Name	Brooke Marshall
Registration number	Impact Assessment Specialist certification IA11090 and REAP certification R80042
Organisation registered with	NGH Pty Ltd

The undersigned declares that this EIS:

- Has been prepared in accordance with Schedule 2 of the *Environmental Planning and Assessment Regulation 2021*
- Contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates
- Does not contain information that is false or misleading
- Addresses the Secretary's Environmental Assessment Requirements (SEARs) for the Project
- Identifies and addresses the relevant statutory requirements for the Project, including any relevant matters for consideration in environmental planning instruments
- Has been prepared having regard to the Department's *State Significant Development Guidelines - Preparing an Environmental Impact Statement*
- Contains a simple and easy to understand summary of the Project as a whole, having regard to the economic, environmental and social impacts of the Project and the principles of ecologically sustainable development
- Contains a consolidated description of the Project in a single chapter of the EIS
- Contains an accurate summary of the findings of any community engagement
- Contains an accurate summary of the detailed technical assessment of the impacts of the Project as a whole.

Signature:

Brooke Marshall

Date: 31 July 2024

Acronyms and abbreviations

ACH Act	*Aboriginal Cultural Heritage Act 2003*
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AGL	Above ground level
AIA	Aviation Impact Assessment
AMSL	Above Mean Sea Level
APZ	Asset Protection Zone
ASL	Above sea level
AWS	Automatic weather station
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCS	Biodiversity and Conservation Services (division of NSW DCCEEW)
BDAR	Biodiversity Development Assessment Report
BFEMOP	Bush Fire Emergency Management and Operations Plan
BFSA	bush fire safety authority
Biosecurity Act	*Biosecurity Act 2015* (NSW)
BOM	Australian Bureau of Meteorology
BTA	Blade Throw Assessment
(The) Bulletin	NSW Wind Energy: Visual Assessment Bulletin
CaLP Act	*Catchment and Land Protection Act 1994*
CE	Critically endangered
CEMP	Construction environmental management plan
Cth	Commonwealth
DAWE	Department of Agriculture, Water and the Environment (Cth) (formerly DoEE now DCCEEW)
DBH	Diameter at breast height

DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth) (formerly DAWE)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (NSW) (formerly DPE until 31 Dec 2023)
DPE	(Former) Department of Planning and Environment (NSW) (now DCCEEW and DPHI from 01 January 2024)
DPHI	Department of Planning, Housing and Infrastructure (NSW) (formerly DPE)
DPIE	(Former) Department of Planning, Industry and Environment (NSW) (DPE from 21 Dec 2021 to 31 Dec 2023)
E	Endangered
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIA	Environmental impact assessment
EIS	Environmental impact statement
EMF	Electric and Magnetic Fields
EMI	Electromagnetic Interference
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
ESD	Ecologically Sustainable Development
FM Act	*Fisheries Management Act 1994* (NSW)
GDA	Geographic Datum of Australia
GIS	Geographic information system
GPS	Geographical positioning system
ha	hectares
HAZID	Hazard Identification
Heritage Act	*Heritage Act 1977* (NSW)
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ISEPP	State Environmental Planning Policy (Infrastructure) 2007 (NSW)
KFH	Key Fish Habitat

km	kilometres
LALC	Local Aboriginal Land Council
LCU	Landscape Character Units
LEP	Local Environment Plan
LGA	Local government area
LSALT	Lowest Safe Altitude
LVIA	Landscape and Visual Impact Assessment
m	metres
MW	Megawatt
MNES	Matters of National Environmental Significance under the EPBC Act (*c.f.*)
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NPWS	National Parks and Wildlife Service
NV Act	*Native Vegetation Act 2003* (NSW)
NVR	Native vegetation risk
OEH	(Former) Office of Environment and Heritage (NSW) (now DCCEEW)
OLS	Obstacle Limitation Surfaces
PBP	NSW RFS *Planning for Bush Fire Protection 2019*
PMST	Protected matters search tool
Sp/spp	Species/multiple species
SSR	Secondary Surveillance Radar
TEC	Threatened ecological community
V	Vulnerable
VFR	Visual flight rules

Table of definitions

Project	Baldon Wind Farm - the proposed construction, operation and decommissioning of a wind farm and ancillary infrastructure including battery storage.
Applicant	Baldon Wind Farm Pty Ltd, a propriety limited company established for the Project. The Project is being developed by Goldwind Capital (Australia) Pty Ltd (Goldwind), on behalf of Baldon Wind Farm Pty Ltd.
Project area	The broader property boundaries of Project host landowners who have entered into an agreement to host Project infrastructure. The Project area is approximately 46,259ha The schedule of lands is provided in Appendix A.
Development corridor	The area of land within which environmental constraints have been surveyed and assessed. The Development corridor represents a buffered indicative infrastructure layout that has been used for specialist assessment. *The total area of the Development corridor is approximately 2842.5ha.* Note: this area is termed "Subject Land" within the biodiversity assessment.
Disturbance area	The area that would be directly impacted by the Project inclusive of all construction and operational activities. (this area is termed "Development footprint" within the biodiversity assessment). Noting some changes are likely prior to construction, this area is currently estimated from the indicative layout as: • Construction footprint: 819.0ha • Operational footprint: 348.8ha
Associated dwellings	These dwellings are associated with the Project. Landowners have entered into agreements, either to host Project elements or accept specific impacts.
Non-associated dwellings	These dwellings are not associated with the Project. All relevant potential impacts have been assessed in the EIS.

Executive summary

The purpose of this Environmental Impact Statement is to assess the economic, environmental and social impacts of the Baldon Wind Farm. This report is structured so that the community, local councils, government agencies and the consent authority can fully appreciate the Project and its potential impacts, so they can make informed submissions and decisions on the merits of the Project.

Project location

The proposed Baldon Wind Farm Project is a utility scale renewable energy project within the Southwest Renewable Energy Zone (REZ) and located near to significant transmission connection options. The site is located within a low-density rural area and distant from the regional towns as listed below and shown in :

- Moulamein, approximately 13km to the south of the Project
- Balranald, approximately 44km to the west of the Project
- Hay, approximately 64km to the northeast of the Project
- Deniliquin, approximately 100km to the southeast of the Project

The site is owned under two freehold holdings and is 46,259 hectares in total.

ES Figure 1 Regional Setting

Project summary

A Project summary is provided in ES Table 1.

ES Table 1 Project summary

Project element	Summary of the Project
Project term	Approximately 30 years, at which point key infrastructure may be repowered (subject to approvals) or the Project would be decommissioned.
Generating capacity	Up to approximately 1,400MW
Energy storage	Up to approximately 200 MW / 400 MWh (two hour duration) BESS.
Permanent infrastructure components	Up to approximately 180 wind turbines and all associated infrastructure required to access, construct, operate, maintain, refurbish and decommission the Project.
Staging	Likely to be constructed in two stages: • Stage 1: 45 wind turbines • Stage 2: 135 wind turbines
Turbine dimensions	Maximum ground to blade tip height of 300m Tower (hub) height: 130 - 180m Blade length 82 – 120m
Temporary construction facilities	Construction compounds, mobile concrete batch plants, gravel borrow pits and gypsum extraction if feasible. Workforce accommodation to supplement existing offsite facilities.
Disturbance areas	Estimated to be 819ha during construction. Rehabilitated to a 348ha operational footprint.
Transport, access and traffic	Main haulage route either from Port of Adelaide or Newcastle. Primary point of access off the Sturt Highway where a Basic Right Turn (BAR) and Basic Left Turn (BAL) intersection will be established.
Water requirements	Up to 250ML per annum during construction, sourced primarily from existing and proposed onsite bores and / or from Billabong Creek.
Construction timeframe and hours	If constructed as one stage (worst case), approximately 36 months, with peak periods expected from months 9 -24. Rotating roster for the various contractors necessitating 7 days per week (6am – 6pm) working hours.
Operational hours	24 hours per day, 7 days per week.
Workforce (estimated full time workers)	350-400 over the construction period. 35 during operations.
Estimated development cost	$2.8 billion

Project need and benefits

The Baldon Wind Farm Project would be located within the South West Renewable Energy Zone (REZ). REZs are being located strategically to maximise the benefits and smooth the transition to greater renewable energy development. This is expected to capitalise on economies of scale to deliver cheaper, reliable and clean electricity to NSW homes and businesses.

The Project will provide:

An injection of 1,400 MW of renewable energy into the NEM, equating to approximately 3.4GWh of renewable electricity, displacing coal and gas fired generation.

Renewable energy to power equivalent to almost six hundred thousand homes (598,000 based on the average NSW home electricity usage of 5,745kWh).

200MW/400MWh of battery storage to ‘firm’ the power supply and provide reliable energy to the NEM.

An investment of 1-2 billion dollars, most of which will be invested in NSW.

Positive impacts have been enhanced by commitment to a suite of initiatives and economic stimulus such as the Industry Participation Plan, Community Benefit Sharing Framework, Workforce Management and Accommodation Strategy as well as the Strategic Projects Fund and Communities Fund. These benefits extend through local and regional businesses, local government and the broader community. The Project would be proactive in collaborating with local councils and other key regional economic development stakeholders to support local workforce development and maximise local economic benefits throughout the life of the Project.

At the local level, the benefits are planned to include:

Direct financial benefits to participating landowners.

Direct financial community benefits through agreed Community Benefit Schemes (CBS) with the Hay Shire Council and Murray River Shire Council.

Investment in local suppliers of materials and labour during the construction period.

Approximately 350-400 full-time equivalent jobs during the peak of the construction.

Approximately 35 permanent skilled jobs for the life of the Project.

Project location and values

The Project is located within the flat riverine plains between the townships of Hay and Balranald. Flat terrain with chenopod shrublands and grasslands characterise the site. Few watercourses occur and they are most often dry. Scattered solitary trees are sparse.

The Subject land, where Project infrastructure would be sited, is approximately 2,842ha. The proposed Development footprint covers 819 ha. While the distribution of the Project's impacts would be a very small proportion of the total land holdings (approximately 2% during construction reducing to less than 1% during the operational phase), the environmental survey effort required to understand and manage the environmental impacts has been extensive, particularly to understand the site's key values; Aboriginal heritage and biodiversity. These values are now well understood, and information gained will help manage the Project's impacts as well as leave a legacy of improved local knowledge.

Biodiversity

The site has a history of disturbance and overgrazing. The key strategy used to remediate the site in the 1990's was the planting of native saltbush in rows, to stabilize and capture soil. The rows are still apparent today and have assisted to restore habitat and improve soil conditions. After wetter than average seasonal conditions in recent years, today the vegetation communities score very highly in terms of their species diversity, structure and functional properties. After a targeted survey program spanning winter, spring and summer seasonal windows, the field teams recorded:

- Ten native vegetation communities – dominated by moderate condition grasslands
- Two threatened flora species - Chariot Wheels *Maireana cheelii* and Mossgiel Daisy *Brachyscome papillosa*
- Two threatened fauna species in the Development footprint - Southern Bell Frog *Litoria raniformis and* Plains-wanderer *Pedionomus torquatus*
- Nine threatened bird species during the first year of bird utilisation surveys - White-fronted Chat *Epthianura albifrons* Little Eagle *Hieraaetus morphnoides*, Black Falcon *Falco subniger*, Spotted Harrier *Circus approximans*, and Black-breasted Buzzard *Hamirostra melanosternon*
- Two threatened species of microbat during the first year of bat utilisation surveys - Forest Bat *Vespadelus baverstocki* and Little Pied Bat *Chalinolobus picatus.*

Spring surveys in 2024 will address some species assumed to occur and bird and bat utilisation surveys will continue until a full two-year seasonal profile of their activity is compiled. The extensive results collated to date reflect a site that has been able to recover and be repopulated by the region's unique biodiversity assemblage.

Aboriginal cultural heritage

The cultural heritage surveys, carried out with the Aboriginal community representatives, have uncovered a rich history of sustained land use. Survey transects were undertaken on foot and in vehicles across virtually the entirety of the proposed Development footprint. A combined total of 1,090km of walked survey transects were undertaken in addition to 220km of vehicle transects.

The team recorded 206 new cultural heritage sites. Isolated artefacts and artefact scatters were the most numerous sites recorded but many sites contained multiple features. The overall cultural and scientific value of the sites was deemed to be of high significance. Most notably, were the burial sites, mounds, hearths, and culturally modified trees identified. These features have had the largest impact on the Project's layout. Several additional surveys were carried out to find ways to avoid key sites.

Agricultural land use

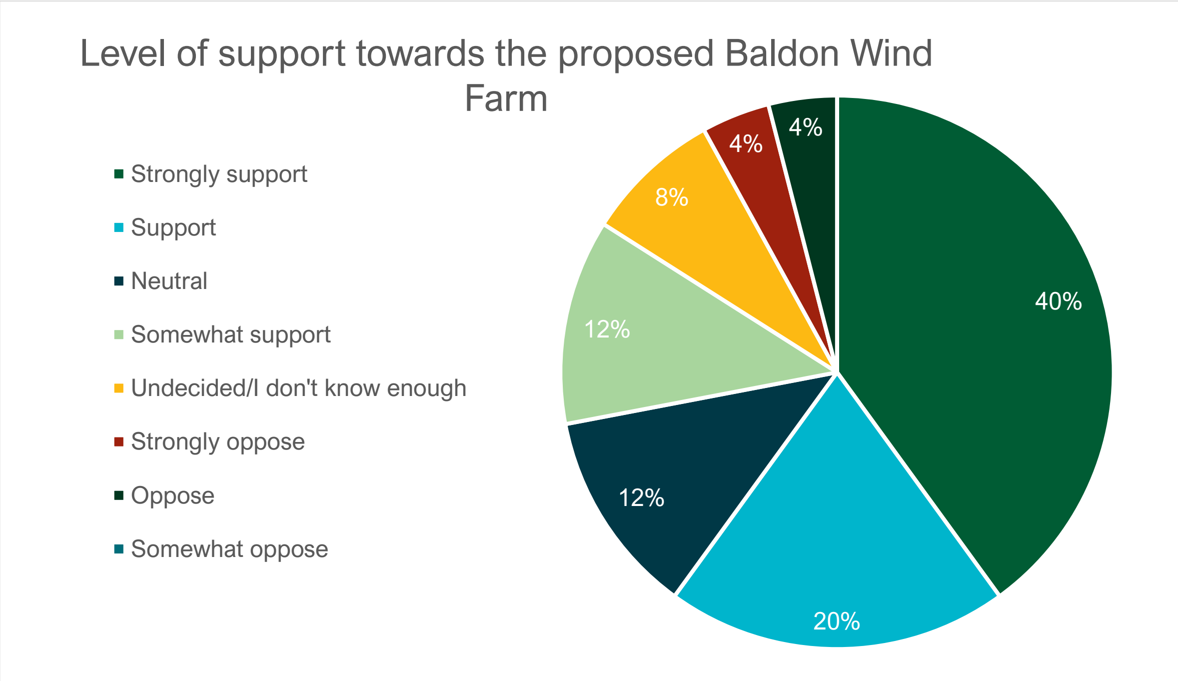
The site is zoned RU1 Primary production and is used for grazing activities. No Biophysical Strategic Agricultural Land (BSAL) occurs within the Project area and these soils were verified in field survey and lab analysis to have high to severe limitations to cultivation. Primarily the Landscape Soil Capability Class is Class 5; low impact agricultural practices can be sustainable on these lower capability lands. Grazing rates onsite are generally 1 sheep per 2 ha on average; typical for this region. Soil surveys of the site have informed the assessment of Project impacts and will continue to inform specific rehabilitation strategies to restore all areas of soil that are disturbed by the Project, drawing on lessons learned from past restoration activities and aiming to restore the diverse native vegetation assemblage after construction, for a much reduced operational Project footprint. Grazing is proposed to continue largely unaffected throughout the life of the Project. The additional income stream provided to host landowners will enable a climate proof income stream for their continued activities as the region adapts to greater extremes of climate over the next 30 years.

Community impacts

Community consultation and social impact assessment have evaluated the impact the Baldon Wind Farm Project is likely to have on the local and regional community. Key aspects that were evaluated include:

- Way of life
- Community
- Accessibility
- Culture
- Health and wellbeing
- Surroundings
- Livelihoods
- Decision-making systems

Feedback from the community was mostly positive, with the community commenting that they feel familiar and optimistic toward the Project and the Applicant. The factor that garnered the most interest was community benefits, with almost all stakeholders noting a desire and enthusiasm for the potential benefits the Project may bring to the area. As shown in ES Figure 2 an overwhelming number of survey respondents – 72% - indicated support for the Project and for the potential benefits that it could bring to the local area.



ES Figure 2 Survey results for community level of support for the Project

Key issues raised by the community have informed the assessment of impacts. Detailed assessment and mitigation strategies have been developed to address these issues including workforce employment and accommodation, visual impacts, pollution and bushfire.

Key environmental impacts and mitigation commitments

The key findings of the environmental assessment are presented below in ES Table 2, alongside the commitments the Project has developed to address them.

ES Table 2 Key impact assessment findings and mitigatin commitments

Biodiversity	• No Terrestrial Threatened Ecological Communities would be impacted by the Project.

	• 15.6 ha of Murray River Endangered Ecological Community would be impacted; associated with Abercrombie Creek and its riparian areas. This is an ephemeral waterway which was dry during all of the ecological surveys.
	• 805.54 ha of native vegetation, dominated by PCT 164: *'Cotton Bush open shrubland of the semi-arid (warm) zone',* would be removed. This includes confirmed habitat for:
	  o Mossgiel Daisy *Brachyscome papillosa*
	  o Chariot Wheels *Maireana cheelii*
	  o Southern Bell Frog *Litoria raniformis*[1]
	  o Little Eagle *Hieraaetus morphnoides*
	• No high bird or bat collision risks during operation are anticipated however, ongoing monitoring is a commitment of the Project, targeting several moderate risk species.
	• One Serious and Irreversible Impact (SAII) candidate species, the *Plains-wanderer Pedionomus torquatus* is relevant but SAIIs are not anticipated for this species.
	The linear clearing pattern required for the Project and the prolific distribution particularly of Mossgiel Daisy *Brachyscome papillosa and* Chariot Wheels *Maireana cheelii* means that avoidance of impacts is not possible however, the Project includes:
	• Further surveys to address key uncertainties – several species assumed to occur are considered highly likely to be 'ruled out' in September 2024 during further surveys.
	• Design measures to minimise impacts of infrastructure placement – minimising the footprint in higher value areas.
	• Mitigation to address local biodiversity threats, such as pest animals, and to ensure rehabilitation of disturbance is successful.
	• Ongoing monitoring and adaptive risk management to manage collision risks during operation.
	• Biodiversity offset commitments including Stewardship agreements to enhance and protect local habitats in perpetuity.

Aboriginal cultural heritage	• The field program recorded 206 new sites during the assessment of which 118 will be avoided – these important findings have had the largest impact on the Project's infrastructure layout. • Further avoidance of sites is likely to be achieved by micro siting the design of the final Development Footprint. • A similar density of artefact and hearth sites are expected to remain within the Project area and across the wider region. The overall impact on the archaeological record for the region is therefore likely to be minimal. • Mitigation will include a Cultural Heritage Management Plan to contain site-specific mitigation measures and a continued role for Aboriginal community stakeholders.
Landscape and visual	• Specific local areas were assessed to have moderate scenic quality: Willows Picnic Area and Campground, Willows Visitor Access Trail, Abercrombie Creek, Billabong Creek Edward River and associated floodplains, Moulamein Lakeside Caravan Park. However, in consideration of public view points, wind turbines

[1] These are areas surrounding dams where the species was found; no dams would be removed by the Project.

	would dominate the visual catchment from only two public viewpoints on the Sturt Highway, adjacent to the Project: VP06 and VP07 (St Pauls Rest Area). • The preliminary assessment tool identified 14 non-associated dwellings within 8km of a wind turbine for further assessment: None were closer than 4km. • The detailed assessment assessed that two of these dwellings are likely to experience a moderate visual impact rating and the Project has proposed vegetation screening in consultation with the landholders to reduce impacts. • All others were rated 'low' to 'negligible'.

Social and economic	• The highest potential for adverse impacts to the community would be during construction, related to:
	  o Increased traffic during construction and associated construction noise, and dust.
	  o Pressure on the local labour force, local services and local accommodation.
	• The mitigated risk was assessed to be medium in all cases (with the possibility to reduce this to minor/minimal in most cases).
	• Environmental management mitigation strategies address visual amenity, traffic, noise, and dust separately.
	• Proactive initiatives will include collaborating with local councils and other key regional economic development stakeholders to support local workforce development and maximise local economic benefits.

Traffic and transport	• During the peak construction period, the road network is able to accommodate the Project traffic during the peak construction period. • The site access on Sturt Highway is expected to operate within minimal queues and delays, and the mid-block sections (crossings) within the vicinity of the site are also expected to continue to operate with a good level of service. • During construction approximately nine heavy vehicles per hour are estimated to be required and approximately 1,203 Over Size Over Mass (OSOM) vehicles overall would be required. • The road network is able to readily accommodate the traffic generated by the Project during the construction, operation, and decommissioning periods. • Specific mitigation measures have been included to address road safety risks and ensure that road asset impacts are borne by the Applicant.
Hydrology	• Project-specific infrastructure flood modelling is proposed in tandem with detailed design, to address data gaps and mitigate flood risks. • Management plans will include flood and emergency response preparedness protocols.
Noise and vibration	• No noise exceedances are predicted for any non-associated dwellings during construction or operational activities. This includes traffic noise. • Vibration impacts are not predicted to be detectable at any non-associated dwellings. • Some blasting may be required at the wind turbine foundations, and this has been considered separately. • Revised noise modelling will be undertaken once the selected equipment is finalised to provide further certainty.

Water, soils and land	• The Project area has specific soil and water use limitations and these have been considered and will assist to mitigate impacts on soil resources, water quality and quantity and the agricultural and broader catchment values that these foundations provide. • Soil limitations have been verified by soil surveys. Best practice soil conservation measures are included in the Project's design and will inform rehabilitation practices in all areas disturbed by the Project. • The Project's water requirement can be met by local sources. Should access to groundwater and surface water be required, the Applicant will apply for a Water Access License. • Agriculture land use will be re-established over the operational footprint (unless otherwise agreed with the landowner and/or regulatory authorities) and the operational footprint will be returned to an agricultural productivity potential that is approximately equivalent of pre-Project status, at the end of the Project's life.
Other impacts considered	• Historic heritage, hazards and risks including bushfire, air quality and waste were considered by desktop assessment and key risks have been found to be manageable. • Management strategies centre on specific environmental management plans and site protocols, coordinating with local and government stakeholders where relevant and backed up by site monitoring and reporting requirements. • Key uncertainties have been identified explicitly for all environmental issues assessed and strategies to address data gaps or assumptions are included within the identified mitigation measures for each issue, where required. This includes additional biodiversity surveys during appropriate seasonal windows and Project-specific flood modelling.
Cumulative	• The Baldon Wind Farm Project would be located within the South West Renewable Energy Zone and as such cumulative impacts may result from the interaction of projects. These have been considered in terms of environmental effects as well as social impacts and the potential benefits as well as potential to exacerbate adverse impacts. • Cumulative impacts during construction may occur if the proposed Wilan, Keri Keri or Tchelery wind farm construction activities are undertaken concurrently. Key adverse cumulative impacts in this case could include social (labour and skills shortages, pressure on social infrastructure, services and housing and accommodation), traffic, visual and biodiversity impacts. These can be addressed by the Baldon Wind Farm Project's mitigation strategies in each of these areas. • Opportunities to coordinate and maximise the benefits of the Project have also been identified and include the identification of strategic biodiversity offsets and positive economic impacts such as increased employment, additional procurement, and training opportunities, increased local and regional economic development and opportunities, increased generation of renewable energy and increased community investment.

ES Figure 3 Typical grasslands of the Project area

ES Figure 4 Low stocking rates, typical of the area

Ability to be approved

The Baldon Wind Farm Project would result in numerous benefits, local and regional. The Project addresses local, state and Commonwealth policies aimed to facilitate the required transition to renewable energy generation.

The Project meets relevant planning requirements and is consistent with the principles of Environmentally Sustainable Development (ESD), which have been incorporated in the design, and will be incorporated into construction, ongoing operations and decommissioning of the development.

As there is not capacity in the SWREZ for all renewable Projects currently being proposed, the Baldon Wind Farm Project has sought to differentiate itself as an important Project worthy of support by regulators and the community. As set out in this EIS, it is a Project that:

- Is responsive to environmental, cultural and social values
- Is conservative in its assessment of impacts and outline of adaptive site-specific management strategies to address risk and uncertainty.
- Proactively seeks opportunities to maximise Project benefits for the environment and to the surrounding communities.

Where to from here

During the public exhibition of this EIS, the community, local council and government agencies are invited to make informed submissions in relation to the Project. The consent authority would consider any formal submissions made during the exhibition period. The Applicant's response to all matters raised in submissions will also be exhibited as Department of Planning, Housing and Infrastructure (DPHI) commence preparation of their own assessment of the Project's impacts and its merits and make a recommendation regarding its ability to be approved.

Please take the opportunity to make a submission directly to the DPHI and to participate in the future engagement activities planned prior to the Project's determination.

01 Introduction

1. Introduction

This chapter introduces the Project and the Applicant, identifies Project objectives and outlines the purpose and structure of this Environmental Impact Statement (EIS). It also outlines the strategies which have been used to inform the Project location, siting of Project elements and how the Project has worked to avoid first and secondly minimise environmental, cultural and social impacts.

1.1. Project overview

Baldon Wind Farm Pty Ltd (the Applicant) proposes to construct and operate the Baldon Wind Farm (the Project), a renewable energy generation and storage development located between Balranald and Hay, NSW, and within the Southwest Renewable Energy Zone (SWREZ).

The Project would consist of up to 180 wind turbines, each approximately 8MW capacity with a maximum tip height of 300m, to provide power to the National Electricity Market (NEM). The Project is targeting 1,400MW capacity. The Project may be installed in two stages:

- Stage 1 would consist of the grid connection works, 45 turbines and associated infrastructure.
- Stage 2 of the Project would include the construction of the remaining 135 turbines and additional associated infrastructure.

The Project would include all the associated infrastructure which is required to connect the Project to the National Energy Market (NEM), provide access to construct, operate, maintain, and decommission the Project, and allows for inclusion of either a distributed or centralised battery energy storage system (BESS). The BESS components would optimise the Project by including energy storage to supply to the NEM in higher demand periods and to address grid system strength requirements. The combined BESS storage and energy discharge capacity could be up to approximately 200MW/400MWh (2 hour storage duration).

The Project would be designed for an operational lifetime of approximately 30 years, with the potential for an additional 30-year operational period, or more, where the Project infrastructure would be refurbished and re-energised in the future, a scenario that appears feasible based on expectations of future renewable energy requirements.

The Project is situated within the Riverina-Murray region, with the majority located in the Murray River Local Government Area (LGA) and the northern part within the Hay Shire LGA (as shown in Figure 1-1). The Project area comprises two rural properties (held by two different landowners) and is approximately 38km north to south and 15km east to west, covering about 46,259ha.

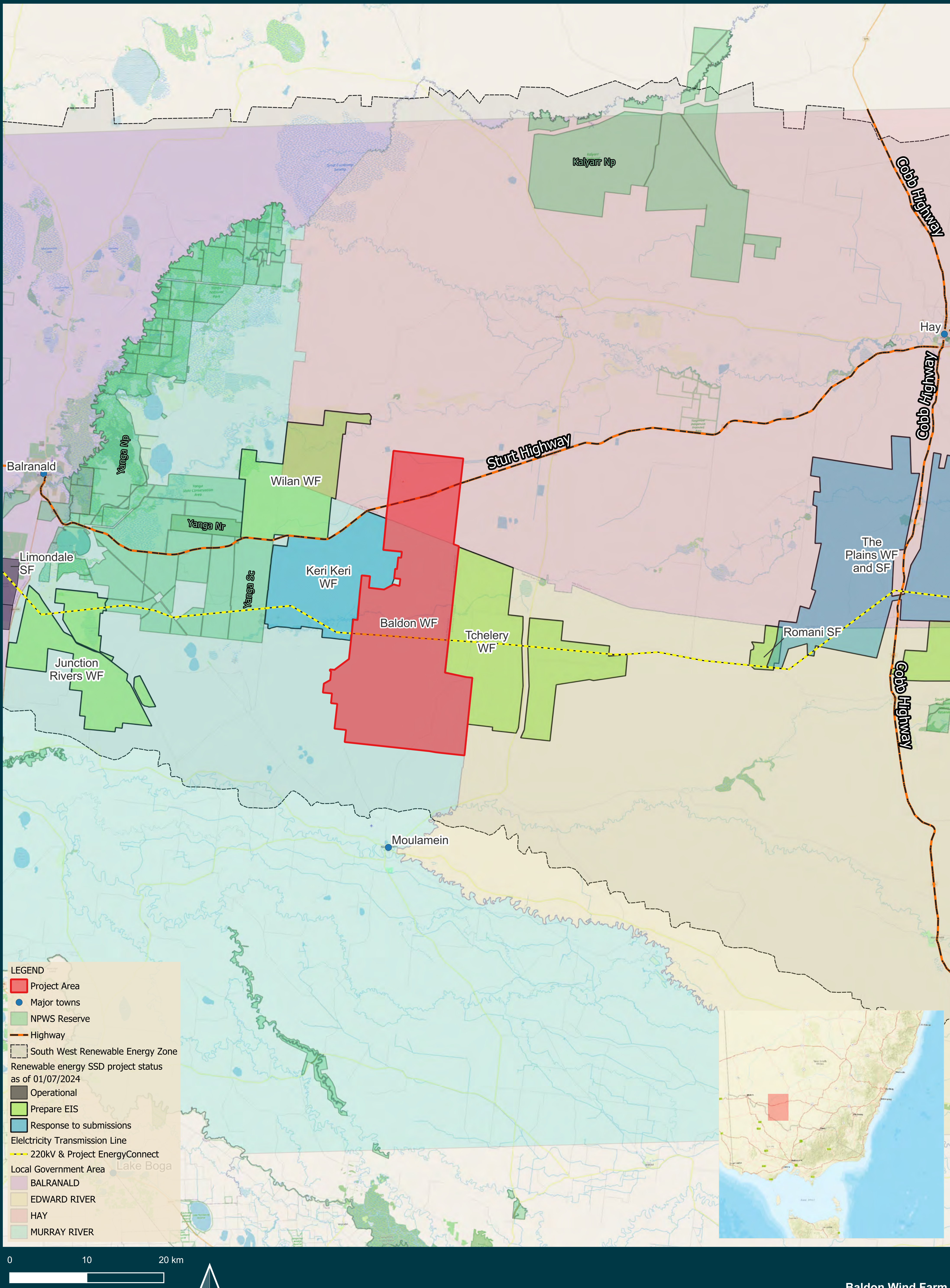
The Project is situated within the plain's country with the Murray River to the southwest (~45km) and Murrumbidgee River to the north (~25km), mostly avoiding the higher value agricultural zones or the river floodplains. It is also within an area of low-density rural settlement and distant from the larger regional towns as listed below:

- Moulamein, approximately 13km to the south of the Project
- Balranald, approximately 44km to the west of the Project
- Hay, approximately 64km to the northeast of the Project
- Deniliquin, approximately 100km to the southeast of the Project

The Sturt Highway traverses the northern portion of the Project area and the existing Darlington Point-Balranald 220kV transmission line passes through the central part of the Project area. The new 330kV 'Project Energy Connect' transmission line is being constructed adjacent to the existing 220kV line.

The Project may connect to one or both these transmission lines (or to future transmission upgrades in the region, subject to approval).

Figure 1-2 shows the general layout of the Project.



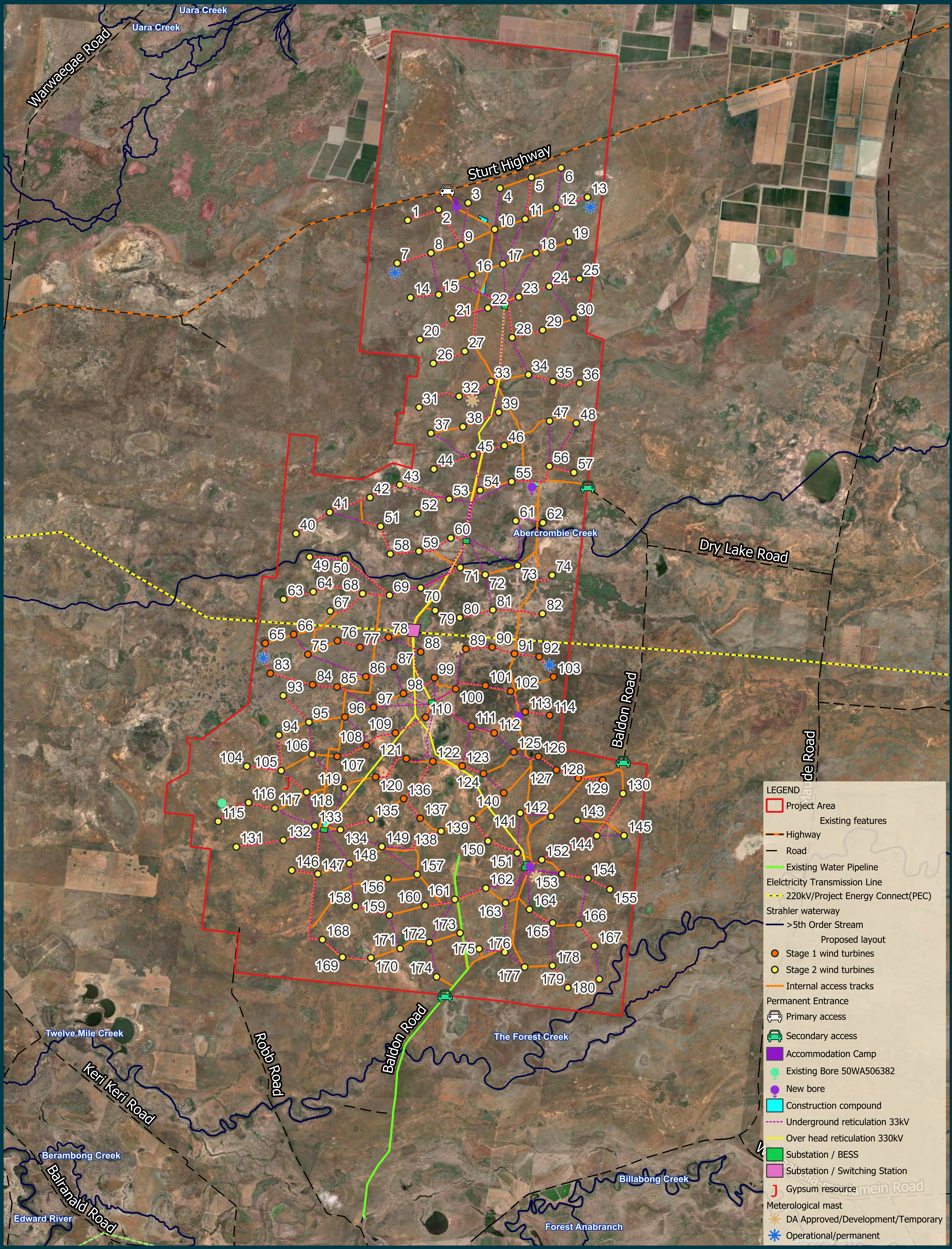
Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

Figure 1-1 Baldon Wind Farm location and regional setting

Ref: 22-366 Baldon Wind Farm EIS 20240229 \ Regional context Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022



0 2.5 5 km

Datum: GDA2020 / MGA Zone 55

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Ref: 22-366 Baldon Wind Farm EIS 20240229 | Project layout for EIS body Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022

Baldon Wind Farm

Figure 1-2 Baldon Wind Farm general layout

1.2. Project objectives

The objective of the Project is to generate and store renewable electricity for use throughout the state and beyond. The Project would provide significant additional renewable energy into the NEM.

The Project would:

- Improve the security, stability and resilience of the NEM, while assisting the transition away from coal fired power generation.
- Be located to contribute to the development of the SWREZ, which enhances economies of scale efficiencies for new network infrastructure.

There is not capacity in the SWREZ for all renewable Projects currently being proposed. Baldon Wind Farm differentiate itself as an important Project worthy of support by regulators and the community. As set out in this EIS, it is a Project that:

- Is responsive to environmental and social values and appropriately demonstrates the principles of avoid first and secondly minimise and mitigate impacts.
- Proactively seeks opportunities to maximise Project benefits for the environment and to the surrounding communities.

1.3. The Applicant

A propriety limited company has been established for the Project, Baldon Wind Farm Pty Ltd; henceforth, the Applicant. Baldon Wind Farm Pty Ltd is owned by a partnership between Goldwind Capital (Australia) Pty Ltd and Omni Wind Pty Ltd. The Project is being developed by Goldwind Capital (Australia) Pty Ltd (Goldwind), on behalf of the Applicant.

Goldwind was established in Australia in 2009 and has main offices in Sydney and Melbourne, in addition to several local site offices which together employ more than 180 people across Australia. Goldwind is involved in both the development of wind farm Projects across Australia and in the supply of wind turbines to the Australian market. Goldwind is a subsidiary of Xinjiang Goldwind Science & Technology Co Ltd (Goldwind International) which is a major manufacturer of wind turbine technology and energy solutions, having supplied over 31,000 wind turbines globally over the past 21 years which now exceeds 50GW of installed capacity.

Since establishment of activities in Australia, from 2009, Goldwind has delivered several significant renewable energy Projects (approx. 2GW) across Australia, some in conjunction with other development partners. These include:

- Mortons Lane Wind Farm (20MW) ,Vic
- Gullen Range Wind Farm (165MW), NSW
- White Rock Wind Farm (175MW), NSW
- Moorabool Wind Farm (312MW), Victoria
- Stockyard Hill Wind Farm (530MW), Victoria
- Cattle Hill Wind Farm (144MW), Tasmania
- Biala Wind Farm (108MW), NSW
- Several microgrid Projects, Western Australia, (Agnew, Esperance, Kathleen Valley)
- Clarke Creek Wind Farm (450MW), Queensland (under construction)

Contact and business information for the Applicant is listed in Table 1-1

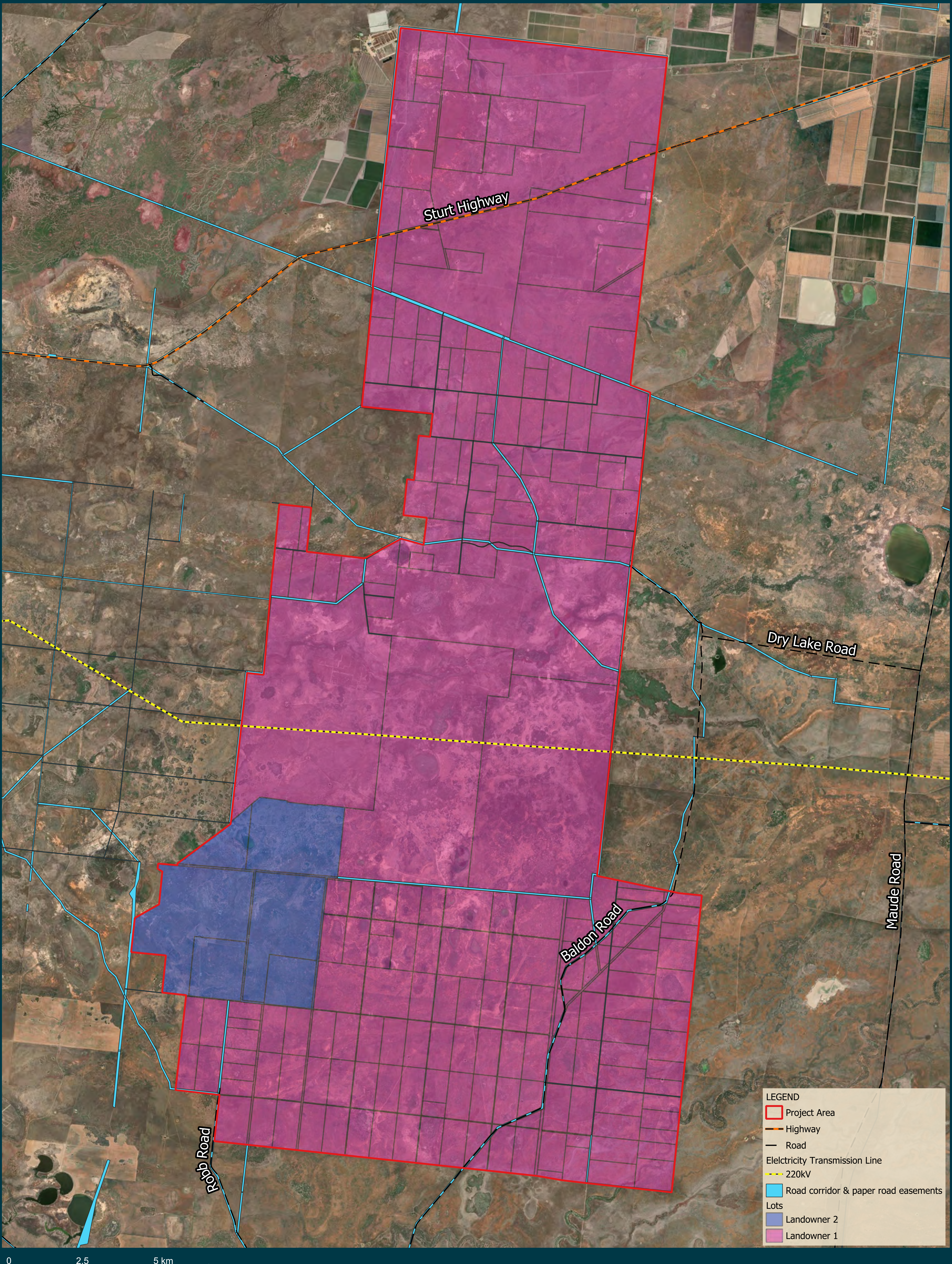
Table 1-1 Applicant details

Baldon Wind Farm Pty Ltd	
ABN	612 375 050
Postal Address	Level 25, Tower 1, 100 Barangaroo Avenue, Barangaroo Sydney NSW 2000

1.4. The Project area

The Project area is comprised of freehold rural land holdings, owned by two separate landholders, as shown in Figure 1-3. It also includes Crown land easements and Council roads. Murray River Council is associated with Keri East Road and Baldon Road. The site access will intersect Transport for NSW's road corridor along the Sturt Highway. Appendix A includes the complete schedule of lands within the Project area.

Neighbours within 10km of proposed wind turbines are shown as potential receivers on Figure 1-4.



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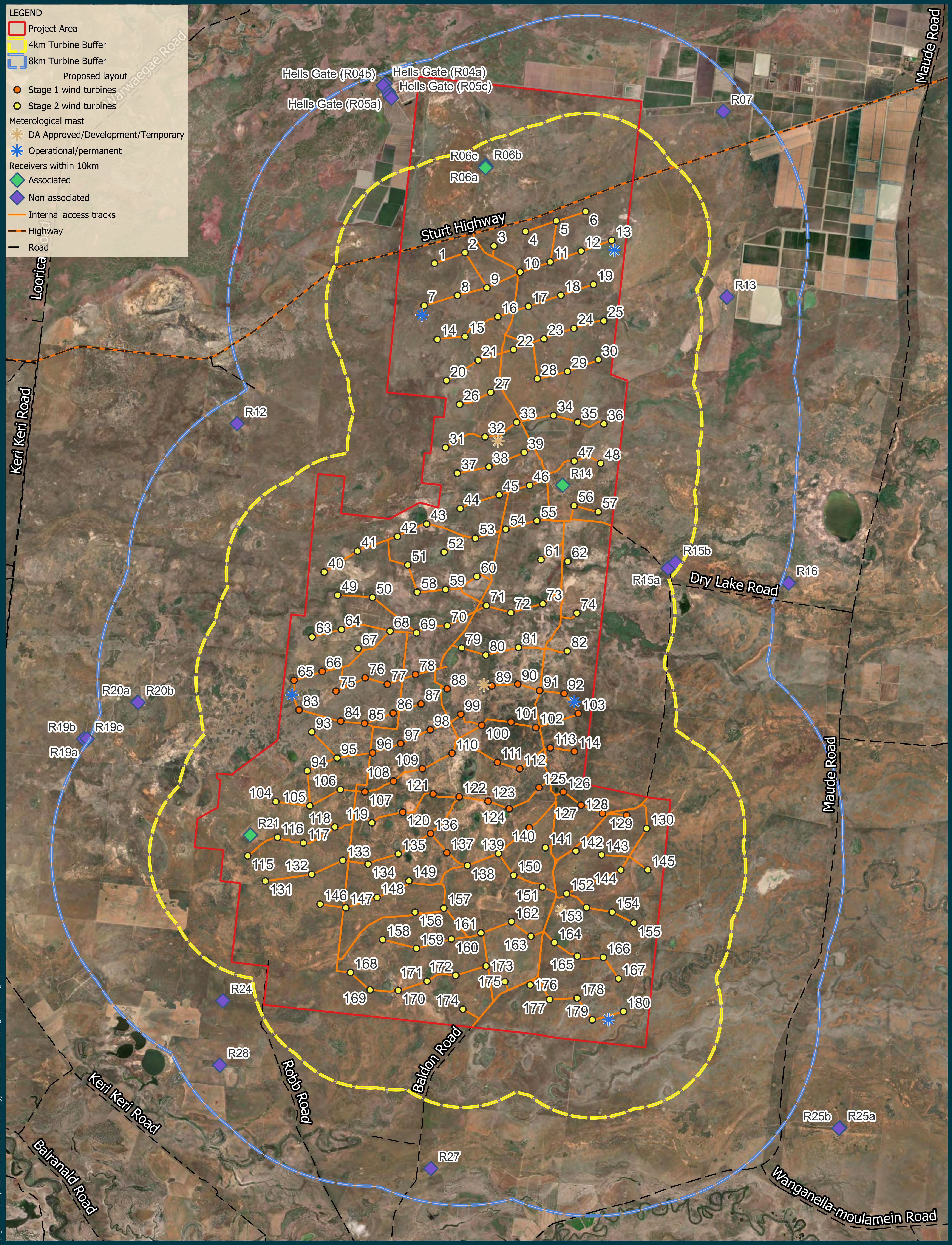
Baldon Wind Farm

Figure 1-3 Land ownership



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Baldon Wind Farm

Figure 1-4 Nearby receivers

Ref: 22-366 Baldon Wind Farm EIS 20240229 | Figure 1-4 Nearby receivers Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022

1.5. Project evolution to avoid or minimise impacts

The Project as it is currently presented has been developed over several years. This has been necessary to investigate and respond to the Project area's complex environmental, cultural and social values, in tandem with optimising the Project's generation potential and constructability factors. This work has been achieved through ongoing investigations and in consultation with specialists and local stakeholders.

The Project presented and assessed in this EIS is a result of this 'evolution', aimed first at avoiding impacts where possible, and secondly at developing appropriate minimisation and mitigation strategies.

Key milestones which informed this Project evolution to date are summarised in Table 1-2.

Table 1-3 provides a summary of the most significant features influencing the Project. This table appreciates that each impact is complex and for the complete assessment of the impact please refer to the relevant chapter or technical report.

Table 1-2 Project evolution timeline

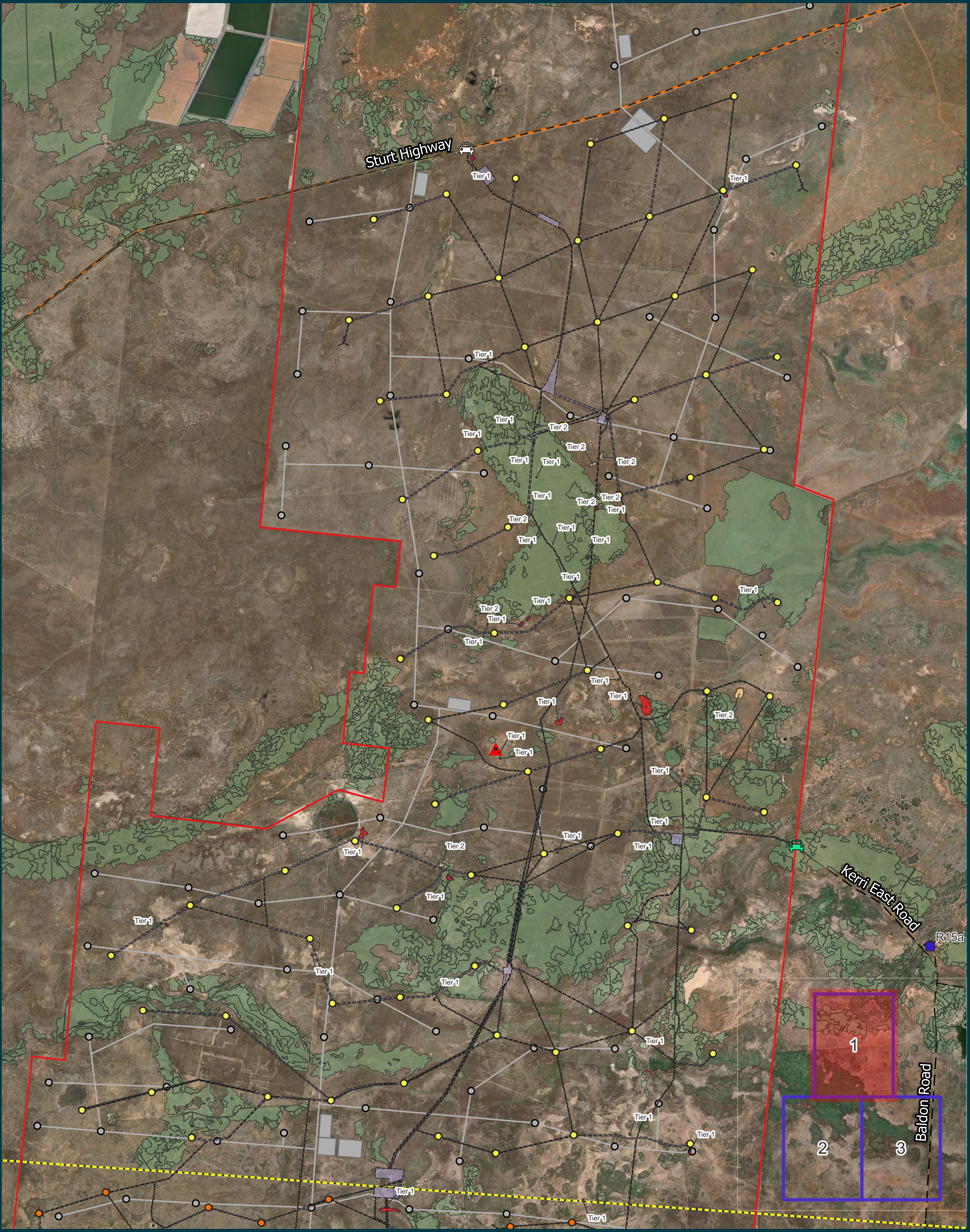
Early layout testing 2018	The wind farm site layout was initially designed to reflect wind resource mapping. The key avoidance considerations at this early stage were noise and visual amenity of neighbours.
Preliminary constraints analysis 2019	A preliminary constraints analysis was commissioned to consider a broad range of environmental, cultural and social factors. This work was largely desktop but included rapid 'ground truthing'. It led to some key early decisions aimed at avoiding impacts, including: • Visual amenity: turbines north of the Sturt Highway were scrutinised with regard to impacts on non-associated dwelling R07 in particular. • Biodiversity: vegetation with potential to belong to Threatened Ecological Communities was largely avoided. Key Fish Habitat and riparian areas were avoided. • Cultural heritage: landforms likely to have cultural heritage significance as well as registered heritage sites were avoided.
Design refinements 2020-2022	Progressive design refinements were made in response to more detailed biodiversity and cultural heritage investigations leading to the layout presented in the Project's Scoping Report, 2022. An addendum Scoping Report was lodged in 2023, reflecting further discussions with host landholders, showing boundary adjustments, updated landowner classifications as well as additional turbine locations.
Key constraints workshop 2023	By the end of 2023, most specialist investigations were nearing completion, in terms of their field survey data compilation. A constraints workshop was held with key specialists (biodiversity and cultural heritage) to consider the updated results and how the Project could better avoid impacts. Tier 1 issues, considered likely to affect permissibility or the ability for regulators and stakeholders to support the Project were prioritised. These included anthropogenic mound features and sites with human remains.

	Teir 2 issues, considered able to withstand some level of impact, included culturally modified trees and potential archaeological deposits. They also included biodiversity features including confirmed habitat for: Mossgiel Daisy (*Brachyscome papillosa*) – Prolific and widespread in the north of the site, including areas of dense and more sparse populations. Chariot Wheels (*Maireana cheelii*)- Prolific and widespread in the south of the site, including areas of dense and more sparse populations. Southern Bell Frog (*Litoria raniformis*) - Prolific and widespread in dams within the site. Plains-wanderer *(Pedionomus torquatus)* – Recorded in several locations and identified as able to use most of the site. Little Eagle (*Hieraaetus morphnoides*) – Confirmed nest and potential nests. Given the widespread nature of the Teir 2 threatened flora and fauna records, minimisation rather than avoidance became the appropriate strategy. Species-specific mitigation strategies were presented to regulators.
Design refinements and supplementary surveys 2024	The 'avoidance' decisions made in the 2023 workshop necessitated several supplementary cultural heritage and biodiversity surveys in new areas now required to 'go around' Teir 1 constraints. As the detailed specialist assessments concluded, the full data set contradicted some earlier assumptions and confirmed: No Threatened Ecological Communities were present onsite. Noise exceedances were not predicted for any non associated dwellings. Further design refinements are expected to continue in response to submissions raised
Response to submissions **Detailed design 2024-2025**	Further design refinements are expected to continue in response to the submissions raised by the community and regulators, after the exhibition of the EIS. Further design refinements will also occur as competitive tender processes continue to inform detailed construction and design decisions.

Table 1-3 Avoid and minimise outcome summary

Impact	High value features	Avoidance	Minimise
Aboriginal cultural heritage **Refer to Section 6.2 and Appendix F.2**	Anthropogenic mound features and sites with human remains	Several changes to avoid these features, as shown in Figure 1-5, Figure 1-6, Figure 1-7.	Commitment to salvage and relocation of items that are in the disturbance footprint.
Biodiversity **Refer to Section 6.1 and Appendix F.1**	Threatened Ecological Communities (now confirmed to be absent). Threatened species including Mossgiel Daisy (*Brachyscome papillosa*), Chariot Wheels (*Maireana cheelii*), Southern Bell Frog (*Litoria raniformis*), Plains-wanderer *(Pedionomus torquatus)* and Little Eagle (*Hieraaetus morphnoides*).	Early layouts aimed to avoid Threatened Ecological Communities, as shown in Figure 1-5, Figure 1-6, Figure 1-7. The Project now avoids dams and nests identified as threatened species habitat.	Species-specific mitigation strategies have been developed to minimise the infrastructure footprint in core population areas and speed the appropriate rehabilitation of disturbed areas.
Visual amenity **Refer to Section 6.3 and Appendix F.3**	Views from nearby sensitive receivers.	Turbines north of Sturt Highway have been removed from the footprint. Avoiding notable visual impacts to R07.	Screening plantings are proposed from the two receivers that receive moderate impacts. These are R13 and R24.
Social and economic **Refer to Section 6.4 and Appendix F.4**	Key community and stakeholder issues relevant to the Project are multifaceted.	Due to the scale of the Project social impacts, avoidance is limited. As such the focus is put into minimising impact and where possible enhancing positive impacts such as local industry participation and benefit sharing.	Three key plans will be developed in response to and drawing from the social impact assessment. These are: 1. Community and Stakeholder Engagement Strategy 2. Industry Participation Plan 3. Community Benefit Sharing Program

Impact	High value features	Avoidance	Minimise
Traffic and transport **Refer to Section 6.5 and Appendix F.5**	The key impact for traffic for the Baldon Wind Farm Include the interaction of heavy vehicles with peak hour traffic, pedestrian infrastructure and bus routes.	The TIA recommends that the movement of Over Size and Over Mass (OSOM) vehicles is timed to not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network, which can be undertaken as part of the permit application. The TIA also recommends that heavy vehicle avoid peak school bus times to limit the interaction of larger vehicles and vulnerable road users.	The TIA states that during the construction program neighbouring properties will be consulted with regarding the timing of major deliveries which may require additional traffic control and disrupt access.
Historic heritage **Refer to Section 7.1**	A number of items with potential heritage significance discovered.	Commitment overall to avoidance of known items.	Commitment to further study for appropriate relocation of items if they are in the disturbance footprint.



LEGEND

Project Area
Existing features
Highway
Road
220kV Project Energy Connect(PEC)
Scoping report layout
Scoping Report wind turbines
Scoping report facilities locations
Scoping report internal tracks
Scoping report potential TEC avoidance
EIS Proposed layout
Construction Disturbance Footprint
Stage 1 wind turbines
Stage 2 wind turbines
Internal access tracks
Permanent Entrance
Primary access
Secondary access
Tier 1 and 2 EIS constraints
Key Fish Habitat
Non-associated dwellings
Aboriginal heritage tiered polygons
Tier 1
Tier 2
Aboriginal heritage tiered points
Tier 1

0 1 2 km

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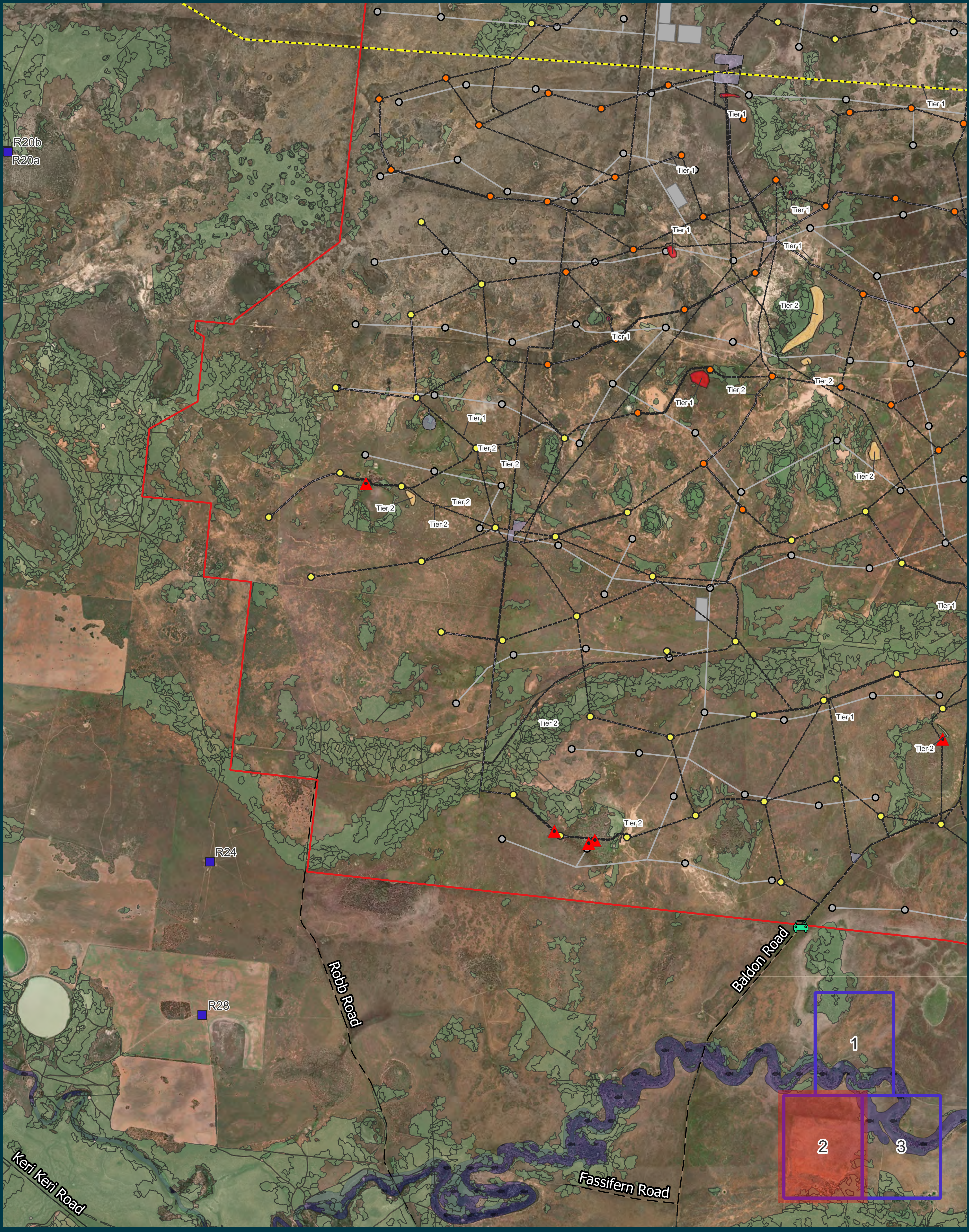
Baldon Wind Farm

Figure 1-5 Project evolution map 1 of 3

Ref: 22-366 Baldon Wind Farm EIS 20240229 \ Project Evolution [low detail atlas] Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022



LEGEND

Project Area

Existing features

Highway

Road

220kV Project Energy Connect(PEC)

Scoping report layout

Scoping Report wind turbines

Scoping report facilities locations

Scoping report internal tracks

Scoping report potential TEC avoidance

EIS Proposed layout

Construction Disturbance Footprint

Stage 1 wind turbines

Stage 2 wind turbines

Internal access tracks

Permanent Entrance

Primary access

Secondary access

Tier 1 and 2 EIS constraints

Key Fish Habitat

Non-associated dwellings

Aboriginal heritage tiered polygons

Tier 1

Tier 2

Aboriginal heritage tiered points

Tier 1

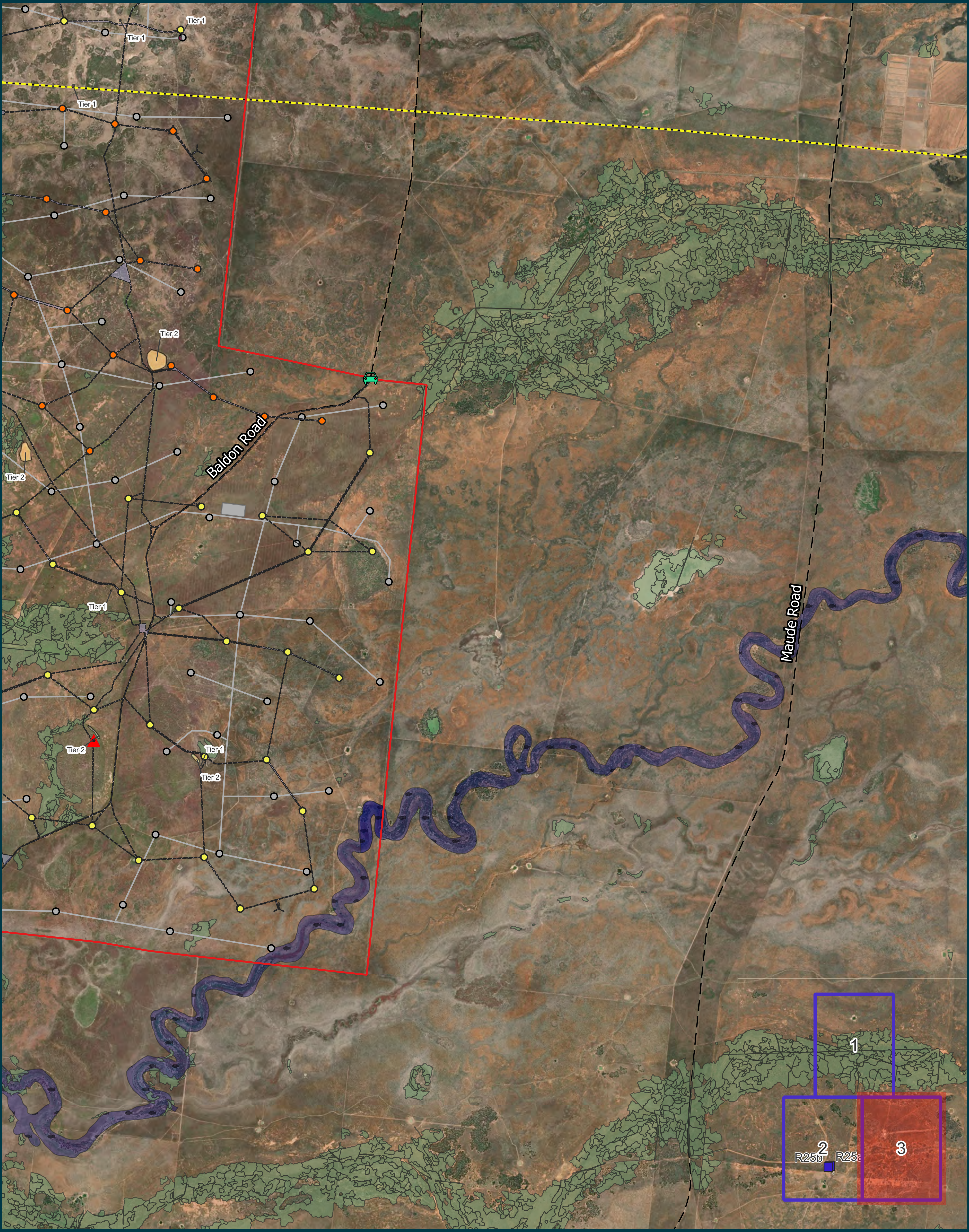
0 1 2 km

NGH

Datum: GDA2020 / MGA Zone 55

Baldon Wind Farm

Figure 1-5 Project evolution map 2 of 3



LEGEND

Project Area

Existing features

Highway

Road

220kV Project Energy Connect(PEC)

Scoping report layout

Scoping Report wind turbines

Scoping report facilities locations

Scoping report internal tracks

Scoping report potential TEC avoidance

EIS Proposed layout

Construction Disturbance Footprint

Stage 1 wind turbines

Stage 2 wind turbines

Internal access tracks

Permanent Entrance

Primary access

Secondary access

Tier 1 and 2 EIS constraints

Key Fish Habitat

Non-associated dwellings

Aboriginal heritage tiered polygons

Tier 1

Tier 2

Aboriginal heritage tiered points

Tier 1

0 1 2 km

NGH

Datum: GDA2020 / MGA Zone 55

Baldon Wind Farm

Figure 1-5 Project evolution map 3 of 3

Ref: 22-366 Baldon Wind Farm EIS 20240229 | Project Evolution [low detail atlas] Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022

1.6. Related development

Water supply demand and final options for supply (refer Section 6.8 regarding available surface water and groundwater opportunities) would be finalised during detail design and construction planning. If needed the potential upgrade of the existing water pipeline along Baldon Road would be subject to further assessment and approvals (refer to Figure 1-2).

Haulage route upgrades to the SWREZ are an issue for all wind farm projects currently proposed therein, noting the REZ does not have capacity for all projects currently proposed to be developed. The Project has provided and discussed with TfNSW a high level assessment approach, given the uncertainty about how many and which projects will be developed. It is understood that TfNSW may request further additional information in this regard during the response to submissions phase of the Project.

1.7. Restrictions or covenants on the land

Various Crown and council land road corridors traverse the site (refer to Figure 1-3 and statutory context in Chapter 4). It is intended that either a Crown Land Licence will be obtained where Project infrastructure traverses these areas, or the land will be acquired by the landholder in the case of Crown Lands.

All existing public access would be retained throughout the life of the wind farm.

1.8. Document purpose and structure

This Environmental Impact Statement (EIS) identifies and assesses the potential environmental, cultural and social impacts associated with the proposed Baldon Wind Farm (Baldon WF) State Significant Development (SSD-40138508). It aims to help the community, councils, government agencies and the consent authority to get a better understanding of the Project and its potential impacts so they can make informed submissions or decisions on the merits of the Project.

The structure and content of this EIS satisfies:

a) the specific requirements of the Secretary's Environmental Assessment Requirements (SEARs), issued by the then Department of Planning and Environment (DPE; now the Department of Planning, Housing and Infrastructure (DPHI)) on 04/07/2022 (refer to Section 5.1), for the Project under Part 8, Division 2 of the Environmental Planning and Assessment Regulation 2021; and
b) the general requirements for an EIS specified in Part 8, Division 5 of the Regulation including with respect to the State Significant Development Guidelines.

As it is being assessed under the Bilateral agreement with the Commonwealth, the EIS also addresses the assessment requirements of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This EIS has been prepared in two parts:

1. The main report describes the Project, summarises the findings of consultation activities and the detailed environmental assessment of the proposed Project including any potential impact and mitigation measures proposed to manage the impacts. The main document aims to be succinct with much of the detailed supporting information appended.
2. The supporting appendices include:

    - Appendix A Schedule of lands
    - Appendix B Project SEARs
    - The Project specific Secretary's Environmental Assessment Requirements (SEARs) which prescribe the structure and content of this EIS.
    - Appendix C Consolidated mitigation measures

- A consolidated table of proposed mitigation measures which form commitments of the Project, if approved.
- Appendix D Statutory context table
- Appendix E Community and Stakeholder Engagement
- Appendix F Technical reports
- Appendix F.1 Biodiversity Development Assessment Report
- Appendix F.2 Aboriginal Cultural Heritage Assessment Report
- Appendix F.3 Landscape and Visual Impact Assessment
- Appendix F.4 Social Impact Assessment
- Appendix F.5 Traffic Impact Assessment
- Appendix F.6 Noise and Vibration Impact Assessment
- Appendix F.7 Soils, Land and Agricultural Impact Assessment
- Appendix F.8 Preliminary Hazards Assessment
- Appendix F.9 Aviation Impact Assessment
- Appendix F.10 Electromagnetic Interference and (EMI) and Electromagnetic Fields (EMF) Assessment
- Appendix F.11 Blade Throw Assessment
- Appendix G Technical Appendices
- Appendix F.1 Air Quality
- Appendix F.2 Waste and recycling
- Appendix H Wind turbine locations and heights

02 Strategic context

2. Strategic context

This section outlines how the Project aligns with the NEM as well as international, Australian and NSW government economic, energy and emissions reductions policy and strategic goals and land use planning. The Project's development history is outlined in regard to alternatives considered and design revisions in consideration of risks and potential cumulative impacts.

2.1. Energy security

2.1.1 Australian Energy Market Operator

The 2024 Integrated System Plan (ISP) sets out how the Australian Energy Market Operator (AEMO) has identified the optimal development path (ODP) for the NEM and is a roadmap through the energy transition. The NEM services five regions – Queensland, NSW, Victoria, South Australia, and Tasmania. The plan is released every two years and aims to guide industry and government in the investments needed for an affordable, secure and reliable energy future, while meeting prescribed emissions trajectories. The 2024 ISP acknowledges that Australia's traditional energy supply system has been based on large-scale power stations with large-scale transmission systems and centralised asset hubs.

The need for renewable energy has been revised to 6GW of new energy per year compared to 4GW in the 2022 ISP to replace the coal generation. In response to the accelerated timeline for the closure of coal fired energy plants, the optimal development path requires significant additional utility-scale generation is required to replace the loss of coal-fired generation.

The AEMO states that there will be a demand for 82 GW of utility-scale wind and solar in the NEM by 2034-35, and 126 GW by 2049-50. 34GW of this energy would need to come from NSW. The Baldon Wind Farm provides a contribution to these targets through wind energy production and battery storage (refer to Section 2.8 for a summary of benefits to be gain from the construction of the Baldon Wind Farm).

2.2. Energy policy

2.2.1 Australia's long term emissions

Reduction plan 2021 and Nationally Determined Contribution (2022)

Australia's long term emissions reduction plan and the Nationally determined contribution to the UN via the Paris Agreement (developed during United Nations Framework Convention on Climate Change (UNFCC) COP21) sets the nations goals towards zero emissions by 2050 and 43% below 2005 levels by 2030 (Department of Industry, Science, Energy and Resources, 2021). This goal was set to achieve the goal of avoiding a 1.5^{o}C rise (from pre-industrial levels) in temperature by the end of the 21st century. The Project assists in this reduction through the generation of electricity from renewables, not fossil fuels.

There have been seven COP's since COP21. The latest outcomes from COP28 highlighted the need to triple global renewable energy capacity globally to meet the goals of the Paris agreement.

The Commonwealth *Climate Change Act 2022* enshrines into law an emissions reduction target of 43 percent from 2005 levels by 2030, and net zero emissions by 2050. In addition, the Act ensure a whole-of-government approach to drive towards the target. The government has formally lodged this target as an enhanced Nationally Determined Contribution under the Paris Agreement. The Act backs onto the Government's Powering Australia plan, which is focused on creating jobs, cutting power bills and reducing emissions by boosting renewable energy.

2.2.2 NSW and regional policy

Climate Change Policy Framework (2016)

The NSW Climate Change Policy framework outlines NSW's long-term objectives to achieve net zero emissions by 2050 and to make NSW more resilient to a changing climate (NSW Government, 2016). It guides the NSW Government's policy and programs, including the NSW Climate Change Fund and the NSW Electricity Infrastructure Roadmap. This Project aids in meeting the net-zero emissions by the 2050 target.

Net Zero Plan Stage 1: 2020 2030 (2020) and Implementation update (2022)

The NSW Department of Planning and Environment released the Net Zero Plan Stage 1: 2020-2030, in March 2020 along with the establishment of Renewable Energy Zones in regional NSW. The goal of establishing this Net Zero plan is to assist the State in the delivery of a 35% cut in CO2 emissions by 2030, when compared to 2005 levels. The plan highlights several key initiatives and is the first of three 10-year plans that set a pathway to net zero emissions by 2050. The Net Zero plan has several goals as highlighted below:

- A central focus on the creation of jobs
- Lowering energy costs for consumers
- Encouraging investment in technologies such as:
  - energy-efficient appliances and buildings,
  - rooftop solar panels,
  - firmed grid-scale renewables Projects,
  - electric vehicles and
  - electric manufacturing technologies.
- To provide levels of certainty to investors that NSW is a place to invest in renewable energy, efficient technologies, and sustainable materials
- Funding, targets, and programs that will help drive this change, such as:
  - Development of three Renewable Energy Zones in the Central-West, New England, and South West of NSW to drive up to $23 billion in investment and create new jobs
  - Development of a Green Investment Strategy, with Sydney as a world-leading carbon services hub by 2030,
  - Enhancement of the EnergySwitch service which enables consumers to compare the emissions performance of energy retailers
  - Establishment of a hydrogen program that will help the scale-up of hydrogen as an energy source and feedstock, and the setting of an aspirational target of up to 10% hydrogen in the gas network by 2030
  - $450 million Emissions Intensity Reduction Program
  - $450 million commitment to New South Wales from the Climate Solutions Fund
  - $1.07 billion in additional funding via both NSW and Commonwealth Governments in a range of measures. It is anticipated that the implementation of the Net Zero Plan, together with the NSW Electricity Strategy, will result in more than $11.6 billion of new investment for NSW, including $7 billion in regional NSW and see the creation of almost 2,400 new jobs.

The investment in wind and battery infrastructure related to this Project and its strategic location within the SWREZ makes it part of NSW's critical pathway to reaching the targets of the net zero plan.

Electricity Strategy (2019)

The three objectives of the NSW Government for the state's electricity system, as stated in the NSW Electricity Strategy, are:

- Reliability

- Affordability
- Sustainability.

The successful implementation of the NSW Government's Electricity Strategy will:

- Improve the efficiency and competitiveness of the NSW electricity market by reducing risk, cost, Government caused delays and by encouraging investment in new price-reducing generation and energy saving technology.
- Prompt Government to act if there is a forecast breach of the Energy Security Target which private sector Projects are unlikely to address. This should be done in a way that minimises costs to consumers and taxpayers and does not give rise to moral hazard risk.
- Ensure that there are appropriate powers available for Government to analyse and respond to electricity supply emergencies, should they arise.

This Project would contribute to the NSW government's plan to achieve the objectives for the electricity system which include reliability, affordability and economic growth and sustainability. The contribution of the Project to local employment and economy is set out in detail in Section 6.4 of this EIS.

Electricity Infrastructure Roadmap (2020)

The NSW Electricity Infrastructure Roadmap ('The Roadmap') aims to redefine NSW as a modern, global energy superpower by delivering the electricity infrastructure needed to support a modern prosperous economy (NSW DPIE, 2020). The roadmap sets out a plan to transition the electricity sector from the existing power sources that are coming to the end of their lives, to cleaner, cheaper and more reliable energy sources including wind, solar, batteries and pumped hydro.

The electricity sector in NSW would be underpinned by five foundational pillars outlined in The Roadmap:

1. Driving investment in regional NSW: supporting our regions as the State's economic and energy powerhouse.
2. Delivering energy storage infrastructure: supporting stable, long-term energy storage in NSW.
3. Delivering Renewable Energy Zones (REZs): coordinating regional transmission and renewable generation in the right places for local communities.
4. Keeping the grid secure and reliable: backing the system with gas, batteries or other reliable sources as needed.
5. Harnessing opportunities for industry: empowering new and revitalised industries with cheap, reliable and low emissions electricity.

The Roadmap reiterates the need to act now given four of the five coal fired power stations in NSW are anticipated to close within 15 years, starting with the Liddell power station which announced decommissioning in April 2023. These power stations provide, as of 2020 power mix generation, around three quarters of NSW's electricity supply and two thirds of the firm capacity needed during summer heat waves, and as they age, tend to fail more frequently resulting in reliability problems. The infrastructure needed to replace coal fired power stations has long lead times, further justifying the need for action to coordinate and unlock investment before they close.

The key benefits of The Roadmap are shown in Figure 2-1.

Figure 2-1 Benefits of The Roadmap (Source: NSW Electricity Infrastructure Roadmap).

The Baldon Wind Farm would contribute directly to the five pillars as a renewable energy development as follows:

1. Driving investment in regional NSW by increasing economic activity during construction and through benefit sharing programs. The Project has an Estimated Development Cost (EDC) of $2.9 billion.
2. Contributing an installed capacity of 1,400MW of energy generation capacity and up to 400MWh of stored dispatchable energy to the grid network, to support stabilising the supply of electricity to the NEM
3. The Project is located within the SWREZ
4. The Project includes a battery, it would assist in ensuring the grid is kept stable by providing dispatchable energy to the grid
5. The Project provides renewable energy to the grid as part of the broader NEM

Renewable Energy Zones

The NSW Government's Electricity Strategy sets out a plan to deliver five REZs. These zones will be in the Central-West Orana, New England, South-West, Hunter Central Coast, and Illawarra regions. These REZs will stimulate the construction of renewable energy generation and deliver affordable reliable energy to help replace the State's existing carbon-based power stations as they come to their scheduled end of operation. It is estimated that the formation of these REZ's will unlock a significant pipeline of large-scale renewable energy and storage Projects, which will be supported by over $20 billion in private investment in the regions and the creation of over 5,000 jobs at peak.

The NSW Government has declared the South West REZ (SWREZ) where the Project area stands (refer to Figure 1-1). This SWREZ will benefit from the proposed EnergyConnect transmission line Project. The EnergyConnect Project is a new high-voltage interconnector between NSW and SA to link the SA and NSW markets. The new transmission line would provide additional connection options and increased capacity for renewable energy Projects in the South-West REZ. The Baldon WF is well located to provide maximum benefits to the SWREZ and contribute to the $2.9 billion of expected investment (by 2030) and provide construction and operational jobs benefiting the region.

2.3. Land use planning

2.3.1 Riverina Murray Regional Plan 2041

The Riverina Murray Regional Plan 2041 (Regional Plan) is a 20-year blueprint for the future of the Riverina Murray region (DPE, 2023). The Plan seeks to establish a framework to grow the regions cities and local centres, to guide land use planning priorities and decisions. The plan includes a specific objective that the region supports the transition to net zero by 2050 in particular through the support of the SWREZ, the EnergyConnect transmission Project and Snowy 2.0. The Baldon WF will directly support this objective by contributing renewable energy to the grid within the SWREZ and along the EnergyConnect transmission route.

2.3.2 Riverina and Murray Joint Organisation

Hay Shire, Murray River and Edward River Councils are all members of the Riverina and Murray Joint Organisation (RAMJO). The RAMJO's key function is to establish and implement strategic regional priorities and strategies. The *RAMJO Statement of Strategic Priorities 2022–2026* identifies the need to build the capacity of the Joint Organisation and the member councils in facing big issues including the ability to attract and maintain a robust workforce (particularly engineering, surveying, planning, finance and Project management); and the ability to attract contractors for infrastructure maintenance and construction (RAMJO, 2022a).

The Statement sets out seven Strategic Priority Pillars to underpin the goal of diverse population growth within RAMJO. Pillars relevant to this Project include:

- Pillar 2: Improve energy security and affordability.
- Pillar 6: Boost industry, workforce and jobs.
- Pillar 7: Improve housing in our region.

The *RAMJO Regional Energy Strategy 2022-2032* positions RAMJO and the member Councils to take advantage of the opportunities that are arising with the rapid shift to renewable energy and ensure rural and regional communities obtain benefits (RAMJO, 2022b). Proposed actions include a focus on mechanisms for local communities and Councils to obtain financial, social and employment benefits from the shift to renewable energy and to quantify the flow of money related to energy in and out of the region.

2.3.3 Regional Economic Development Strategies

Murray Regional Economic Development Strategy 2023

The Murray River and Edward River LGAs sit within the Murray Functional Economic Region (FER). This FER's *Murray Regional Economic Development Strategy (REDS) – 2023 update* identifies the key endowments underpinning the region's economy as the Murray River and associated irrigation infrastructure, water supply, and cultural significance; rich Aboriginal heritage; the established tourism sector; road transport infrastructure, and the SWREZ (DRNSW, 2023a).

The FER's engine industries include agriculture, tourism, manufacturing, road transport, and energy supply, including renewable energy. The Murray REDS notes that net zero targets and related policies will have a direct impact on the Murray FER, by supporting a range of major planned renewable energy generation and storage Projects. Many of these Projects will occur within the SW REZ.

Western Murray Regional Economic Development Strategy 2023

The cross-border Western Murray FER includes the Balranald, Hay, and Swan Hill LGAs (DRNSW, 2023b). The *Western Murray Regional Economic Development Strategy – 2023 update* identifies agriculture as the core engine industry of the region's economy. Other engine industries include construction and mining, tourism and manufacturing. Energy generation is the strongest emerging industry for the FER.

A key challenge is ensuring the region can derive long term local benefit from new renewable energy generation Projects, especially post the investment intensive construction phase. Towards this, the Western Murray REDS identifies opportunities to grow the mining, manufacturing and construction industries by leveraging the renewable energy investment and exploring manufacturing opportunities enabled by the REZ. Potential barriers to fully capitalising on these opportunities include a lack of skilled workers and training pathways, and a lack of housing availability and accommodation for major Project workforces and their families, both of which will require a collaborative approach to address.

2.3.4 Council planning

Murray River Council - Local Strategic Planning Statement

The Murray River Council's *Local Strategic Planning Statement 2020–2040* (MRC, 2020) establishes a 20-year vision for land use planning and growth in the LGA. It documents community priorities and aspirations for the LGA along with actions to enhance its character, preserve its natural attributes and improve residents' quality of life. It identifies nine planning priorities grouped under three themes:

- A robust, growing and innovative economy.
- Liveable communities with social capital.
- Environment, heritage and climate change.

The planning priority most relevant to the Project is:

- Priority 9: Climate change and natural hazards. To achieve this priority, Council will promote local renewable energy Projects by collaborating with energy providers and implementing best practice waste management and by create planning instruments and management plans that encourage developments that are climate-responsive, water-sensitive, and energy-conscious.

Murray River Council - Community Strategic Plan

The *Community Strategic Plan 2022–2032* (MRC, 2022) has been developed as the overarching strategic document that guides the delivery of all other Council plans and strategies. It includes seven themes, of which Theme 5: A place of prosperity and resilience, is highly relevant to the Project. Theme 5 includes the following goals and objectives:

- Encourage and support economic development across the region:
  - Strategic Objective 5.4: Alternative and renewable energy investment opportunities.
- Continue to develop strong and resilient communities:
  - Strategic Objective 5.7: Development of a resilient economy.

Hay Shire Council - Local Strategic Planning Statement

The Hay Shire Council's *Local Strategic Planning Statement* (LSPS) (HSC, 2020) sets the 20-year framework for the LGA's economic, social and environmental land use needs. It outlines how growth and change will be managed to maintain the high levels of environmental amenity, liveability and landscape quality that characterise the Hay Shire. It identifies 10 planning priorities across three themes: Liveability, Economy, and Environment and Resources.

Planning Priority 9 seeks to encourage the growth of renewable energy developments. It identifies that Hay Shire is well-positioned to cater for renewable energy on all scales, from domestic to utility-scale, with ample sunshine, level topography, affordable land, and grid connections available.

Hay Shire Council - Community Strategic Plan

Council's *Community Strategic Plan 2022–2032* (HSC, 2022a) sets out the community's vision, objectives, strategies, priorities and aspirations. Community and stakeholder consultation to inform the plan identified renewable energy, growing the local skilled labour force, more recycling, and expanding tourism opportunities as key priorities. The plan's objectives and associated outcomes, strategies and targets are grouped under five themes, including:

- A – Environmental Sustainability: targets include a reduction in non-renewable energy.
- B – Liveable and vibrant community: strategies include improved access to a diverse range of housing opportunities (B2.1); and targets include a skilled labour force and increases in employment and education options.
- C – Economic prosperity and sustainability: targets include an increase in business numbers and opportunities across the community. Also aiming to increase housing options within the community.

Hay Shire Council - Investment Attraction Strategy

Renewable energy is also identified as an existing strength in the Council's *Investment Attraction Strategy 2022–2027* (HSC, 2022b). Aspirational opportunities related to renewable energy include green tech, alternative fuels, and training and maintenance. The strategy identifies the role of Council in shaping economic outcomes by providing a range of enablers and incentives, including developing a housing strategy, conducting a skills audit, and identifying and developing training opportunities with the energy industry and TAFE.

2.4. Project's consideration of key features

2.4.1 The region and locality

The Project is situated on the Hay Plains in the Riverina Murray region of southwest NSW, within the Murray River and Hay Shire LGAs and adjacent to the Edward River LGA. Located to the west of the Great Dividing Range and extending along the state border with Victoria, the Riverina Murray region, encompasses 20 LGAs, contains vast waterways and river systems. The west of the region is dominated by open plains of native grasslands and semi-arid shrublands and is home to the Yanga, Kalyarr, Oolambeyan, and Murray Valley National Parks and the Ramsar-listed NSW Central Murray Forests.

Moulamein is the nearest town to the Project, located approximately 15km to the south. Moulamein is the oldest town in the Riverina, located at the junction of the Edward River and Billabong Creek and historically falls within the territory of the Wemba Wemba (or Wamba Wamba) people. The township is small and constrained by flood issues. The 2021 population of 489 people is ageing with a median age of 48 years and substantial growth in the proportion of residents aged 65 to 74.

The Sturt Highway crosses east-west through the northern part of the Project area. There are few roads in the vicinity of the Project, most notably Maude Road which passes to the east of the Project area, Baldon Road which runs through the southeast corner of the Project and Keri East Road which enters the site from the east. Lake Road runs east-west between Maude Road and Baldon Road.

The community around the Project area is rural with a strong focus on agriculture and a very low population density. Some properties cover large areas and have significant operations. There are 14 non-associated dwellings and five associated dwellings located within 8km of the Project area.

2.4.2 Key environmental features

The Project area covers an area of approximately 46,259ha and includes landscape features such as:

- Wetlands
  - Gunyah Swamp
- Watercourses
  - Abercrombie Creek
  - Snaky Creek
- Manmade dams and irrigation channels
- Remnant native woodland
- Remnant native scrubland
- Scattered solitary trees
- Hollow bearing trees
- Agricultural pastoral land
- Roads
  - Baldon Road
  - Keri Keri East Road

The topography is predominantly flat with elevations ranging between 68m-80m above sea level, with large expanses of flat shrubland intermixed with claypans and depressions, sand lunettes, billabongs, wetland complexes and major watercourses.

The key values of the site have been identified as Biodiversity and Aboriginal Heritage features. The efforts this Project has made to avoid and minimise impacts on these features plus additional impacts is summarised in Section 1.5, expanded on throughout Section 6, and supported by the technical appendices in Appendix F.

2.4.3 Cumulative impact considerations

The Project is in the SWREZ. The objectives of the SWREZ are to facilitate the coordinated development of renewable energy generation projects, energy storage and transmission. Policy provides for the region to have a significant number of renewable energy developments and infrastructure Projects that may lead to cumulative positive and negative impacts relating to social, economic, traffic, biodiversity, visual amenity, agricultural and land use conflicts, Aboriginal cultural heritage, noise, aviation. Potential cumulative impact considerations of the Project are detailed further in Section 7.5.

2.5. Project alternatives

Through the planning process the applicant has considered three options for the Project and compared them to the objectives of the Project to determine the most appropriate route. These options are:

- Option 1 – do nothing
- Option 2 – 162 turbines onsite including some turbines north of Sturt Highway
- Option 3 – 180 turbines at a greater density; excluding areas north of Sturt Highway, with detailed consideration of constraints.

2.5.1 Option 1 – do nothing

The ‘do nothing’ option represents the status quo situation; avoiding all development impacts but similarly not realising a proposal’s potential benefits. The direct consequence of not proceeding with the Project would be to forgo the benefits (detailed in Section 2.8), most importantly, the Project’s contribution to:

- Energy transition progress and associated greenhouse gas emission reductions
- Electricity reliability, cost and security benefits
- Direct and indirect socio-economic benefits.

The environmental impacts associated with the development and operation of the proposed wind farm would be avoided if the ‘do nothing’ option was selected. In this case, key impacts (detailed in Section 5 and Section 6) relate to:

- Aboriginal Heritage (negative impacts would be avoided in terms of impacts to heritage places and items but positive impacts would not occur, in missing out on the cultural study of the land through an Aboriginal Cultural Heritage Assessment (ACHA))
- Biodiversity (impacts on threatened flora species and their habitat and risks during operation, specifically bird and bat collision risks).

None of these were concluded to be substantive or lead to long term negative impacts to the environment or community. In this case, the potential benefits are considered to outweigh the impacts and as such the ‘do nothing’ option is not the preferred option.

2.5.2 Option 2 – 162 turbines

A 162 turbine layout was presented in the Project’s scoping report with turbines included north of Sturt Highway. As discussed in Section 1.5 this first iteration of the layout avoided expansive areas of potential TEC mapped vegetation. This extent of avoidance has now been deemed unnecessary and has been revised in option 2. More broadly however the Project area selection outlined in the scoping report remains valid regarding the sites suitability for wind farm infrastructure.

2.5.3 Option 3 – 180 turbines

The preferred option and the one presented in this EIS is the installation of 180 turbines as shown in the indicative infrastructure layout in Figure 3-1, Figure 3-2 and Figure 3-3 in the chapter below. The layout still retains all of the site suitability characteristics identified above but now responds to more detailed environmental assessments undertaken as part of this EIS. Most notably the refinement of TEC areas and micro siting in response to Aboriginal heritage impacts (refer to Section 6.2).

This option would achieve all of the project benefits summarised below in Section 2.8

2.6. Site suitability

This specific site has been selected on the following basis:

- Wind: The wind resource has been assessed as good using modelled data and on-site wind monitoring for 2+ years.
- Land: The landowner supports the Project and has entered into an agreement for the development.
- Environment: The flat site and current agricultural use means the design can be flexible to avoid any sensitive areas.
- Community: The Murry River and Hay Shire councils are very supportive and recent community engagement has indicated there is no strong opposition to the Project. Low rural settlement density and the ability to provide large setback distances to neighbouring dwellings will reduce potential for community impacts
- Planning: The State Government and local Shire councils are supportive and there is a well-defined planning approvals pathway to assess the Project
- NEM: An existing transmission line crosses the subject land which provides access for grid connection. The proposed Project EnergyConnect project could add further grid capacity if it its final location is close to the Project.
- Design: This scoping study has enabled a preliminary design to be produced that seeks to provide a viable project while minimizing any potential impacts to the environment or the local and regional community.

2.7. Project agreements

The Project has agreements with the two involved host landholders.

No 'negotiated agreements' have been entered into to manage impacts on any near neighbours.

Hay Shire Council and Murray River Council have endorsed the Project's proposed Community Benefit Fund strategy, consisting of:

- A Voluntary Planning Agreement with each Council for managing funds.
- A Strategic Community Fund managed by a proposed Community Committee.
- A First Nations Fund focussed on initiatives within 80km of the Project.

2.8. Project benefits summary

The Project will provide a number of benefits at the Commonwealth, State and Local levels. At the Commonwealth and State level, the benefits could include:

- ✓ An injection of 1,400 MW of renewable energy into the NEM, equating to approximately 3.4GWh of renewable electricity, displacing coal fired generation.
- ✓ Alignment with government policies including:
  - o Commonwealth Government's commitment to reduce Australia's greenhouse gas emissions to zero by 2050 and 43% below 2005 levels by 2030
  - o NSW governments greenhouse gas reduction targets and is appropriately located within the NSW South-West REZ created by the NSW government to promote renewable energy development
- ✓ Renewable energy to power equivalent to almost six hundred thousand homes (598,000 based on the average NSW home electricity usage of 5,745kWh)
- ✓ Reliable energy to the NEM with firmed storage through the installation of a 200MW/400MWh BESS onsite

A Project of this size is likely to require an investment of 1-2 billion dollars, most of which will be invested in NSW. At the local level, the benefits are planned to include:

- ✓ Direct financial benefits to participating landowners
- ✓ Direct financial community benefits through agreed Community Benefit Schemes (CBS) with the Hay Shire Council and Murray River Council (refer to Section 2.8)
  - o The Hay Shire Council CBS includes:
    - ▪ A Voluntary Planning Agreement for Council to manage $80,000 per annum of funds (based on generation from turbines within the Hay LGA) for community benefits
  - o The Murray River Council CBS includes:
    - ▪ A Voluntary Planning Agreement for Council to manage $640,000 per annum of funds (based on generation from turbines within the Murray River LGA) for community benefits
  - o Benefits split between both LGAs
    - ▪ A Community Committee to manage approximately $720,000 per annum of Strategic Community Funds (across both LGAs)
    - ▪ A First Nations Fund of up to $144,000 per annum managed by an independent committee for first Nations initiatives
- ✓ Investment in local suppliers of materials and labour during the construction period,
- ✓ Approximately 350-400 full-time equivalent jobs during the peak of the construction, and
- ✓ Approximately 35 permanent skilled jobs for the life of the Project.

03 Project description

3. Project description

This chapter provides a description of the Project including:

- Project infrastructure components
- Project timing, including the:
  - Staging of the construction process and how 'construction fronts' are likely to progress
  - Project phases, such as preconstruction, construction, operation and maintenance, refurbishment and decommissioning activities and likely timing.

3.1. Overview

The Project would consist of up to approximately 180 wind turbines, generating approximately 1,400MW of power capacity to the National Electricity Market (NEM). The Project includes all associated infrastructure required to access, construct, operate, maintain, refurbish and decommission the Project. It also includes a Battery Energy Storage System (BESS) , with discharge and storage capacity of up to approximately 200MW/400MWh (2hour storage duration), to enhance the stability of the network and optimise Project performance.

The Project would consist of the following operational infrastructure components (refer to the layout presented in Figure 1-2 for the plan view of the site and further larger scale mapping in Figure 3-1, Figure 3-2 and Figure 3-3:

- Up to 180 wind turbines rated capacity of approximately 8MW[2].
  - Three blades mounted to a rotor hub on a nacelle above a tubular steel tower
  - Maximum ground to blade tip height of 300m
  - Tower (hub) height: 130 - 180m
  - Blade length 82 – 120m
  - Adjacent hardstand areas (approximately 85m x 70m) for use as crane pads, assembly and laydown areas
- Internal access tracks, formed width approximately 6 -10 m wide, depending on location and use [3]
- Drainage provisions where required, alongside roads and other infrastructure
- Underground cabling to connect groups of turbines to the substations, or BESS facilities
- Overhead transmission lines (likely 220kV or 330kV):
  - To connect the Project substations to the points of connection.
  - Approximately 33km in total
  - Overhead as well as underground cabling to connect groups of turbines.
- Substations and switching stations and other related electrical facilities:
  - Up to 7 substations/switching stations
  - These areas may also include some operations facilities.
  - BESS facilities configurations may include a large, centralised BESS and / or a number of smaller decentralised BESS's connected to all or a subset of the wind turbines and located on the turbine hardstand
- Connection to the National Electricity Grid via either:
  - The existing 220kV transmission line;
  - The 330kV Project Energy Connect in the central part of the Project area; and/or
  - Future augmentations of the surrounding electricity network

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[2] The actual turbine is not yet selected. Staging may affect the turbine model selected. A greater rated capacity is likely in later stages due to anticipated technological advances over time.
[3] The disturbance footprint assessed accounts for all impacts required to install the access tracks.

- Operations and maintenance facilities

The Project consists of the following construction facilities within the designated Construction footprint:

- Temporary construction facilities and laydown areas
- Temporary concrete batching plants and mobile rock crushing equipment
- A temporary accommodation camp
- Temporary and permanent meteorological masts
- Onsite quarrying of gypsum to assist with road stabilisation
- Establishment of additional bores and the use of an existing water pipeline along Baldon Road to assist with construction water supply (and minimal operational requirements).

The Project consists of the following access requirements, whose impacts have also been assessed:

- A primary site access, off the Sturt Highway for construction and operational access.
- Upgrades to the offsite transport route required to facilitate component deliveries. The responsibility of completing such upgrades is yet to be confirmed however, being part of the SWREZ it is expected that the NSW Government will ensure that the transport route from Port to the Sturt Hwy is suitable for the over-dimensional loads (EnergyCo, 2023).

The Project is likely to be developed in separate stages. This will depend on the available capacity in the surrounding electricity network. Staging is likely to include:

- Stage 1: 45 turbines
- Stage 2: 135 turbines

During decommissioning, most above ground infrastructure would be removed and the areas of disturbance would be rehabilitated, returning the vast majority of the site to its current land capability, for ongoing agricultural or other use. This would be managed via a detailed Decommissioning plan.

Specific infrastructure would be retained. This is likely to be limited to:

- TransGrid assets, which will be contained within formal subdivision agreements
- A number of internal access tracks that the landholders wish to retain.

A Project summary, capturing the main Project elements is provided in Table 3-1.

Table 3-1 Project summary

Project element	Summary of the Project
Project term	Approximately 30 years, at which point key infrastructure may be repowered (subject to approvals) or the Project would be decommissioned.
Generating capacity	Up to approximately 1,400 MW
Energy storage	Up to approximately 200 MW / 400 MWh (two hour duration) BESS which may be centralised or distributed.
Permanent infrastructure components	Up to approximately 180 wind turbines and all associated infrastructure required to access, construct, operate, maintain, refurbish and decommission the Project. Refer to breakdown in Table 3-2.
Turbine dimensions	• Three blades mounted to a rotor hub on a nacelle above a tubular steel tower • Maximum ground to blade tip height of 300m • Tower (hub) height: 130 - 180m • Blade length 82 – 120m
Temporary construction facilities	At least six construction compounds Approximately two or three mobile concrete batch plants adjacent to the construction compounds. These may be relocated to different construction locations, depending on Project staging and work front location. Gravel borrow pits and gypsum extraction if feasible.
Disturbance areas	Estimated to be 819ha during construction. Estimated to be 348ha during operation, after the completion of construction rehabilitation activities.
Transport, access and traffic	Main haulage route either from Port of Adelaide or Newcastle. Primary point of access to the Project, off the Sturt Highway (administered by Transport for NSW), upgraded to include: • Establishment of a Basic Right Turn (BAR) and Basic Left Turn (BAL) intersection at the access point from the Sturt Highway. Traffic requirements including: • 142 heavy vehicle movements per day (at a rate of 87 heavy vehicle movements per hour), during peak construction • 2,375 movements of Oversize and Overmass traffic movements, during construction.
Water requirements	Up to 250ML per annum during construction. Water to be sourced primarily from existing and proposed onsite bores and / or from Billabong Creek.
Construction timeframe and hours	If constructed as one Stage, approximately 36 months, with peak periods expected from months 9 -24. The construction would be nearer to 2 years for each stage if the Project was constructed in two stages. Rotating roster for the various contractors necessitating 7 days per week (6am – 6pm) working hours. Various activities will be required to occur outside these hours to meet environmental and technical requirements, such as concrete pours and turbine installations.
Operational hours	24 hours per day, 7 days per week

Project element	Summary of the Project
Workforce (full time workers)	Approximately 350-400 full time equivalent workers over the construction period. Approximately 35 full time equivalent workers during operations (for 180 turbine Project). Workforce accommodation to supplement existing offsite facilities will be constructed onsite.
Estimated Development Cost	$2.9 billion

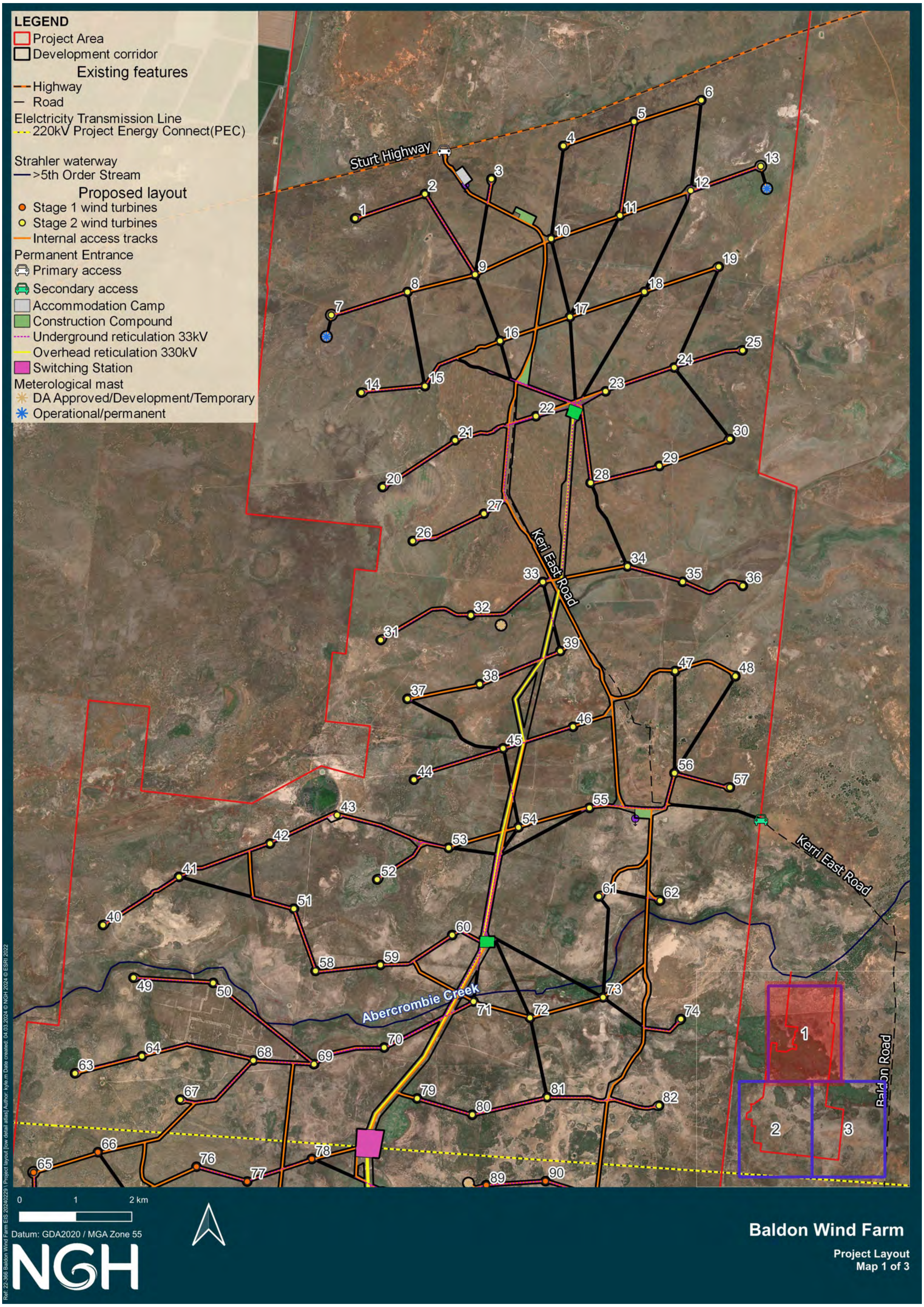


Figure 3-1 Project layout map 1 of 3

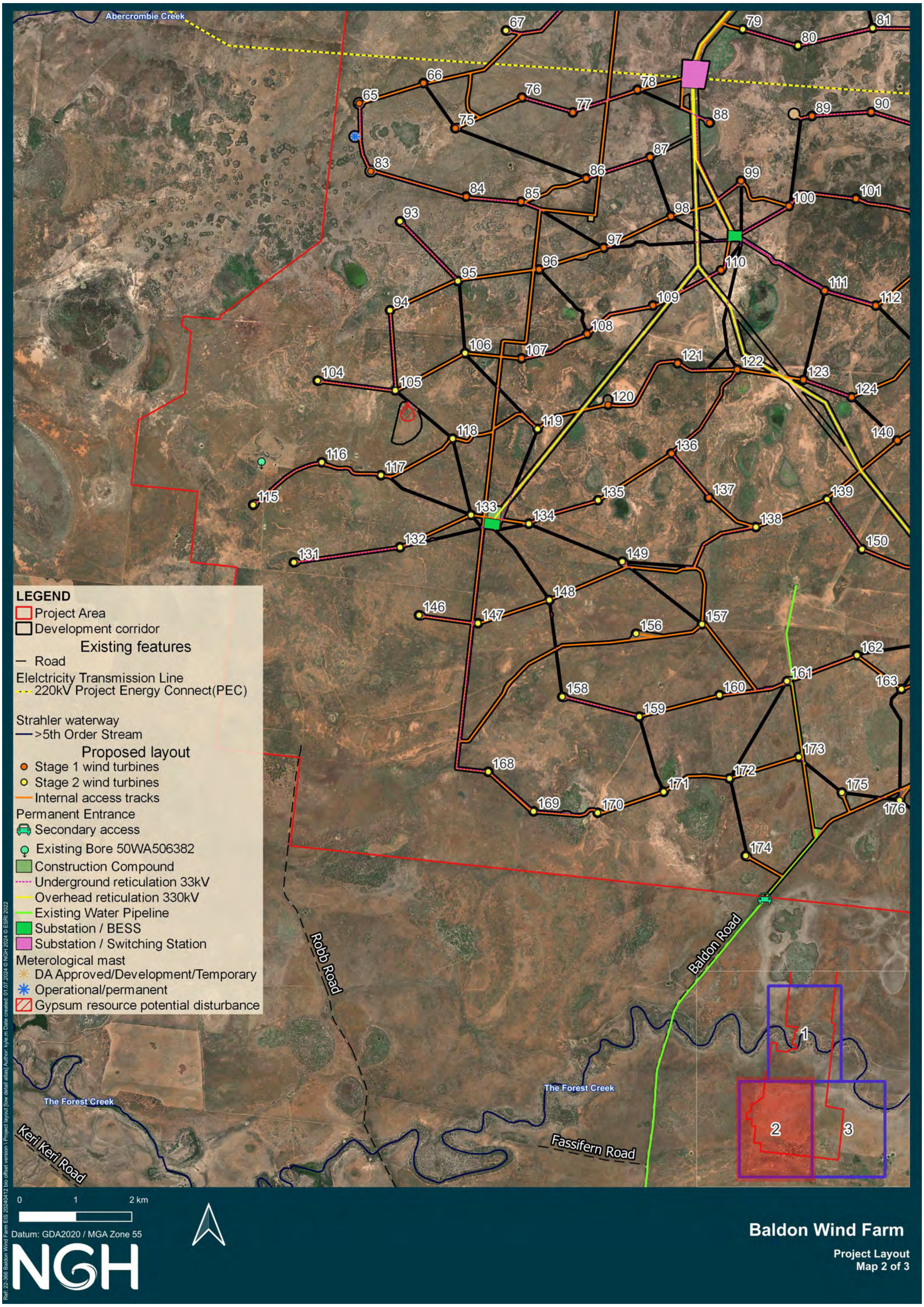


Figure 3-2 Project layout map 2 of 3

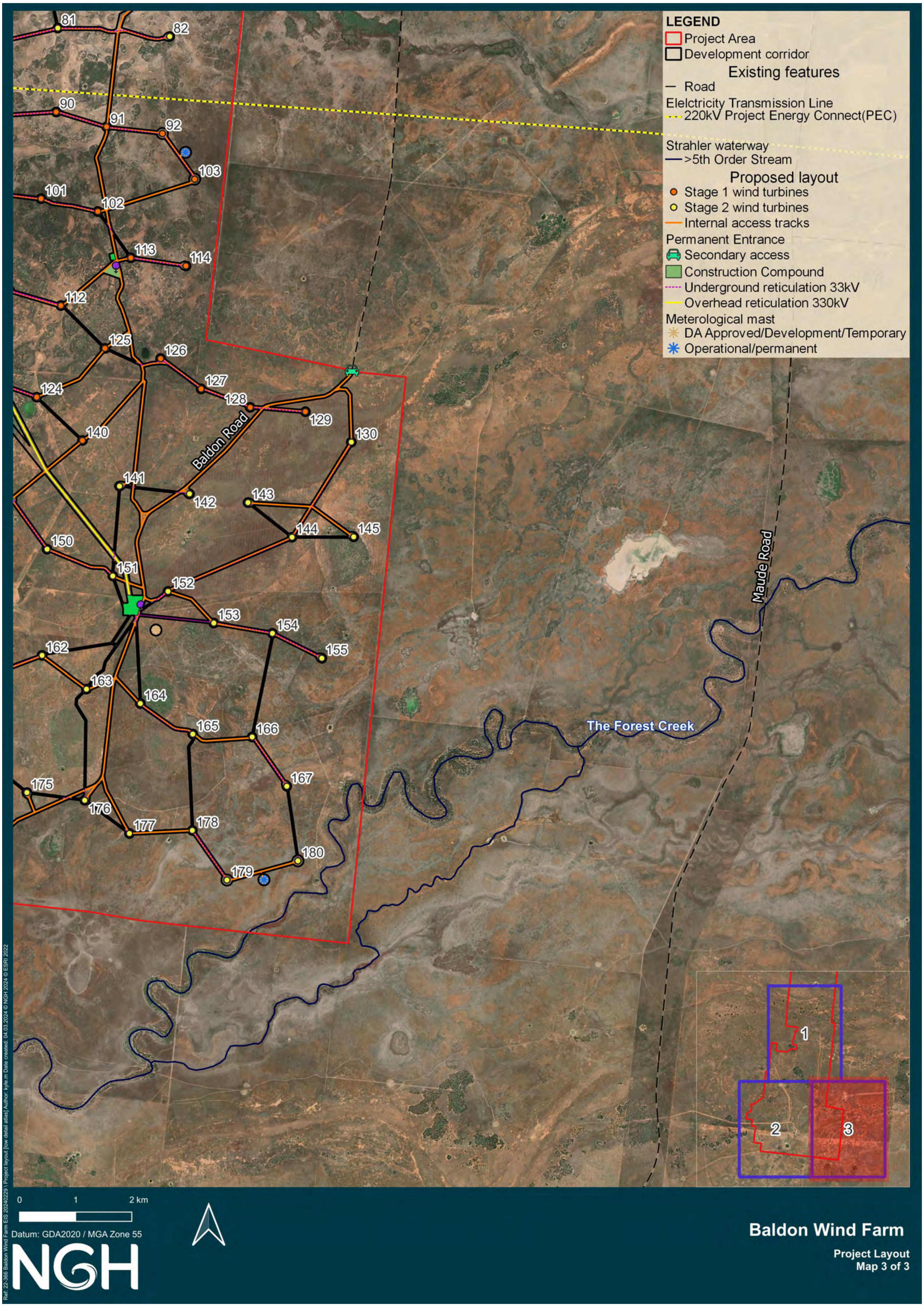


Figure 3-3 Project layout map 3 of 3

3.2. Project disturbance area

Table 3-3 sets out the likely Project infrastructure components and considers the associated Disturbance areas. This supports the assessment of impacts in Chapters 6 and 7. The Disturbance area is also shown in Figure 3-4, Figure 3-5 and Figure 3-6.

Actual components and the final Disturbance areas might vary after the detailed design is completed and the construction completed. Therefore, investigations have assessed a broader 'Development corridor' in order that some flexibility is afforded during the detailed design phase.

The Disturbance area (Construction footprint) covers approximately 819ha and the Disturbance area (Operational footprint) covers approximately 349ha.

Table 3-2 Project components and estimated disturbance requirements

Design element	Indicative dimensions
Temporary construction areas	
Construction compounds and Laydown areas	1-5ha each (note this is a construction area) Number and locations subject to final design
Underground cabling	Cabling disturbance widths can be 5-10m, depending on the number of circuits
Temporary meteorological masts	3 development met masts are already onsite. A further 8 would be installed during construction. All of these masts would be deconstructed once the wind farm is operational
Mobile concrete batching plants	Two or three ~100m x 100m each, typically located at construction compounds
Permanent operational areas	
Turbine foundation with hardstand	Approximately 70 by 85 meters each
BESS Facilities - Large - Small, at turbine sites	Approximately 1.1ha for an independent BESS, otherwise smaller BESS located on turbine hardstands
Substation/s and switching station/s	Up to seven substations would be installed covering 1-5ha each. Substations and all ancillary buildings would be no taller than 4m excluding pole like structures such as gantries, bus bars and other transmission connection infrastructure.
Overhead lines - Tower Structures - Line easement – line clearance extent (where applicable) - Service track (if required)	Approximately 85 poles (approximately one pole every 400m with a disturbance radius of 10m). Poles may reach up to 65m in height. Width of clearance corridor (60m only trees require removal to maintain electrical safety distances)
Operation and Maintenance (O&M) buildings, storage, water tanks, and other necessary infrastructure placement	Approximately 1ha each, likely located within the construction compound site areas, or at substation sites.
Internal access tracks and associated drainage	Typically 6-10m wide. Design may vary depending on location.

Design element	Indicative dimensions
Permanent meteorological masts	Five Operation met masts (approximately 130m tall) would be installed onsite as shown in the layout.
Accommodation Camp	~5ha

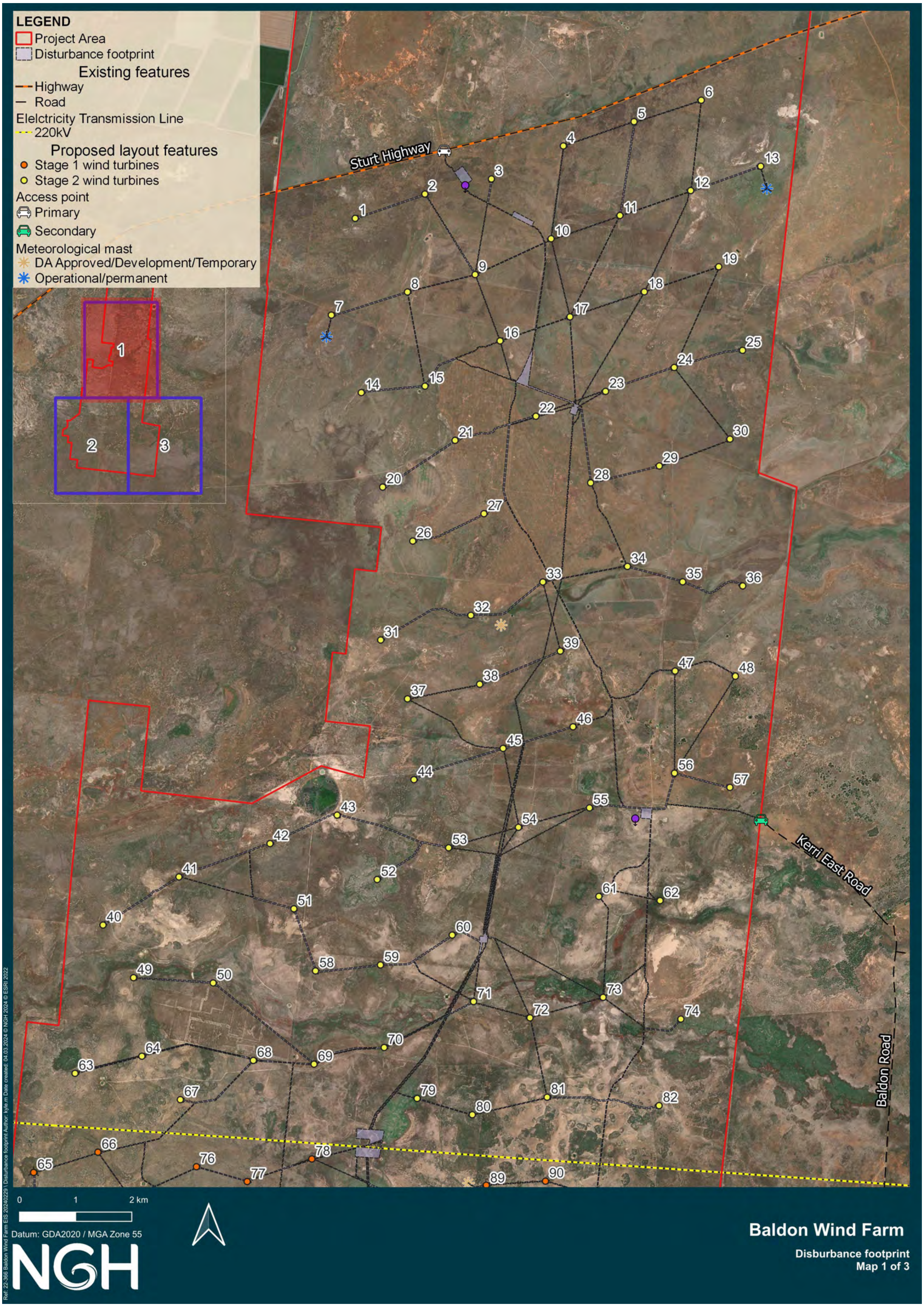


Figure 3-4 Disturbance footprint map 1 of 3

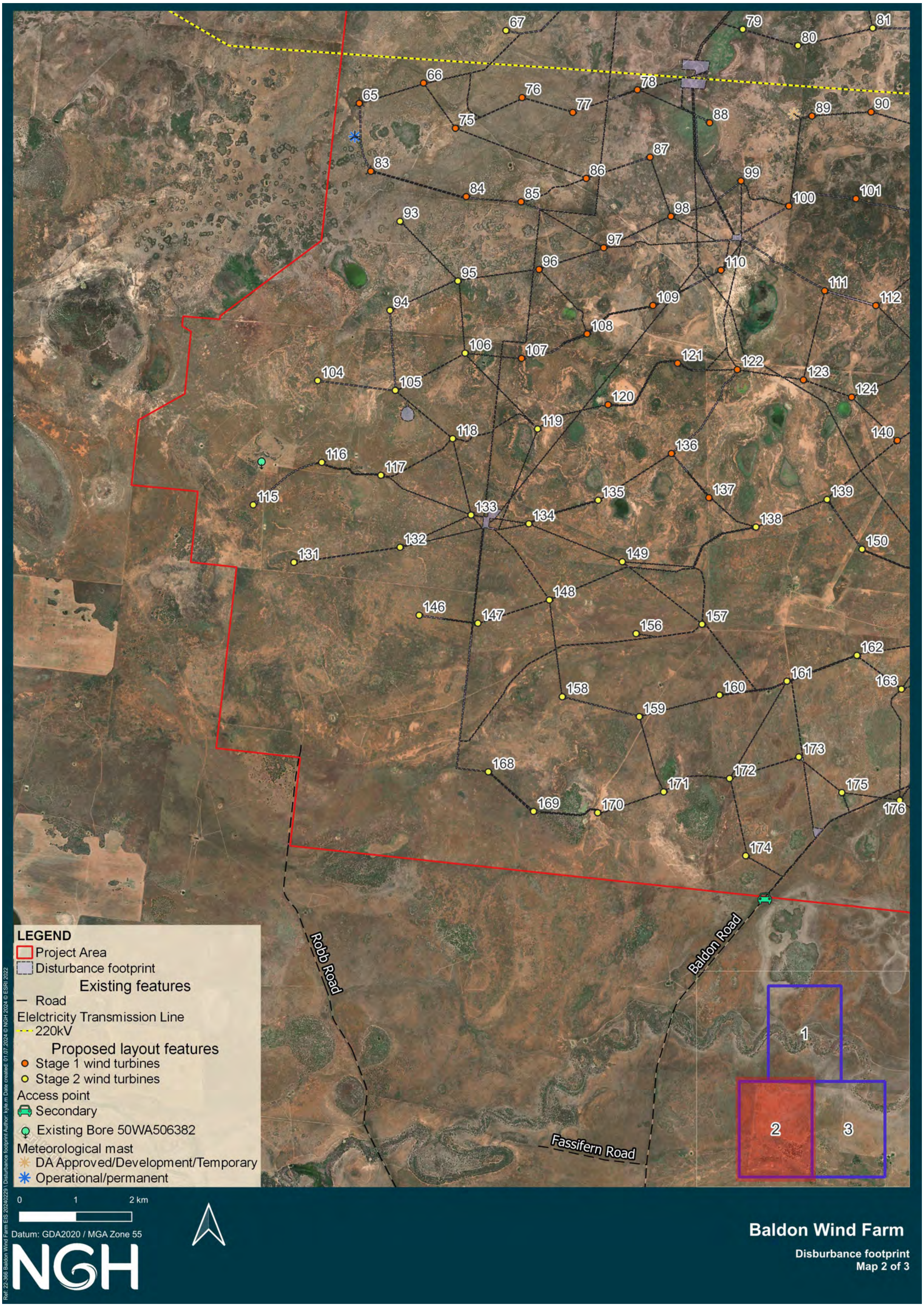


Figure 3-5 Disturbance footprint map 2 of 3

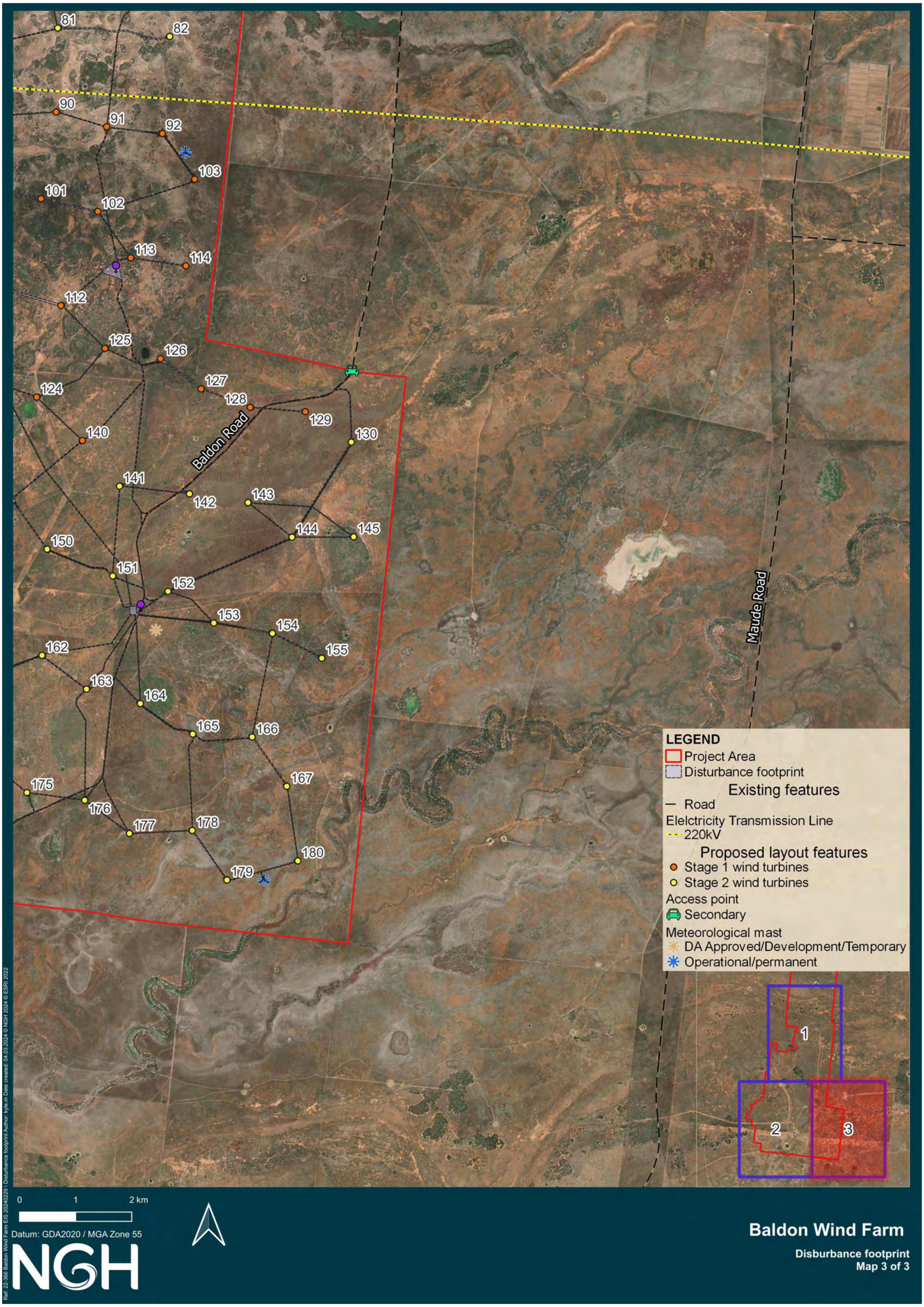


Figure 3-6 Disturbance footprint map 3 of 3

3.3. Project elements detailed

3.3.1 Wind turbine generators

The Project will use horizontal-axis wind turbines as shown in (Figure 3-7). Each wind turbine is made up of the following components:

- Concrete foundation
- Tower, generally made of multiple steel sections bolted together
- Nacelle at the top of the tower which houses a gearbox and the generator and to which the rotor is attached
- Components within the nacelle such as the yaw system and cooling system
- Generator with a specific name-plate MW capacity
- Rotor hub, to which turbine blades are attached
- Wind turbine blades, usually three with pitch system to allow adjustments to the wind turbine operation
- Electrical and communications cabling (generally underground) between the turbine, substation.

The rotor hub has motors that allow the pitch of each of the blades to be adjusted to accommodate different wind conditions and for start-up and shut down of the wind turbine. The rotor is connected to the generator that is housed within the nacelle. Individual wind turbines can be controlled and operated independently. The generator is a large 'donut shaped' unit which is independently fitted to the nacelle prior to the rotor being attached.

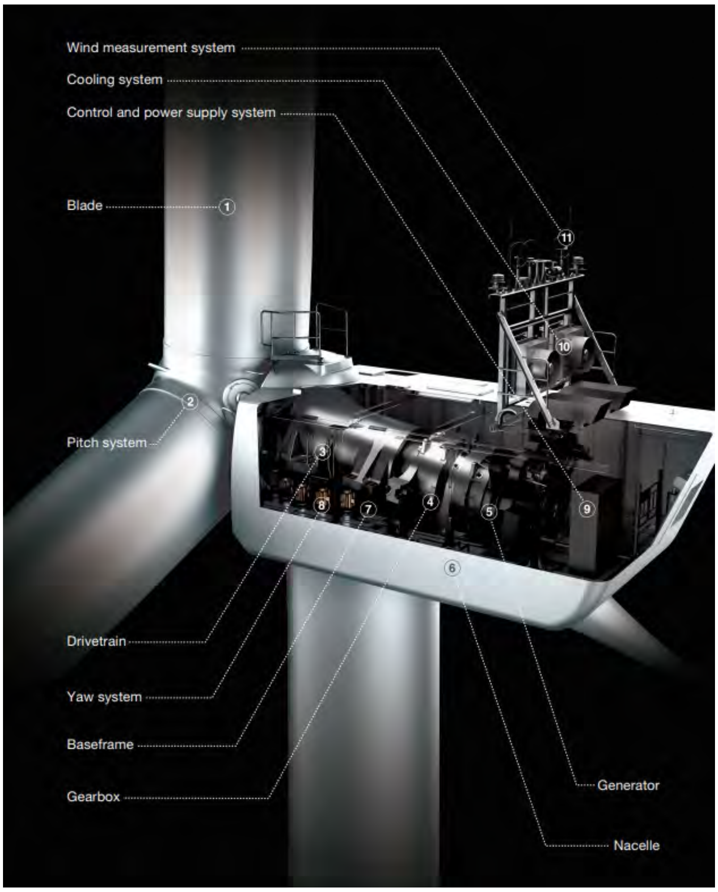


Figure 3-7 Wind turbine nacelle cross-section

The nacelle (Figure 3-7) is located on top of the tower and sits on a ring that can turn (yaw) to enable the turbine to be turned into the wind as required for its operation. The nacelle also contains the turbine gearbox. Access to the nacelle is usually via stairs and ladders, or a lift that is located inside the tower. Instrumentation attached to the top of the nacelle provides information on wind speed and direction, which each wind turbine's control system uses to adjust the turbine orientation continuously to optimise its performance. Additional wind measurement instrumentation may also be installed on monitoring masts within the Project area and act as additional points of reference for the wind turbines.

The turbine towers are designed specifically for each turbine and are constructed from multiple tubular steel sections with the first base-section being bolted to the concrete foundation. Successive sections are raised using a crane and bolted on top of each other. The tower also contains electrical and communication cabling as well as a small elevator, a ladder and hoist to access the nacelle.

Turbine foundations will each require the excavation of approximately 2,200m^3 of soil. Excavated material will be stockpiled and reused to backfill the concrete foundation. The surplus material would be reused on site. Details of materials that will be used to construct the turbine foundation is provided in Table 3-3. These are indicative quantities based on preliminary design. A detailed design would advise on exact quantities which will also depend on the final model of turbines used.

Table 3-3 Turbine foundation materials requirement

Foundation material	Tonnes per turbine foundation	Estimated total tonnes
Steel	80	10,080
Sand manufactured	193	34,650
Sand fines	428	76,986
Aggregate	735	132,300
Cement	195	35,028
Water	137	24,570

Most of the electrical equipment, including a step-up transformer, would likely be mounted inside the base tower section or in a kiosk adjacent to the turbine. A Ring Main Unit (RMU) which serves as a switch between each turbine and the rest of the wind farm will typically be located externally, near to the base of the tower. Radiators will normally be located at the base of the tower, on the outside, and will provide cooling for the wind turbine.

The maximum turbine tip height and blade length, listed in Table 3-1, is based on estimated wind turbine dimensions to allow for future flexibility and innovation in wind turbine design and development. Generally, larger turbine models on higher towers will more efficiently harness the available wind resource.

The current nominal power output of potential turbine models that could be installed for BWF is 6.5 – 8.2MW per turbine. However, turbine technology is constantly improving to increase efficiency and output and the actual model(s) to be used for this Project is still to be confirmed. Figure 3-8 displays the details of Goldwind 3S series turbines (rated to 3.57MW) installed at Stockyard Hill wind farm in Western Victoria. Models proposed for BWF will be larger, higher output and more efficient designs.

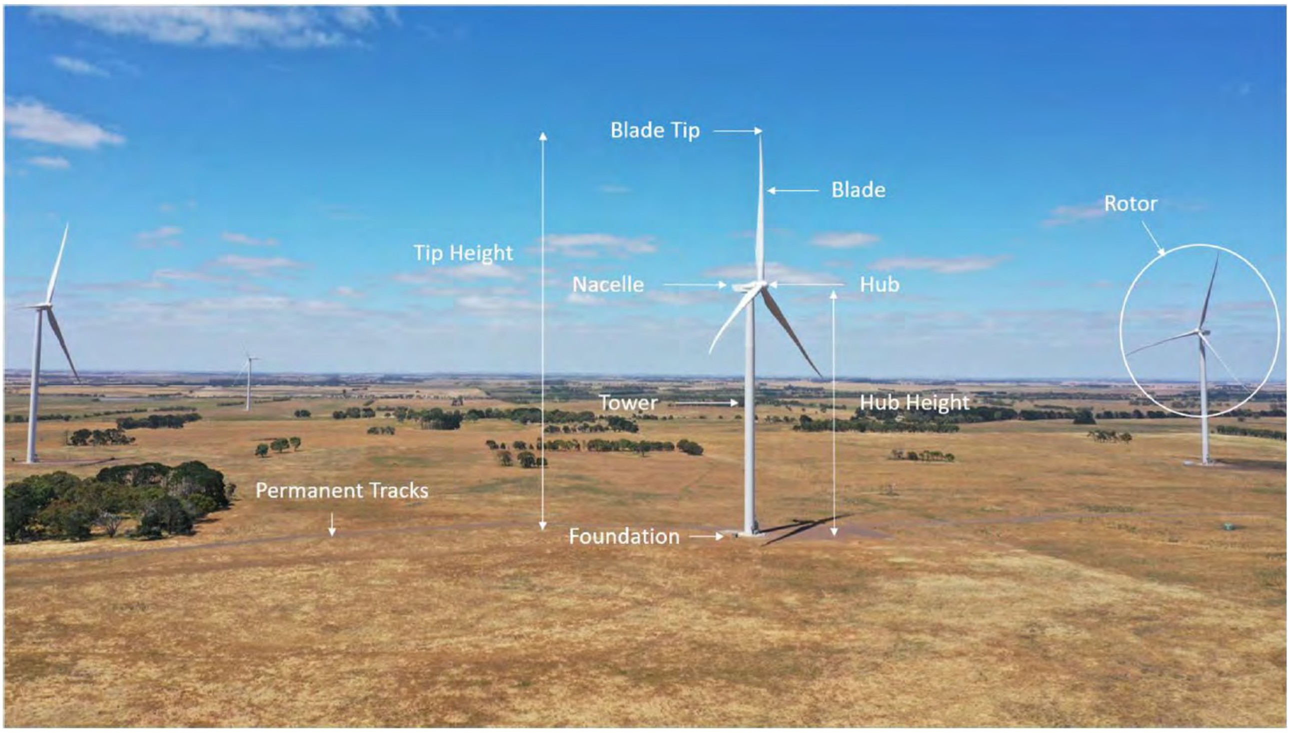


Figure 3-8 Wind turbine generators (3S) installed at Stockyard Hill Wind Farm in Western Victoria (hub height at ~109m and tip height at ~179m)

Turbine hardstands

An integral part of each turbine site is a hardstand adjacent the turbine tower as shown in Figure 3-9.

Hardstands are areas required at each wind turbine site, generally as shown in Figure 3-9 but varying in layout design and extent based on site features, the turbine model and construction methodologies. The hardstand provides the platform for the delivery of turbine components prior to installation and to provide a stable platform for the crane to assemble the turbine components during installation. The hardstands are maintained during the operation phase of the wind farm to support wind turbine maintenance and decommissioning, as required.

The hardstand in Figure 3-9 is approximately 70m by 85m. This hardstand was used for the installation of the GW155/4.5 MW Wind Turbine at Esperance Wind Farm in August 2021. Each turbine model requires a different sized hardstand and clearing required for the turbine footing, hardstand and blade laydown area varies depending on the turbine model, footing design, component dimensions and cranage methodology for the turbine installation.

Figure 3-9 Hardstand with a blade laydown area (Esperance Wind Farm July 2021)

3.3.2 Substation and switch room

The substation is generally comprised of a high voltage switchyard, one or more large transformers, 33kV switch room, auxiliary services equipment, any required power quality components (e.g. harmonic filters, capacitors, etc). An example of a typical wind farm substation is shown in Figure 3-10.

The substation would be built on a specialized hardstand area called a bench; this is surrounded by security fencing as required by the relevant electrical safety regulations. A small parking area is normally provided at the site. One or more large transformers would be installed in large concrete bunds. These bunds are designed to retain the contents of the transformer and cooling system (insulating oil) so that in the event of failure, an oil spill is contained. An oil water separator is likely to be installed in the bund as an environmental protection measure and would be subject to regular inspection and maintenance.

The substation would normally be located away from residences and if necessary, landscape screening can be applied around the perimeter to limit views, if warranted. Up to seven substations locations are proposed for the Project, in order to minimise electrical losses from the lower voltage 33kV cabling. Figure 3-10 is an example of what a substation can look like.

Figure 3-10 Wind Farm Substation Example (Stockyard Hill Wind Farm December 2021)

3.3.3 Electrical connections

Connection within site

Internal cabling would be of two types within the Project:

- Underground cabling – connecting turbines with each other in a collector group of approximately 4 or 5 turbines and to the substations
- Overhead lines – connecting collector substations to the central substation/switching station or other point of connection. In some circumstances, overhead cabling may be used to connect turbines to the collector substations.

The installation of underground cables would require the excavation of trenches about 0.5 metres in width and 1.2 metres in depth. The cables would be laid into the trench and backfilled in accordance with technical specifications.

Overhead 220 kV or 330 kV power lines would connect each collector substation to the substation/switching station at the point of connection. The overhead power lines would require the installation of poles about 400 metres apart, and construction would require about 10 metre radius disturbance area around each pole. About 33 kilometres of overhead power lines would be required for the Project. These would be single circuit or double circuit power lines.

Adjustment of internal cabling may be required to enable micro-siting of tubines or other constraints identified during detailed design or construction.

Connection to grid

The Darlington Point-Balranald 220 kV transmission line and the proposed Project Energy Connect 330 kV line traverse the central portion of the Project area and would run parallel to one another. The substation/switching station located on either side of these lines is expected to serve as the point of connection between the Project and the NEM, however this is dependent on available capacity, accessibility and regulatory approval to connect to one or both of these lines.

The main substation/switching station would be constructed adjacent to the either the 220 kV transmission line or the Project Energy Connect 330 kV line. When the main substation is complete, one or both circuits of the existing transmission line would be connected to the main substation which would enable the wind farm to export energy to the NEM. Typically, at the substation, the connecting lines will drop on to landing frame structures and be routed through a switchyard with protection devices and metering to the substation transformer. The Transmission Network Service Provider (TNSP) typically requires ownership of the point of connection and access easements to it, therefore subdivision is proposed of the final point of connection switching station to allow for the land transfer to the TNSP.

The Project may be developed in stages and each stage may have a different point of connection.

The design of the electrical components which will be required to connect the Project to the NEM are subject to detailed design and approval by the transmission operator and cannot be fully specified in this EIS.

3.3.4 Battery Energy Storage System (BESS)

A BESS would be included in the design and be integrated with the wind farm to store excess energy and enable this energy to be discharged when it is needed. It can maximise the use of the available wind resource by storing/dispatching energy in accordance with market demand and ancillary services (such as Frequency Control Ancillary Services (FCAS) or grid system strength support). Such systems are now commonly used to address the intermittent characteristic of renewable energy supplies and have the additional benefit to consumers of mitigating spikes in energy costs during times that would otherwise be subject to supply shortfall.

The final design of a BESS would include consideration of the scale of storage needed for the Project and the types of systems that could serve that requirement. The ultimate design specification would be determined by system requirements, available technology reliability, and commercial aspects, however it is anticipated that the facility could have a capacity of up to 200MW/400MWh (2 hour storage duration).

The BESS capacity would be achived by one of the following layout options:

- A centralised BESS at one or more substation locations, or
- Smaller BESS distributed at turbine hardstands, or
- A combination of these two options, totalling up to 200 MW/ 400 MWh.

The above BESS capacity would be achieved likely using multiples of Goldwind GoldBlock L700Pro model 365 kW/ 745 kWh battery cabinets.

Centralised BESS

In terms of footprint, a BESS facility would likely have similar requirements to a substation: it would consist of a fenced compound containing a small operation and maintenance buildings, parking spaces and battery modules which are generally provided in shipping container sized structures. A BESS facility may share facilities with the main substation or be in proximity and connected to the substation with underground or overhead cables. It is expected that a BESS facility would be relatively inconspicuous and would be less visible from surrounding areas that other wind farm infrastructure.

Distributed BESS

Under the distributed approach the BESSs would each have a capacity of approximately 1.1 MW/ 2.2 MWh per turbine. The decentralised BESS would include three battery cabinets should be assumed at each turbine. A 3.5m separation distance would be maintained between the containers. A schematic of the arrangement with a 1.1 MW/ 2.2 MWh capacity BESS is shown in Figure 3-11 (note: The figure shows two cabinets, an additional battery cabinet would be included proportionally and maintain the 3.5m separation distance). The BESS would arrive to site pre-assembled and pre-tested prior to installation and connection on site. The BESS would also have an integrated cooling and fire suppressions system (this also applies for the centralised option).

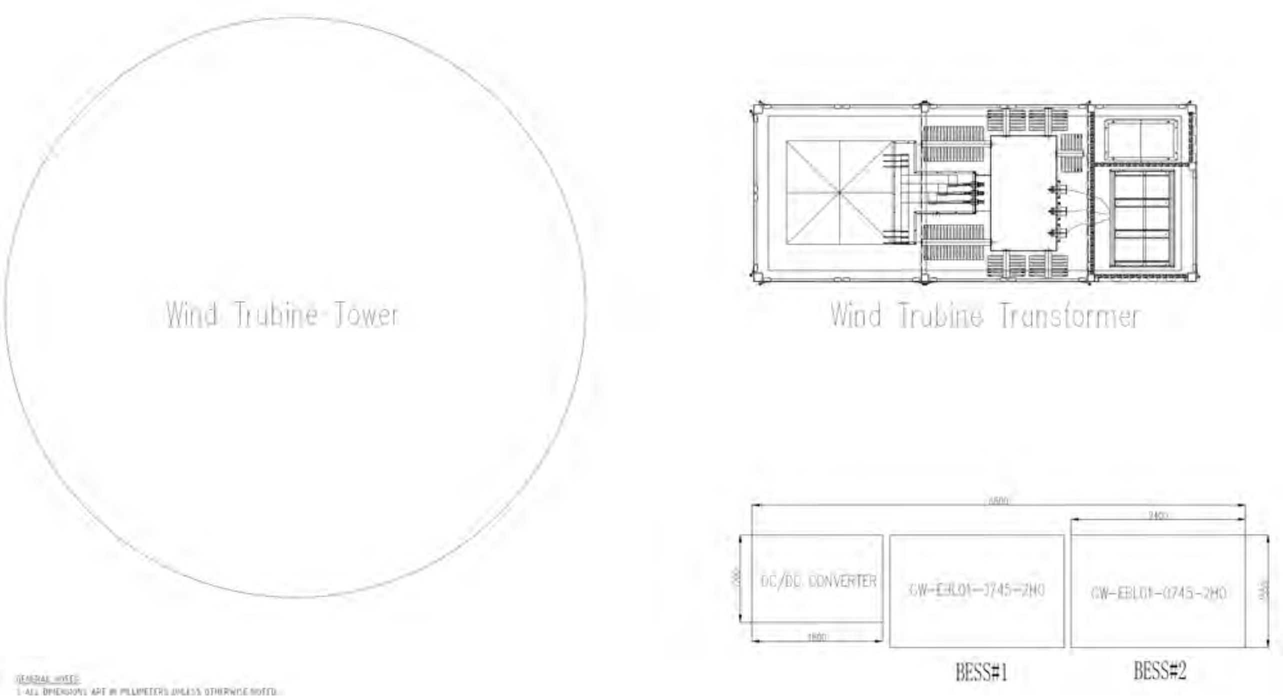


Figure 3-11 Schematic of BESS setup on a turbine hardstand (figure shows two cabinets, an additional battery cabinet would be included proportionally in practise)

3.3.5 Operation and maintenance buildings

The O&M facility is a relatively small part of the final Project footprint but is a key component during operation of the wind farm. The facility houses the service team providing them with office facilities and amenities. These include parking areas (for site team, contractors, and visitors), stores warehouse and workshop building/shed, water tanks, waste skips, vehicle wash down area and trailer parking area. The O&M facility will require power and water supply as well as communications. There will likely be one primary O&M facility, with smaller ancillary O&M facilities at other locations throughout the Project area (typically adjacent to a substation), however the specific arrangements would be based around any staging of the Project and detailed design. Water tanks would store rainfall captured from the facility roofs and may also be supplied by bore water (if available). Potable water would be delivered to site. Ablutions on site would need to be managed through an on-site sewerage system (e.g. septic, composting or other appropriate system). The system would be designed by an appropriate service provider and installed in accordance with local requirements. Electricity on site may be supplied from the local electricity network (Essential Energy) or may be back-fed through the windfarm connection. A backup generator may also be required to supply power during power outages. It is expected that site communications and internet would be provided through the wind farm connection (i.e. SCADA and fibre network) or by other means (e.g. satellite). The site service team would be based at the primary O&M during the operational life of the Project. There would be Approximately 35 full time equivalent workers during operations.

3.3.6 Meteorological monitoring masts

A wind farm will normally require temporary and permanent meteorological masts located through the Project area. These masts normally collect wind resource data at selected heights, including at the proposed hub height of the wind turbines. These permanent meteorological masts are required to calibrate the wind speeds recorded at the wind turbines for initial and ongoing power performance testing and to assist in the generation of the representative wind speed required by AEMO for the calculation of generation forecasts. These masts will also be utilised for operational noise compliance testing.

Three temporary monitoring masts have been installed across the site during development the development assessment phase. The mast currently onsite were approved through a separate DA with Murray River Council. These masts generate long term wind resource data for the site and provide crucial information about the energy available at these sites and to aid in determining the best locations for each wind turbine to be constructed. Indicative locations for 5 permanent and 8 more temporary meteorological masts are included in the Project layout. There is the possibility that the location of these masts may need to be adjusted depending on the staging of the Project and the strict requirements of the power performance testing which needs to meet strict internationally accepted standards (e.g. IEC 61400-12-1).

3.3.7 Traffic and access

Haulage route

A port and transport route assessment has determined that the two most feasible routes for major components to site would be from Port Adelaide or the Port of Newcastle refer to Appendix F.5. Both options remain viable for this Project.

For the Port of Newcastle route:

- **Route 1:** Blades and components under 5.25m loaded height would travel via the M1, NorthConnex tunnel, M2, M7, M5, Hume Hwy and Sturt Hwy (962km)
- **Route 2:** Loads higher than 5.25m loaded height (under 5.9m) would travel via the Hunter Expressway, New England Hwy, Golden Hwy, Newall Hwy and Sturt Hwy with minor bypasses throughout (1077km)

For the Adelaide Port route:

- **Route 1:** Blades would travel via Ocean Steamers Rd, Eastern Parade, Port River Exy (A9), North South Motorway (M2), Northern Exy, Sturt Hwy (A20), Kingston Rd, Hwy (B55), Karoonda Hwy, Stanitzki Rd, Sturt Hwy, Werrimull N Rd, Millewa Rd, Calder Hwy, Hattah Robinvale Rd, Robinvale-Sea lake Rd, Murray Valley Hwy, Sturt Hwy (676.0km)
- **Route 2:** Loads under 40m overall length. Max loaded height 5.2m would travel via Ocean Steamers Rd, Eastern Parade, Port River Exy (A9), North South Motorway (M2), Northern Exy, Sturt Hwy (A20), Kingston Rd, Hwy (B55), Karoonda Hwy, Stanitzki Rd, Sturt Hwy, Seventeenth St, Benetook Ave, Seventh St, Sturt Hwy (628.0km)
- **Route 3 (high load detour):** Loads under 35m overall length. Max loaded height 6.0m would travel via Ocean Steamers Road, Eastern Parade, Port River Expressway, Northern Connector, Port Wakefield Highway “A1”, Mallala Road, Old Port Wakefield Road, Gawler Road, Wilkinson Road, Hatcher Road, Oates Road, Redbanks Road, Mudla Wirra Road, College Road, Cliff Road, Gartrell Street, Roseworthy Road, Sturt Hwy (66km)

The Port Adelaide route is the preferred route as it is shorter in length and would also avoid or minimise cumulative over-size over-mass (OSOM) transport impacts to other REZs in NSW which are being serviced from the Port of Newcastle.

Port Adelaide would also be considered for other shipped deliveries such as BESS containers and other components not sourced domestically (e.g. underground and overhead cabling).

Site access and upgrade

The primary access point to the Project area will be directly from the Sturt Highway (A20), a national highway that traverses NSW, Victoria, and South Australia. The Project layout incorporates a spine access track running approximately north-south through the Project area with offshoots to parts of the layout thereby avoiding or minimising impacts on local roads that are not direct access routes. The site intersection would be upgraded to utilise a Basic Right Turn (BAR) and Basic Left Turn (BAL) intersection.

The local roads which could provide secondary access to the site include:

- Maude Road, to the east of the Project area, links Sturt Highway through to Moulamein in south, but does not cross the Project area
- Dry Lake Road – west of Maude Road, provides access into the Project area and connects with Baldon Road and Keri East Road
- Baldon Road between Moulamein township in south, crosses through the southeast corner of the Project area and joins Dry Lake Road in north that in turn connects to Maude Road to the east.
- Keri East Road joins the Project area from the end of Dry Lake Road. There is a locked gate where Keri East Road intersects with the Project area.
- Secondary site entrances would only be used for local material deliveries (No port to site OSOM deliveries) and for staff access, once the appropriate internal site roads have been established and during operations. They would also be available as secondary emergency access/exit points (e.g. in the event of a bushfire).

While the primary access to the Project area is directly off the Sturt Highway, access between Moulamein and the southern part of the Project area is also expected to be beneficial for construction works in the southern part of the Project area as Moulamein would represent the closest township to that part of the Project and could provide services for part of the Project workforce accommodation and local materials.

Internal tracks

On-site access tracks will be constructed to facilitate access to turbines sites and other infrastructure (refer to Figure 1-2). The access tracks are typically unsealed and designed to allow for safe access for personnel and access for over-dimensional vehicles transporting wind turbine components. Access tracks need to be constructed to bear the required vehicle loadings and designed to include an appropriate turning radius on bends and intersections that allow them to be negotiated by over-dimensional loads such as the blade transport vehicles that may be over 90m in length. The finished access tracks are expected to be approximately 6m wide, though they may widen at intersections and turns.

Vehicle movements

Vehicle movements are most relevant to the construction period, as during the operational period traffic numbers would be significantly reduced to the site operations and service team and associated subcontractors on a periodic basis. During construction, vehicles would range from light cars to heavy vehicles and Oversize Overmass (OSOM) vehicles. An assessment of vehicle movements is included in Section 6.5 and Appendix F.5. Table 3-4 provides a high-level breakdown of main vehicle movements during the construction period and Table 3-5 shows the OSOM movement breakdown. Total Port to site OSOM vehicle movements over the construction period would be 2,375 over the 36 month construction period.

Table 3-4 Vehicle movements during construction

Vehicle Type		Average Vehicle movements per day		Peak Vehicle movements per day	
		Daily (vpd)[4]	Peak hour (vph)[5]	Daily (vpd)[6]	Peak hour (vph)[7]
Light vehicle (car/4wd)		80	40	134	67
Heavy vehicle	Shuttle bus	8	4	12	6
	Rigid trucks	6	1	10	1
	Truck and dog	66	7	108	11
	Semi trailers	4	1	6	1
	B-Double	4	1	6	1
	HV total	88	14	142	20
	Total	168	54	276	87

[4] Vpd = Vehicles per day
[5] Vph = Vehicles per hour
[6] Vpd = Vehicles per day
[7] Vph = Vehicles per hour

Table 3-5 OSOM traffic volumes and vehicle configurations

Component	Vehicle configuration	One-Way OSOM Vehicles	Approx Duration	Average Frequency
Blades	Prime mover with 3x8-3x8 blade trailer	540	24 months	98 per month
Hub	Prime mover with 2x8 dolly and 3x8 low loader	180		
Nacelle	Prime mover with 2x8 dolly and 3x8 low loader	180		
Drivetrain	Prime mover with 2x8-10x8 platform trailer and backup prime mover	180		
Tower Sections	Prime mover with trailer options: • 4x8-4x8 bookend trailer • 8x8 low platform trailer • 4x8-4x8 low extending platform trailer • 3x4-3x8 Dolly and jinker	1,260		
Substation Transformers	Beam set or prime mover with platform trailer	5	6 months	1 per month
wind turbine Erection Cranes	Varies	10	6 months	1 per month

3.3.8 Fencing

At the entrance points to the site, signage would be installed indicating “no entry without authorisation”. Entry to the site would be restricted on an as needs basis to authorised site personnel and to the landowner. Contact details for the site office would be provided on the signage. A lockable gate would be installed at the site entrances

The existing landowner paddock and boundary fencing would remain in most parts or would be adjusted (in consultation with the landowner) to accommodate the Project infrastructure. Additional fencing would be installed around the substations and BESS, which may consist of a steel security fence approximately 2.4m high with barbed wire topping, or similar.

3.3.9 Lighting and monitoring

Lighting within the Wind Farm would be minimised. Motion sensor or infrared security lighting would be installed at the substations, BESS and O&Ms, however this lighting would only be switched on during night-time maintenance or emergency purposes where permitted. Each turbine entry also has a light installed which will be turned off by default and only switched on when required by service personnel.

All external operational lighting would be designed to reduce disturbance to neighbouring properties (except where required for safety or emergency purposes) and would not shine above the horizontal. External lighting would be installed to comply with Australian/New Zealand Standard *AS/NZS 4282:2019 – Control of Obtrusive Effects of Outdoor Lighting*, or its latest version. The external operational lighting would be used only when there are staff on site, as part of night works (where required), site security or during emergency situations including through remote operation to allow improved camera visibility.

Aviation obstacle lighting is not proposed on any of the turbines or meteorological masts.

CCTV cameras may be installed at each site entrance for continuous monitoring by site staff. The CCTV cameras would likely be solar / battery powered with a wireless communication connection and would be mounted on up to approximately 5m high poles complete with sensors or infrared security lighting.

3.3.10 Workers' accommodation

Temporary workers' accommodation is proposed to be provided for the construction of the Project. It is estimated that the workforce required to construct the Project will peak at approximately 400 persons.

The proposed camp is envisaged to supplement existing facilities, such as the existing accommodation camp available for hire at Balranald and other limited local accommodation options around Balranald, Hay, Maude and Moulamein. Nonetheless, approval is sought for a camp size sufficient to cater for the entire Project workforce (~400 persons) in the event that the surrounding local accommodation options are saturated by other development occurring concurrently in the region. An area of 4.3ha near to the Sturt Hwy site entrance has been assessed for siting the accommodation camp and would be sufficient in size. The camp would be decommissioned and the area rehabilitated or cleaned up and handed over to landowner (as agreed with landowner) once the construction period is complete.

The workforce will be a combination of local and regional workers, with specialists coming in from wider areas as required. It is anticipated that some of the workforce may live locally and will not require additional accommodation and that a proportion of the workers may be accommodated in the existing Balranald workers' accommodation camp as well as in available accommodation in surrounding areas.

3.3.11 Resource requirements

Water demand and supply

Supply of water will primarily be required during the construction phase with much reduced demand during the operational phase of the Project. Activities requiring water during construction include:

- Dust suppression
- Material conditioning for access tracks and hardstands
- Concrete batching
- Concrete washout
- Accommodation camp requirements
- Vehicle and equipment wash down
- Cleaning of turbine components before installation
- Amenities.

Water usage is discussed further in Section 6.8. Total water requirements for the construction are estimated to be around 850ML (i.e. ~250ML p/a for 3.5 years), although the amount would vary depending on the weather conditions experienced (e.g. water requirements for dust suppression and material conditioning would be greater during prolonged dry periods) and the duration of construction in relation to staging. Construction water would be sourced from an existing groundwater bore and new groundwater bores; and / or from surface water sourced from Billabong Creek via an irrigation channel and piping to site.

Water requirements during operation would be significantly lower and limited to road and vehicle maintenance and onsite amenities. It's estimated that the operational water supply would be around 3ML per year on average.

Mineral extraction

There is a deposit of gypsum within the Project area which may be suitable for road stabilisation and other soil remediation activities. Specifically, Lot 57 DP756555 contains a surface deposit approximately 50,000m^3.

Recovery of gypsum would necessitate a mining exploration licence and lease, given gypsum is a regulated mineral under the *Mining Act 1992*.

Gravel / access track base / sand requirements

Where practical, gravel material would be sourced from the site within the development footprint for use as fill and road material. Material suitable for the construction of access tracks and hardstands would also need to be sourced from available locations, preferably from local sources. Gravel and fill requirements have been estimated in Table 3-6 below.

Table 3-6 Estimated gravel requirements

Material required for:	Approximate cubic metre (m^3)	Total m^3 for Project
Gravel or suitable roadbase material per 1km of access track	2500	760,000
Thermal sand for underground cable backfilling (if excavated soil is not suitable) per 1km cabling	160	44,800

Concrete batching

Concrete batching plants may be established and disassembled at construction compound or laydown areas as the Project progresses through the construction period. The Project proposes two or three batching plants each approximately 100m x 100m located at construction compounds.

Town water would be trucked to site to meet potable water demand and for concrete batching in the case that the groundwater does not meet the specification requirements for concrete batching.

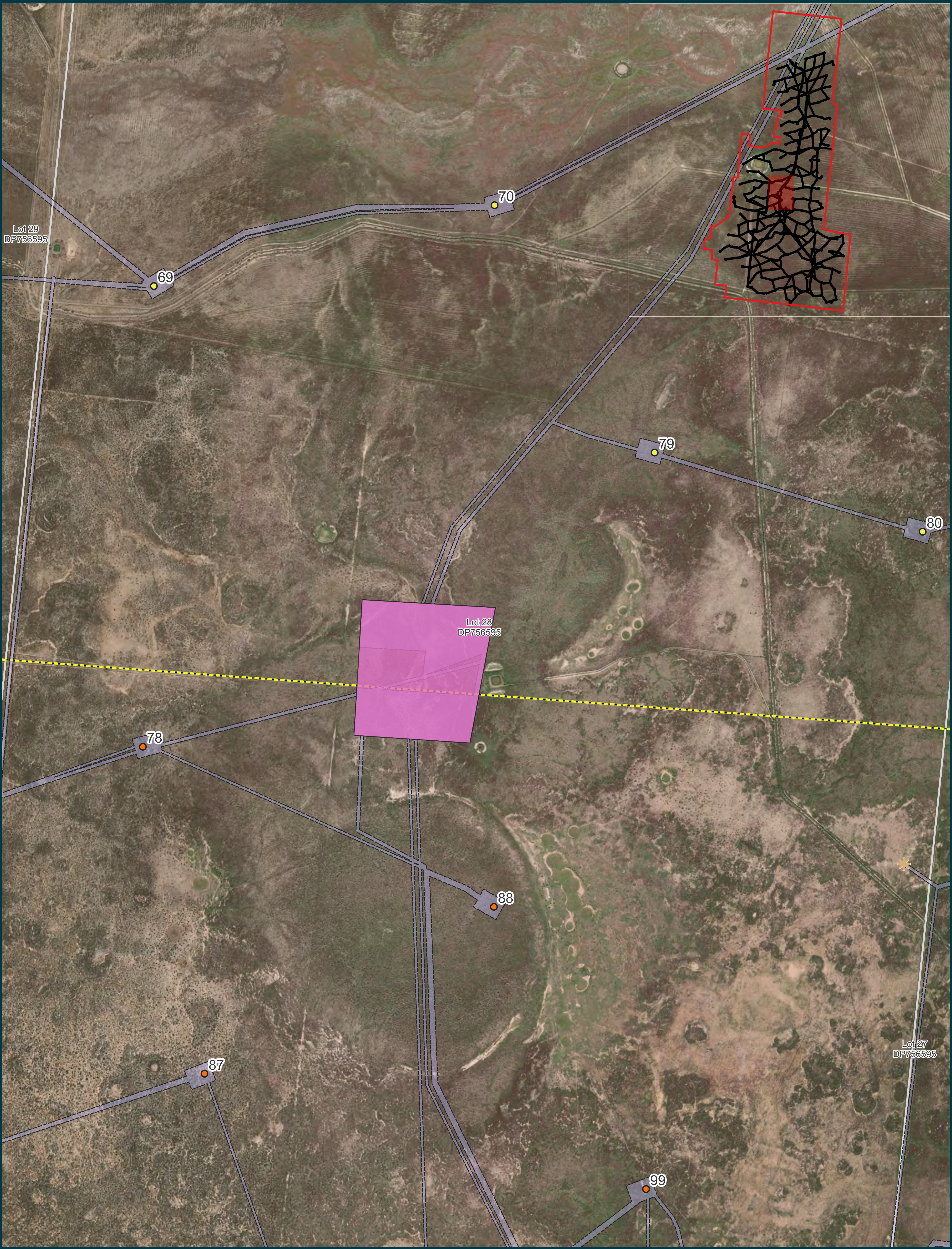
3.3.12 Subdivision and site leases

A subdivision will be required to separate permanent TransGrid assets to be owned by Transgrid. These are expected to include a substation and switching station to facilitate grid connection, which will be sited adjacent to the existing Transgrid 220kV and 330 kV PEC easement. The area expected to be required to be subdivided would be 1-5ha each and wholly within Lot 28 DP756595 (refer to Figure 3-12).

The subdivision is inconsistent with the minimum lot size under the Wakool LEP (500ha) and the Hay LEP (600ha). However, section 4.38(3) of the EP&A Act provides an exception for SSD Projects. Therefore, the subdivision can be granted.

Pending approval, the subdivision would be administered through consultation with Murray River Council. The subdivision areas shown are indicative only and would be formalised through subsequent subdivision applications.

The operational footprint of the wind farm would be leased from the host landholdings by registration of a long term lease under the Real Property Act in agreement with the land holders.



0 250 500 m

Datum: GDA2020 / MGA Zone 55

Construction Disturbance area
Elelctricity Transmission Line
220kV
Existing Lots
Stage 1 turbines
Stage 2 turbines
Substation lot for subdivision

Baldon Wind Farm

Figure 3-12 Indicative subdivision

Ref: 22-366 Baldon Wind Farm EIS 20240229 \ Indicative Subdivision Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022

3.4. Project timing; phases and stages

Table 3-7 provides an outline of the indicative development, construction, and operational milestones for the Project. Timeframes are approximate and indicative only. The construction period is estimated to be approximately 3.5 years for the full Project, or nearer to 2 years for each stage if the Project was constructed in two stages.

Table 3-7 Indicative Project Timetable

Activity	Indicative Timeline
Environmental Impact Statement (EIS) Lodged	Q2 2024
Development consent granted	Q1 2025
Financial close (subject to grid connection awarded)	Q2 2025
Start of construction	Q4 2025
Operations commence	Q2 2029 (or likely earlier if the Project is constructed in stages)
Decommissioning or Repowering	2054 - 2059

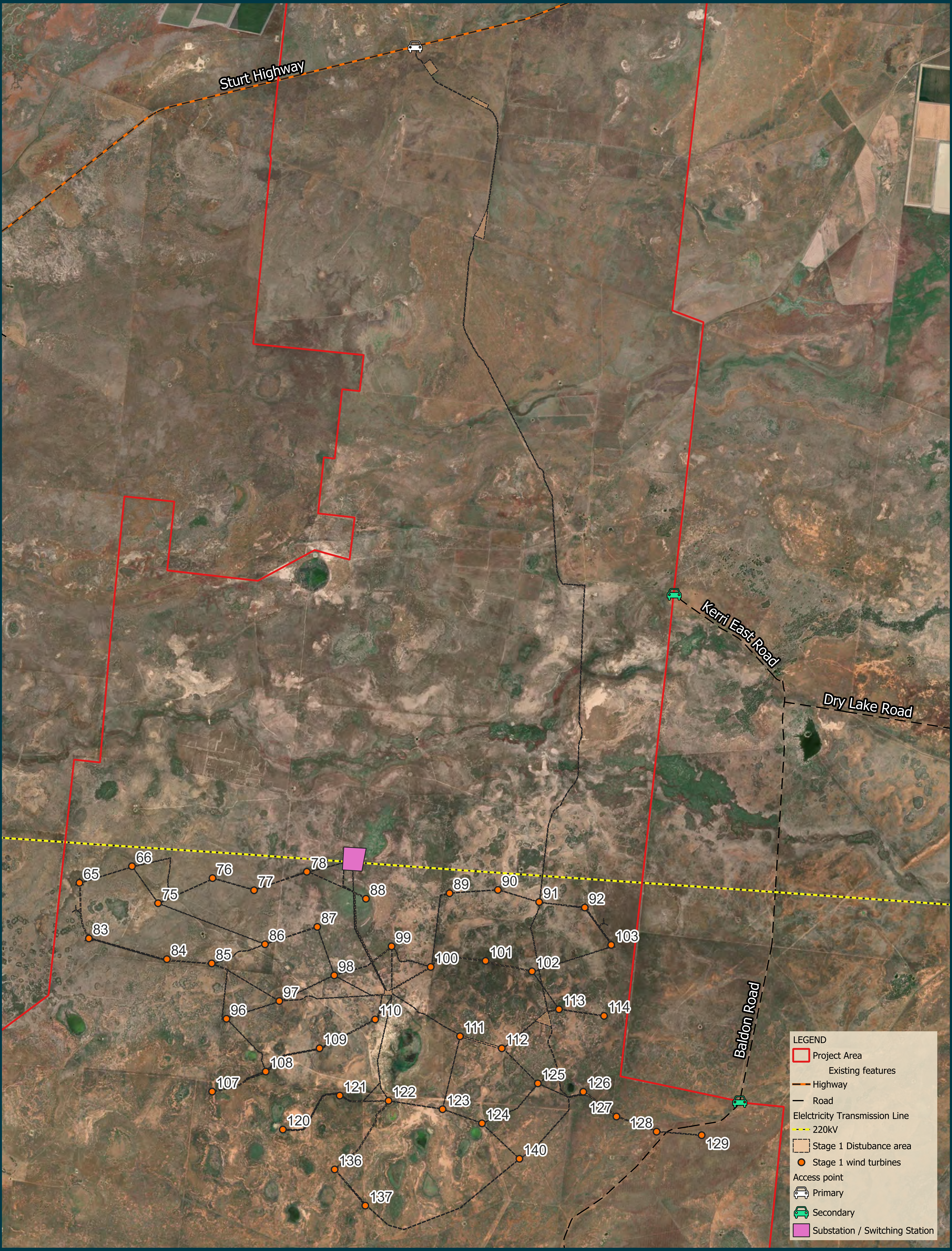
3.4.1 Staging

The Project is likely to be constructed in two stages. Staging may affect both timing and the final selection of components. For example, a greater rated turbine capacity is likely in later stages due to anticipated technological advances over time.

A two staged construction approach has been assessed in this EIS. The reasoning for the staging is to expedite grid connection in line with the existing connection agreement made with Transgrid. The assumptions are that the first stage would include the installation of 45 turbines and the second stage would include the remaining 135 turbine installation. Other details include:

- Ancillary infrastructure for Stage 1 would be inclusive of the substation and switching station, internal tracks, the accommodation facility, overhead and underground electrical lines laydown areas/compounds, met masts, new bores and operational facilities. The Stage 1 Disturbance area is shown in Figure 3-13. Stage 1 would be commissioned and become operational independent of Stage 2.
- Stage 2 would be completed as an expansion of the Stage 1. Additional supporting infrastructure would also be installed in this stage such as additional substations, batteries, internal roads, etc

If the Project is to be re-powered after the initial 30-year term, then the phases may repeat – albeit with a potentially shorter construction window given the established site access and ability to reuse some infrastructure. However, given the likely progression of wind turbine models, it is expected that a further planning approval would be required.



0 1 2 km

Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

Figure 3-13 Stage 1 Construction Disturbance area

3.4.2 Phases

The Project would proceed in five phases; pre-construction, construction, operations, refurbishment and decommissioning, as set out below.

Pre-construction

Following the Project receiving Development Consent from NSW and, if applicable, EPBC Approval (Federal) (referred to here as the Approvals), there are typically several approval conditions that must be satisfied before work can begin. This process may involve:

- Further site studies such as a geotechnical study to finalise the design layout.
- Finalisation of grid connection agreements.
- Exercising landowner options and taking long-term lease agreements
- Seeking tenders from contractors that can deliver the Project components
- Arranging financing
- Awarding of construction contracts
- Completion of all other pre-construction requirements as set out in the Approvals, including the preparation and DPHI endorsement of specified management plans.

Where permitted by the Approvals, certain early works may proceed subject to any further or secondary approvals, for works such as:

- Local road and intersection upgrades may be implemented to facilitate the safe commencement of on-site works without local traffic conflicts.
- An initial small work force would develop site entries, limited access tracks and a construction compound. Scale up activities at the compound would occur as the workforce increases.
- Establishment of temporary accommodation facilities for the construction workforce prior to commencement of full construction.
- Site establishment by the civil and/or electrical balance of plant contractor.
- Installation of meteorological monitoring masts is generally required in advance of the commencement of construction. The data from these masts is used for energy assessment, layout design, turbine performance analysis and background noise monitoring and/or post-construction noise compliance monitoring.

Construction

Subject to gaining all the necessary planning approvals, licences, contractual and financing arrangements in place, the construction of the Project is estimated to commence in 2024.

Examples of construction works are outlined below:

- Vegetation clearing initially for temporary facilities and progressively for access tracks and hardstands for each turbine site eventually leading to preparation of cable routes for trenching and cable installation. Extension of this activity, ahead of civil works, to ensure sensitive clearing and protection of fauna as well as defining limits of native vegetation impacts is a normal procedure for cable installation.
- Bulk earthworks to form tracks, hardstands and excavate turbine and substation footings. This may involve forming topsoil stockpiles and removing soils that are unsuitable for access track formation and replacing them with suitable materials, where necessary.
- Formation of turbine and substation foundations by installing formwork, steel reinforcing and concrete pours.

- Construction of substations, including grid connection componentry (delivery of component parts including large transformer(s)).
- Trenching for installation of underground cabling between substation and turbines. Backfilling trenches and rehabilitation of impact areas.
- Delivery of turbine components to site and set-down on hardstands or adjacent land (blades may be placed on blade racks to limit ground disturbance).
- Crane contractor to establish on-site and commence turbine installations.
- Erection of turbines across the site, possibly using multiple cranes operating in parallel. Consideration may also be given to multiple shifts to fast-track the installations.
- Following installation, the turbines will be connected to collector circuits and checked to ensure readiness for commencement of turbine commissioning.

Commissioning, operation and maintenance

Pre-commissioning checks will be carried out on the high voltage electrical equipment at the substation prior to connection to the NEM. When the Project's electrical system has been energised, the wind turbines and BESS can be commissioned and put into service.

Wind turbines are commissioned sequentially enabling parts of the wind farm to commence operation before others. The commissioning phase requires a team of commissioning and service contractors working on each wind turbine and associated facilities to ensure correct operation for commissioning purposes.

At this phase of the development, the Project will start to review operational compliance and ensure items such as noise requirements are able to be met and potential avifauna impacts are monitored through the implementation of the Operational Environmental Management Plan (OEMP).

Following completion of commissioning of all wind turbines, the Project will enter the operations phase where the wind farm will operate continuously as wind conditions are suitable. Individual turbines will be shut down for periodic scheduled inspections and maintenance and, as necessary, unscheduled maintenance. The on-site operational facility will be host to a team of about 35 permanent on-site service staff including technicians with electrical and mechanical experience and site management and administration personnel. The permanent on-site service team will from time-to-time be supported by contract service personnel.

Occasionally more substantial maintenance and repairs to a wind turbine may be required, for example, to replace a wind turbine blade or generator. This would require a crane and turbine component being mobilised to site together with associated plant, riggers, and crew to carry out the work.

Pending Project approval, refurbishment may be adopted to extend the life of the wind farm life.

Refurbishment would most likely involve the replacement of the existing wind turbines with newer, more efficient models, or the replacement of worn out components to extend the life of the installed equipment. This would also extend to battery replacements. This may require changes to the internal access tracks, cabling, foundations as well as changes to turbine spacing and tip height. Refurbishment details would be subject to available equipment at the time and would be in consideration of the site's environmental and social values. Any changes to the approved disturbance footprint, infrastructure components or operational parameters may require additional assessment and approvals at that time.

Decommissioning or refurbishment

The design life of the wind turbines is potentially for a period of 30 years after commencement of operations. At that time, the Project owners would need to consider options for future use of the site. Such options would include decommissioning and removal of the existing turbines and towers with or without replacement with new turbine equipment. Given the transition to renewables that is occurring, it is expected that continued use of the site for renewable energy would be the most likely outcome. However, that could involve different wind turbine models, changes in dimensions and/or turbine power ratings.

If it is determined to decommission the wind farm, then the wind turbines would be dismantled, and their respective components removed from site, generally as follows:

- Dismantle turbine components maximising recycling of materials
- All associated buildings managed by will be removed from the site
- Substations and ancillary buildings owned by the TNSP may need to be retained longer term as they may form an integral part of the grid network infrastructure
- Hardstands and access tracks would either be subject to rehabilitation or retained if agreed with the landowner
- Access tracks may be left in place if beneficial to the landowner or could be removed and returned to pasture
- Underground reticulation and turbine footprints would not be completely removed. Turbine footings would be covered under 500mm of topsoil which would be stockpiled from the initial construction of the turbines.

The duration of decommissioning can take up to two years to complete, depending on the complexity of the site and the number of wind turbines and associated infrastructure to be removed. A Decommissioning Environmental Management Plan including (DEMP) a Traffic Management Plan would be prepared for decommissioning.

Refurbishment may be adopted to extend the life of the wind farm life.

Refurbishment would most likely involve the replacement of the existing wind turbines with newer, more efficient models, or the replacement of worn out components to extend the life of the installed equipment. This would also extend to battery replacements. This may require changes to the internal access tracks, cabling, foundations as well as changes to turbine spacing and tip height. Refurbishment details would be subject to available equipment at the time and would be in consideration of the site’s environmental and social values. Any changes to the approved disturbance footprint, infrastructure components or operational parameters may require additional assessment and approvals at that time.

04 Statutory context

4. Statutory context

The following table sets out the statutory requirement of the Project. It is categorised in accordance with the Table 2 of the DPHI EIS guidelines (refer to Table 4-1) (DPE, 2021). Table 4-1 and Table 4-2 provide further details on the pre-conditions and mandatory matters that must be considered prior to development consent.

Table 4-1 Statutory context

Category	Statutory requirements	Relevance to Project	Section reference
Power to grant consent	State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) Environmental *Planning and Assessment Act 1979* (EP&A Act).	Section 20 of Schedule 1 of the Planning Systems SEPP states that the following is considered a SSD: *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 an estimated development cost of more than $30 million, or* *(b) has an estimated development cost of more than $10 million and is located in an environmentally sensitive area of State significance.* The Project would have an EDC estimate of more than $30 million. Therefore, the Project is classified as “State Significant Development” under division 4.7 of the EP&A Act. The Minister for Planning and Public Spaces is the consent authority for SSD, and SSD applications are assessed by DPHI (unless specific conditions occur e.g., where 50 or more people have objected to the application, the local council has objected to the application; and/or the applicant has disclosed a reportable political donation, whereby the Independent Planning Commission (IPC) would be the consent authority. Section 4.38(2) of the EP&A Act also allows SSD Projects to be granted consent even if the development is wholly prohibited by an environmental planning instrument.	EDC is stated in Section 3.1
Permissibility	State Environmental Panning Policy (Transport and Infrastructure) 2021 (TISEPP), Wakool Local	The Project area is located within land zoned RU1 (Primary Production), under the Wakool Local Environmental Plan 2013 and the Hay Local Environmental Plan 2011. Electricity generation is prohibited within this zone, however Section 2.36(1)(b) of the TISEPP states development for the purpose of electricity generating works may be carried out by any person with consent on any land in a	Addressed succinctly in this table considering the exceptions of the TISEPP.

Category	Statutory requirements	Relevance to Project	Section reference
	Environmental Plan 2013 (Wakool LEP) Hay Local Environmental Plan 2011 (Hay LEP)	prescribed non-residential zone. Therefore, the Project is permissible with consent.	
Other approvals (consistent approvals)	*Roads Act 1993* (Roads Act), *Protection of the Environment Operations Act 1997 (POEO Act)*	**Consistent approvals** Section 4.42 of the EP&A Act states "*An authorisation of the following kind cannot be refused if it is necessary for carrying out State significant development that is authorised by a development consent under this Division and is to be substantially consistent with the consent*": • Consent under section 138 of the Roads Act for road upgrades to the public road network. • Schedule 1 of the POEO Act defines scheduled activities and Part 1 Premises based Activities. Item 17 (1) includes wind farms. As a Scheduled Premises, the Wind Farm is required to apply for and obtain an Environment Protection Licence (EPL). The EPL may be issued in phases, initially for the wind farm development works and subsequently for the wind farm operation. These phases will have different environmental risks and the EPL is likely to be varied for the operational phase to take account of impacts such as operational noise. Additionally, the POEO Act requires that the EPL Holder prepare, maintain and periodically test a Pollution Incident Response Management Plan (PIRMP). Annual Returns are also required to be submitted by the	N/A. Post approval requirements

Category	Statutory requirements	Relevance to Project	Section reference
		Licence Holder for the site.	
Other approvals (EPBC Act Approval)	*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act),	Under the EPBC Act, if the Minister determines that an action is a 'controlled action' which would have or is likely to have a significant impact on a Matter of National Environmental Significance (MNES) or Commonwealth land, then the action may not be undertaken without prior approval of the Minster. The BDAR and Biodiversity section have identified potential impacts of the Project on migratory birds which are a MNES entity. As such an EPBC referral is being issued to the Commonwealth Department of Climate Change, Energy, the Environment and Water.	Section 6.1 and Appendix F.1
Other approvals	*Crown Lands Management Act 2016 (CLM Act),*	An easement, licence or permit would be required under division 5.6 of the *Crown Lands Management Act 2016.* There are a number of crown owned paper roads throughout the Project area.	Section 3.3.12
	Conveyancing Act 1919	The Transgrid subdivision as discussed in Section 3.3.12 would require a subdivision certificate under Division 6.4 of the EP&A Act. The subdivision would be undertaken under the provisions of the *Conveyancing Act 1919.*	Section 3.3.12
Approvals not required	*Fisheries Management Act 1994 (FM Act),* *Heritage Act 1977*, *National Parks and Wildlife Act 1974 (NPW*	Section 4.41 of the EP&A Act excludes the following approvals when the Project is an SSD. • A Fisheries permit under the Section 201 and 219 of the *Fisheries Management Act 1994* • An excavation permit for details heritage surveys under	N/A

Category	Statutory requirements	Relevance to Project	Section reference
	Act), *Rural Fires Act 1997,* *Water Management Act 2000 (WM Act).*	Section 139 of the *Heritage Act 1977* • An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974*[8] • The Project would not require a bushfire safety authority under Section 100B of the *Rural Fires Act 1997* • A water use approval (Section 89), a water management work approval (Section 90) and an activity approval (Section 91) under the *Water Management Act 2000* would not be required.	

[8] Note that the Project has comprehensively assessment impacts to Aboriginal heritage as part of an Aboriginal Cultural Heritage Assessment (ACHA) during the EIS.

4.1. Pre-conditions to exercising the power to grant approval

Table 4-2 Pre-conditions to exercising power to grant approval

Statutory reference	Pre-condition	Relevance	Section in EIS
State Environmental Planning Policy (Transport and Infrastructure) 2021	In accordance with Section 2.119 The consent authority must not grant consent unless it is satisfied of certain matters relating to vehicular access to the classified road, impacts on the safety, efficiency and operation of the classified road and sensitivity of development fronting the classified road.	The Projects primary access is via a classified road, the Sturt Highway. The Project is considered to be consistent with Section 2.119 as it would not compromise operation of the Sturt Highway as assessed in the EIS.	Section 6.5 and Appendix F.5
	Section 2.122 of the Transport and Infrastructure SEPP requires ‘traffic generating development’ to be referred to TfNSW.	The Project would result in the generation of additional vehicles on the transport network. As such traffic impacts assessment has been completed. TfNSW have been consulted throughout the development of the Traffic Impact Assessment and will be able to provide a submission during the EIS submission phase.	Section 6.5 and Appendix F.5

4.2. Mandatory matters for consideration

Table 4-3 Mandatory matters for consideration

Statutory reference	Mandatory consideration	Section in EIS
Consideration under the EP&A Act and EP&A Regulation		
Section 1.3	Relevant objects of the Act: • To promote the social and economic welfare of the community and a better environment by the proper	In order: Section 6.4

Statutory reference	Mandatory consideration	Section in EIS
	management, development and conservation of the State's natural and other resources • To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment • To promote the orderly and economic use and development of land • To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	Section 8.7 Section 6.4 Section 6.1
Section 4.15	Relevant environmental planning instruments and any proposed instruments: • State Environmental Planning Policy (Transport and Infrastructure) 2021 • State Environmental Planning Policy (Planning Systems) 2021 • State Environmental Planning Policy (Resilience and Hazards) 2021 • State Environmental Planning Policy (Biodiversity and Conservation) 2021 • State Environmental Planning Policy (Primary Production and Rural Development) 2021 • Wakool Local Environmental Plan 2013 • Hay Local Environmental Plan 2011 Note: As per Table 4-1 the provisions of the TISEPP override the provisions of the Wakool Local Environmental Plan 2013 and Hay Local Environmental Plan 2011, however specific relevant provisions of each LEP are considered in this table. Relevant planning agreement or draft planning agreements: • VPA for the site entered into between the applicant and another party. Regulations • EP&A Regulation 2021 • Environment Protection and Biodiversity Conservation Regulations 2000	This table, Table 4-1 and Section 2.7 (planning agreements) Environment Protection and Biodiversity Conservation Regulations 2000 addressed in Appendix F.1
	Likely impacts of the development (environmental, social and economic)	Section 6 and Section 7.

Statutory reference	Mandatory consideration	Section in EIS
	Suitability of the site for development	Section 2.4 & Section 2.5
	Submissions made in accordance with the Act or regulations	Executive summary: Where to from here
	Public interest	Section 8.4
Considerations under other legislation		
Biodiversity Conservation Act 2016 – Section 7.14	The Minister for Planning is to consider the likely impact of the proposed development on biodiversity values as assessed in the biodiversity development assessment report. The Minister for Planning may (but is not required to) further consider under that Act the likely impact of the proposed development on biodiversity values. The Project has completed a Biodiversity Development Assessment Report (BDAR) under Section 7.9 of the *Biodiversity Conservation Act 2016.* The BDAR has been undertaken in consultation with Biodiversity Conservation and Science (BCS)	Section 6.1
Native Title Act 1993	There are no areas within the Project area registered or under assessment under the *Native Title Act 1993* as of 7 June 2024	N/A
Mandatory relevant consideration under NSW EPIs		
State Environmental Planning Policy (Resilience and Hazards) 2021 – Section 3.7	Section 3.12 of the SEPP Resilience and Hazards requires the consent authority to consider the Project's preliminary hazard analysis (PHA). The Project includes a BESS which requires preparation of a PHA. Consideration must be given to current circulars or guidelines published by DPE as follows: • Hazard Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use and Safety Planning, • Hazard Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis, and • Multi-level Risk Assessment A Preliminary Hazard Analysis (PHA) has been completed that addresses Section 3.7 of the State Environmental Planning Policy (Resilience and Hazards) 2021 for energy storage systems.	Section 7.2.1 Appendix F.8

Statutory reference	Mandatory consideration	Section in EIS
	Section 4.6 of the SEPP Resilience and Hazards requires the contamination and remediation of land to be considered by a consent authority, when determining a DA.	Section 7.4
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Chapter 3 of the Biodiversity and Conservation SEPP applies to each LGA listed in Schedule 2 of this SEPP, where Murray River LGA is listed. Before a consent can be granted to a development application to carry out an activity on land to which this Part applies, the planning authority must be satisfied as to whether or not the land is a potential koala habitat. Koalas were not identified as part of the biodiversity assessment and the land is not considered potential koala habitat.	Section 6.1 and Appendix F.1
State Environmental Planning Policy (Primary Production and Rural Development) 2021	The State Environmental Planning Policy (Primary Production and Rural Development) 2021 provides provisions to balance between rural needs and facilitate the orderly economic use and development of lands for primary production, to reduce land use conflict and sterilisation of rural land and to identify State significant agricultural land. An Soils, Land and Agricultural Impact Assessment was undertaken that addresses the provisions of this SEPP.	Section 6.4, Section 6.9 and Appendix F.7
Wakool Local Environmental Plan 2013	In accordance with Section 6.1 Earthworks the development must consider any detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land.	Section 6.6, Section 6.2, Section 6.9 Section 6.2 Section 7.1
	In accordance with Section 6.3 the Development must consider impacts to terrestrial biodiversity.	Section 6.1
	In accordance with Section 6.8 Essential services, development consent must not be granted unless the consent authority is satisfied that essential services for the development are available or that adequate arrangements have been made to make them available when required.	Section 7.4
Hay Local Environmental Plan 2011	In accordance with Section 6.1 Earthworks the development must consider any detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land.	Section 6.6, Section 6.1, Section 6.9 Section 6.2 Section 7.1

Statutory reference	Mandatory consideration	Section in EIS
	Section 6.3 provides for the "effective and ongoing use of Hay Aerodrome". The clause is limited to the Obstacle Limitation Surfaces or the Procedures for Air Navigation Services for Hay Aerodrome.	Section 7.2.2 and Appendix F.9
	In accordance with Section 6.3 the Development must consider impacts to terrestrial biodiversity.	Section 6.1
Development Control Plan provisions (DCPs)	Do not apply to SSDs in accordance with Section 2.10 of the Planning Systems SEPP	N/A

05 Engagement

5. Engagement

Engagement with stakeholders is an integral part of developing a project that responds to its social and environmental context, while also achieving community support and social licence to develop and operate. Wind energy projects continue to be an emerging sector in the Australian energy industry and bring a concentration of both direct and indirect benefits through economic stimulus and employment.

Particularly within Renewable Energy Zones, wind farm projects cannot be viewed as isolation, as the decisions made in one project influence the perceptions and attitudes towards the entire renewables industry. Strong community engagement creates mutual benefits, and when engaged successfully can:

- Ensure impacts will be acceptable to the community
- Spread the benefits to all those who will be affected, and
- Build long-term relationships and trust with the community.

5.1. Community engagement and consultation

This section summarises the detailed consultation activities undertaken to achieve these goals, considering the broader community, and specific stakeholders including First Nations community representatives and government agency stakeholders. It identifies:

- Issues and views raised by stakeholders
- Opportunities to influence the Project
- Plans for future engagement.

5.1.1 Background relevant to the consultation process

The proposed Baldon Wind Farm is located within the South West Renewable Energy Zone (SW-REZ). The site is located on freehold land used for sheep grazing in an area over 42,000 hectares (ha) in size. The site is located 15km north of Moulamein, 55km east of Balranald and 75km southwest of Hay NSW. The Baldon Wind Farm sits within the Murray River and Hay Shire Council areas and is adjacent to the Edward River Council to the east. The Project would host approximately 180 wind turbines and associated infrastructure and could produce over 1000MW of electricity, which is the equivalent of powering over 700,000 homes.

The Applicant submitted a Scoping Report to the NSW Department of Planning and Environment (DPE, now known as the NSW Department of Planning, Housing and Infrastructure, or DPHI) in 2022 and received Secretary Environmental Assessment Requirements (SEARS) in July 2022. The Applicant has been conducting the associated EIS assessments, including community and stakeholder engagement, since this date and prior.

In mid-2023, the Victoria to NSW Interconnector West (VNI West) proposed route was adjusted, with the corridor running to the north of Moulamein within 3km of the township. In early 2024, the corridor was further moved north of Moulamein, and is now situated approximately 4km to the south of the Project boundary running in an East – West direction. The VNI-W route development by Transgrid has been controversial amongst the community, with concerns being raised relating to the lack of transparency and communication from Transgrid and views that the development would impede existing irrigated farming and cropping operations in the area. This has, in turn, changed some local perspectives towards renewable energy developments in the region, though there is general acceptance for projects located in the plains country where the population density is very low.

The Baldon Wind Farm EIS does not currently propose a connection into the VNI West and further assessment and approval would be required via a project Modification should this connection be proposed in the future.

The Applicant is aware of and appreciates the concern that the community has towards VNI West and has kept this background understanding in consideration when engaging with the community.

The community engagement and consultation summary in this chapter outlines the steps taken to engage directly with both the issues and opportunities associated with the Project through a broad range of engagement activities undertaken throughout the detailed environmental impact assessment phase, spanning from June 2022 through to April 2024.

The Applicant recognises the value community feedback has provided in refining the Project's design, the way it can share benefits locally and how it can contribute to the broader aspirations of the region.

5.1.2 Scoping phase engagement

The Applicant commenced community engagement and consultation for the Scoping Report in early 2021. During this period, NSW was under a variety of Public Health restrictions due to the COVID-19 pandemic, which continued throughout the year. These restrictions prevented or discouraged travel and work related to in-person consultation activities including meetings, forums, and community drop-in sessions. As a result, the Applicant adapted to these restrictions and undertook community and stakeholder engagement through a combination of in-person (where possible) and remote engagement tools.

- Near neighbours were identified through desktop assessment and contact details obtained where possible and were contacted through telephone and email. An introductory letter and copy of the Project introduction newsletter were also mailed to all landowners with residences within 5km of the Project Boundary.
- A website was established that contained Project information, a map, and details of how to contact the Project team. Communication and feedback channels were also established through an email address, phone number, and website contact form. A feedback form, which included social and landscape value questions, was also available on the website.
- In-person meetings with officials from the Murray River Council, Hay Shire Council, and Edward River Council were conducted to provide a Project briefing in August 2021, September 2021 and February 2022.
- Community information drop-in sessions were facilitated at Moulamein Bowls Club on Wednesday 23rd February 2022 from 2-4 pm, and Thursday the 24th of February from 5-7 pm. The drop-in sessions were advertised on the Riverine Grazier, The Guardian, The Wongi (Moulamein local newspaper), the Hay Shire Council Facebook page, the Moulamein Business Centre, and the Moulamein Bowling Club.

During the early stages of the Baldon Wind Farm consultation, the community feedback captured a sense of the perceived issues and opportunities of the Project. The main issues and opportunities for ongoing discussion and consideration during the EIS included:

- General support of renewable energy
- Desire to maximise opportunities for local communities through jobs and broader economic benefits
- Drive to maximise benefits for the local communities through community benefit schemes
- Opportunities for local accommodation providers to benefit during construction
- Concern about local housing supply would not be sufficient for the influx of local workforce
- Concern that construction would drain the local workforce and increase wage expectation
- Concern over negative noise impact
- Concern around grid constraints and cumulative impacts of multiple windfarms competing for availability
- Concern for visual amenity impact on the flat landscape.

These issues and opportunities were explored further during the EIS engagement activities and the responses and adaptations applied to the Project are outlined in the section below.

Overall, the Applicant and the NSW government recognised that a significant level of consultation, engagement and information sharing was required during the EIS development and beyond. As a result, the Applicant delivered a communications and engagement program that represented a genuine investment in engagement and consultation with the local community.

5.1.3 EIS phase engagement

Community consultation was re-initiated in January 2023 once COVID-19 restrictions subsided nationally. The Applicant re-commenced engagement by providing updates on the Project to stakeholders including near neighbours, targeted stakeholders (such as the Councils) and the broader community. Ongoing communication and engagement continued throughout the EIS period in the form of phone calls, emails, face-to-face meetings, community pop-ups, drop-in information sessions, and more.

Six dedicated community information drop-in sessions were facilitated across the EIS engagement period; three sessions in September 2023 and a further three sessions in May 2024 held at various locations in Balranald, Hay and Moulamein. These community information drop-in sessions provided the wider community and identified stakeholders the opportunity to meet the Project team, learn more about the Project, learn about assessment outcomes, and provide their feedback.

Several community pop-up sessions were also held at community events. These pop-ups were in the form of an information table/booth and allowed attendees of the community events to meet the team and learn more about the Project. One pop-up was facilitated at the annual Moulamein Festival in February of 2023, and two more were held across a weekend in August 2023 at the Moulamein Bowling Club during the Moulamein Bowls Tournament.

The Project team also facilitated a stall at the inaugural Hay TAFE NSW Employment and Education Expo on the 9th of November 2023, where high school students and other attendees had the opportunity to discuss future employment opportunities within the renewables industry. This allowed students in the local area to not only meet the Project team and learn about the Project itself but also gain a broader understanding of the wider energy industry.

The Applicant provided multiple sponsorship opportunities in the local community throughout the EIS consultation period. Sponsorships were provided in the form of financial incentives and worked to assist local communities with various events and initiatives in the local area.

Sponsorships included:

- Celebrate Moulamein Festival (Feb 2023)
- Moulamein Easter Fair (2023 & 2024)
- Moulamein Bowls Classic (Aug 2023)
- Hay TAFE Jobs Expo (Nov 2023)
- Moulamein Race Day Children's Activities (Dec 2023)
- Moulamein Football & Netball Club (May 2024)

Members of the Project team also attended ongoing meetings with nearby residents and other identified stakeholders throughout 2023 and into 2024 as part of the EIS consultation to further discuss the Project.

As outlined in the Scoping engagement summary above, all neighbours within 10 km of the site were contacted by phone to introduce the Applicant, initiate relationships, and inform them of the proposed Project. Letters introducing the Project, and copies of Project newsletters, were also sent via posted mail to all receivers within 5km of the Project site. Consultation and engagement with sensitive receivers throughout the EIS period organically flowed on previous consultation efforts, with neighbours kept up-to-date via phone calls, meetings, and discussions held at community event pop-ups and drop-in information sessions.

Engagement and consultation occurred with First Nations groups and Registered Aboriginal Parties (RAPs) for the Project, including the Balranald Local Aboriginal Land Council, Hay Local Aboriginal Land Council, Hay Aboriginal Working Party, Nari Nari Tribal Council, Pappin Family Aboriginal Corporation, and Wakool Indigenous Corporation. This occurred both through general communication and engagement processes to discuss the Project, and possible community benefits, as well as through the formalised ACHA process (set out in Section 5.2). Ongoing liaison via email, phone calls and meetings throughout the EIS engagement period.

Substantial consultation also occurred with Balranald Shire Council, Hay Shire Council and Edward River Shire Council throughout the EIS consultation period. Communication topics included updates on the Project's progress, Project briefings, advertising community information sessions, negotiation around Voluntary Planning Agreements (VPA) and feedback on community benefit initiatives, stakeholder collaborations (such as TAFE NSW), workforce accommodation, dwelling entitlements, local engagement opportunities, and more.

During the Baldon Wind Farm consultation, the community feedback and submissions received through the community survey captured a strong sense of the key issues and opportunities perceived by the community, building upon the sentiment gathered in Scoping engagement activities. The main issues and opportunities highlighted throughout the EIS consultation period remained relatively consistent with earlier consultation results and included:

- General support of renewable energy on the Hay Plains and the Project more broadly
- Large show of support for the increased business the development would bring through ancillary services in the region
- Large show of support for community benefit opportunities for the region
- General interest in the technology used in the renewable energy sector
- Desire to maximise opportunities for local communities through jobs and broader economic benefits
- Desire for local education providers to partner with renewable energy developers in the region to teach local populations the skills required in such developments
- Opportunities for local accommodation providers to benefit during construction
- Concern regarding local housing supply with construction workforce accommodation needs
- Concern around the VNI West transmission route
- Concern around the potential impact on flora and fauna across the Hay plains (raised by one stakeholder)
- Interest in cultural heritage within the area with concern about preserving sites of significance
- Concern for visual amenity impact on the flat landscape.

These opportunities and concerns were continuously explored throughout conversations and engagement activities facilitated throughout the EIS phase.

5.1.4 Key community stakeholders

The Baldon Wind Farm Project team were responsible for developing and implementing the Engagement Action Plan in collaboration with NGH, a national environmental and advisory consultancy. A detailed list of Project stakeholders was developed to inform the Engagement Action Plan (EAP). This analysis considered the level of *impact on* and *influence of* stakeholders to arrive at an appropriate engagement approach, in keeping with the International Association of Public Participation (IAP2) Engagement Framework. See Table 5-1 for a breakdown on Project stakeholders and engagement approach adopted by the Project.

Table 5-1 Project stakeholder breakdown and engagement approach

Stakeholder group	Details	Objectives and opportunities	Influence high, medium or low (H,M,L)	Impact high, medium or low (H,M,L)	Engagement approach
Host Landowner	Properties with agreements to have turbines. Construction impacted.	• Develop a strong ongoing relationship • Contribution to engagement planning and delivery • Contribution to the Project progress, ability to provide local knowledge, advice and input • Involvement in the development of the Community Benefit-Scheme.	H	H	Consult Involve Collaborate
Near neighbours	Residents up to 10 km kilometres from the proposed site boundary. Receiver list here	• Keep neighbours informed about the Project from early in the planning phase and undertake detailed consultation • Identify impacts and mitigations – such as visual screening) through a collaborative process • Discuss neighbour benefit sharing options directly • Provide opportunities to raise issues and provide feedback.	H	H	Consult Involve Collaborate
Wider community	• Moulamein • Hay • Balranald • Swan Hill	• Develop an understanding of and opportunity to participate in the Project • Provide opportunities to raise issues and provide feedback • Discuss Community Benefit Sharing options.	M	M	Consult Involve
Haulage Route Users	Feedlot companies who may be impacted by the Project: • Hell's Gate Feedlot • Ravensworth Feedlot	• Develop an understanding of and opportunity to participate in the Project • Provide opportunities to raise issues and provide feedback • Discuss Community Benefit Sharing options.	M	M	Consult Involve
Hay Shire Council	• Mayor – Cr Carol Oataway • GM – David Webb • Director Planning – Jack Terblanche	• Develop and maintain a positive relationship • Build on previous discussions • Identify opportunities to support the local economy	M	M	Consult Involve Collaborate

Stakeholder group	Details	Objectives and opportunities	Influence high, medium or low (H,M,L)	Impact high, medium or low (H,M,L)	Engagement approach
	• Executive Manager - Economic Development – Alison McLean	• Identify and Leverage council communication channels.			
Murray River Council	• Mayor – Cr Frank Crawley • CEO – Terry Dodds • Director Planning – Rod Croft	• Develop and maintain a positive relationship • Build on previous discussions • Identify opportunities to support the local economy • Identify and Leverage council communication channels.	M	M	Consult Involve Collaborate
Edward River Council	• Mayor – Cr Peta Betts • Director Cooperate Services Shelly Jones • Director Infrastructure and Acting CEO – Mark Dalzell	• Develop and maintain a positive relationship • Build on previous discussions • Identify opportunities to support the local economy • Identify and Leverage council communication channels.	M	M	Consult Involve Collaborate
Balranald Shire Council	• General Manager - Craig Bennet • Director of Infrastructure & Planning Services – David McKinley	• Develop and maintain a positive relationship • Build on previous discussions • Identify opportunities to support the local economy • Identify and Leverage council communication channels.	M	M	Consult Involve Collaborate
State MP Seat of Murray	Mrs Helen Jennifer Dalton MP (Independent)	• Introduce the Project and its details • Identify the member's policies, concerns, and opportunities concerning the Project.	M	M	Inform Consult
Federal MP Seat of Farrer	Hon. Sussan Ley MP (Liberals)	• Introduce the Project and its details • Identify the member's policies, concerns, and	M	M	Inform Consult

Stakeholder group	Details	Objectives and opportunities	Influence high, medium or low (H,M,L)	Impact high, medium or low (H,M,L)	Engagement approach
		opportunities about the Project.			
Traditional Owners RAPs TOs First Nations community	• Balranald Local Aboriginal Land Council • Wamba Wamba Local Aboriginal Land Council • Hay Local Aboriginal Land Council • Deniliquin Local Aboriginal Land Council • Nari Nari Tribal Council • Pappin Family Aboriginal Corporation • Wakool Indigenous Corporation • Nari Nari Traditional Custodians • Local RAPs	• Engage with the relevant Local Aboriginal Land Council and RAPs through the formal process (refer to Section 6.2) • Look for opportunities to contribute to the local story of Country and contribute to the local First Nations Community • Involve local community organisations in Community Benefit Sharing initiatives.	H	H	Consult Involve Collaborate
RFS/ Urban fire/emergency services	RFS and emergency services	• Liaise to ensure fire truck access is considered in the design, share information on how to manage fires in the solar farm and ensure the Project activities abide by safety and regulatory requirements.	M	M	Consult Involve
CASA	• Civil Aviation Safety Authority	• Continue to liaise with CASA and seek an approval letter to be submitted with the EIS.	H	H	Inform Consult
Government Agencies	• DPHI's Biodiversity, Conservation and Science Directorate • NSW National Parks and Wildlife Service	• Continue to liaise with relevant government agencies throughout the EIS phase before submission of the EIS report and post-submission.	H	H	Inform Consult

Stakeholder group	Details	Objectives and opportunities	Influence high, medium or low (H,M,L)	Impact high, medium or low (H,M,L)	Engagement approach
	• Heritage NSW • DPHI Water Group • WaterNSW • Environment Protection Authority • Crown Lands • Regional NSW – Mining, Exploration & Geoscience • Department of Primary Industries – Agriculture and Fisheries divisions • Transport for New South Wales Fire & Rescue NSW • Murray Local Land Services				
Schools, TAFEs and Universities	• Moulamein Public School • Moulamein Preschool • TAFE Hay	• Ensure organisations are updated on education and vocational opportunities associated with the Project • Identify relevant community benefit sharing opportunities.	M	M	Consult Involve Collaborate
Business groups/industry stakeholders Balranald Hay Moulamein	• Chamber of Commerce • National Parks and Wildlife	• Work with the chamber to identify any local businesses that may be impacted by the Project (positive or negative) • Identify opportunities to develop or utilise local capability.	M	M	Consult Involve
Local Community Groups	Groups that may be interested in, impacted or benefit from the Project, in Hay, Moulamein and Balranald e.g.	• Work with businesses to identify any local businesses that may be impacted by the Project (positive or negative) • Identify opportunities to develop or utilise local capability.	M	M	Consult Involve

Stakeholder group	Details	Objectives and opportunities	Influence high, medium or low (H,M,L)	Impact high, medium or low (H,M,L)	Engagement approach
Balranald Hay Moulamein	• Country Women's Association • Lioness/Lion Club • Legacy • Probus Club • Rotary Club • VIEW Club • Local sporting organisations • Tourism groups • Moulamein Caravan Park • Moulamein Football and Netball Club • Moulamein Historical Society • Moulamein Art Gallery				
Groups of wind farm objectors	• TBA	• Identify and address concerns as required • Prepare responses to known concerns based on previous Projects • Manage issues constructively and efficiently • Ensure equity in the engagement (allow other stakeholders time to talk in information sessions).	M	L	Consult Involve
Advocacy groups	• TBA	• Consider opportunities for partnerships and community events • Consider advocacy opportunities • Potential for partnerships.	M	M	Consult Involve

5.1.5 Overview of activities

During the detailed environmental assessment stage, as the EIS was being prepared, a wide range of engagement activities were undertaken. These aimed to broaden awareness of the Project, respond to concerns, work through issues and capture opportunities. Importantly, the Applicant committed to developing very detailed answers in response to local enquiries and sought local partnership opportunities where possible.

Given the scale of the Project, a wide range of communication and engagement activities were applied. The engagement program sought to reach out across the Moulamein, Hay and Balranald communities and beyond while continuing conversations and issue-specific discussions with near neighbours. The types of activities included:

- Six drop-in community information sessions
- Four pop-up information booths at community events
- Seven community sponsorship opportunities
- Direct communications (letters, emails, phone calls, meetings)
- Newspaper advertisements
- Social media advertisements for drop-in community information sessions
- Property visits
- Use of online communication tools; website and survey
- Presentations, meetings and briefings.

The focus and timing of these activities are summarised below.

Table 5-2 Overview of EIS phase engagement activities

Activity	Focus	Delivery timing and reach
Drop-in information sessions		
Drop-in Information Session Balranald Senior Citizens Centre (Appendix E.1)	Explain the Project, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials were produced in large format to discuss with people, Project Overviews and FAQ documents were available to take away and the team completed feedback forms capturing discussions and sentiment. People were also encouraged to complete the online survey by scanning a QR code to access it and then complete it in their own time.	• Tuesday 12 September 2023, 8.00 am – 1.00 pm • Approximately 10 attendees and face-to-face conversations.
Drop-in Information Session Hay Memorial Hall (Appendix E.2)	Explain the Project, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials were produced in large format to discuss with people, Project Overviews and FAQ documents were available to take away and the team completed feedback forms capturing discussions and sentiment. People were also encouraged to complete the online survey by scanning a QR code to access it and then complete it in their own time.	• Tuesday 12 September 2023, 4.00 pm – 7.00 pm • Approximately 9 attendees and face-to-face conversations.
Drop-in Information Session Moulamein Art Gallery (Appendix E.3)	Explain the Project, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials were produced in large format to discuss with people, Project Overviews and FAQ documents were available to take away and the team completed feedback forms capturing discussions and sentiment. People were also encouraged to complete the online survey by scanning a QR code to access it and then complete it in their own time.	• Wednesday 13 September 2023, 8.00 am – 1.00 pm • Approximately 8 attendees and face-to-face conversations.
Drop-in Information Session at Balranald Information Centre (Appendix E.4)	A pop-up session aimed to introduce the Project and provide updates and outcomes on EIS assessments, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials in the form of flyers and brochures were produced and were available to take away and the team completed feedback forms capturing discussions and sentiment.	• Wednesday 8 May 2024, 1.00 pm – 3.30 pm • Approximately 11 attendees and face-to-face conversations.

Activity	Focus	Delivery timing and reach
Drop-in Information Session at Black Sheep Coffee Shop, Hay (Appendix E.5)	A pop-up session aimed to introduce the Project and provide updates and outcomes on EIS assessments, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials in the form of flyers and brochures were produced and were available to take away and the team completed feedback forms capturing discussions and sentiment.	• Thursday 9 May 2024, 8.00 am – 10.00 am • Approximately 12 attendees and face-to-face conversations.
Drop-in Information Session at Moulamein Art Gallery (Appendix E.6)	A pop-up session aimed to introduce the Project and provide updates and outcomes on EIS assessments, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials in the form of flyers and brochures were produced and were available to take away and the team completed feedback forms capturing discussions and sentiment.	• Thursday 9 May 2024, 1.00 pm – 3.30 pm • Approximately 8 attendees and face-to-face conversations.
Community event pop-up sessions		
Pop-Up at Moulamein Festival (Appendix E.7)	A pop-up booth to introduce the Project, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials in the form of flyers and brochures were produced and were available to take away and the team completed feedback forms capturing discussions and sentiment. People were also encouraged to complete the online survey by scanning a QR code to access it and then complete it in their own time.	• Thursday 27 April 2023, 11.00 am – 3.00 pm • Approximately 50 attendees and face-to-face conversations • Over 18 surveys completed at the event.
Pop-up at Moulamein Bowls Tournament	A pop-up booth to introduce the Project, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials in the form of flyers and brochures were produced and were available to take away and the team completed feedback forms capturing discussions and sentiment. People were also encouraged to complete the online survey by scanning a QR code to access it and then complete it in their own time.	• Saturday 26 August 2023, 10.00 am – 1.00 pm • Sunday 27 August 2023, 10.00 am – 1.00 pm • Approximately 10 attendees and face-to-face conversations.

Activity	Focus	Delivery timing and reach
Pop-up at Hay TAFE NSW Employment and Education Expo (Appendix E.8)	A pop-up booth at the TAFE NSW Employment and Education Expo to educate visitors about the energy transition and the SWREZ and the opportunities it may bring to the local community. The pop-up also provided an opportunity to introduce the Project, outline the EIS process, discuss issues/opportunities, and engage with local stakeholders. Materials in the form of flyers and brochures were produced and were available to take away and the team completed feedback forms capturing discussions and sentiment. People were also encouraged to complete the online survey by scanning a QR code to access it and then complete it in their own time.	• Thursday 9 November 2023 5.30 pm – 9.00 pm. • Approximately 50 attendees and face-to-face conversations.
Near neighbour consultation		
Targeted phone calls/liaison	Phone calls were made to support discussions around: • Updates on the progress of the Project • Coordinating visual assessments • Coordinating noise assessments • Following up on emails (to understand more about concerns) • Coordinating social impact assessment-focused interviews	• Over 20 calls were made to neighbours throughout the EIS engagement period.
Email correspondence	Email correspondence made to support discussions around: • Updates on the progress of the Project • Coordinating visual assessments • Coordinating noise assessments • Following up on emails (to understand more about concerns) Coordinating social impact assessment-focused interviews	• Approximately 20 emails were sent and received throughout the EIS engagement period.
Property visits/face-to-face consultation	Property visits were facilitated to discuss the Project, potential impacts, concerns and feedback. Phone calls were conducted as the majority of neighbours did not desire a face-to-face visit.	• Five property visits were conducted throughout the EIS engagement period.

Activity	Focus	Delivery timing and reach
Property visits for visual assessments	The visual assessment consultant identified a list of priority properties to be considered for visual impact assessments. These properties were identified as having the highest potential impact through viewshed and associated modelling. These properties were prioritised for property visits and incorporated all residents who lived within 10 km of the proposed site. As a result, 14 non-associated dwellings (R04a, R04b, R05a, R05b, R05c, R07, R12, R13, R15a, R15b, R20a, R20b, R24, R27) were assessed as part of the visual impact assessment. There were follow-up discussions facilitated via phone and face-to-face VIA meetings were offered for residents, with no receivers who participated in the VIA opting in nor desiring further meetings. Some residents were unable to be contacted. The Applicant responded to all enquiries regarding visual impact via phone.	Visit dates: • Monday 25 to Wednesday 27 September 2023. Number of visits: • 14 dwellings Follow-up phone calls: • 8-12 July 2024
Traditional media		
Public notices (See Appendix E.9, Appendix E.10 and Appendix E.11)	Public notices were placed in local newspapers to advertise the various Pop-up and Community Information Drop-in Sessions. The purposes of the public notices were to explain the Project, promote the information sessions, encourage people to visit the Project website, read the Frequently Asked Questions, complete the feedback survey, and encourage people to meet and speak with the Project team. Public notices were published: • The Grazier, Wednesday 23 August 2023 • Moulamein Wongi, Week 4, 8 September 2023 • The Grazier, Wednesday 6 September 2023 • The Grazier, Wednesday 1 May 2024 • The Grazier, Wednesday 8 May 2024	• August 2023 • September 2023 • May 2024
Newsletter updates (See Appendix E.12 E.13 and E.14)	Newsletters were distributed with Project updates throughout the EIS consultation period. The purpose of the newsletters was to keep neighbours and other identified stakeholders up-to-date with information and provide updates on assessment outcomes. Three printed newsletters were created in February 2023, September of 2023 and May 2024, and were circulated with the community during the Community Information Drop-in Sessions.	• February 2023 • September 2023 • May 2024

Activity	Focus	Delivery timing and reach
Electronic Direct Mail updates (See Appendix E.15, E.16, E.17	Electronic Direct Mail (EDM) updates were to stakeholders who signed up to the email update list. The purpose of the EDMs was to keep these stakeholders updated with information regarding the Project. Four EDMs were created and distributed on 4 April 2023, June 6 2023, September 5 2023, and November 3 2023.	• April 2023 • June 2023 • September 2023 • November 2024
Project Fact Sheets (See Appendix E.18)	Fact Sheets were created outlining the details of the Project and were distributed to community members throughout the EIS consultation period. The purpose of the fact sheet was to provide top-level Project information in a quick digestible way and was available at every Community Information Drop-in and Community Pop-Up session.	• February 2023 – July 2024
Project FAQ (See Appendix E.19)	A frequently asked questions (FAQ) document was created, answering common questions related to the Project. The purpose of the FAQ document was to answer questions about the Project (such as noise and environmental impacts, wind generation capacity, etc.) and was distributed to stakeholders at every Community Information Drop-in and Community Pop-Up session.	• February 2023 – July 2024
Digital tools		
Website	Provide a central location for updates, information, an online survey, and a detailed list of frequently asked questions. The website has been live and accessible since the Scoping engagement phase of the Project. The website statistics featured on the right show a 12-month snapshot of the website traffic, from 1 August 2023 to 1 July 2024.	Available throughout the Scoping and EIS phase and proposed to be ongoing as the Project progresses. Website reach to date: • 24,636 visits between 1 August 2023 and 1 July 2024
Online Survey	The online survey aimed at capturing thoughts on the Project in a way that informed the Social Impact Assessment and follow-up engagement discussions. The survey was promoted through letters, emails, information sessions, stakeholder briefings, phone calls and both organic and paid Facebook campaigns.	The survey was live for 13 months between 13 February 2023 and 12 March 2024. 25 surveys completed.

Activity	Focus	Delivery timing and reach
Social media tiles (see Appendix E.20)	Social media advertisements (see Appendix C.19) were posted on various community pages ahead of the information sessions in a bid to promote the sessions and encourage people to visit the Project website, read the Frequently Asked Questions, and complete the feedback survey. The Facebook community pages these adverts were posted on: • Balranald Link • What's On in Hay • Hay Matters • Balranald Bulletin Board • Moulamein Notice Board • Moulamein Buy Swap Sell • Hay Shire Council Website.	Posts throughout September before the formal Community Information Drop-in Sessions.
Stakeholder group presentations/briefings		
Hay Shire Council	The Applicant and NGH held many discussions with the Hay Shire Council throughout the EIS consultation period between February 2023 and March 2024. Discussions focused on providing an update on the Project, discussing key issues and opportunities such as housing and accommodation, organising community events, and asking for feedback and ideas for benefit sharing and local industry engagement. Subsequent meetings were held to inform the opportunities for benefit sharing included in the EIS. Ongoing communication continued via email and phone calls throughout the entirety of the EIS consultation period. The Applicant also participated in a round table held at Hay TAFE in February 2024, led by the Hay Economic Development and Tourism officer and Community Engagement Manager at Re-Alliance, which was attended by other developers in the region. The round table served as an opportunity to listen to one another's experiences and share information on industry issues, REZ access, community benefits and how to help local communities. The Community Benefits Fund letter of intent was endorsed by the Hay Shire Council on 26 June 2024.	Direct briefings held with: • Discussion with Economic Development Officer on 22 August 2023. • Discussion with Hay Shire GM on 12 September 2023 at Hay Community Information Session. • Briefing with Economic Development Officer, on 6 November 2023. • Briefing GM David Webb on 21 February 2024. • Confirmed Community Benefit arrangements were confirmed on 26 June 2024 ahead of EIS submission.

Activity	Focus	Delivery timing and reach
Edward River Council	The Applicant and NGH held several discussions with Edward River Council between February 2022 and June 2024. Whilst the Project does not lie within the Edward River Council LGA, The Applicant engaged with Edward River Council to keep them up-to-date on the progress of the Project and any anticipated traffic movements and routes due to its location near the LGA border. Engagement focused on providing an update on the Project, outlining the EIS process, dwelling entitlements, and any anticipated traffic movements, and requesting the opportunity to provide a briefing. Whilst communications regarding the Project and relevant dwelling entitlements occurred between The Applicant and Edward River Council via email, requests to provide a briefing during the EIS period went unanswered.	• Emails regarding dwelling entitlement March 11 2024, April 15 2024, June 15 2024, June 18 2024. • Emails regarding Project briefing and Project information March 11 2024.
Murray River Council	The Applicant and NGH held various discussions with Murray River Council between February 2023 and March 2024. Discussions focused on providing an update on the Project, outlining the EIS process, discussing key issues and opportunities, and asking for feedback and ideas for benefit sharing and local industry engagement. Subsequent meetings were held to inform the opportunities for benefit sharing included in the EIS, as well as a meeting to discuss arrangements around dwelling entitlements, interactions between the Project and council assets, infrastructure and road easements. The Community Benefits Fund letter of intent was endorsed by Murray River Council on 27 June 2024.	Direct briefing held with: • Economic Development Officer, Director Planning, and Director Infrastructure on 9 February 2024. • Manager for Planning and Manager for Infrastructure & Manager for Development Services meeting held 29 May 2024. • Confirmed Community Benefit arrangements confirmed on 26 June 2024 ahead of EIS submission.
Balranald Shire Council	The Applicant and NGH held several discussions with Balranald Shire Council between February 2023 and June 2024. Whilst the Project does not lie within the Balranald Shire Council LGA, The Applicant engaged with Balranald Shire Council to keep them up-to-date on the progress of the Project as well as discuss some factors that might impact the Council. Engagement focused on providing an update on the Project, outlining the EIS process, worker accommodation camps and sourcing relevant materials and any anticipated traffic movements and routes due to its location near the LGA border.	Direct briefings held with: • Discussion with Balranald Shire Council Health and Development Officer on 27 February 2023.

Activity	Focus	Delivery timing and reach
		• Meeting with Balranald Shire Council's GM, Health and Development Officer, and Tourism, Communications and Events Coordinator concerning community benefits12 September 2023. • Discussion with Balranald Shire Council Tourism, Communications and Events Coordinator on 8 May 2024.
Balranald Local Aboriginal Land Council	A meeting was facilitated to discuss the Project, cultural significance in the area, and potential Community Benefit Schemes, as well as asking for feedback on ideas such as employment and training opportunities, and gathering feedback and input	• Direct briefing with Balranald LALC representative on 9 March 2023. • Also engaged through Aboriginal Cultural Heritage Assessment and Social Impact Assessment.
Nari Nari Tribal Council / Hay Local Aboriginal Land Council	Two meetings were facilitated with Nari Nari Tribal Council / Hay Local Aboriginal Land Council to discuss the Project, cultural significance, biodiversity offsets, potential Community Benefit Schemes and initiatives, employment and training opportunities, and feedback more broadly.	• Direct briefing held with Nari Nari Tribal Council / Hay LALC on 8 March 2023 • Direct briefing held with Naril Nari Tribal Council / Hay LALC on 27 March 2024 • Also engaged through Aboriginal Cultural Heritage Assessment and Social Impact Assessment.
Hay Aboriginal Working Party	A phone discussion was facilitated to discuss the Project, cultural significance in the area, and potential Community Benefit Schemes, as well as asking for feedback on ideas such as employment and training opportunities, and gathering feedback and input	• Phone call with Hay Local Aboriginal Working Party representative on 26 March 2024.

Activity	Focus	Delivery timing and reach
		• Also engaged through Aboriginal Cultural Heritage Assessment and Social Impact Assessment.
Wamba Wamba Local Aboriginal Land Council	Discussions were facilitated over phone call and discussed the Project, cultural significance in the area, community benefit opportunities, and gathering feedback and input.	• Direct briefing held with Naril Nari Tribal Council / Hay LALC on 27 March 2024. • Direct briefing held with Naril Nari Tribal Council / Hay LALC on 27 March 2024. • Also engaged through Aboriginal Cultural Heritage Assessment and Social Impact Assessment.
Pappin Family Aboriginal Corporation	A face-to-face briefing to discuss the Project, cultural significance in the area, and community benefit ideas and opportunities, and gathering feedback and input	• Direct briefing held with Papping Family Aboriginal Corporation on 27 March 2024. • Also engaged through Aboriginal Cultural Heritage Assessment and Social Impact Assessment.
Wakool Indigenous Corporation	A face-to-face briefing to discuss the Project, cultural significance in the area, and community benefit ideas and opportunities, and gathering feedback and input.	• Direct briefing with Wakool Indigenous Corporation 27 March 2024. • Also engaged through Aboriginal Cultural Heritage Assessment and Social Impact Assessment.

Activity	Focus	Delivery timing and reach
Riverina Local Landcare Association (RLLA)	The Project team met with a Senior Land Services Officer at one of the Drop-in Information sessions and discussed the Project. RLLA advised on recent rare native plants found near Hay, and the Project team discussed the biodiversity aspects of the Project.	• 12 September 2023.
TAFE NSW - Hay	The Project team engaged with TAFE NSW - Hay several times throughout the EIS engagement phase. Consultation initially focused on providing an update on the Project, outlining the EIS process, providing information on benefit sharing, as well as details on how to complete the survey and provide feedback. The Applicant has had ongoing meetings with TAFE NSW – Hay regarding educational opportunities in the area, plus how relevant workplace upskilling could be sourced in the area. The Applicant also participated in a TAFE NSW Employment and Education Expo at the Hay campus, which focused on providing information to attendees on various vocational and employment opportunities. At the Expo, The Applicant provided information on the Project, as well as the energy industry more broadly.	• Virtual meetings with TAFE NSW to investigate opportunities for promoting training in the renewables focussed in the Renewable Energy Zones on 31 May, 2023 and 1 June 2023. • Face-to-face consultation with CSO and Coordinator at Hay TAFE and NSW TAFE Business Development Manager at Hay Community Information Session 12 September 2023. • Participation in TAFE NSW Employment and Education Expo on 9 November 2023.
Moulamein Preschool	The Project team provided information on the Project, the EIS process, and participated in fundraising activities for the Preschool.	• Emails 29 March 2023, 5 April 2023, 31 May 2023, 4 March 2024.
Moulamein Football and Netball Club	The Project team provided information on the Project, the EIS process, and participated in sponsorship activities for the club.	• Email 8 May 2024. • Ongoing phone calls.
Moulamein Racing Club	The Project team provided information on the Project, the EIS process, benefit sharing, and how to provide feedback.	• Email 19 August 2023.

Activity	Focus	Delivery timing and reach
Moulamein Historic Society	The Project team provided an update on the Project, outlined the EIS process, information on benefit sharing, and details on how to complete the survey and provide feedback, and requested a meeting for a verbal briefing.	• Face-to-face briefing with Moulamein Historic Society 11 September 2023.
Moulamein Art Gallery	The Project team provided an update on the Project, outlined the EIS process, information on benefit sharing, and details on how to complete the survey and provide feedback, and requested a meeting for a verbal briefing. The Project team also kept in communication with Moulamein Art Gallery about community events in the region, sharing the feedback survey, as well as facilitating community information sessions at the venue.	• Email briefing 23 February 2023 and 17 January 2024. • Face-to-face consultation 18 December 2023 and 9 May 2024.
Moulamein Caravan Park	The Project team provided an update on the Project, outlined the EIS process, information on benefit sharing, and details on how to complete the survey and provide feedback. The Applicant and Moulamein Caravan Park discussed accommodation requirements during construction, and other community benefit ideas tied to the Project.	• Face-to-face consultation 21 August 2023. • Email discussion 27 March 2024.
Bothwell Pharmacy	The Project team met face-to-face and provided an update on the Project, outlined the EIS process, information on benefit sharing, and details on how to complete the survey and provide feedback. Discussed community needs and community development.	• Face-to-face discussion 15 February 2024.
Federal MP, Member for Farrar	The Project team provided a brief update on the Project and offered to brief Sussan Ley MP. Supporting information was provided by email to the electoral office.	• 11 July 2024
State MP, Member for Murray	The Project team provided a brief update on the Project and offered to brief Helen Jennifer Dalton MP. Supporting information was provided by email to the electoral office.	• 11 July 2024
EnergyCo	The Project team met with EnergyCo to discuss the status of EnergyCo's progress in investigating the over-dimensional route to SW-REZ. The Project team contacted the SWREZ EnergyCo team in April 2024, to provide them with an update on the preferred Project routes from Adelaide or Newcastle and to advise EnergyCo of some immediate opportunities available to secure aspects of the route.	• Virtual meeting on 26 October 2023. • Email update April 2024.

5.1.6 Summary of findings

Overall sentiment

The engagement activities undertaken throughout the detailed environmental assessment / EIS phase demonstrated that there is a low level of concern (mainly associated with local Landcare Groups and a small number of sensitive receivers) regarding the Project and a high level of support and encouragement from the broader community.

The concerns expressed were primarily focused on the following topics:

- Concern regarding local housing supply with construction workforce accommodation needs
- Concern around the VNI West transmission route
- Concern about the potential impact on flora and fauna across the plains
- Interest in cultural heritage within the area with concern about preserving sites of significance
- Concern for visual amenity impact on the flat landscape.

Feedback received from sensitive receivers, wider community members and identified stakeholders towards the Project is mostly positive, with the community commenting that they feel familiar and optimistic toward the Project and the Applicant. The factor that garnered the most interest was community benefits, with almost all stakeholders engaged noting a desire and enthusiasm for the potential benefits the Project may bring to the area.

This was reiterated by the community feedback survey, with an overwhelming number of the survey respondents – 72% - indicating support for the Project for the potential benefits that it could bring to the local area. Two respondents also voluntarily left comments in the online survey stating that they want the Project ‘up and going’ and hope the ‘Project takes off and has a long successful lifespan’. Support concerning the Project was based on the following topics:

- Community benefit-sharing opportunities
- Potential for diversification of land use and income streams
- Benefits for First Nations People in the area
- Educational opportunities for local people
- Expansion of vocational offering at TAFE NSW
- Local business opportunities in the area
- Sponsorship events for the local community
- Economic stimulus for the local region
- Desire to increase renewable energy uptake in the region
- Local employment opportunities in the area.

Online survey feedback

Communication tools such as posted letters, electronic emails, a face-to-face information session and stakeholder briefings resulted in 25 responses to the online survey for the social impact assessment.

Of the respondents, 56% of the respondents lived in Moulamein, 8% lived in Moolpa, 4% lived in Kyalite, 4% lived in Hay, and the remaining 28% lived in towns that were not named within the survey or lived outside the area and visited for work (see Figure 5.1).

The majority of respondents nominated community and family ties, agriculture and natural values (including biodiversity, ecosystems etc.) as the most valued aspects of their region.

When considering the benefits of the wind farm industry more broadly, local economic opportunities (such as jobs, tourism and economic stimulus), community benefits (including funds for community Projects) and renewable energy generation were selected as the top three by respondents. All respondents believed there was at least one positive benefit that renewable energy generation could bring (see Figure 5.2).

Concerns that respondents held about the wind farm industry (in general) included visual impacts (selected by 36% of respondents), impacts on natural areas or habitats (selected by 32% of respondents), effects on land values (selected by 28% of respondents), community impacts (selected by 20% of respondents), traffic during construction and effects on land use (both selected by 16% of respondents), and noise during construction or operation (selected by 8% of respondents). 28% of respondents indicated that their concerns were none of the above or that they held no concerns, and 12% of respondents indicated other concerns outside of those nominated.

When the respondents were asked to rate their level of support for the Project, 40% strongly supported it, 20% supported it, 12% somewhat supported it, 12% were neutral, 8% were undecided or felt they didn't know enough about it, 4% opposed it, and 4% strongly opposed it (see Figure 5.3).

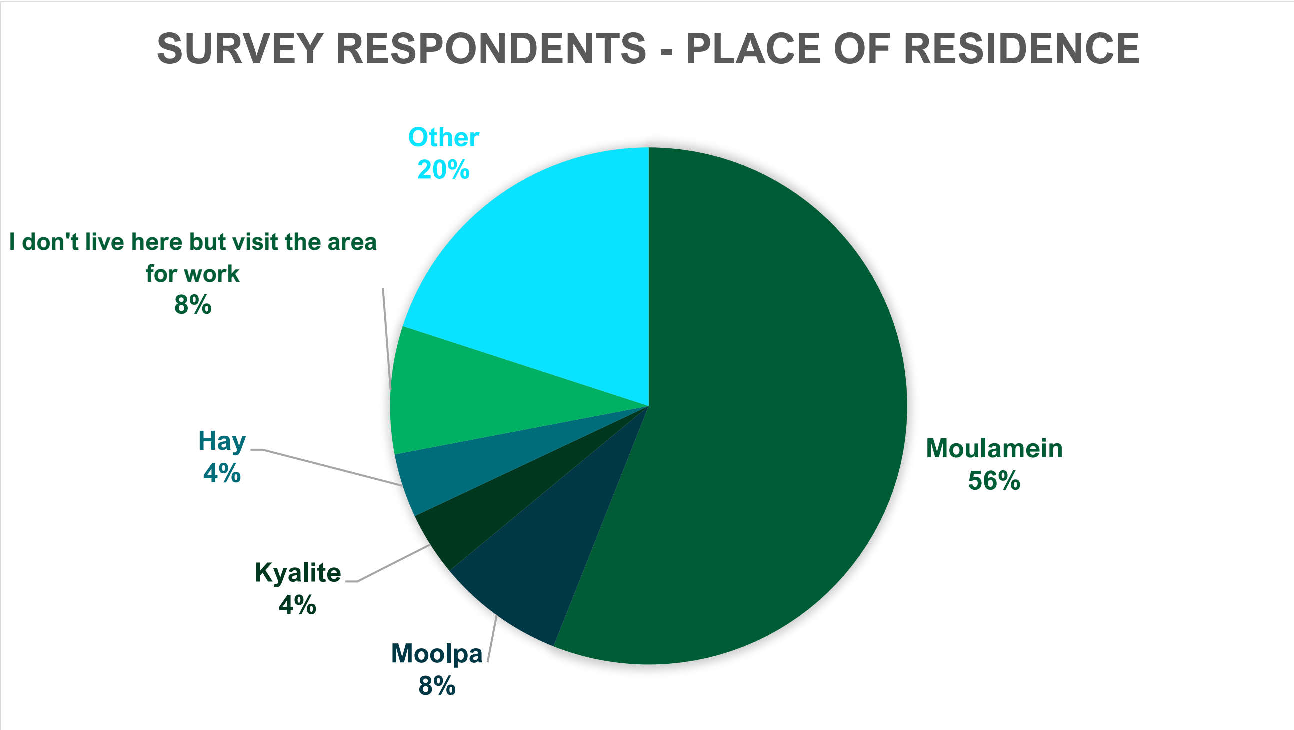


Figure 5.1 Table outlining survey respondents' place of residence

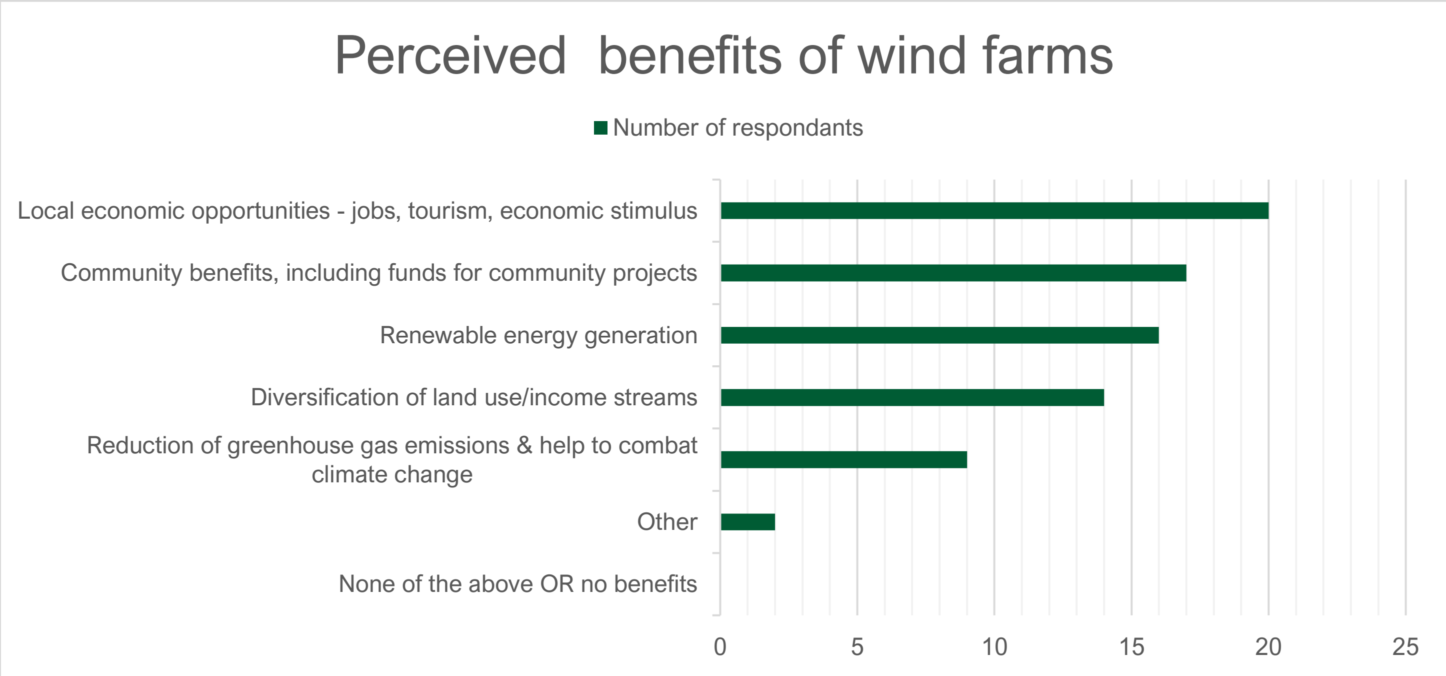


Figure 5.2 Table outlining survey respondents' perceived benefits of wind farms (generally)

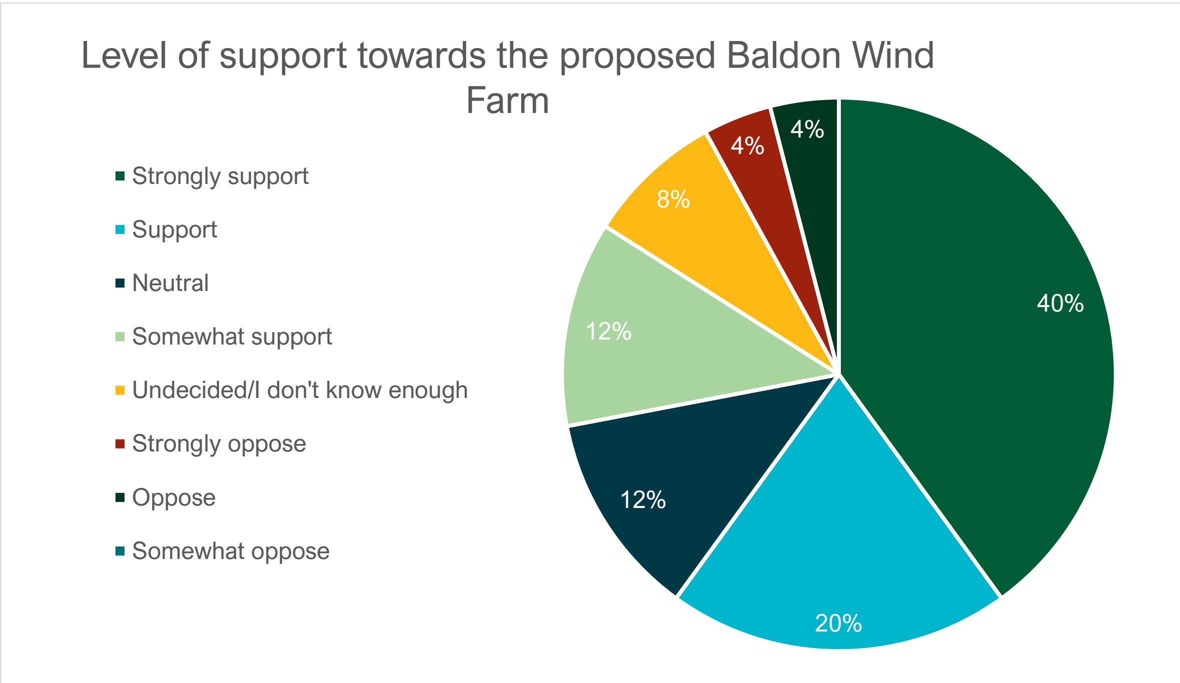


Figure 5.3 Level of support towards the Project

5.1.7 Summary of key issues and opportunities

The Project team responded to many community queries and views on the Project. These issues varied across topics, and details regarding these concerns can be found below.

Table 5-3 Key community Project issues and opportunities

Topic	Strategic category (as per EIS requirement)	Details and Project team responses
Workforce and employment	Economic, environmental, and social impacts of the Project	A large number of conversations held with community members and other identified stakeholders focused on the ability of the Project to bring workforce and employment opportunities to the local area (both through direct employment (jobs associated with the development) and indirect employment, (such as jobs through ancillary providers such as accommodation, food, etc.). Employment and workforce opportunities were viewed very positively by the community.
Accommodation	Economic, social impacts of the Project	Accommodation and the lack of rental accommodation in the towns of Moulamein, Hay and Balranald was raised as one of the largest (if not the largest) issues raised by the community. Whilst many stakeholders mentioned the lack of local rental availability and the difficulty locals are having with finding adequate accommodation, many had ideas on how the workforce accommodation could be approached and suggested alternative accommodation possibilities. This ranged from worker accommodation camps in Balranald and empty house partnerships with Hay Council to the release of more land at Moulamein for housing and the extension of the Moulamein caravan park for worker accommodation. Whilst accommodation is perceived as one of the largest issues in the community, it was also identified as being a subject of opportunity.
Visual impacts	Economic, environmental, and social impacts of the Project	Several stakeholders brought up the positive visual changes to the landscape that the Project would bring. Some community members mentioned that it would bring interest to the landscape, whilst others suggested painting the turbine's colours for added interest. The wind turbines were considered far enough from the town of Moulamein to not cause a material concern to residents. No near neighbours reported concerns related to visual amenity.

Topic	Strategic category (as per EIS requirement)	Details and Project team responses
Pollution	Environmental, social impacts of the Project	One stakeholder had concerns regarding Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) pollution from paint. The stakeholder mentioned they had seen a video online stating that the shedding from the paint/coating used on the turbine caused pollution due to PFAS particles being present within the paint. The stakeholder mentioned this was something they felt that other community members were also concerned about.
Bushfire	Economic, environmental and social impacts of the Project	One sensitive receiver (who is a near neighbour to the Project) raised a query and concern related to elevated bushfire risk. They asked if the Project would elevate the risk of grass fires starting from the wind farm and potentially spreading to other properties beyond the wind farm boundary, causing damage to property and loss of livestock and feed. The Applicant confirmed that it was extremely rare for a wind turbine to cause a fire and that the turbines were equipped with safety equipment and detection devices to minimise the risk of a fire occurring. The gravel-capped site access roads built for the project would vastly improve access for firefighters in the event of a fire (regardless of the ignition source) and these roads would also create a network of fire breaks in themselves.
VNI West Transmission	Economic, environmental and social impacts of the Project	As mentioned in the background section of this chapter, the VNI West Transmission development caused some concern in the community. Concerns raised included the lack of transparency and communication from Transgrid and views that the development would impede existing irrigated farming and cropping operations in the area. The Applicant, at this point, does not anticipate to connect to the VNI West Transmission route.
Community benefits	Economic, environmental, and social impacts of the Project	Community benefit sharing was identified as being the biggest opportunity that the Project would bring to the local community. The community had many ideas on the shape that this could take; from donations for the local primary school, repairing the Moulamein wharf, supporting the local aged care facility, providing training and education opportunities, and accommodation initiatives that would leave a positive legacy locally.

Topic	Strategic category (as per EIS requirement)	Details and Project team responses
First Nations involvement	Economic, environmental, and social impacts of the Project	First Nations stakeholders were supportive of the Project and keen to see a range of initiatives implemented such as First Nations inductions for staff such as the inclusion of a smoking ceremony, maximising First Nations and Traditional Owner employment and opportunities, and support for storing the collected artefacts in a keeping place that can be used for cultural education and awareness purposes.
Cultural heritage	Environmental, social impacts of the Project	One community member raised concerns relating to cultural heritage preservation on site. They own land nearby and recently discussed items of significant cultural heritage importance found on their land and were interested if similar items had been located on the proposed site. The Applicant explained the importance of cultural heritage surveys within the EIS phase of the Project and shared information about the heritage studies undertaken with the RAPs as part of the EIS and the desire to maximise the avoidance of impacts on cultural heritage.
Yam daisies and other protected species	Environmental impacts of the Project	One stakeholder who attended the Hay Community Information Drop-in Session had concerns regarding the preservation of protected flora and fauna. Rare native plants (Yam daises) had recently been discovered on a travelling stock reserve in Hay, and there was concern such species were located on the proposed site. The stakeholder mentioned that the site had previously been cleared and they had been involved in replanting operations some ten or so years ago, so had concerns about the preservation of other endangered species. The Applicant discussed the flora and fauna that had been identified to date.
Economic benefits	Economic, environmental, and social impacts of the Project	One stakeholder indicated an interest in tendering for the concrete supply works on Project and is supportive of the Project and the economic development it will bring to the region. The stakeholder also indicated interest in running a carbon-neutral feedlot operation in the years to come and is open to the possibility of housing a wind turbine on his land.

Topic	Strategic category (as per EIS requirement)	Details and Project team responses
Project location and energy capability	Economic, environmental, social impacts of the Project	One community member raised concerns about the development and its location, questioning why it was not located in Sydney. The stakeholder also raised concerns about the efficacy of wind farms and renewable developments more broadly.
Loss of prime agricultural land	Economic, environmental impacts of the Project	One community member raised concerns surrounding the loss of prime agricultural land noting the site is grazing land.
Lack of healthcare services in Moulamein	Social impacts of the Project	One community member raised concerns surrounding the lack of healthcare services and emergency care available in Moulamein, and how this may impact the temporary workforce. Suggestions from the stakeholder on how this can be managed included support for healthcare staff through community benefits.

5.1.8 Future community engagement

As the Project progresses, the following engagement is planned for the Project commensurate with the findings of engagement carried out during the preparation of this EIS.

Table 5-4 Planned future engagement activities, pending Project approval

Group	Construction phase	Operation phase
Stakeholders	Near neighbours, Hay Shire Council, Edward River Council, Murray River Council, Haulage Route Users, local education providers, wider community and First Nations Groups	Near neighbours, Hay Shire Council, Edward River Council, Murray River Council, Haulage Route Users, local education providers, wider community and First Nations Groups
Key actions	• The Applicant to provide updates to near neighbours and the community once further information is available regarding the progress of the Project towards construction (e.g. if Access Rights are awarded to the Project) • The Applicant to provide further updates to near neighbours on the results of visual impact assessments conducted on their property if a face-to-face meeting is requested. • The Applicant to provide further engagement with neighbours about visual impact mitigations, including proactive planting of screening vegetation, if and when required. • The Applicant to engage with near neighbours about planned traffic arrangements, construction activities and impact mitigations once a clear path to construction and timings are better understood. • The Applicant to continue engaging with local First Nations groups regarding local industry participation opportunities. • The Applicant to provide updates via email, letters (to a 10 km radius) and public notices regarding construction activities, employment opportunities	• The Applicant to continue to engage with near neighbours with key details regarding operation details of the site. • The Applicant to continue to engage with the local community and key community groups to highlight benefits and key milestones during operation. • The Applicant to engage via email and posted letters to residents within a 10 km radius should any maintenance work be carried out during operation and mitigate any impacts that may arise. • Continue to foster strong relationships with the community via the establishment of community partnerships and industry participation. • Proactively communicate the decommissioning strategy (including damaged turbine parts) to interested stakeholder groups and the wider community.

Group	Construction phase	Operation phase
	and expected impacts (traffic, noise, dust). • Delivery of updates to interested stakeholder groups such as near neighbours, Hay Shire Council, Edward River Council, Murray River Council, haulage route users, local education providers and the wider community. • Ongoing engagement to finalise and implement VPA and/or community benefit sharing initiatives. • The Applicant to continue to foster relationships that have been created and continue to be a valuable member of the local community.	
Consistency with 'Undertaking Engagement Guidelines for State Significant Projects' (DPIE, 2021)	• Proactive, transparent and collaborative engagement, spanning from informing on construction activities to involving and collaborating through benefit-sharing opportunities. • The Applicant to continue to gather ideas from locals regarding opportunities to work with local businesses and minimise construction impacts.	• The Applicant will continue to actively engage during the operation and decommissioning stage of the Project in line with the conditions of approval. • The Applicant will also continue to foster strong relationships with key stakeholders and further liaise with Edward River Council, Murray River Council and Hay Shire Council regarding the implementation of benefit sharing within the local community.
Monitoring of effectiveness for community participation	• The Applicant will continue to liaise with stakeholders and monitor community sentiment towards the Project to resolve key issues and capitalise on opportunities. • Explain to stakeholders at post-approval how community views were considered when reaching decisions. • The Applicant will utilise local knowledge and expertise with suppliers and contractors. • The Applicant will ensure they use appropriate engagement	• The Applicant will continue to proactively engage through the operation and decommissioning stage to ensure the local community and interested stakeholder groups are well-informed on key elements of the Project. • Proactive engagement will make it easy for the community to access information.

Group	Construction phase	Operation phase
	techniques when targeting specific groups, for example, First Nations groups where engagement should be planned and undertaken by Indigenous Engagement specialists.	

5.2. Aboriginal community engagement

Two avenues for engagement with the local First Nations community were adopted:

1. Engagement through the Engagement Action Plan (EAP); Traditional Owners – Indigenous community stakeholders were identified as Registered Aboriginal Parties (RAPs) for the Project and Local Aboriginal Land Council (LALC). The engagement sought to:
    a. Look for opportunities to contribute to the local story of Country and contribute to the local Aboriginal Community.
    b. Involve local community organisations in Community Benefit Sharing initiatives.

The relevant LALCs received communications in relation to the proposed development throughout both the Scoping and EIS engagement activities. The Applicant will continue to engage with the LALC and RAPs to discuss broader Project opportunities to promote cultural awareness and education, employment opportunities, management and protection of heritage sites, and other ways to benefit mutually on the Project.

2. Formal consultation in relation to potential to impact First Nations cultural heritage.

Consultation with Aboriginal people must be undertaken and documented in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a). In accordance with Step 4.1.2 of the *Consultation Requirements,* NGH contacted a range of organisations on 28 November 2022. The following organisations were contacted:

- Heritage NSW
- Aboriginal Land Rights Act 1983 – ALRA
- National Native Title Tribunal (NNTT)
- Native Title Services Corporation Limited (NTSCORP Limited)
- Murray Local Land Services
- Balranald LALC
- Deniliquin LALC
- Edward River Council
- Hay LALC
- Hay Shire Council
- Murray River Council
- Wamba Wamba LALC.

In addition, in accordance with Step 4.1.3, an advertisement was placed in the Riverine Grazier on November 30th 2022, requesting expressions of interest for consultation regarding the Project.

At the completion of this process, 15 Aboriginal parties registered their interest to become RAPs. In response:

- A copy of the proposed survey and assessment methodology, and a request for cultural knowledge were communicated to the RAPs on 1 December 2022 requesting feedback by 10 January 2023. Responses were received from seven parties.
- The archaeological survey of the Project was conducted by four registered[9] parties over 48 days from 27 February 2023 to 7 March 2024.
- A draft copy of the Aboriginal Cultural Heritage Assessment Report (ACHAR) was sent to the RAPs on 7 June 2024 for a 28-day review period. Four RAPs responded, and the ACHAR was finalised and is appended to this EIS, Appendix F.2.

Further consultation and Project involvement, pending Project approval, would occur during the construction stage specifically in relation to monitoring and salvage activities. Refer to Section 6.2.4 which sets out the Project's commitments to managing Aboriginal cultural heritage impacts.

5.3. Agency engagement

5.3.1 Agency consultation

As part of preparing the EIS for this SSD development application, the SEARs require that the relevant State or Government authorities, infrastructure and service providers, community groups, affected landowners, exploration licence holders, quarry operators and mineral title holders be consulted.

Table 5-5 summarises the method of consultation, if issues were raised and if so, where they are addressed in this EIS. The SEARS, including a cross-reference table showing where each specific matter is provided in the EIS, is also included in Appendix B.

Table 5-5 Agency consultation summary

Issue raised by agency	Detail
Department of Planning, Housing and Infrastructure	
Project updates	• Regular phone calls between Project Development Manager and DPHI Project contact Planner to: provide project update and timing of EIS submission; seek advice or input on certain planning matters; ensure project requirements and logistics were appropriate with regards to submitting the EIS; amongst other matters. • 28 June 2024 EIS Pre-lodgement Meeting
Murray River Council	
Project updates	• Letter sent informing Council of the status of the EIS on 14 February 2024 and providing direct Project team contacts in relation to the detailed assessment. o Council responded on 10 May 2024 advising Council has no objections to the proposed development. Furthermore, we welcome the opportunity to review the Environmental Impact Statement (EIS) once it is finalised • The Applicant met with members of the Murray River Council on:

[9] Six were invited and four elected to participate.

Issue raised by agency	Detail
	o 1 September 2021 to introduce The Applicant and the Project to Council and to outline the planning process ahead for the project and any matters that Council wanted to raise and discuss. o 9 February 2024 to provide an update on the project and to discuss VPAs and other matters that may affect the LGA in relation to the number of renewable projects being developed in the area (e.g. traffic & accommodation). o 28 May 2024 to discuss project interactions with Council controlled roads (Baldon Rd and paper roads) to discuss s.138, licences and also the assessment of dwelling entitlements. • Project newsletters have been sent to Council to provide regular updates. • Additional meetings were sought by the Applicant for the project but were not taken up by Council.
Traffic assessment	Email 21 June 2024 from traffic consultant: • Briefing Council that Project does not propose to make use of any local roads under the management of Murray River Council with the exception of up to 10 light vehicles per day which may travel between Moulamein and the Project Area via Baldon Road. • Seeking feedback on the use of the local road network for low levels of Project traffic, and any road upgrades or events planned along the route from Moulamein. This section will be updated following any relevant feedback from Council.
VPA and other Project commitments	Ongoing consultation with Council resulted in Council accepting, and countersigning on the 27 June 2024, a Letter of Intent endorsing the proposed Community Benefit Fund strategy outlining: • A Voluntary Planning Agreement for Council to manage $500/MW installed per annum of funds (based on generation from turbines within the Murray River LGA) for local community benefits which would result in $640,000 per year during operations if 160 turbines of 8 MW capacity are installed. • A Community Committee to manage approximately $500/MW installed per annum of Strategic Community Funds (across all LGAs) managed by a committee. This would result in $720,00 per annum of funding for the community if 180 turbines of 8MW capacity are installed. • A First Nations Fund of $100/MW installed per annum managed by an independent committee for first Nations initiatives. This would result in $144,000 per annum of funding if 180 turbines of 8MW capacity are installed.
Hay Shire Council	
Project updates	Letter sent informing the agency of the status of the project on 14 February 2024 providing direct project team contacts in relation to the detailed assessment. Follow up emails were sent with no response from Council to the letter. The Applicant met with members of the Hay Shire Council on: • 13 August 2021 to introduce The Applicant and the Project to Council and

Issue raised by agency	Detail
	to outline the planning process ahead for the project and any matters that Council wanted to raise and discuss. • 12 September 2023 to provide a project update and to be briefed on the various initiatives and planning being progressed by Council in preparation for the rollout of the SWREZ. Discussed VPA, housing, traffic, waste, amongst others. • 9 November 2023 to provide an update on the project and to follow up from the September meeting. • 21 February 2024 – Round Table with Council and other developers to discuss Council's document on 'Fundamental Principles for Successful Renewable Energy Development in Hay LGA' and receive feedback on funding initiatives and expectations around the VPA. • Project newsletters have been sent to Council to provide regular updates.
VPA and other Project commitments	Ongoing consultation with Council regarding the project Community Benefits Funding strategy resulted in Council accepting, and countersigning on the 26 June 2024, a Letter of Intent endorsing the proposed Community Benefit Fund strategy outlining: • A Voluntary Planning Agreement for Council to manage \$500/MW of installed capacity per annum of funds (based on generation from turbines within the Hay LGA) for community benefits which would result in \$80,000 per year if 20 turbines of 8 MW capacity are installed. • A Community Committee to manage \$500/MW of installed capacity per annum of Strategic Community Funds (across all LGAs). This would result in \$720,00 per annum of funding for the community if 180 turbines of 8MW capacity are installed. • A First Nations Fund of \$100 p/MW per annum of installed capacity managed by an independent committee for first Nations initiatives. This would result in \$144,000 per annum of funding if 180 turbines of 8MW capacity are installed.
Edward River Council	
Project updates	Letter sent informing the agency of the status of the project on 14 February 2024 providing direct project team contacts in relation to the detailed assessment. A response was received on the 15 March 2024 indicating Council would respond to the EIS. Other engagement has included: • The Applicant met with members of the Edward River Council on 25 August 2021 and introduced the project, outlined the planning process ahead for the project and received feedback on matters that Council wanted to raise and discuss. • Email correspondence during 2024 to undertake the dwelling entitlements assessment • Project newsletters have been sent to Council to provide regular updates. • Additional meetings were sought by The Applicant for the project but were not taken up by Council.

Issue raised by agency	Detail
VPA and other Project commitments	VPA is not required with Edward River Council as the project area is not located within the Council Local Government Area. However, the Community Benefits funding strategy for the project which has been endorsed by Hay Shire Council and Murray River Council includes a Community Strategic Fund which is limited to initiatives within 80km from the project boundary and is not limited to any particular LGA. This fund will enable community funding to flow to Edward River LGA if funding initiatives from within the LGA are successful.
Biodiversity Conservation Service	
Project update	Letter sent informing the agency of the status of the Project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. A response was received on 15 February 2024 welcoming ongoing technical consultation prior to submission.
Application of the Biodiversity Assessment Method (BAM)	Consultation log including as Appendix G of the BDAR demonstrates progressive consultation between October 2022 and April 2024 with regard to application of the BAM including survey windows, flood impacts, targeted surveys, vegetation zone assignment, staging of impacts and offsets.
Plains Wanderer, expert advice	April 2024 meeting with D. Parker, Plains wander specialist, South West BCS identified there are benefits for Plains Wanderer habitat from grazing. Discussion regarding impacts and offsets for this species. Singorimbah BSA TransGrid site sets a precedent for this type of management measure to be adopted. It was noted that strategic offsets, in collaboration with other regional projects in consideration of Plains Wanderer habitat could have good strategic outcomes.
Project update and offsets	April 2024 Project update meeting; as well as update on the biodiversity impact assessment and underpinning assumptions, this meeting also discussed offsets. Specific input was sought from BCS to guide the assessment and mitigation strategies. The meeting discussed offset matters including: • Appropriate buffers between development sites and stewardship sites • Grazing of native grasslands within a Stewardship site. • Offsets regarding ‘Serious and Irreversible Impacts’ • Strategic offsets – coordinating SSD project offsets
Nature Markets and Offset Division	In May 2024 NGH provided the Project’s draft offset strategy including the credit profile and a desktop assessment of land holdings with key credit drivers, to seek interested landholders from NMOD directly, and discuss local stewardship projects of relevance. The Credit Supply Branch provided resources to inform this process.
Flood risk	In early July 2024 NGH provided BCS with an overview of the approach to flooding in the EIS providing consideration of risk to the environment and project and Project performance commitments. NGH advised that Project specific infrastructure flood modelling is proposed in tandem with detailed design, to address data gaps and mitigate flood risks. BCS acknowledged the approach and the requirement for a quantitative assessment of flood risk to demonstrate how high flood risk areas are being avoided especially given that the Abercrombie Creek flows through the site. If not

Issue raised by agency	Detail
	provided during the EIS BCS will be requesting that this occurs during the RTS phase. BCS also noted that it would be best practice to apply the procedures detailed in the new *Flood Impact and Risk Assessment (FIRA) guideline (2023).*
National Parks and Wildlife Service	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 providing direct project team contacts in relation to the detailed assessment. A response was received on the 21 June 2024 advising that the EIS will be reviewed following submission and noting that although Baldon does not directly neighbour Yanga State Conservation Areas it does significantly add to the cumulative effects of Keri Keri & Wilan wind farms.
NSW Aboriginal Land Council	
Project update	Letter sent informing the NSW ALC of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. On the 15 March 2024 discussed the Project and distinctions between agency and social consultation and cultural heritage assessments, and NSW LALC's role in Energy Co advisory committee.
NSW Heritage	
Project update	Letter sent informing the agency of the status of the Project on 14 February 2024and providing direct project team contacts in relation to the detailed assessment. A response was received on the 23 February 2024 acknowledging receipt and no further comments were received.
Local Land Services Riverina	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. Acknowledgment received 21 March 2024 advising that internal meeting on Project is scheduled.
Biodiversity impacts and offsets	25 March 2024: meeting held to discuss impacts and offsets regarding the Project. Specifically, rehabilitation strategies to consider the scale of the Project appropriately were discussed. Contacts were provided for local restoration contractors and local conduits to advertise for landholders interested in participating in the offsets scheme (Murray Native Seed Services, The Riverine Grazier). It was noted a coordinated LLS response is in progress for all local wind farm proposals.
Potential impact to Yam Daisy	Met with Local Land Services representative during the Hay Project Information Session on 12 September 2023. The project was made aware of the recent discovery of Yam daisy on the Hay Plains. This was communicated to the project ecology consultant to ensure this species was considered. The representative

Issue raised by agency	Detail
	expressed concerns about the widespread development of the Hay Plains for renewables projects on the fragile Hay Plains ecosystem.
DPHI Water and Department of Natural Resources Access Regulator	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. A response was received on 21 February 2024 requesting submission through portal. Subsequent email communications established that DCCEEW Water group generally provide comments on referrals once the EIS is submitted. Further consultation on technical matters relating to water take and Water Access Licences was undertaken in May 2024.
Water NSW	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. A response was received on 16 February 2024 noting project changes and no further comments on SEARs advice.
NSW Environmental Protection Authority	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. Responses received 15 March and 19 March 2024 advising no further comments at that stage.
Crown Lands	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. Crown land left phone messages and confirmed on 28 March 2024 acknowledging freehold land and advising that Crown Land landholders consent required if Crown Land is impacted.
Crown Land Licence	Application submitted to Crown Land to initiate the process to obtain a Licence over Crown Land on 24 June 2024. The Application was not able to be accepted until after the EIS application has been lodged, and the Crown Licence cannot be issued until after the planning consent has been obtained.
Geological Survey of NSW – Mining Exploration and Geoscience (MEG)	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. A response was received on the 27 February 2024 advising MEG has not identified any resource sterilisation issues at this early stage. MEG will review this advice for this renewable project at each environmental assessment stage. MEG requires the Applicant to actively monitor the MinView map viewer at https://minview.geoscience.nsw.gov.au for mining title changes that interact with this project.

Issue raised by agency	Detail
Department of Primary Industries (Agriculture)	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. A response was received on the 23 February 2024 confirming no further comments in addition to SEARs, and offered to discuss draft Agricultural Impact Statement ahead of lodgement.
Department of Primary Industries (Fisheries)	
Project update	Letter sent informing the agency of the status of the project on 14 February and providing direct project team contacts in relation to the detailed assessment. A response was received on 19 June acknowledging aquatic ecology assessment being prepared and will review and provide comment once EIS exhibited.
Transport for NSW	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. No response was received to this consultation.
Traffic assessment	Ongoing consultation between Traffic consultant, Project team and TfNSW included: • 26 March 2024 Traffic consultant introduced Project and confirmed traffic assessment parameters including adopting growth rate of 1.5% per annum for traffic forecasts. • 21 June 2024 traffic consultant email to TfNSW seeking feedback on the potential access routes from Port Adelaide and Port of Newcastle, and any road upgrades or events planned along the State Road network. • 12 July 2024 meeting between the Project team and TfNSW to discuss the project including requirements for the OSOM route assessment. TfNSW advised that the proposed routes are feasible and would require further assessment. Further detailed assessment requirements were subsequently received via email from TfNSW (as included in traffic impact assessment). The Applicant has participated in various South West REZ developer discussions with the NSW government and TfNSW regarding collaborations on haulage route assessments and implementation.
TransGrid	
Project update	Letter sent informing the agency of the status of the Project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. Noting Applicants direct consultation on grid connection. No response received.
NSW Telco Authority	

Issue raised by agency	Detail
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. Response received 20 February 2024 confirming receipt and advising of investigation into any impacts to Public Safety Network used by government agencies. Requested updated turbine locations to consider potential obstruction to microwave links. Updated turbine layout provided 24 June 2024. Provided confirmation on 5 July 2024 that the proposed turbines are not obstructing Telco Authority microwave links and no further comments.
Fire and Rescue NSW	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 providing direct project team contacts in relation to the detailed assessment. Receipt was acknowledged on 21 February 2024 and acknowledged request to engage in consultation prior to exhibition stage of the approval process and advised they will not engage in consultation until exhibition. Links to information and position statements were provided.
NSW RFS	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 providing direct project team contacts in relation to the detailed assessment. A response was received on 14 June 2024 confirming RFS will consider the bush fire risk assessment section of the EIS when the referral is made during exhibition.
Department of Defence	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. A response was received on 16 February 2024 and NGH clarified Aviation Projects will be liaising on technical matters whilst NGH could advise on general project information.
Civil Aviation Safety Authority	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. Response received 22 February 2024 confirming receipt and review once EIS submitted. Noted visual impact assessment likely to address night lighting.
Meteorological masts during development	Response to project Development Application to Murray River Council for the installation of 3 meteorological masts on 18 October 2022. CASA did not object to the Project and supported the proposed visual marking measures to the mast and requested further consideration to markings during night time or fog conditions.
Airservices Australia	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment.

Issue raised by agency	Detail
	Receipt was acknowledged 14 June 2024 advising they will be in contact if further information is required.
Aviation assessment	The following stakeholders were notified of the Project in relation to aviation safety: Airservices Australia, Department of Defence, Murray River Council, Hay Shire Council, Royal Flying Doctor Service, NSW Rural Fire Service and Aerial operators.
Meteorological mast installation during development	Response to project Development Application to Murray River Council for the installation of 3 meteorological masts on 7 June 2023. ASA did not object to the application and provided advice on airspace procedures; communications/navigation/surveillance (CNS) Facilities; air traffic control operations. It was concluded the masts would not have an impact on these things.
Murrumbidgee Local Health District	
Project update	Letter sent informing the agency of the status of the project on 14 February 2024 and providing direct project team contacts in relation to the detailed assessment. Receipt was acknowledged on 15 March 2024 acknowledging receipt and advising no further queries until IES reviewed following referral.

06 Assessment of impacts

6. Assessment of impacts

6.1. Biodiversity

6.1.1 Assessment approach

A Biodiversity Development Assessment Report (BDAR) was prepared by NGH on behalf of Baldon Wind Farm Pty Ltd (the Applicant). It is summarised below and appended in full in Appendix F.1.

It assesses the impact of the Baldon Wind Farm Project in accordance with the NSW Biodiversity Assessment Method (BAM) and addresses the requirements of the Biodiversity Assessment Methodology 2020 (BAM 2020) in accordance with Section 7.9 of the NSW *Biodiversity Conservation Act 2016* (BC Act). This includes;

- An assessment of the biodiversity values of the project including plant community types (PCTs), threatened species, migratory species and habitat values
- An assessment of the likely biodiversity impacts of the project including the application of the avoid, minimise and offset framework
- Details of the biodiversity offset requirements and the measures proposed to address the offset obligations.

The BAM is endorsed to assess Commonwealth listed entities as well, under the Bilateral Agreement between NSW and the Commonwealth government. It focusses on the impacts of vegetation clearing and establishes an offset obligation, for impacts which cannot be avoided or sufficiently minimised. It includes specific 'prescribed' impact assessment where relevant; including prescribed wind farm impacts. It is supported by vegetation surveys and targeted species survey programs, as prescribed by the BAM.

To consider the operational risks of the Project to birds and bats (for example; the risks of collisions and alienation effects around turbines), Nature Advisory are completing a multiyear base line bird and bat utilisation survey program. They have also completed a Preliminary Collision Risk Assessment and are producing annual reports to summarise the survey findings as they accrue. This data has been used to inform the assessment of operational risks to birds and bats and will inform an adaptive management monitoring program during the operation of the Project. This is included within the BDAR.

The BAM does not address all listings under the Fisheries Management Act or detail how the Project will meet the offset obligation calculated by the BAM. As such, to address all items specified in the SEARs:

- Additional commentary is added to this chapter to assess the Project's impacts on Fisheries Management Act entities.
- A separate Offset Strategy was developed in consultation with key stakeholders. It is included within Appendix F.1.

Field surveys

Field surveys informing this assessment have included:

- Biodiversity Assessment Method (BAM):
  - 2020 - Rapid survey to identify general site condition and values, key constraints and direct future work
  - 2022 – Rapid survey to inform preliminary collision risk assessment
  - 2023 - Vegetation assessment to determine and map plant community types

- 2023 - Targeted surveys within the Development footprint:
    - August – Nocturnal Fauna
    - September – Threatened Flora
    - October – Threatened Flora and Vegetation Integrity (BAM) plots
    - October – Grey Snake and Southern Bell Frog
    - October – Plains-wanderer
    - November – Grey Snake, Southern Bell Frog
    - November – Stick nests, Hollow-bearing Trees (HBTS) and breeding threatened birds (using hollows/stick nests)
    - November – Plains-wanderer
    - November – Threatened Flora and Vegetation Integrity (BAM) plots
    - December – Vegetation Integrity (BAM) plots
- 2024 - Targeted surveys of development corridor:
    - January – Vegetation Integrity (BAM) plots
- Bird and Bat Utilisation Surveys (BBUS):
    - 2022 – 2024 Bird utilisation surveys[10]
    - 2022 – 2024 Bat utilisation surveys[11]

Strategic avoidance

The construction and operational phases of the Project will impact biodiversity values at the site. This would occur through direct impacts, such as habitat clearance (and associated noise and disturbance) and the presence of infrastructure, which may create barriers to movement and present an ongoing collision risk for birds and bats. The most appropriate way to address these impacts is by first fully exploring how the Project can avoid the identified biodiversity values of the site. This is the mandate of the Biodiversity Assessment Method (BAM); first avoid, then minimise, and offset impacts only as a last resort.

Various options relating to location, design and technology were evaluated in the planning of this development, taking biodiversity values into account. The Project has progressed through the following steps to apply the 'avoid and minimise' decision-making process:

1. Early constraints identified and validation of desktop mapping undertaken by rapid survey for the broad Project Area to inform the preliminary design for project infrastructure
2. Detailed field surveys to inform updated constraints mapping for the narrower development corridor
3. Constraints workshop to consider overlapping constraints (specifically heritage constraints covering different areas to biodiversity constraints)
4. Avoid and minimise workshop to clarify avoidance strategies and develop further options to minimise impacts.

These four steps are discussed in detail below.

Early constraints identified for the broad Project Area in 2020 included:

- Potential for Serious and Irreversible Impacts to Plains-wanderer (*Pedionomus torquatus*) and Eastern Curlew (*Numenius madagascariensis*)
- *Natural Grasslands of the Murray Valley Plains* CEEC

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[10] Bird spring 2022 surveys not included due to regional flooding.
[11] Bat summer 2023 surveys not included at this time.

- Raptor nests, in relation to collision risks

Low constraint areas were identified as previously cropped and planted vegetation areas, noting these areas are a very small percentage of the Project Area. Higher constraint areas were identified as potential Threatened Ecological Communities (TECs) (Portions of PCT 46), similarly occupying a small proportion of the Project Area. The large proportion of the Project Area was considered moderate constraints - moderate to good condition native vegetation (shrublands and woodlands) not aligning to a TEC, however could provide habitat for threatened species.

In November 2023, after the primary biodiversity and heritage surveys were completed, key issues were ranked for consideration of avoidance. For biodiversity, key matters identified included:

- Mossgiel Daisy (*Brachyscome papillosa*) – Prolific and widespread in the north of the Project area, including areas of dense and more sparse populations.
- Chariot Wheels (*Maireana cheelii*)- Prolific and widespread in the south of the site, including areas of dense and more sparse populations.
- Southern Bell Frog (*Litoria raniformis*) - Prolific and widespread in dams within the site
- Plains-wanderer *(Pedionomus torquatus)* - Identified as likely to use most of the site
- Little Eagle (*Hieraaetus morphnoides*) - One confirmed nest and one potential nest identified

Infrastructure layout refinements were made in terms of key heritage matters in 16 locations. These necessitated additional biodiversity and heritage field work to survey new avoidance areas. In March 2023, mitigation strategies had been developed for key matters and was presented to BCS in April 2024 during a Project update, in light of the difficulty in avoiding altogether the threatened flora species identified. Key strategies centred on rationalising impacts in areas where prolific populations were recorded and commitments to seed bank protection protocols in rehabilitation strategies.

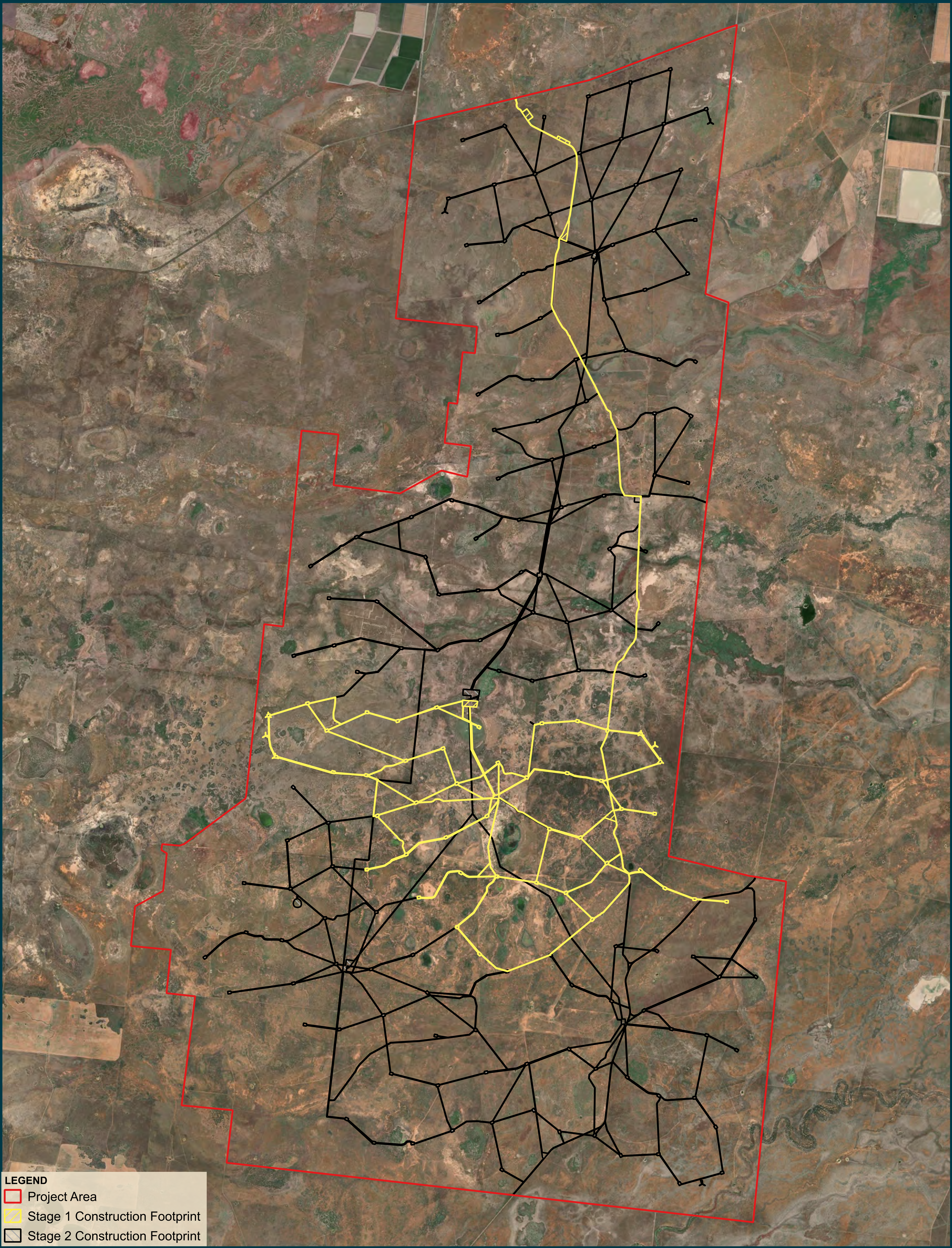
It is noted that the Project would be undertaken using a staged construction process that will also assist to minimise construction impacts occurring simultaneously over a large scale. The construction methodology involves the progression of limited (2-3) construction 'fronts'. As such, exposed areas of soil will be limited and able to be stabilised and rehabilitated progressively. This staged approach also assists mobile species such as Plains-wanderer to move away from disturbance footprints.

Project design has also minimised impacts on vegetation and habitat through;

- Maximising the use of existing tracks within the Project Area – this was considered in early layouts
- Access tracks and cabling have been designed to traverse the shortest feasible distance – this was considered in more detailed layout development
- Reducing the width of tracks to the minimum, considering landform and other engineering constraints – this has been locked into mitigation measures
- Maintaining roads as gravel and minimise raising to avoid or minimise changes to onsite hydrology– this has been locked into mitigation measures
- Avoiding all dams – this has been locked into mitigation measures.

Staging assumptions

As the Project may be developed in two stages, this has been considered in the calculation of offset obligations for the Project. The staging assumptions are illustrated below in Figure 6-1 and further detailed within the Project description, Section 3.



0 2.5 5 7.5 10 km

Datum: GDA2020 / MGA Zone 55

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Baldon Wind Farm

Figure 6-1 Project staging assumptions; extent of Stage 1 and Stage 2.

Ref: 22-366 Baldon WF Biodiversity BDAR 2024 \ Figure 7-2 Staged assessment footprint Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022

6.1.2 Existing environment

Regional context

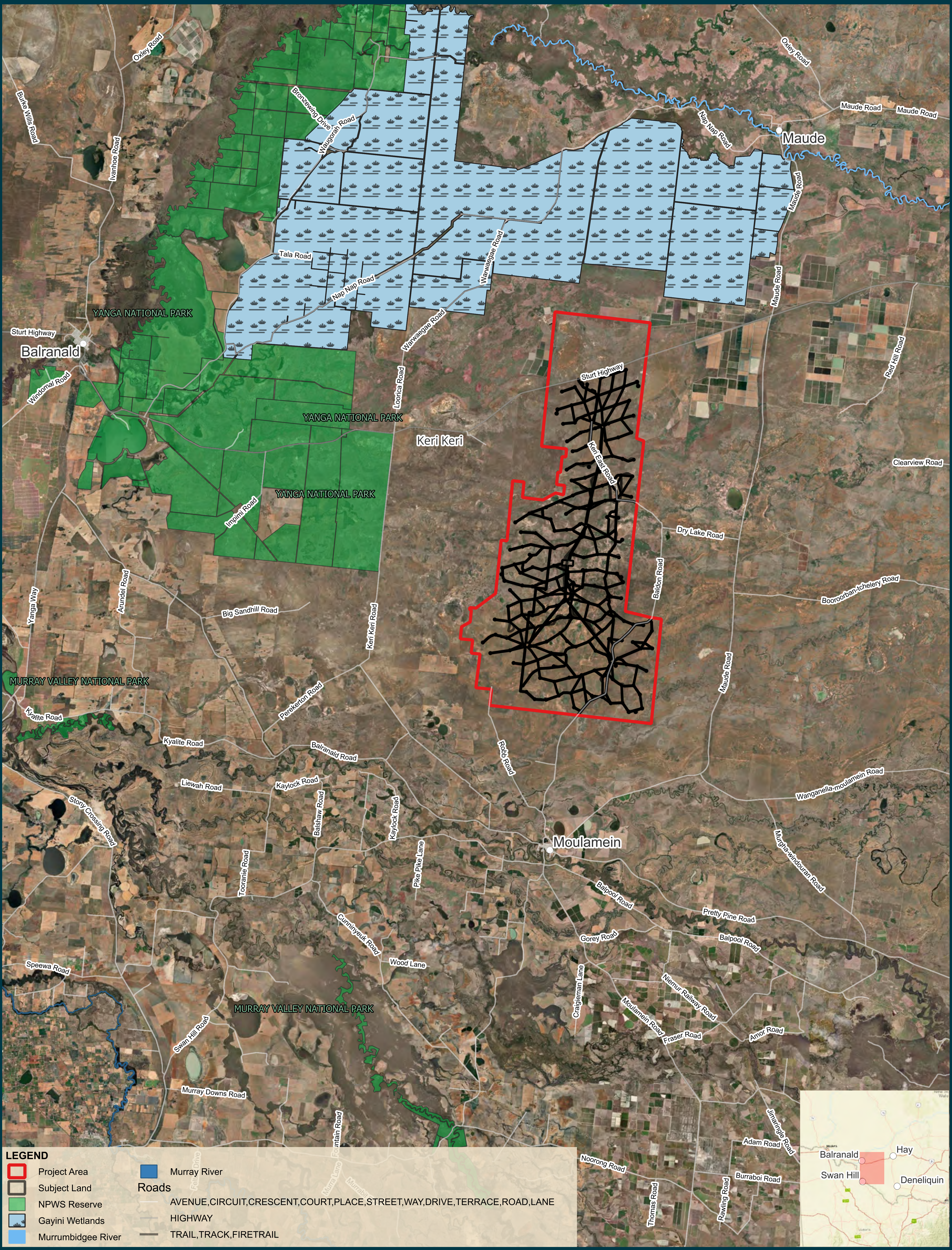
The Project is located 17km east of the Yanga State Conservation Area (SCA), Yanga National Park and Yanga Nature Reserve (collectively known as the Yanga Parks) (refer Figure 6-2). The Yanga Parks protect significant vegetation and landscape types within the largely cleared Riverina Bioregion, including part of the third largest contiguous stand of River Red Gum forest in Australia, as well as providing habitat for a range of threatened species.

The Gayini Wetlands Conservation Area are located 5 km north of the Development corridor (refer Figure 6-2). The Gayini Wetlands covers 88,000 ha on the Lowbdigee Floodplain, the largest remaining area of wetlands in the Murrumbidgee in the southern Murray-Darling Basin. It has high biodiversity and cultural significance.

The Project is located within the flat riverine plains between the townships of Hay and Balranald with topography ranging between 68-80m above sea level. The dominant Mitchell Landscape within the Development corridor is the Murrumbidgee Depression Plains. Landscape features include chenopod shrublands intermixed with claypans and depressions, sand lunettes, Black Box billabongs, wetland complexes and ephemeral watercourses. Scattered solitary trees, including hollow bearing trees occur onsite.

Manmade dams and irrigation channels as well as roads exist in the Project area. The site is used predominantly for extensive grazing of sheep today; 1 sheep per 2 ha on average. The site has a history of disturbance. Overstocking of sheep and drought conditions caused extensive damage to groundcover and resulted in bare ground over much of the site. The key strategy used in mid to late 1990s was the planting of saltbush in rows, to stabilize and capture soil. The rows are still apparent and have increased native plant diversity and improved soil conditions. This has been observed by the NGH ecology field team in surveys conducted between 2022 – 2024.

The proposed Development Footprint covers 819 ha of the 2,842.47 ha Subject Land subject to survey, within the wider 46,259 ha Project area. A total of 41,435 ha is located south of the Sturt Highway and no impacts are proposed north of the Sturt Highway. As such the BDAR considers only the Project area south of the Sturt Highway. There are no areas of outstanding biodiversity value occurring within or adjacent to it.



0 2.5 5 7.5 10 km

Datum: GDA2020 / MGA Zone 55

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Figure 6-2 Regional context

Ref: 22-366 Baldon WF Biodiversity BDAR 2024 | Figure 6-2 Regional context Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022

Plant community types

Plant community types (PCTS) within the Subject land were determined through vegetation stratification and field survey according to the BAM 2020. Native vegetation outside the Subject land was determined using NSW State Native Vegetation mapping (NSW DCCEEW, 2023) with adjustments made for local observations made during the field surveys. Surveys were undertaken during preliminary field assessments in September 2020 with more detailed floristic surveys in March 2023 and between September 2023 to January 2024.

The following ten Plant Community Types (PCTs) were identified and are listed in order of their prevalence onsite:

- PCT 164: *'Cotton Bush open shrubland of the semi-arid (warm) zone'*
- PCT 153: '*Black Bluebush low open shrubland of the alluvial plains and sandplains of the arid and semi-arid zones'*
- PCT 46: '*Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion'*
- PCT 160:*'Nitre Goosefoot shrubland wetland on clays of the inland floodplains*'
- PCT 15: '*Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)'*
- PCT 163: '*Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones'*
- PCT 159: '*Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)*'
- PCT 28: '*White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone'*
- PCT 57: '*Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion*
- PCT17: '*Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion)*'

Vegetation integrity (VI) plots[12] were used to further delineate PCTs into specific zones based on their condition. While the Draft Native Vegetation Regulatory (NVR) Map (DCCEEW, 2024) shows some areas of the Subject land as Category 1 Land (having a history of intensive cultivation), the site surveys identified threatened species habitat and moderate condition grasslands in these areas. All areas have therefore been assigned to a native vegetation zone and the impact area included in the BDAR for assessment.

The distribution of PCTs, zones and the location of VI plots and their values is shown below in Table 6-1 and illustrated using an overview map in Figure 6-3. The detailed maps sets are included within the BDAR, Appendix F.1. In general, the zones showed very good diversity of plant species (scoring high VI scores) and only one zone recorded hollow bearing trees. The surveys reflect wetter than average seasonal conditions, and wet weather benchmarks were used for PCT 17, 153, 160, 163 and 164 within the BAM Calculator (BAM-C).

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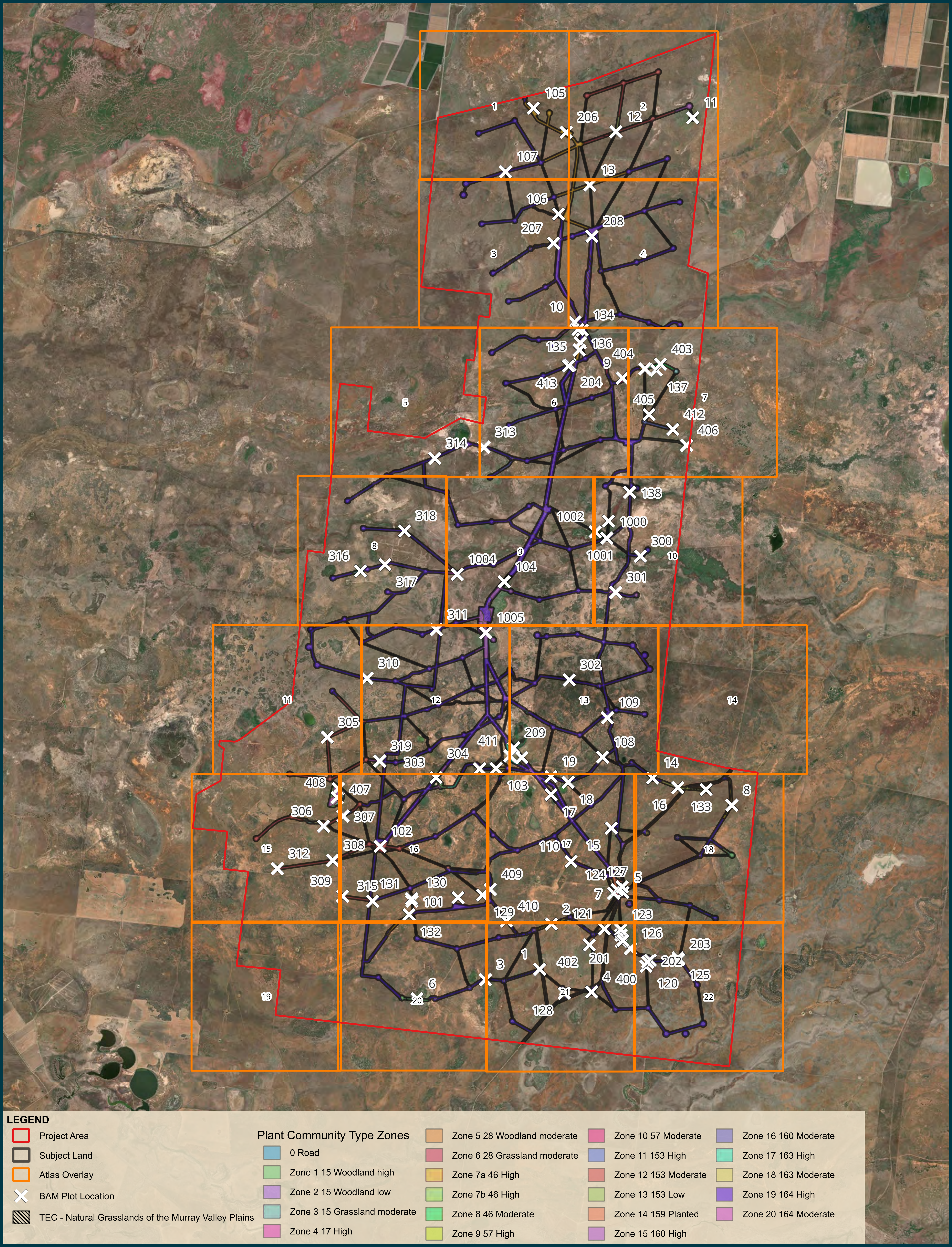
[12] Floristic surveys as required by the BAM. VI scores reflect vegetation condition, considering diversity, structure and function, on a scale from 0 to 100.

Table 6-1 Current Vegetation Integrity scores for each Vegetation Zone within the Subject Land

Zone ID	PCT/Zone	Hollow Bearing Trees?	Vegetation Integrity Score out of 100
1	15_Woodland_high	Present	71.1
2	15_Woodland_low	Absent	55.5
3	15_Grassland_moderate	Absent	33.9
4	17_High	Absent	85.7
5	28_Woodland_moderate	Absent	21.1
6	28_Grassland_moderate	Absent	36.7
7a	46_High	Absent	96
7b	46_High (TEC)	Absent	84.2
8	46_Moderate	Absent	50.1
9	57_High	Absent	59.3
10	57_Moderate	Absent	47.6
11	153_High	Absent	99.2
12	153_Moderate	Absent	59.2
13	153_Low	Absent	42.2
14	159_Planted	Absent	92.1
15	160_High	Absent	75.8
16	160_Moderate	Absent	45.5
17	163_High	Absent	88.3
18	163_Moderate	Absent	67.2
19	164_High	Absent	94.6
20	164_Moderate	Absent	56.6



0 2.5 5 7.5 10 km

Datum: GDA2020 / MGA Zone 55

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Figure 6-3 Overview of Plant Community Types, associated zones and BAM plot locations within the Subject Land

Threatened species survey requirements

In the BAM, threatened species are categorised as either:

1. Ecosystem credit species; which are assumed present (do not require targeted surveys) and contribute to the vegetation offset obligation (ecosystem credits), or
2. Species credit species; which require targeted surveys and produce an additional offset obligation (species credits).

The Biodiversity Assessment Method (BAM) uses the vegetation plot data above to predict threatened species which may occur and generate an offset obligation. This has been supplemented by a NSW BioNet (DPE, 2023) search (undertaken on 8 December 2023) and Protected Matters Search Tool for Matters of National Significance (undertaken on 5 December 2023), to consider species previously recorded within 10 km of the Development corridor and the results of the field survey program, including incidental records.

This produced a list of 33 ecosystem credit species.

It is noted that two additional ecosystem credit species have been added to the BAM-C manually. Black Breasted Buzzard (*Hamirostra melanosternon*) has been included based on observations during surveys within or surrounding the Subject land. Flame Robin (*Petroica phoenicea)* has been included based on being recorded in a BioNet background search. Regent Parrot (eastern subspecies) *Polytelis anthopeplus monarchoides* was excluded from further assessment because the Project area is not within 10km of the junction of the Murray River.

There were 34 species credit species returned for consideration:

- A spear-grass *Austrostipa metatoris*
- A spear-grass *Austrostipa wakoolica*
- Claypan Daisy *Brachyscome muelleroides*
- Mossgiel Daisy *Brachyscome papillosa*
- Sand-hill Spider Orchid *Caladenia arenaria*
- A burr-daisy *Calotis moorei*
- Bindweed *Convolvulus tedmoorei*
- Yellow Gum *Eucalyptus leucoxylon subsp. pruinosa*
- Winged *Peppercress Lepidium monoplocoides*
- Lanky Buttons *Leptorhynchos orientalis*
- Chariot Wheels *Maireana cheelii*
- Austral Pillwort *Pilularia novae-hollandiae*
- Turnip Copperburr *Sclerolaena napiformis*
- Menindee Nightshade *Solanum karsense*
- Slender Darling Pea *Swainsona murrayana*
- Red Darling Pea *Swainsona plagiotropis*
- Silky Swainson-pea *Swainsona sericea*
- Pink-tailed Legless Lizard *Aprasia parapulchella*
- Australian Bustard *Ardeotis australis*
- Bush Stone-curlew *Burhinus grallarius*
- Endangered population -White-browed Treecreeper population in Carrathool local government area south of the Lachlan River and Griffith local government area *Climacteris affinis*
- White-bellied Sea-Eagle *Haliaeetus leucogaster*
- Black-breasted Buzzard *Hamirostra melanosternon*
- Little Eagle *Hieraaetus morphnoides*
- Swift Parrot *Lathamus discolor*
- Southern Bell Frog *Litoria raniformis*
- Pink Cockatoo (Breeding) *Lophochroa leadbeateri*
- Square-tailed Kite (Breeding) *Lophoictinia isura*
- Barking Owl (Breeding) *Ninox connivens*
- Plains-wanderer (Breeding) *Pedionomus torquatus*
- Koala Phascolarctos cinereus
- Regent Parrot (eastern subspecies) *Polytelis anthopeplus Monarchoides*
- Superb Parrot (Breeding) *Polytelis swainsonii*
- Masked Owl *Tyto novaehollandiae*

Under the BAM, these species credit species generate additional requirements unless:

1. They are excluded because key habitat features don't exist, or they are geographically limited. Some species may also be excluded because important habitat mapping does not exist inside the Development corridor, or
2. Habitat components are lacking such that they could not occur, or
3. Survey effort has demonstrated they are not present.

Four additional 'species credit' species have been added to the targeted survey plan based on the results of database searches and the field surveys:

- A spear-grass *Austrostipa metatoris*
- Black-breasted Buzzard *Hamirostra melanosternon*
- Grey Snake *Hemiaspis damelii*
- Plains-wanderer *Pedionomus torquatus*

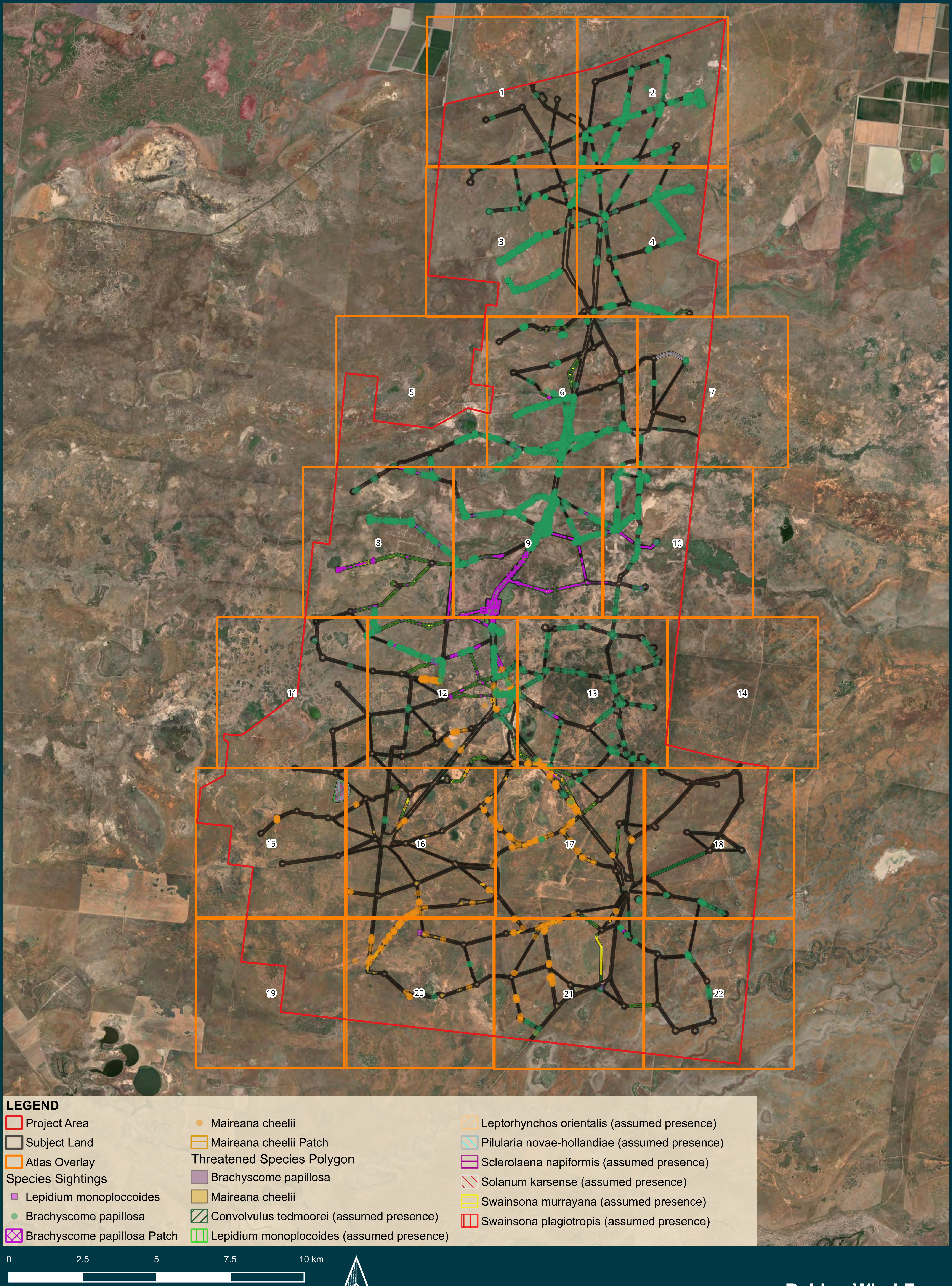
Targeted survey results

Two flora species, Chariot Wheels *Maireana cheelii* and Mossgiel Daisy *Brachyscome papillosa* were detected within the proposed Development footprint during targeted flora surveys. One suspected *Lepidium monoplocoides* (Winged Peppercress) was detected outside the Development corridor as an incidental observation. As of July 2024, *Convolvulus tedmoorei* is 'assumed present'. Further targeted surveys are planned during the flowering period for this and several other species in September 2024 where conservative assumptions have been made regarding the extent of their occurrence onsite. The species obligations may be reduced or removed for these species, depending on further survey results.

Fauna species detected in targeted surveys included:

- Southern Bell Frog *Litoria raniformis*
- Plains-wanderer *Pedionomus torquatus*

Areas of impact for species found or assumed to occur are either by using associated PCTs / zones or by defining a species-specific species polygon, as shown in Figure 6-4. Detailed justifications for these assignments and the detailed map sets are provided in the BDAR, Appendix F.1.



Datum: GDA2020 / MGA Zone 55

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Figure 6-4 Overview of flora species recorded within Subject land

Ref: 22-366 Baldon WF Biodiversity BDAR 2024 | Figure 6-4 Overview of flora species recorded within Subject land Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022

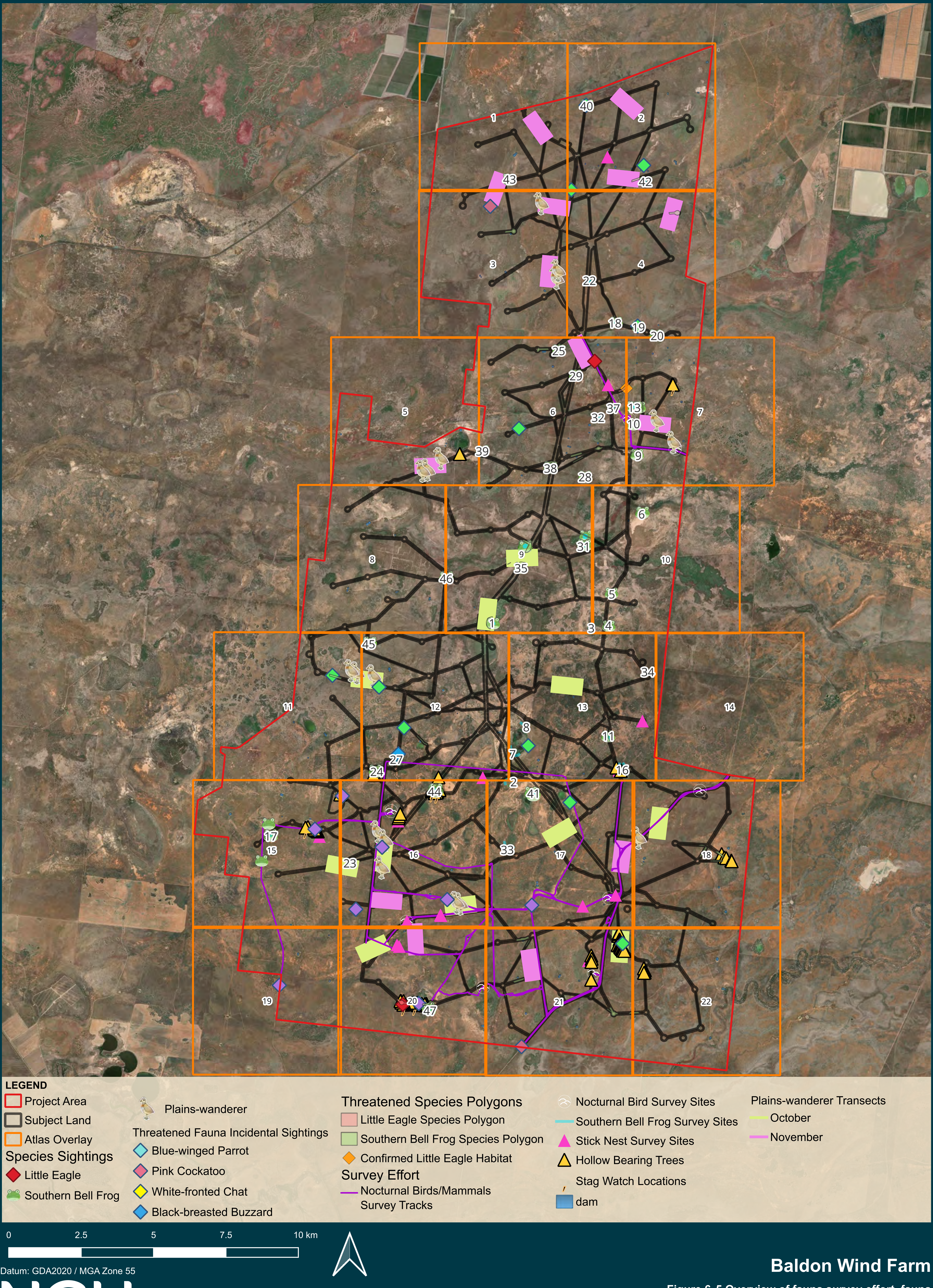

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Figure 6-5 Overview of fauna survey effort, fauna sightings and species polygons

Bird and bat activity on the Project site

Bird and bat utilisation surveys (BBUS) provide baseline data to inform the impacts of a development on local bird and bat populations. The first-year results of a two-year program are now available (and provided in the first annual report, within the BDAR, Appendix F.1).

In summary, a total of 808 individuals from nine threatened bird species were observed during the first year of surveys. White-fronted Chat (*Epthianura albifrons*) (Vulnerable BC Act) was the most abundant of the threatened bird species observed, consisting 88% of all threatened bird species observations. Included in the threatened species recorded were four Vulnerable (BC Act) species of raptor, namely Little Eagle (*Hieraaetus morphnoides*), Black Falcon (*Falco subniger*), Spotted Harrier (*Circus approximans*), and Black-breasted Buzzard (*Hamirostra melanosternon)* (incidental record), and two Vulnerable (BC Act) species of microbat, namely Inland Forest Bat *(Vespadelus baverstocki)* and Little Pied Bat *(Chalinolobus picatus).*

Diversity of bird species was influenced by vegetation and seasonality. Typically, survey points within or adjacent to patches of tall shrubland or scattered trees returning a higher diversity than points in open grassland dominated locations. Higher diversity was also recorded in Winter as compared to Autumn and Summer, which is likely due to availability of foraging resources and water within the Project Area.

The majority of birds observed at impact sites (95.6%) were observed below the height of the wind turbine blade sweep area (or Rotor Sweep Area; RSA), with only 4.4% of observations within the RSA (52 – 300 m). The largest percentage of observations recorded at RSA height at impact points were flocks of Straw-necked Ibis *(Threskiornis spinicollis)* (44.5%), followed by Fairy Martins *(Petrochelidon ariel)* (20.6%) and Australian Pelican *(Pelecanus conspicillatus)* (12.5%).

Ten raptor species were recorded across the surveys, comprising 327 observations, with 244 at impact points and 83 at reference points. Raptor presence varied between seasons, in line with diversity of all species, which would suggest availability of foraging resources was also a factor. During formal BBUS Nankeen Kestrel (*Falco cenchroides)* was the most abundant species, followed by Wedge-tailed Eagle (*Aquila audax)*. Nankeen Kestrel (*Falco cenchroides)* and Black Kite (*Milvus migrans)* were the two most common raptors observed incidentally, comprising ~70% of incidental raptor observations. Nankeen Kestrel (*Falco cenchroides)* and Wedge-tailed Eagle (*Aquila audax)* are amongst the most vulnerable species to collision with operating turbines due to their soaring and hovering hunting methods. A total of 55 (13%) raptor observations were at RSA height. Black Kite (Milvus migrans) (5.9%) and Wedge-tailed Eagle (Aquila audax) (5.1%) were the most abundant raptors observed at RSA.

Fisheries Management Act considerations

The Fisheries Management Act lists additional species and communities for consideration. These were considered by evaluation of habitat.

Within the Project area there are numerous constructed dams within the site that act as watering points for livestock. Fish were observed in one dam during ecological investigations in 2023-24. This was a large dam with standing water, with heavy ringing riparian and aquatic vegetation. There are 265 irrigation canals present. Many of these are currently dry. Two major watercourses traverse the Project area namely Abercrombie Creek and The Forest Creek; both streams are classified as Strahler order 9 Streams.

- Abercrombie Creek passes through the centre of the Project area and is within the assessment corridor of the Project. It is an ephemeral waterway which was dry during the ecological survey period; there were no native fish or aquatic invertebrates present. The Fisheries Spatial Data Portal classifies Abercrombie Creek as having ‘Poor’ status in terms of freshwater fish community.
- The Forest Creek passes through the southeastern portion of the Project area and is at least 320m from the nearest assessment corridor.

It is noted that the Strahler stream mapping within the Project area does not align well with the current aerial imagery (2011/2012).

- Several mapped alignments are up to 450m distant from the current location show in in aerial imagery
- Additionally, there are several short sections of stream which originate and terminate within the Project area

These anomalies may be due to the flat nature of the site and slow water drainage, leading to changeable accumulated runoff and silt within depressions around the Project area during flooding.

A search of NSW Department of Primary Industries (DPI) Fisheries NSW Spatial Data Portal returned two threatened fish species which may occur in waterways within the site:

- Silver Pearch *Bidyanus bidyanus* in both Abercrombie Creek and the Forest Creek
- Flathead Galaxias *Galaxias rostratus* in Abercrombie Creek only

Tributaries and lakes that flow into the regulated portion of the Murrumbidgee and Murray River form part of the *Lower Murray River aquatic ecological community*, listed as Endangered under the Fisheries Management Act. This community includes Abercrombie Creek and all native fish and aquatic invertebrates that occur within this waterway. It drains into the lakes and wetlands (Lake Leriwa, Upper Sandhill Lake, Big Sandhill Lake, Lake Merwin) and floodplains of the Edward River and Murrumbidgee River.
Waterways within Project area are mapped in Section 6.6 and not duplicated here.

Matters of National Environmental Significance (MNES)

An EPBC Act Protected Matters Report was generated on 05/12/2023 to identify Matters of National Environmental Significance (MNES) that have the potential to occur within 10km of the Development corridor. It identified:

- Four Ramsar Wetlands of International Importance downstream of the Development corridor:
    - Banrock Station wetland complex 300 – 400km downstream
    - Hattah-Kulkyne Lakes 100 – 150km downstream
    - Riverland 200 – 300km downstream
    - The Coorong, Lake Alexandria and Lake Albert wetland 400 – 500km downstream

  The closest Ramsar Wetland of International Importance is the Hattah-kulkyne lakes approximately 150km northwest.

- Five Threatened Ecological Communities, all considered ‘likely to occur’ in the search area: only one was identified in the Project area: *Natural Grasslands of the Murray Valley Plains.*
- 35 threatened species with the potential to occur within the search area. Of these species eleven were considered likely to utilise habitat found within the Development footprint:
    - *Brachyscome papillosa* Mossgiel Daisy
    - *Lepidium monoplocoides Winged* Peppercress
    - *Maireana cheelii* Chariot Wheels
    - *Aphelocephala leucopsis* Southern Whiteface
    - *Lophochroa leadbeateri* Pink Cockatoo (eastern)
    - *Pedionomus torquatus* Plains-wanderer
    - *Neophema chrysostoma* Blue-winged Parrot
    - *Melanodryas cucullata cucullata* South-eastern Hooded Robin

  - *Litoria raniformis* Southern Bell Frog
  - *Calidris ferruginea* Curlew Sandpiper
  - *Nyctophilus corbeni* Corben's Long-eared Bat
- 14 listed migratory species with the potential to occur within the search area. Of these species, 12 were considered likely to utilise habitat found within the Development footprint:
  - *Actitis hypoleucos* Common Sandpiper
  - *Apus pacificus* Fork-tailed Swift
  - *Calidris acuminata* Sharp-tailed Sandpiper
  - *Calidris ferruginea* Curlew Sandpiper
  - *Calidris melanotos* Pectoral Sandpiper
  - *Gallinago hardwickii* Latham's Snipe
  - *Gelochelidon nilotica* Gull-billed Tern
  - *Hydroprogne caspia* Caspian Tern
  - *Motacilla flava* Yellow Wagtail
  - *Tringa glareola* Wood Sandpiper
  - *Tringa nebularia* Common Greenshank
  - *Tringa stagnatilis* Marsh Sandpiper

The Project was determined to be a controlled action in June 2024 and supplementary SEARs have been addressed as part of the BDAR.

6.1.3 Potential impacts

Vegetation clearing impacts

Impacts to vegetation and habitats will be greatest during construction, hence the calculation of the Project's clearing requirements and related offset obligation is based on the proposed Disturbance footprint. This includes all areas required to be disturbed during construction. Clearing is assumed to be 100% within these areas during construction, although some areas may only require temporary storing of equipment and 471 ha will be rehabilitated post-construction. No further clearing is required during the operation phase. During decommissioning it is likely the some of the original Disturbance footprint will be disturbed again but this would also be subject to rehabilitation activities post decommissioning. Table 6-2 and Table 6-3 show the clearing in each vegetation zone, by stage.

Table 6-2 Stage 1 Disturbance footprint impacts on vegetation (potentially generating ecosystem credits)

Zone ID	PCT/Zone	Area impacted (ha)
1	15_Woodland_high	0.95
6	28_Grassland_moderate	0.24
7a	46_High	22.83
9	57_High	0.01
14	159_Planted	0.54
15	160_High	9.88
17	163_High	2.39
18	163_Moderate	3.35
19	164_High	176.31
20	164_Moderate	0.19
	Total	**216.70**

Table 6-3 Stage 2 Disturbance footprint impacts on vegetation (potentially generating ecosystem credits)

Zone ID	PCT/Zone	Area impacted (ha)
1	15_Woodland_high	5.4
2	15_Woodland_low	1.78
3	15_Grassland_moderate	4.84
4	17_High	0.57
5	28_Woodland_moderate	0.98
6	28_Grassland_moderate	4.95
7a	46_High	20.87
7b	46_High (TEC)	1.12
8	46_Moderate	1.3

Zone ID	PCT/Zone	Area impacted (ha)
10	57_Moderate	0.27
11	153_High	6.72
12	153_Moderate	67.8
13	153_Low	2.44
14	159_Planted	6.43
15	160_High	21.05
16	160_Moderate	1.11
17	163_High	1.28
18	163_Moderate	1.87
19	164_High	435.18
20	164_Moderate	2.99
	Total	**588.84**

Species credit species that have been assumed to be impacted[13] are shown below.

Table 6-4 Stage 1 species credit species impacts (species assumed to occur are underlined).

Species Credit Species	Area of habitat impacted (ha)
Brachyscome papillosa Mossgiel Daisy	46_High (zone 7): 9.4 159_Planted (zone 14): 0.1 160_High (zone 15): 8.9 164_High (zone 19): 75.10
Convolvulus tedmoorei Bindweed	160_High (zone 15): 1.5 163_High (zone 17): 1.1 164_High (zone 19): 16
Lepidium monoplocoides Winged Peppercress	160_High (zone 15): 0.5
Maireana cheelii Chariot Wheels	163_High (zone 17): 0.90 163_Moderate (zone 18): 0.03 164_High (zone 19): 22.52
Solanum karsense Menindee Nightshade	160_High (zone 15): 0.5

[13] Species are shown with an underline where further targeted surveys are planned that may be reduce or avoid impacts, depending on further survey results.

Species Credit Species	Area of habitat impacted (ha)
Swainsona murrayana Slender Darling Pea	15_Woodland_high (zone 1): 0.12 163_High (zone 17): 1.1 164_High (zone 19): 16.05
Litoria raniformis Southern Bell Frog	15_Woodland_high (zone 1): 0.55 160_High (zone 15): 0.13 164_High (zone 19): 6.00 164_Moderate (zone 20): 0.07

Table 6-5 Stage 2 species credit species impacts (species assumed to occur are underlined).

Species Credit Species	Area of habitat impacted (ha)
Brachyscome papillosa Mossgiel Daisy	15_Woodland_high (zone 1): 0.63 15_Woodland_low (zone 2): 0.66 15_Grassland_moderate (zone 3): 2.27 17_High (zone 4): 0.57 46_High (zone 7): 5.41 46_Moderate (zone 8): 1.29 153_High (zone 11): 1.16 153_Moderate (zone 12): 11.42 153_Low (zone 13): 2.20 159_Planted (zone 14): 1.02 160_High (zone 15): 15.15 160_Moderate (zone 16): 1.1 163_High (zone 17): 0.1 164_High (zone 19): 182.42 164_Moderate (zone 20): 2.18
Convolvulus tedmoorei Bindweed	46_High (zone 7): 0.07 46_Moderate (zone 8): 1.22 159_Planted (zone 14): 0.73 160_High (zone 15): 4.87 163_High (zone 17): 0.97 164_High (zone 19): 28.06
Lepidium monoplocoides Winged Peppercress	15_Woodland_high (zone 1): 0.29 15_Grassland_moderate (zone 3): 0.44 46_Moderate (zone 8): 1.22 160_High (zone 15): 3.86
Leptorhynchos orientalis Lanky Buttons	46_Moderate (zone 8): 1.22 160_High (zone 15): 4.40
Maireana cheelii Chariot Wheels	15_Woodland_high (zone 1): 0.86 28_Grassland_moderate (zone 6): 1.23 46_High (zone 7): 4.27 153_High (zone 11): 0.19 153_Moderate (zone 12): 1.56 159_Planted (zone 14): 0.51 163_High (zone 17): 0.03

Species Credit Species	Area of habitat impacted (ha)
	163_Moderate (zone 18): 0.40 164_High (zone 19): 32.13
Pilularia novae-hollandiae Austral Pillwort	15_Woodland_high (zone 1): 0.29 15_Grassland_moderate (zone 3): 0.44 46_Moderate (zone 8): 1.22
Sclerolaena napiformis Turnip Copperburr	46_Moderate (zone 8): 1.22
Solanum karsense Menindee Nightshade	15_Woodland_high (zone 1): 0.29 15_Grassland_moderate (zone 3): 0.44 160_High (zone 15): 3.86
Swainsona murrayana Slender Darling Pea	15_Woodland_high (zone 1): 0.29 15_Grassland_moderate (zone 3): 3.13 46_High (zone 7): 0.07 46_Moderate (zone 8): 1.22 163_High (zone 17): 0.97 164_High (zone 19): 28.06
Swainsona plagiotropis Red Darling Pea	46_High (zone 7): 0.07 46_Moderate (zone 8): 1.22
Hieraaetus morphnoides Little Eagle	15_Woodland_high (zone 1): 1.35 57_Moderate (zone 10): 0.19 164_High (zone 19): 0.96
Litoria raniformis Southern Bell Frog	15_Woodland_high (zone 1): 1.02 28_Woodland_moderate (zone 5): 0.33 46_High (zone 7): 0.01 153_High (zone 11): 0.1 153_Moderate (zone 12): 2.59 159_Planted (zone 14): 0.13 160_High (zone 15): 3.72 164_High (zone 19): 23.53 164_Moderate (zone 20): 1.03

Impacts on habitat resources

Surveys identified 109 hollow-bearing trees within the Development corridor (Figure 6-5). Of these 27 would be removed, all of which are associated with Stage 2. This increases the credit obligation for the vegetation zones in which they occur.

Indirect impacts

Even where clearing impacts are restricted, it is possible that areas outside the proposed disturbance footprint may be adversely affected by indirect impacts such as edge effects (increased wind on the edges of clearing), transport of weeds (blown into adjacent areas) and construction noise. The construction program would be staged across the site, such that no areas are considered likely to be impacted for the full construction program, reducing this risk.

There may be short-term disturbance due to increased traffic during the construction phase within proximity to the identified habitat features, like nests and dams. However, these impacts would be temporary.

The Project also has the potential to reduce connectivity through clearing. Connectivity within and across the disturbance footprint is currently provided for species which do not require a consistent canopy for traversal. In particular, a high number of farm tracks, which vary from being single tyre tracks across vegetation to formed tracks and roads, intersect the Project Area. As such, the Project Area is considered somewhat fragmented, although to a low degree.

The project will increase vehicle movement with the disturbance footprint through the construction of access tracks. Traffic will be highest during the construction phase. Increased risk of vehicle strike could occur for the following species:

- Southern Bell Frog (*Litoria raniformis*)
- Plains-wanderer (*Pedionomus torquatus*)
- White-fronted chat (*Epthianura albifrons*)
- Pink Cockatoo (*Lophochroa leadbeateri*)
- Superb Parrot (*Polytelis swainsonii*)
- Blue-winged Parrot (*Neophema chrysostoma*)
- Southern Whiteface (*Aphelocephala leucopsis*)
- Freckled Duck (*Stictonetta naevosa*)
- Western Blue-tongued Lizard (*Tiliqua occipitalis*)

Vehicle speed protocols can manage this risk. Operation traffic will be low volume and unlikely to present significant biodiversity risks.

Collision risks with wind turbines

Turbine collision risks and alienation effects are related to the operational phase of the Project only. Whilst the majority of birds at the Development corridor were common farmland and woodland species, nine species of threatened birds and two species of threatened bats were identified during BBUS or associated incidental surveys. Out of these species, the following one species has been assessed as having moderate risk associated with collisions with turbine blades during the operation of the Project:

- Black Falcon (*Falco subniger*)

The impacts to Plains-wanderer (*Pedionomus torquatus)* from wind turbines are currently unknown. This species mostly occupies low vegetation, however have been observed flying as high as 40m above ground (HANZAB 2023). Whilst impacts from turbines are unlikely, no formal studies have been undertaken as to the impact of wind turbines on Plains-wanderer (*Pedionomus torquatus)*. Mitigation measures for this species would consider adaptive management and post construction surveys. The work will add to the existing knowledge base on this subject, providing increased certainty for other wind farm projects.

Impacts to threatened aquatic communities and threatened fish populations

The total Project Area is about 46,259 ha in total. The total waterway buffer area within the Project area is 2,842.5 ha. Applying best practice waterway buffers to the Disturbance footprint, a 15.6 ha impact footprint results. Specifically, this results from:

- Seven access road crossings across the Abercrombie Creek
- One transmission line crossing across the Abercrombie Creek
- One wind turbine intersects the riparian corridor buffer area of Abercrombie Creek (Turbine 72)

The Project is not expected to adversely impact threatened fish. The waterways in the Project area are highly ephemeral. Protocols to manage the impact on potential habitat and manage risks to downstream waterways are included as commitments of the Project. Given the small extent and sparse distribution of the impact, as well as the low relief terrain, the risks are considered low. There is a high degree of confidence in the type of management measures proposed. These are set out in full in Sections 6.8 and 6.6; soil and water and hydrology impact assessment chapters respectively. By committing to best practice design and rehabilitation of riparian zones with regard to works in waterways, the Project would not contribute substantively to the degradation of native riparian vegetation along water courses, which is listed as a key threatening process.

The Project is not expected to adversely impact the *Lower Murray River Aquatic Ecological Community*. An estimated 15.6 ha of impact would occur over an area of around 46,259 ha. Given the small extent and sparse distribution of the impact, as well as the low relief terrain, the risks are considered low and Assessment of significance was not completed. There is a high degree of confidence that the Project would not interfere with the recovery actions underway for the community. Specifically, the recovery actions include preventing sedimentation and poor water quality by improving land management practices, conserving and restoring riparian vegetation and using effective erosion control measures. Appropriate safeguards and mitigation measures are set out in full in Sections 6.8 and 6.6; soil and water and hydrology impact assessment respectively. These address the Project's impacts.

Impacts to Matters of National Environmental Significance (MNES)

One Threated Ecological Community, *Natural Grasslands of the Murray Valley Plains*, was recorded within the Subject Land. The EPBC listed form of this community makes up 7.07 ha within the Subject Land. Of this, 1.12 ha would be removed. The extent of this community within the locality is unknown. Mitigation measures such as designating 'no-go zones' and machinery hygiene procedures will ensure that there will be no impacts to the potential extent of this community outside of the Disturbance footprint. The impacts on this community will be offset using the NSW Biodiversity Assessment Method, as the Project is being assessed under the Bilateral agreement with the Commonwealth government.

A habitat assessment was conducted for EPBC Act listed threatened species returned from the protected matters search. Eleven of these species are considered likely to be impacted by the proposed development.

The species considered likely to be impacted include:

- *Brachyscome papillosa* Mossgiel Daisy
- *Lepidium monoplocoides* Winged Peppercress
- *Maireana cheelii* Chariot Wheels
- *Aphelocephala leucopsis* Southern Whiteface
- *Lophochroa leadbeateri* Pink Cockatoo (eastern)
- *Pedionomus torquatus* Plains-wanderer
- *Neophema chrysostoma* Blue-winged Parrot
- *Melanodryas cucullata cucullata* South-eastern Hooded Robin
- *Litoria raniformis* Southern Bell Frog
- *Calidris ferruginea* Curlew Sandpiper
- *Nyctophilus corbeni* Corben's Long-eared

The potential impacts to these threatened species have been considered and mitigation measures are proposed accordingly. Where required by the BAM, offsets will also be generated.

A habitat assessment was also conducted for migratory species that were returned from the protected matters report. Twelve of these species are considered likely to occur onsite.

The migratory species likely to be occur within the Project Area are generally considered to have a low risk of collision, as they are not likely to be permanent residents of the project area and are considered to be infrequent visitors to the region of the project.

Serious and irreversible impacts (SAII)

Further assessment has been undertaken for the following SAII entities, as shown on Figure 6-6, as these are species identified by the BAM as unable to withstand further loss (offsets may not be available):

Plains-wanderer (*Pedionomus torquatus*)

The direct impacts to the Plains-wanderer within the Disturbance footprint are comprised of the clearing of native vegetation and the risk of vehicle strike. Indirect impacts include reduced habitat quality in adjacent vegetation due to edge effects, noise impacts, transport of weeds and pathogens, loss of breeding habitat, and increase in predators (including pest animals). Unknown impacts include the effect of Wind Turbines over Plains-wanderer habitat and whether the Plains-wanderer would avoid areas within the vicinity of wind turbines based on a perceived threat. Plains-wanderer avoids inhabiting areas in close proximity to trees as a defence strategy to avoid predation by raptors (Commonwealth of Australia, 2016) and turbines could be perceived as a 'tree' or threat by the Plains-wanderer. No studies have been done on these impacts.

Post construction, the species would continue to be able to move within the wider Project Area, and not cause a fragmentation of populations. The current grazing management within the wider Project Area that has favoured the establishment of Plains-wanderer habitat would be maintained and the Project would not change grazing regimes within the Project Area.

Impacts to this SAII population have been avoided where possible. A key mitigation measure will be the establishment of a pest animal management plan, which will reduce the number of predators within the Project Area.

Bindweed (*Convolvulus tedmoorei*)

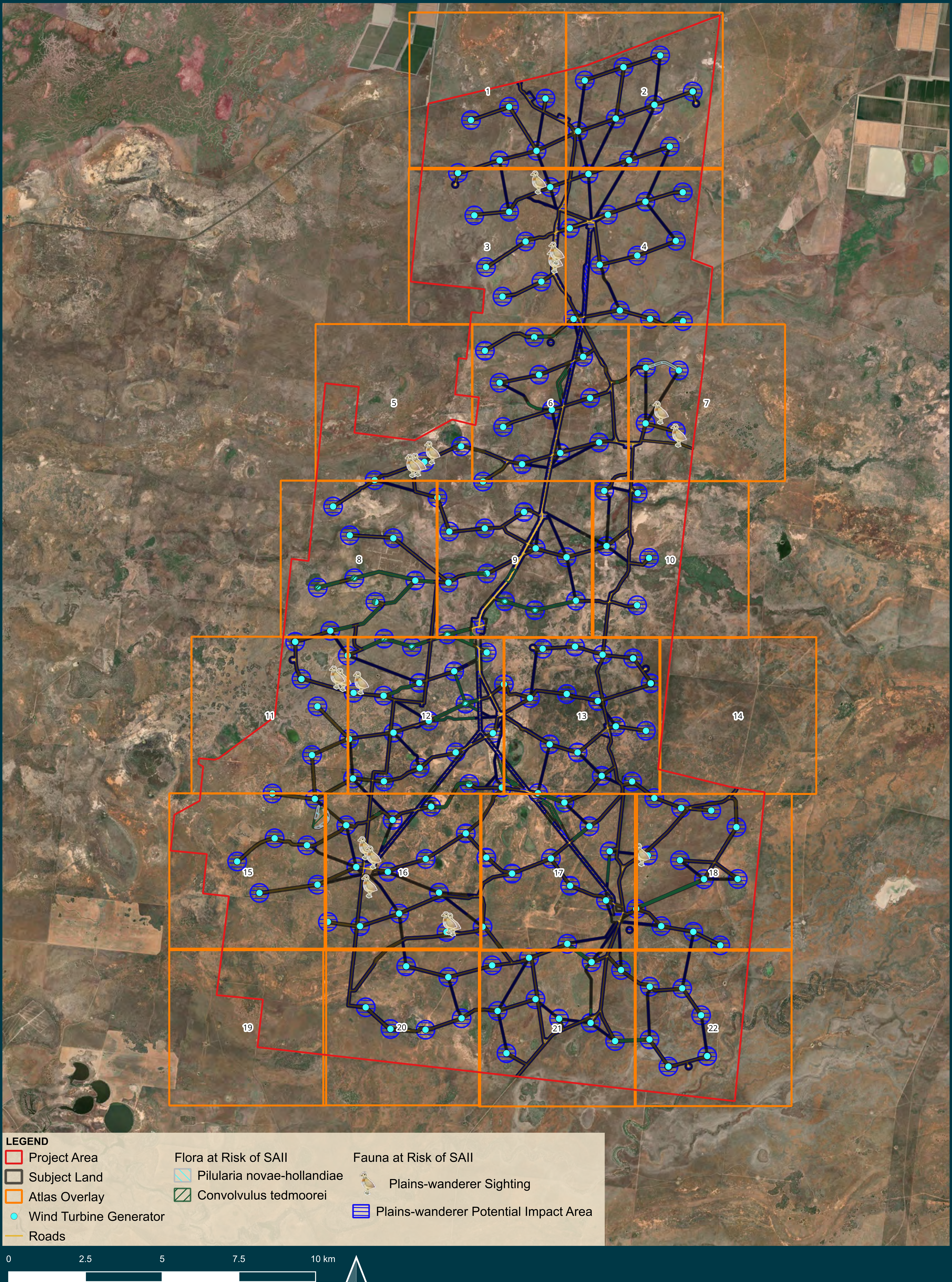
The major threats to Bindweed are habitat loss, its restricted distribution, and an insufficient understanding of its ecology, distribution and abundance, and threatening processes (OEH, 2022b). Impacts to this SAII species will be avoided where possible. The Project may impact the species though clearing native vegetation in 54.8 ha of suitable habitat. To mitigate this, areas of assumed presence will be surveyed prior to construction. If the species is identified, the species would be avoided where possible. Further surveys are planned to increase the certainty around these potential impacts in September 2024.

Indirect impacts may include reduced habitat quality in adjacent vegetation due to edge effects, and the transport of weeds and pathogens to the site. The proposed mitigation measures taken to avoid indirect impacts on Bindweed include using hygiene protocols to prevent the spread of weeds or pathogens, and providing activity and sit specific rehabilitation for all in areas of disturbance.

Austral Pillwort (*Pilularia novae-hollandiae*)

The major threats to Austral Pillwort are the drainage of swamps, roadworks impacting roadside populations, invasive grasses, and stock (OEH, 2024a; OEH, 2024b). The Project may impact the species through the removal of 2.0 ha of associated habitat in which the species has been assumed present, as per the BAM. To mitigate this, areas of assumed presence will be surveyed prior to construction. If the species is identified, the species would be avoided where possible. Further surveys are planned to increase the certainty around these potential impacts in September 2024.

Indirect impacts may include reduced habitat quality in adjacent vegetation due to edge effects, and the transport of weeds and pathogens to the site. Proposed mitigation measures include using hygiene protocols to prevent the spread of weeds or pathogens, and providing ecological rehabilitation for disturbed areas.



Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

Figure 6-6 Overview map of threatened entities at risk of SAII

Cumulative impacts

The Biodiversity Assessment Method is updated regularly to reflect increasing knowledge about species and threats. The Project has avoided and minimised impacts where possible to ensure that its cumulative contribution to the state's clearing is as low as possible. It will contribute to in perpetuity biodiversity offsets calculated to be commensurate with this impact.

Positive cumulative impacts are highly likely to occur as well:

- As the extensive biodiversity management planning process that accompanies construction and operation of State Significant Developments will provide opportunities to address existing weed and pest animal populations locally.
- As new stewardship sites are established locally to meet the credit requirements of these large projects. The Project has investigated a number of strategies to maximise these local benefits of strategic offsets.
- As greater information is gained about the distribution and habitat preferences of local species identified in the extensive surveys accompanying these large projects.
- As operational monitoring addresses current assumptions about species collision risk profiles.

Specific to the movement patterns, and cumulative collision and alienation risks of other wind farms in the vicinity, the bird and bat risk assessments have considered the ability of species to avoid collision and to withstand losses. No set migration paths have been identified in the region. It is much more likely that these patterns will change in response to ephemeral resources and seasonal conditions that are difficult to predict. Adaptive management of operational monitoring addresses current assumptions and options such as 'sector curtailment' where turbines can be switched off in high-risk periods are always a last resort option if required. Table below shows the projects considered most relevant to cumulative impacts. More detail is provided within the BDAR.

Table 6-6 Surrounding proposed windfarms, if approved likely to interact with Baldon Wind Farm.

Project	Potential for cumulative impacts
Tchelery Wind Farm	• **Likely:** - Cumulative impacts due to disturbance to Plains Wanderer during construction and operation - Cumulative impacts due to collision with bat and avifauna during operation • **Potential**: - Cumulative impacts due to removal of habitat
Keri Keri Wind Farm	• **Likely:** - Disturbance to Plains Wanderer during construction and operation - Collisions with bat and avifauna during operation • **Potential:** - Cumulative impacts due to removal of habitat
Wilan Wind Farm	• **Likely:** - Collision with bat and avifauna during operation

	• **Potential:** - Disturbance to Plains Wanderer during construction and operation - Cumulative impacts due to removal of habitat
Bullawah Wind Farm	• **Potential:** - Collision with bat and avifauna during operation - Cumulative impacts due to removal of habitat
Junction Rivers Wind Farm	• **Likely:** - Collision with bat and avifauna during operation • **Potential:** - Cumulative impacts due to removal of habitat
The Plains Wind Farm	• **Likely:** - Collision with bat and avifauna during operation • **Potential:** - Cumulative impacts due to removal of habitat
Boorooban (Saltbush) Wind Farm Pottinger Wind Farm	• **Likely:** - Collision with bat and avifauna during operation • **Potential:** - Cumulative impacts due to removal of habitat
Pottinger Wind Farm (Someva / Pottinger Renewables Pty Ltd)	• **Likely:** - Collision with bat and avifauna during operation • **Potential:** - Cumulative impacts due to removal of habitat
Koorakee Energy Park	• **Potential:** - Collision with bat and avifauna during operation - Cumulative impacts due to removal of habitat

The bird and bat risk assessment identified the following key species to be at risk of collision with wind turbines at Baldon Wind farm, which may lead to potential cumulative impacts in combination with other wind farms in the vicinity considered here;

Black Falcon is considered to be of Medium risk due to collision with turbines. This species occurs in relatively low and transient numbers but is relatively common in the region. Turbine strikes are considered likely, but irregular. Given the species is threatened and occurs in low numbers, cumulative impacts to the species in the region could arise if repeated impacts occurred at multiple projects in the region. However, it is expected that higher numbers of strikes would occur during boom years, when implications to the population are not as great.

Spotted Harrier and Little Eagle are considered to be at Low risk due to collision with turbines. These species occur across the majority of mainland Australia, at relatively low densities. The risk of cumulative impacts to these species in the region is considered low. However, there have been significant declines in these species' populations over three generations, and if these populations continue to decline, then the risk of cumulative impacts may increase as more wind farm projects become operational in the region.

Pink Cockatoo is considered to be at Very Low risk due to collision with turbines, and if turbine RSAs are built at sufficient height across projects in the region, it is considered that the risk of cumulative impacts to the population due to collision, is low. This species is reliant on trees with suitable nesting hollows, for breeding habitat. If such hollowed trees are removed at sufficient quantities across multiple projects, this may lead to a cumulative impacts on the species in the region through loss of habitat. Therefore, projects should avoid removal of suitable woodland habitat, and especially hollowed trees.

Plains Wanderer is considered to be at Low risk due to collisions with turbines, and cumulative impacts due to collision are unlikely. The species may be at risk due to disturbance during the construction, operational and de-commissioning stage of a wind farm project, and due to habitat loss. As the spatial extent of disturbance sources may be large across the Baldon Windfarm footprint, and across other windfarms in the vicinity, and potentially long term, there is a risk of cumulative impacts to the species in the region through this impact pathway. Turbine locations and infrastructure should avoid and or minimise impacts to good quality native grassland habitats favoured by this species.

Detailed, adaptive management plans, such as an operational Bird and Bat Adaptive Management Plan, will be required to be developed and implemented to effectively monitor these species, and potential impacts to them. These will include strategies to manage and mitigate construction and operational issues in order to reduce the likelihood of the Baldon Windfarm contributing to cumulative impacts in the region.

Key uncertainties

Climatic conditions, weather and the cryptic nature of some species may influence the species present and detectability of species at any one time. Where surveys had been undertaken for candidate species requiring confirmation of presence or absence, this has been done employing appropriate methods and timing, as required under the BAM and in consultation with BCS. The results in BDAR are based on the proper application of the BAM and therefore are considered sufficient to inform the development of the Project's mitigation strategies and offset obligation.

The quantification of hollow bearing trees, in particular the size and number of hollows, was made from ground level. It is possible that some hollows are present that were not visible from ground level, which may result in underestimates of the number of hollows (Gibbons and Lindenmayer 2000). Additional mitigation has been recommended to address this limitation.

Where surveys effort or timing was not sufficient, these species have been assumed present; further surveys are planned and may reduce the assumed impacts and offset obligations accrued for these species. Key species include: *Convolvulus tedmoorei* Bindweed and *Pilularia novae-hollandiae* Austral Pillwort.

Regarding cumulative impacts, it is noted that:

- Many of these projects are in the planning phase, or with respective EIS still in preparation, and therefore the level of direct impacts to native vegetation, threatened ecological communities, and threatened and migratory species is unknown.
- It is unlikely that all projects currently being assessed will be approved, and similarly it is unlikely that the full numbers of proposed turbines will be constructed. For the purposes of this assessment, we

have assumed that all projects and turbines above will be approved, but it is likely that the eventual actual impacts will be lower.

- Bird and Bat utilisation surveys are still underway, and therefore the qualitative discussion below may be informed by new information during latter stages of the project.

Following the conclusion of current surveys, and availability of more detailed information from relevant projects, it has been recommended that a more comprehensive assessment of cumulative impacts be carried out for the above receptors, informed by quantitative information where available.

6.1.4 Mitigation measures

There will be a further opportunity to avoid impacts to biodiversity during the design stage of the Project. These opportunities are embedded within the mitigation measures below. In addition, two overarching management plans will work together to ensure the biodiversity impacts that cannot be avoided by the Project will be sufficiently minimised:

1. Biodiversity Management Plan (BMP), primarily targeting construction impacts
2. Bird and Bat Adaptive Management Plan, targeting operational risks.

Specific measures that will be included within these plans are set out in the BDAR (Section 9 of Appendix F.1).

Additional plans will work in conjunction with the BMP to minimise impacts on biodiversity, such as:

3. Dust Management Plan
4. Soil and Water Management Plan
5. Traffic Management Plan

These are detailed in other sections of this EIS (Sections 6.8 and 6.6).

Together, these form commitments of the Project, pending approval. Specific biodiversity measures are set out in Table 6-7.

Research for Plains-wanderer

While it is not currently a Project commitment, it is understood that to address unknown impacts and contribute to future understanding of Plains-wanderer within wind turbine sites, a funding allocation for research into Plains-wanderer monitoring post construction is being considered by the Applicant. For example, the Project could contribute $50,000 per annum for 3 years post construction to support further research into the potential indirect impact of wind turbines to Plains Wanderers in the region. This research would ideally be coordinated by a relevant research body in line with the National Recovery Plan for the Plains Wanderer. If implemented, it would be highly beneficial, not only to better understand and manage the impacts of this Project but to understanding the cumulative impact of other projects on this species in the REZ.

Offset strategy

The Project's offset requirements would form a condition of consent and would be retired in accordance with the Biodiversity Offset Scheme.

An Offset Strategy (Appendix F.1) was prepared to inform the next steps the Project will take to meet its BAM calculated credit obligation. It reflects discussions with local stakeholders and aims to maximise the environmental benefits that can be gained in securing the biodiversity offsets required for this Project.

Establishment of a physical stewardship site to retire credits is the option preferred by the Applicant. From a desktop review and in consultation with stakeholders, a short list of properties has been developed and further investigation of these or other suitable sites will be progressed in tandem with the Project's assessment and approval pathway to find the most suitable site in consultation with local landholders. It is highly likely that additional credits would also need to be sourced from the credit market and then from BCT (paid out directly), to meet the full credit obligation.

To assist with the scale and complexity of the offset requirement, staging the offsets in line with Project staging is being considered. Participation in 'reverse auctions' held by the Credit Supply Branch would maximise the ability of the Credit Supply Branch to match the Project with suitable credits being generated at other Stewardship sites.

Several opportunities have been identified in consultation with stakeholders that will influence the Project's approach to meeting the credit obligation. Baldon Wind Farm will endeavour to:

- Maximise opportunities for local landholders, land councils and First Nations organisations to participate in management actions with the stewardship site and to provide local training and skill sharing.
- Work with Nature Markets and Offsets Division to ensure managed grazing is allowable within the stewardship site, where appropriate.
- Work with Nature Markets and Offsets Division to coordinate the stewardship site with other South West Renewable Energy Zone projects, where appropriate.
- Maximise opportunities to build local capacity within local contractors to supply seed and plants that may assist to supply South West Renewable Energy Zone projects, in rehabilitation as well as in active management of stewardship sites.
- Rehabilitation requirements for this Project, including detailed forward planning and consideration of synergies with offset active management (seed collection during preclearing surveys, where appropriate).

Table 6-7 Safeguards and mitigation measures for biodiversity

ID	Mitigation measures	Project stage
B1	Detailed design will: • Ensure turbine locations will be microsited around Little Eagle (*Hieraaetus morphnoides*) nests to provide a minimum 100m buffer from turbines. • Consider dismantling nests to avoid long term collision risks where these occur within 100m of a wind turbine. • Ensure no dams will be removed to minimise impacts to Southern Bell Frog (*Litoria raniformis*)	Design / pre-construction
B2	An adaptive Biodiversity Management Plan (BMP) will be developed with input from BCD and DCCEEW prior to commencement of the action. Measures will include: Fauna management, including: Staged clearing procedures for hollow bearing trees Relocation of habitat features Vehicle and parking protocols	Pre-construction / construction

ID	Mitigation measures	Project stage
	Southern Bell Frog mitigation Preclearing surveys and protocols for Plains-wanderer breeding sites, Bindweed (*Convolvulus tedmoorei*) and Austral Pillwort (*Pilularia novae-hollandiae*) Vegetation management, including: Rehabilitation protocols with consideration to native revegetation requirements Weed, pest animal and pathogen management Staff training requirements with respect to understanding the sites sensitive environmental features	
B3	A Bird and Bat Adaptive Management Plan (BBAMP) will be developed in consultation with BCD. This will consider the full data set of the Project's bird and bat utilisation surveys as well as include a more comprehensive assessment of cumulative impacts, informed by quantitative information where available for relevant surrounding projects. Collision risk modelling may be appropriate where sufficient data is available, with triggers to ensure that mitigation is appropriate to the modelled risk.	Pre-construction
B4	The Project's offset obligation will be met in accordance with the NSW Biodiversity Offsets Scheme (BOS), and may include the following options: • Retiring credits under the Biodiversity Offsets Scheme based on the like-for-like rules, or • Making payments into the Biodiversity Conservation Fund using the offset payments calculator, or • Funding a biodiversity action that benefits the threaten entities impacted by the development. Offsets may be staged, to reflect the timing of impacts.	Prior to construction

Offset requirements by stage

Table 6-8 PCTs and vegetation zones that require offsets within the Stage 1 Disturbance footprint

Zone ID	PCT ID	Zone Condition	Ecosystem credits required
1	15	Woodland high	30
6	28	Grassland moderate	4
7a	46	High	822
9	57	High	1
14	159	Planted	31

Zone ID	PCT ID	Zone Condition	Ecosystem credits required
15	160	High	281
17	163	High	79
18	163	Moderate	84
19	164	High	6255
20	164	Moderate	4

Table 6-9 PCTs and vegetation zones that require offsets within the Stage 2 Disturbance footprint

Zone ID	PCT ID	Zone Condition	Ecosystem credits required
1	15	Woodland high	168
2	15	Woodland low	43
3	15	Grassland moderate	72
4	17	High	21
5	28	Woodland moderate	10
6	28	Grassland moderate	91
7a	46	High	751
7b	46	High	59
8	46	Moderate	24
10	57	Moderate	5
11	153	High	250
12	153	Moderate	1,506
13	153	Low	39
14	159	Planted	370
15	160	High	599
16	160	Moderate	19
17	163	High	42
18	163	Moderate	47
19	164	High	15,438
20	164	Moderate	63

Table 6-10 Candidate species requiring offsets Stage 1 Disturbance footprint

Species Credit Species	Species credits required
Brachyscome papillosa Mossgiel Daisy	4,345
Convolvulus tedmoorei Bindweed	1,297
Lepidium monoplocoides Winged Peppercress	19
Maireana cheelii Chariot Wheels	1,106
Solanum karsense Menindee Nightshade	14
Swainsona murrayana Slender Darling Pea	812
Litoria raniformis Southern Bell Frog	311

Table 6-11 Candidate species requiring offsets Stage 2 Disturbance footprint

Species Credit Species	Species credits required
Brachyscome papillosa Mossgiel Daisy	10,098
Convolvulus tedmoorei Bindweed	2,442
Lepidium monoplocoides Winged Peppercress	187
Leptorhynchos orientalis Lanky Buttons	191
Maireana cheelii Chariot Wheels	1,813
Pilularia novae-hollandiae Austral Pillwort	62
Sclerolaena napiformis Turnip Copperburr	24
Solanum karsense Menindee Nightshade	122
Swainsona murrayana Slender Darling Pea	1,458
Swainsona plagiotropis Red Darling Pea	26
Hieraaetus morphnoides	71

Species Credit Species	Species credits required
Little Eagle	
Litoria raniformis Southern Bell Frog	1,409

6.2. Aboriginal cultural heritage

An Aboriginal Cultural Heritage Assessment (ACHA) report was prepared by NGH on behalf of Baldon Wind Farm Pty Ltd (the Applicant). It is summarised below and appended in full in Appendix F.2.

The ACHA is consistent with the following codes and guides:

- *Guide to Investigating, Assessing, and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011);
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (ACHCRP; DECCW 2010a); and
- *Code of Practice for the Aboriginal Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b).

6.2.1 Assessment approach

Consultation with Aboriginal stakeholders was undertaken in accordance with Section 60 of the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2019 and included a four-stage process as follows:

Stage 1 – Notification of project proposal and registration of interest

Stage 2 – Presentation of information about the proposed project

Stage 3: - Gathering information about cultural significance

Stage 4 – Review of draft cultural assessment report.

Consultation commenced in November 2022 and is set out in Section 5 of this EIS.

A field survey program was completed, in participation with Aboriginal stakeholders who registered an interest in the Project (Registered Aboriginal Parties; RAPs). The work is synthesised within the ACHA report, which has been finalised to address comments provided by RAPs.

6.2.2 Existing environment

Landscape context

Landforms within the Project area have been determined based on topographical identification during the visual inspection during the field survey and in consideration of contour data, Digital Elevation Modelling (DEM), and the Mitchell landscapes mapping. Given the limited topographical variation within the Project area, it was determined that the Mitchell landscape mapping most accurately reflects the landforms and vegetation within the Project area and provides the most relevant basis for refining an understanding of the landforms and archaeological sensitivity in the wider Project area.

Archaeological context

Prior to European land modifications, this area as a whole would have provided resources, shelter, water and food from terrestrial and fluvial environments for Aboriginal people. The Project area lies in a region that contain the indeterminate boundaries between the Mutthi Mutthi, Watthi Watthi. Wemba Wemba and Nari Nari language groups which are understood to have a high proportion of shared vocabulary (Blake et al 2011; Horton 1994; Tindale 1974). The boundaries of cultural areas, including language groups, likely incorporated a degree of fluidity in the cultural life of Aboriginal people prior to the impacts of colonisation. As such, the identification of boundaries between groups is now difficult and there may continue to be some dispute within the Aboriginal community about them. This assessment attempts to work with all stakeholders using a collaborative approach, respecting differing views and opinions.

George Augustus Robinson in 1846 identified that there were two names for people living in the region; those who lived in the reed beds and wetland areas were termed “Unangan” and those who lived amongst the bush and used boomerangs were called “Myal” (Pardoe and Martin 2001). Robinson recorded he saw large gatherings of people such as at Lake Tala where he encountered about 300 people, men women and children and that they came from several different areas, such as Lake Walgere, Lake Tala, Lake Yanga, among other areas. This indicates that large gatherings of people occurred and that lakes were likely a focus for such gatherings owing to the availability of resources.

Regarding constructed resources, heat retainer ovens and mounds were first observed by Thomas Mitchell in 1836 in the Murray River system, where he noted how the mounds were used to cook Typha (reeds found on the edge of water bodies) around the lower Lachlan and Murrumbidgee Rivers. Beveridge also observed and recorded his observations of mound use in the Murray River area below Swan Hill from the 1850s. Mounds were also used for medicinal purposes, whereby people would be partially buried within a heated mound to provide beneficial steam vapour and warmth (Beveridge and Bowler in Martin 2006, 2010).

Trees were a valued and abundant resource within the landscape for the Aboriginal people. Pardoe and Martin (Pardoe and Martin 2001; Martin 2010) provide excerpts from eyewitness accounts of the extraction of bark from trees for various purposes, including for roofing of huts and for canoes. It was noted by Kirby (Martin 2010) that a gum tree possessing the right bend and characteristics for making canoes was highly valued. Other uses for bark include carrying dishes for water and food. Martin quotes Gribble from Warangesda near Darlington Point that water carrying vessels were made from the “round lumps on gum trees” (Martin 2010). Trees were also a source of food and Oxley and Gribble both describe how people would climb a tree, cutting small toe holds with their hatchets to access a hollow where possums would be hiding. They would cut a hole in the tree to extract the possum. These cut marks would potentially be visible as scars on trees.

For the early recorders of Aboriginal life, one of the most striking sights were the graves. Near the junction of the Lachlan and Murrumbidgee Rivers, Mitchell recorded how he saw from some distance away, a small hut like structure that was erected over a grave. He saw similar graves near the junction of the Murrumbidgee and Murray River, where there were a group of graves surrounded by earthen ridges (Pardoe and Martin 2001; Martin 2010). At Tala Lake, approximately 30km north west of the Project area, Robinson recorded similar graves. He described how the grave consisted of raised ridges, a hut about five feet high made from bark and timber and containing a wooden shield. There was a second grave nearby, which had no hut, but the grave was covered by old wood (Pardoe and Martin 2001; Martin 2010).

In an archaeological context, few of these items would survive, particularly in an open site context. Materials would have weathered and decayed, and through use of the landscape for grazing and farming, as well as natural erosion, the earthen ridges would likely have faded into the ground, although it is feasible that there would be some remnants surviving if no disturbance had occurred in a particular location.

Database records

The Aboriginal Heritage Information Management System (AHIMS) provides a database of previously recorded Aboriginal heritage sites. A search provides basic information about any sites previously identified within a search area. However, a register search is not conclusive evidence of the presence or absence of Aboriginal heritage sites, as it requires that an area has been inspected and the details of any sites located have been provided to add to the register.

A search of the AHIMS database was initially conducted on 16 August 2022 (Client ID 708913), followed by a second search of the AHIMS database on 11 November 2022 (Client ID 732494). AHIMS searches were repeated to provide updated AHIMS data on 15 January 2024 (Client ID 854725) and 18 January 2024 (Client ID 859669). A breakdown of the latest combined AHIMS search results are shown below in Table 6-12. There is a total of 144 sites recorded within the search area. Full details of the most recent AHIMS search are detailed in the ACHA report in Appendix F.2

Table 6-12 Breakdown of previously recorded Aboriginal sites in the region

Site type	Number
Artefact (1 or more)	51
Burial	25
Earth Mound, Hearth and Artefact	17
Earth Mound and Hearth	9
Burial, Earth Mound and Hearth	5
Earth Mound	5
Hearth and Artefact	5
Artefact, Earth Mound and Potential Archaeological Deposit (PAD)	3
Burial and Artefact	3
Earth Mound and PAD	3
Earth Mound, Artefact and PAD	3
Hearth	3
Artefact, Earth Mound, Hearth, Potential Archaeological Deposit (PAD)	2
PAD	2
Burial and Art	1
Burial and Earth Mound	1
Burial and PAD	1
Burial, Artefact PAD	1
Burial, Artefact, Shell and PAD	1
Burial, Hearth and Artefact	1
Earth Mound, Artefact and Shell	1

Site type	Number
Hearth and PAD	1
TOTAL	**144**

Other heritage register searches were also undertaken (most recently in July 2024) to identify recorded items or places in proximity to the Project area:

- The NSW State Heritage Inventory (SHI), includes items on the State Heritage Register and items listed by state agencies and local Government, to identify any items currently listed within or adjacent to the proposal site. The results of the NSW SHI database search indicated that there are no previously recorded Aboriginal Place listed under the National Parks and Wildlife Act within or adjacent to the Project area.
- The Australian Heritage Database, includes items on the National and Commonwealth Heritage Lists, to identify any items that are currently listed within or adjacent to the proposal site. The results indicated that there may be a listed item within or in the vicinity of the Project area. An Indigenous Place is recorded as being located at Tchelery Station near Hay, NSW, Australia. It is registered as an 'Indicative Place' on the non-statutory archive of the Register of National Estate and no additional information is available from the online source. Subsequent enquiries to the Heritage section of the federal Department of Climate Change, Energy, the Environment and Water Heritage to date have yet to reveal any further information regarding the location or nature of this place. Records of these enquiries with DCCEEW are contained in the ACHAR (Appendix F.2).

Survey methods and effort

The cultural heritage field survey was undertaken for a Development corridor, that buffered an indicative infrastructure layout, to ensure the assessment was robust to Project refinements. The layout and thus Development corridor underwent several changes during the survey program, many of which were undertaken to avoid or minimise impacts on the Aboriginal sites and site types being recorded.

Survey transects were undertaken on foot and in vehicles across virtually the entirety of the proposed Development corridor primarily in February and March 2023 and August and September 2023. Further field survey was undertaken in February and March 2024 to assess layout changes. Visibility differed between the surveys undertaken for this Project due to seasonal differences following significant rains and subsequent vegetation growth in the winter of 2023.

- A combined total of 1,090km of walked survey transects were undertaken. The 5 m inspection width per person equates to a survey area of approximately 545 ha. This is just less than 20% of the 2,752ha Development corridor.
- A combined total of 220km of vehicle transects were undertaken with typically two participants in each vehicle. Allowing for a 10m inspection width, approx. 220ha was subjected to survey by this method.

The pedestrian survey accounted for most of the survey coverage, in accordance with best practice. Vehicle transects were utilised to provide opportunities to identify landforms, features and exposures that could then be subject to pedestrian survey.

The survey units were based on four Mitchell Landscapes, shown in Figure 6-7:

- Murrumbidgee Depression Plains

- Murrumbidgee Scaled Plains
- Murrumbidgee Channels and Floodplains
- Murrumbidgee Lakes, Swamps and Lunettes.

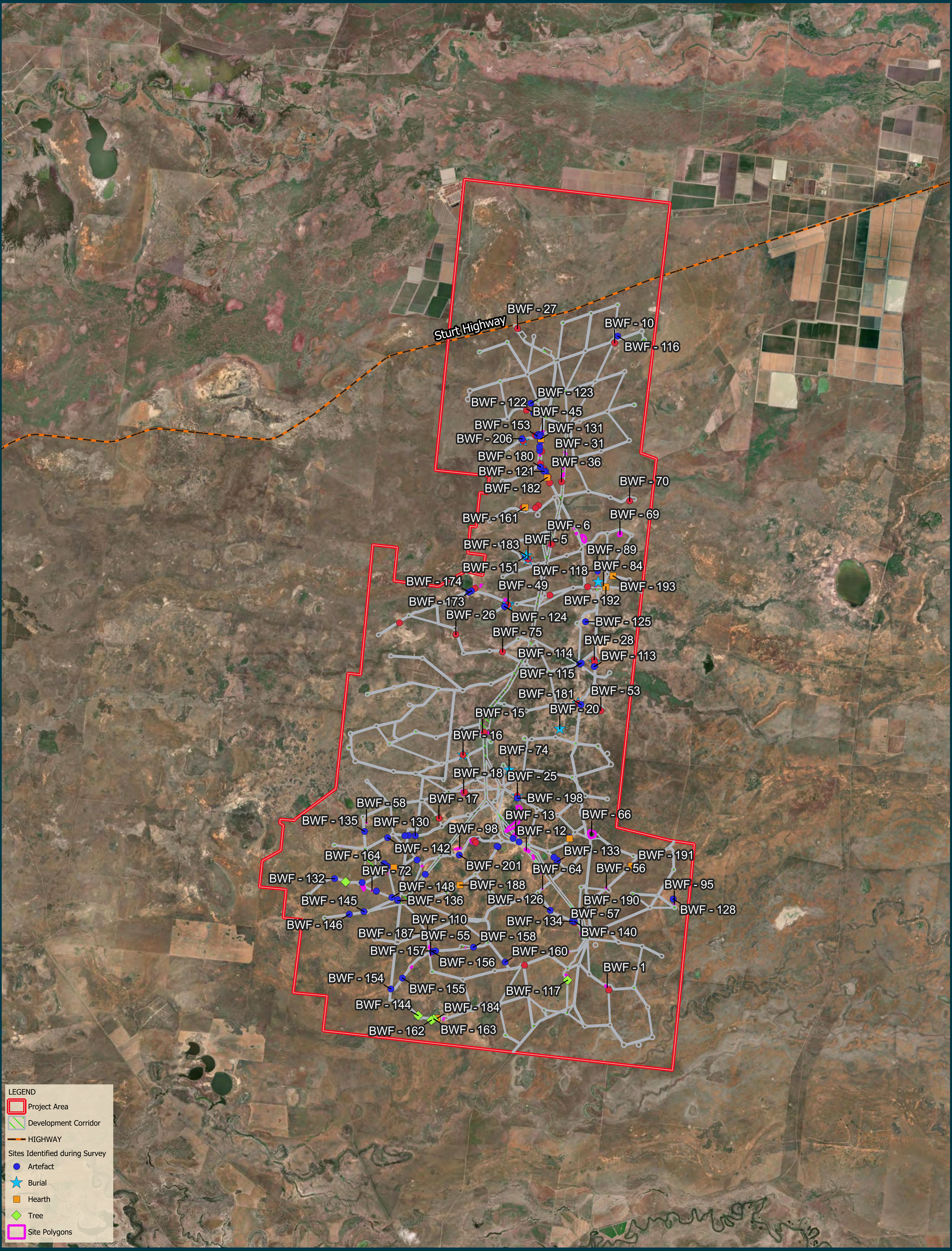
Survey results

There were 206 newly recorded sites were identified within the Project area during the assessment. A breakdown is provided in Table 6-13 below. Isolated artefacts and artefact scatters were the most numerous sites recorded but many sites contained multiple features. Locations of the sites recorded during the survey are shown in Figure 6-7. More detailed figures are provided in the ACHA (refer Appendix F.2).

Table 6-13 Newly recorded sites in the Project area

Site type	Number	Site type	Number
Isolated Artefact	71	Artefact scatter and hearth	1
Artefact Scatter	32	Burial	1
Hearth	16	Burial, hearth, artefacts and shell	1
Mound and artefacts	16	Hearth complex and artefact scatter	1
Hearth and artefacts	14	Hearth with PAD	1
Mound	10	Mound and artefact	1
PAD	8	Mound, hearth and artefacts	1
Artefact scatter and PAD	7	Mound and burial	1
Mound, hearth and artefacts	6	Mound, hearth, artefacts and PAD	1
Culturally Modified Tree	5	Mound, burial, hearth and artefact	1
Mound, burial and artefacts	4	Mounds and artefacts	1
Mound, burial, hearth and artefacts	4	Potential Archaeological Deposit with artefact	1
Artefact and PAD	1		
	Total		**206**

i



0 2.5 5 km

Datum: GDA94 / MGA zone 55

NGH

Baldon Wind Farm

Figure 6-7 Location of sites recorded during the cultural heritage survey

Ref: 22-366 Baldon Wind Farm Heritage_231005_Current \ Figure 6-7 Location of sites recorded during the cultural heritage survey (EIS) Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2024 © Goldwind 2024

Significance

There are four main criteria for assessing the significance of Aboriginal cultural heritage sites listed in the Guide to Investigating, Assessing, And Reporting on Aboriginal Cultural Heritage in NSW (NSW Office of Environment and Heritage (OEH), 2011). These are social or cultural significance, aesthetic significance, historic significance, and scientific significance. Each criterion of significance are rated low, moderate, or high in consideration of factors including research potential, representativeness, rarity and education potential. A full summary of cultural heritage values and corresponding significance assessment for the sites with known Aboriginal objects within the Project Area is provided in Appendix E7.

A significance assessment determined that the overall *cultural and scientific* (archaeological) value of the sites was deemed to be of high significance, most notably burial sites, mounds, hearths, and culturally modified trees. The ACHA found that there are generally no *aesthetic values* associated with the archaeological sites and there are no known *historic values* associated with the Aboriginal cultural material present in the Project area.

The results agreed well with the predictive model. The findings of this Project have substantially increased the number of sites listed in the AHIMS database for the area. In terms of representativeness and rarity generally, it was considered that there are likely to be many such sites in the surrounding region. In regard to rarity, two exceptions include:

- BWF-14, the large lunette PAD which appears to be a rare feature in the broader regional landscape.
- BWF - 29 and BWF- 49, where burnt and charred human bone were noted as possible evidence for cremation activities (previously recorded AHIMS site 48-4-0013 also noted evidence of possible cremation and is relatively close to these sites).

In summation, the significance of the sites as a <u>large complex</u> is rated as high, with many avenues of research available across landforms, soils, vegetation, site types, inter and intra variability and dating possible.

6.2.3 Potential impacts

Extensive redesign work has been undertaken to avoid impacts to sites with the highest Aboriginal cultural values including:

- Landforms of high archaeologically sensitivity (ie lunettes, paleochannels, source bordering dunes, areas around black box swamp depressions and undisturbed raised red sandy areas).
- Burial and mound features and culturally modified trees.

Avoidance of a minimum of 118 sites, including 10 previously recorded AHIMS sites, has been influenced by the significant changes made by the Applicant to the proposed Development corridor. Nonetheless, not all impacts can be avoided. Ground disturbance that will impact Aboriginal objects will result from Project construction activities, including:

- Construction of internal access roads and perimeter fencing
- Construction of construction compound areas and laydown areas
- Installation of wind turbine footings and hardstands
- Construction of the ancillary power conversion and storage infrastructure.

There are 77 newly recorded sites within the current Development corridor. While the ACHA has determined that further significant alteration to the Development corridor is not warranted, the

Applicant is able to commit to further avoidance opportunities by micro-siting the design of the final disturbance area, during the detailed design stage of the Project. A salvage program and relocation of artefacts will also be undertaken as part of the Cultural Heritage Management Plan protocols, outlined in the ACHA. The surface collection salvage of the stone artefacts to be impacted by the development was also requested by the Aboriginal representatives during the fieldwork programme.

Based on the current Development corridor, a breakdown of sites potentially impacted and sites avoided by the proposed development is provided in Table 6-14 below. A summary of the degree of harm and the consequence of that harm upon each site type recorded is provided in Table 6-15.

Table 6-14 Summary of sites potentially impacted and sites avoided by the proposed development.

Sites potentially impacted	Sites avoided
BWF - 54	BWF – 1 to BWF - 53
BWF - 56	BWF - 55
BWF – 63 & BWF 64	BWF – 57 to BWF 62
BWF - 85	BWF – 65 & BWF - 66
BWF - 91	BWF – 68 to BWF - 84
BWF - 94	BWF – 86 to BWF - 89
BWF – 99	BWF - 90
BWF – 100 to BWF - 110	BWF – 92 & BWF - 93
BWF - 114	BWF – 95 to BWF - 98
BWF – 120 & BWF - 121	BWF – 111 to BWF - 113
BWF - 123	BWF – 115 to BWF - 119
BWF – 125 & BWF - 126	BWF - 122
BWF – 129 to BWF - 132	BWF - 124
BWF - 135	BWF – 127 & BWF - 128
BWF - 138	BWF – 133 & BWF 134
BWF – 141 & BWF - 142	BWF – 136 & BWF - 137
BWF – 146 to BWF - 149	BWF – 139 & BWF - 140
BWF – 153 to BWF - 160	BWF – 143 to BWF - 145
BWF - 166	BWF – 150 to BWF - 152
BWF – 168 to BWF - 182	BWF – 161 to BWF - 165
BWF - 185	BWF – 167
BWF – 187 & BWF - 188	BWF – 183 & BWF - 84
BWF - 190	BWF – 186

Sites potentially impacted	Sites avoided
BWF – 192 to BWF - 194	BWF – 189 to BWF - 191
BWF – 196 to BWF - 198	BWF – 195
BWF – 201 to BWF - 203	BWF – 199 & BWF - 200
BWF - 206	BWF – 204 & BWF - 205

Table 6-15 Summary of the degree of harm and the consequence of that harm upon each site type recorded within the Project area.

Site type	Type of Harm	Degree of harm	Consequence of harm	No. of Sites
Newly Recorded Sites				
Isolated Artefact	Direct	Complete	Total loss of value	45
	Nil	Nil	No loss of value	26
Artefact Scatter	Direct	Complete	Total loss of value	20
	Nil	Nil	No loss of value	12
Hearth	Direct	Complete	Total loss of value	9
	Nil	Nil	No loss of value	7
Mound and artefacts	Nil	Nil	No loss of value	16
Hearth and artefacts	Direct	Complete	Total loss of value	1
	Nil	Nil	No loss of value	13
Mound	Nil	Nil	No loss of value	10
PAD	Nil	Nil	No loss of value	8
Artefact scatter and Potential Archaeological Deposit	Nil	Nil	No loss of value	7
Mound, hearth and artefacts	Nil	Nil	No loss of value	6
Culturally Modified Tree	Nil	Nil	No loss of value	5
Mound, burial and artefacts	Nil	Nil	No loss of value	4
Mound, burial, hearth and artefacts	Nil	Nil	No loss of value	4

Site type	Type of Harm	Degree of harm	Consequence of harm	No. of Sites
Artefact and Potential Archaeological Deposit	Nil	Nil	No loss of value	1
Artefact scatter and hearth	Nil	Nil	No loss of value	1
Burial	Nil	Nil	No loss of value	1
Burial, hearth, artefacts and shell	Nil	Nil	No loss of value	1
Hearth complex and artefact scatter	Nil	Nil	No loss of value	1
Hearth with Potential Archaeological Deposit	Nil	Nil	No loss of value	1
Mound and artefact	Nil	Nil	No loss of value	1
Mound, hearth and artefacts	Nil	Nil	No loss of value	1
Mound and burial	Nil	Nil	No loss of value	1
Mound, hearth, artefacts and Potential Archaeological Deposit	Nil	Nil	No loss of value	1
Mound, burial, hearth and artefact	Nil	Nil	No loss of value	1
Mounds and artefacts	Nil	Nil	No loss of value	1
PAD with artefact	Nil	Nil	No loss of value	1
Previously recorded AHIMS sites within the Project area				
Burials	Nil	Nil	No loss of value	4
Burial, Earth Mound, Hearth	Nil	Nil	No loss of value	2
Burial, Earth Mound, Hearth, Artefact	Nil	Nil	No loss of value	1

Site type	Type of Harm	Degree of harm	Consequence of harm	No. of Sites
Burial, Mounds, Artefacts	Nil	Nil	No loss of value	1
Burial, Mounds	Nil	Nil	No loss of value	1
Isolated Artefact	Nil	Nil	No loss of value	1

Key uncertainties of the assessment

While a thorough archaeological survey was conducted to identify and minimise the harm to Aboriginal objects, it is likely that other artefacts are present within the Development Corridor. However, the overall impact of the Project on the archaeological record for the region is likely to be minimal. This conclusion is made in consideration of the disturbance which has occurred through farming practices and the assumed similar density of artefact and hearth sites that remain within the Project area and across the wider region.

6.2.4 Mitigation measures

A summary of safeguards and mitigation measures from the ACHA to address Aboriginal heritage are provided in Table 6-16. Further detail is provided in Appendix F.2.

Table 6-16 Safeguards and mitigation measures for Aboriginal heritage

ID	Mitigation measures	Project phase
AH1	All sites identified in the Project area must be managed in accordance with the site specific mitigation and management recommendations provided in the site table in Appendix D of the ACHA report.	During construction - ongoing
AH2	A Cultural Heritage Management Plan (CHMP) will be prepared to address the potential for finding additional Aboriginal stone artefacts and objects during the construction of the Project and for the management of known sites within the Development corridor in accordance with the ACHA. The CHMP should include at a minimum the following items: • An unexpected finds procedure to manage any objects suspected to be Aboriginal in origin during the construction, maintenance, operation and decommissioning. The unexpected finds procedure must also include a procedure to manage suspected human remains. • Include requirements for heritage matters and an Aboriginal Cultural Awareness element to be included as part of the site inductions for all employees, contractors and utility staff working on site. • Include requirements for management of sites during construction including demarcation and signage, monitoring	Prior to construction

ID	Mitigation measures	Project phase
	of initial ground disturbing activity in higher sensitivity areas and any ongoing auditing of site condition if necessary. • Include a methodology for surface collection, storage and relocation of collected material. Preparation of the CHMP should be undertaken in consultation with the registered Aboriginal parties.	
AH3	Specific micrositing recommendations and further assessment stipulated in the ACHA must be implemented during detailed design, not limited to: • Buffer zones to protect BWF – 24 and BWF – 195. • The gypsum extraction works area (a lower sensitivity area has been defined). • Installation of overhead cabling (specific locations have been identified in the ACHA).	Prior to construction
AH3	All works for the Baldon Wind Farm Project must stay within the area assessed in the ACHA or further assessment and consideration of impacts will be required. This may include additional Aboriginal consultation and survey and/or subsurface testing.	Prior to construction

6.3. Landscape and visual

Moir Landscape Architecture (Moir LA) prepared a Landscape and Visual Impact Assessment (LVIA) on behalf of Baldon Wind Farm Pty Ltd (the Applicant). It is summarised below and appended in full in Appendix F.3.

6.3.1 Assessment approach

LVIA methodology

The LVIA addresses the requirement of the SEARs to include a detailed assessment of the visual impacts of all components of the project in accordance with the NSW Wind Energy: Visual Assessment Bulletin (the Bulletin) (DPE, 2016).

The objectives of the Bulletin are to:

- provide the community, industry and decision-makers with a framework for visual impact analysis and assessment that is focused on minimising and managing the most significant impacts
- facilitate improved wind turbine and ancillary infrastructure siting and design during the pre-lodgement phase of a project, and encourage early consideration of visual impacts to minimise conflicts and delays where possible, and provide for a better planning outcome

- provide the community and other stakeholders with greater clarity on the process along with an opportunity to integrate community landscape values into the assessment process; and
- provide greater consistency in assessment by outlining appropriate assessment terminology and methodologies.

The LVIA updates the Preliminary Visual Impact Assessment undertaken for the scoping report by GBD Landscape Architecture submitted with the Scoping report.

In accordance with the Bulletin, the visual assessment includes:

- 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; and
- Justification for the final proposed layout and identification of mitigation and management measures.

6.3.2 Existing environment

The LVIA determined the regional landscape character is typical of the Riverina region and is characterised by extensive flat open landscapes utilised for grazing and irrigated or dryland cropping. The area is characterised by extensive saltbush plains with small depressions and isolated low rises. Vegetation communities on channels and swamps include Black Box (Eucalyptus largiflorens) and Lignum (Duma florulenta).

The LVIA Study Area refers to the land associated with and surrounding the Project. For the purpose of the visual impact assessment, the LVIA Study Area is generally defined by an 8km radius around the Project area in accordance with the Bulletin.

The existing landscape character of the Study Area is considered in the LVIA to be of low scenic quality due to it being modified and lacking any distinct landscape features. Surrounding settlements are scattered and large tracts of land are generally uninhabited.

Visual baseline study

The LVIA included a Visual Baseline Study to establish the existing landscape and visual conditions through descriptions, mapping and photographic representations within the LVIA Study Area. The study method for undertaking the Visual Baseline Study has been established in accordance with Appendix A of the Bulletin where relevant and in conjunction with previous experience on large scale wind energy projects.

The following inputs outlined in

Table 6-17 are included in the development of a visual baseline study.

Table 6-17 Visual baseline study inputs

Base line input	Description
Landscape Character Type	Describe the broad area of land in which the wind energy project is located.
Sensitive Land Use Designations	Map Layer identifying National and State Sensitive Land use Designations and LEP Zones.
Key Landscape Features	Identify areas of visual interest or quality that stand out visually in the landscape.
Landscape Character Unit Classification	Landscape is categorised into Landscape Character Units (LCU) and Scenic Quality Ratings are applied to each LCU.
Viewpoint Inventory and Sensitivity Levels	Undertake a viewpoint inventory from public and private locations and establish the Visual Influence Zones for each.
Visibility Distance Zones	Undertake visibility or view shed mapping when assessing what may be visible from a given viewpoint looking in all directions.

Key landscape features and key viewing locations

The LVIA provides an overarching assessment of the existing sensitive land use designations. This included noting the RU1 Primary Production and C1 National Parks and Nature Reserves zoning. The LVIA notes that the predominant land uses are agricultural production within and around the Project Area, minimal use/ conservation around Yanga State Conservation Area (SCA) and Nature Reserve and flat and open irrigated cropping and pastures are prevalent to the southeast, east and northeast of the Project Area.

The above information was used in the LVIA to identify seven key landscape features and viewing location categories in order to determine the Land Character Units to be analysed (refer to the subheading below). The key features identified in the LVIA include (refer also to Figure 6-8):

1. **Rivers, creeks and dry lakes:** Lakes and creek lines of the region are seasonal and generally remain dry through most of the year. Dry creeks and lakes in proximity of the Project Area include Abercrombie Creek, Forest Creek, Dry Lake, Keri Keri Lake and Gunyah Swamp
2. **National Parks and Nature Reserves:** Yanga National Park, Nature Reserve and SCA are located to the west of the Project Area. For the purpose of this assessment, the areas that exhibit characteristics of the National Park, Nature Reserve and SCA are identified as Yanga Parks
3. **Geology and landforms:** The region is made up of Quaternary alluvial sediments with shallow and small depressions that are as deep as 2 m. These depressions form a number of

dry lakes studded in the landscape. In some areas these depressions form large scale swamps. The landform is also characterised by isolated low rises formed by wind processes over time

4. **Campgrounds and points of interest** The Willows Picnic Area and Campground and Willows Visitor Access Trail recreational areas are located within the Yanga SCA. They offer opportunities for short bushwalks, birdwatching, camping and rest/picnic areas.

   Moulamein Lakeside Caravan Park is located in the township of Moulamein. Willowvale Rest Area is located on the northwestern side of the Project and St Pauls Rest Area is located on the northeastern side of the Project. Both rest areas are located along the Sturt Highway and serve as rest areas for commuters travelling between the towns of Hay or Balranald
5. **Vegetation character:** Vegetation is typically characterised by large tracts of saltbush and native grasses with scattered stands of trees and mid-storey shrubs near creek corridors and dwellings
6. **Access roads:** Sturt Highway is a main road connecting various towns such as Balranald and Hay and intersects the northern section of the Project Area.

   Local roads include Maude Road that runs generally north - south and is located to the east of the Project Area, Dry Lake Road and Baldon Road are minor, unsealed roads located to the east and southeast of the Project Area and Keri Keri Road is a low use road that runs generally north – south.
7. **Local Towns:** No towns or settlements were identified within the Study Area. The nearest town is Moulamein which is a heritage town located approximately 12 km south of the Project Area.

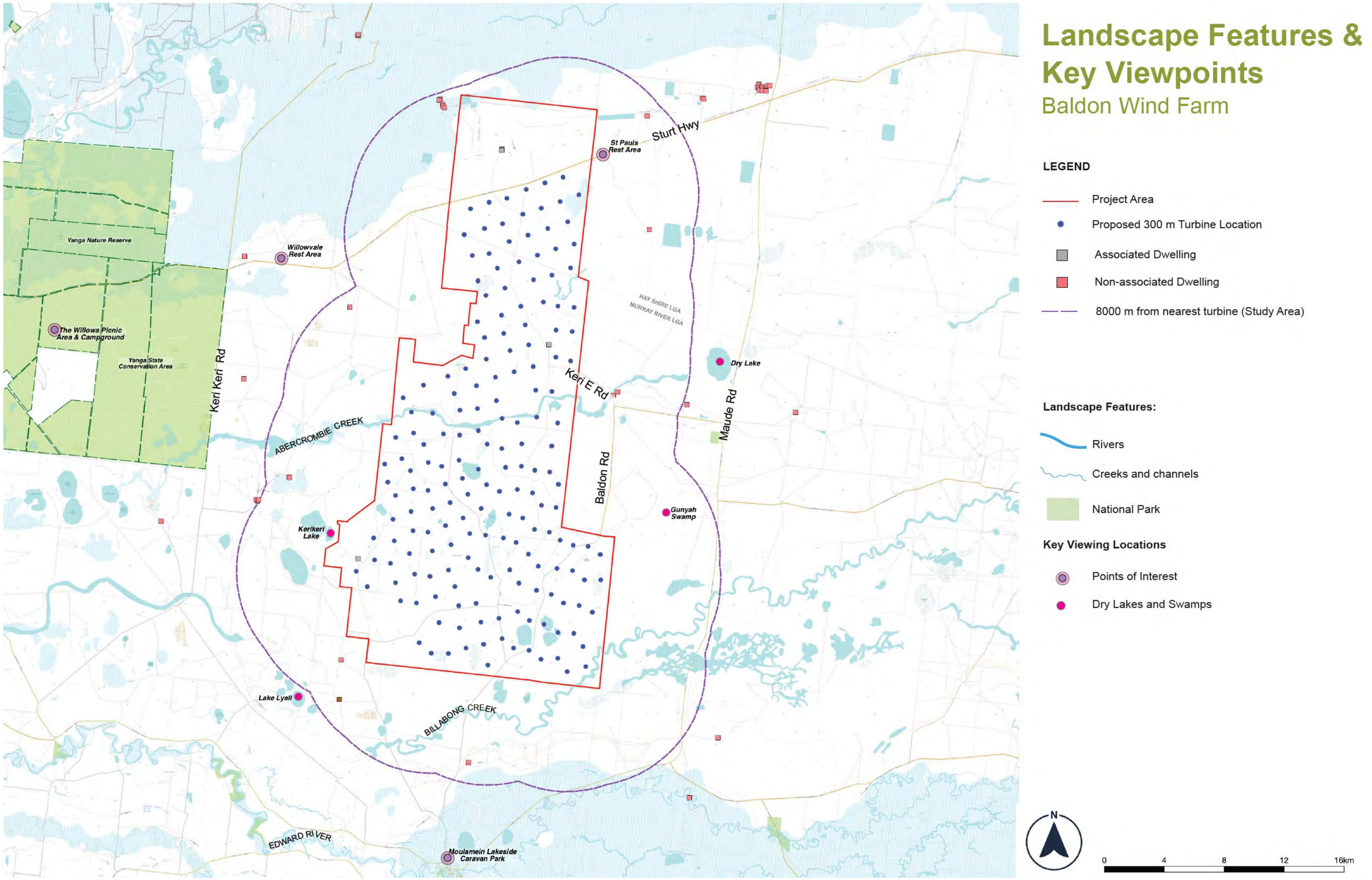


Figure 6-8 Landscape features and viewpoints (Source: Moir LA)

Landscape Character Units

The LVIA Study Area has been categorised into five (5) LCUs to assist in the assessment. These LCUs are mapped in Figure 6-9 and are as follows:

1. LCU01: Yanga Parks
2. LCU02: Dry Creek Corridors
3. LCU03: Dry Lakes and Swamps
4. LCU04: Farmlands
5. LCU05: Rivers and Creeks

Each LCU is characterised by its level of scenic quality in seven categories. Land forms, water forms, vegetation, human influence, activity, rarity and relationship with adjoining landscapes. A full assessment is provided in the LVIA, however Table 6-18 provides a summary of the scenic quality of each LCU.

Table 6-18 Overview of LCU scenic quality (adapted from LVIA)

LCU	Name	Key landscape features	Key Locations	Scenic quality rating
LCU01	Yanga Parks	Undisturbed forested areas, flat, recreational areas	The Willows Picnic Area and Campground, The Willows Visitor Access Trail.	Moderate
LCU02	Dry Creek Corridors	Seasonal creek lines and waterways grasses and shrubs with groupings of trees, flat with topographical depressions	Abercrombie Creek	Moderate
LCU03	Dry Lakes and Swamps	Gentle semi-circular depressions, seasonal lake and swamps, vegetation includes shrubs and groundcovers	Dry Lake	Low
LCU04	Farmlands	Flat, open expanses, sparse tree cover, large	Willowvale Rest Area, Sturt Highway, Keri Keri	Low

LCU	Name	Key landscape features	Key Locations	Scenic quality rating
		tracts of grass and bush, grazing lands	Road, Maude Road.	
LCU05	Rivers and Creeks	Permanent creeklines and riparian areas associated with Edward River floodplain	Billabong Creek Edward River and its associated floodplains Moulamein Lakeside Caravan Park	Moderate

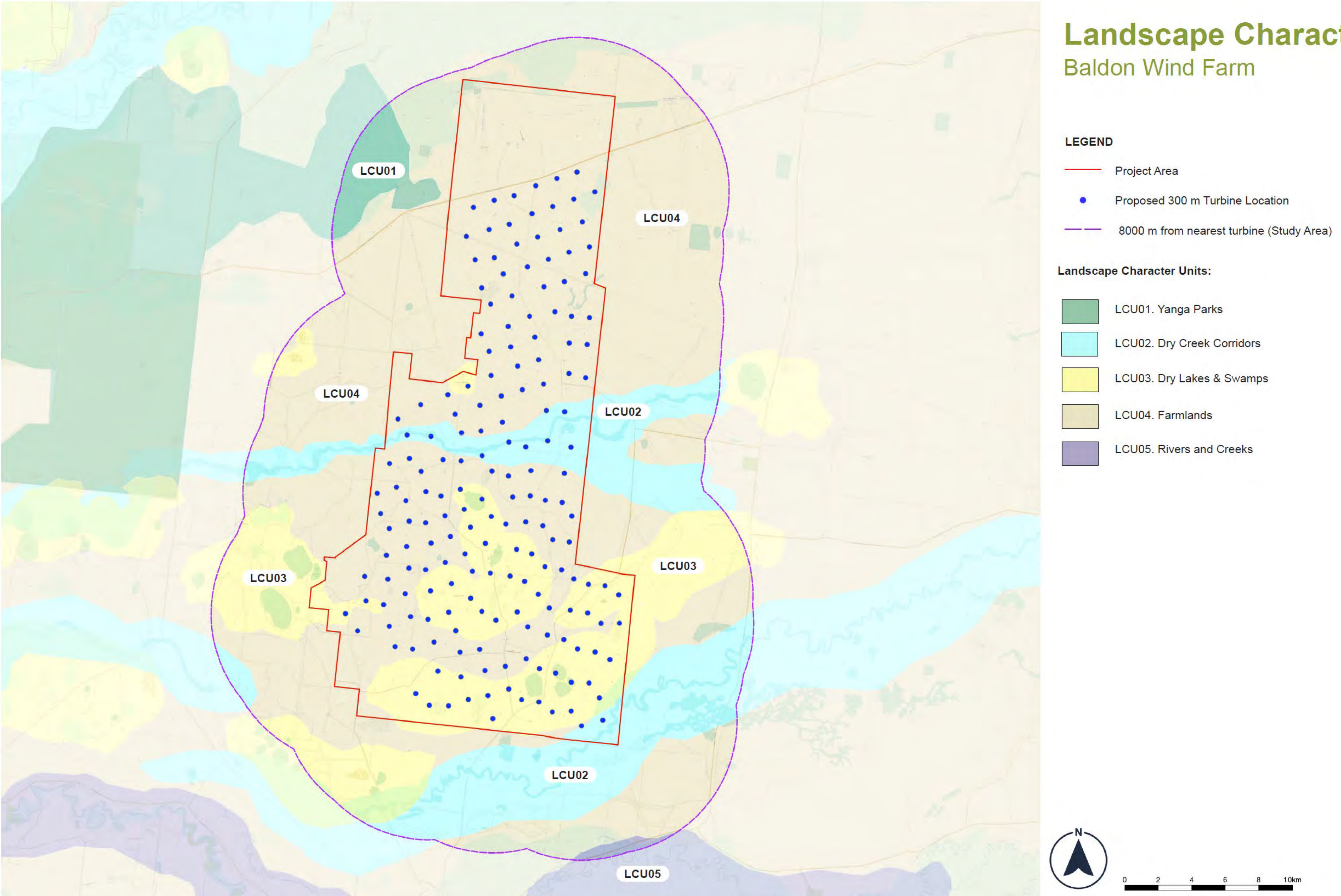


Figure 6-9 LCUs

6.3.3 Potential impacts

The LVIA centres on the visual impacts of the installed wind turbines however, other Project impacts have also been considered such as visual amenity impacts during construction and decommissioning and the impacts of ancillary infrastructure noting:

- Construction impacts of the Project would be temporary and include, civil and excavation works, temporary facilities, temporary signage and additional machinery movements.
- No scenic views will be impacted by the construction activity. The smaller scale of ancillary structures including the proposed O&M have the ability to be screened by existing vegetation.
- During decommissioning impacts are likely to be similar to construction, as such similar impacts and mitigation measures to address them would be employed at this stage.

Preliminary assessment

The preliminary assessment undertaken in accordance with the Bulletin involved analysis utilising the following two tools to identify viewpoints for further detailed assessment:

1. Visual Magnitude, and
2. Multiple Wind Turbine Tool

Visual magnitude

The visual magnitude threshold is based on the height of the proposed wind turbines (to the tip of the blade) and prescribed distances within which dwellings or key public viewpoints may potentially have significant visual magnitude impacts. These distance buffer zones are referred to in the Bulletin as the black and blue threshold lines.

Application of the visual magnitude threshold tool in the LVIA, with a worst case tip height scenario of 300m, established a black line buffer distance of *4,000 metres* and a blue line buffer distance of *5,900 metres,* refer to Figure 6-10. The buffers for the blue and black lines in relation to the Project are Figure 6-13.

The black and blue line distances are not determinative of acceptability. Instead, they provide a basis for further detailed assessment to be undertaken based on theoretical potential visibility of turbines of that height. The detailed assessment then considers topography and intervening vegetation and structures between viewpoints and the Project. The assessment of potential impacts relating to visual magnitude is a key factor as it is acknowledged that wind turbines are very large structures that will be visible in the landscape.

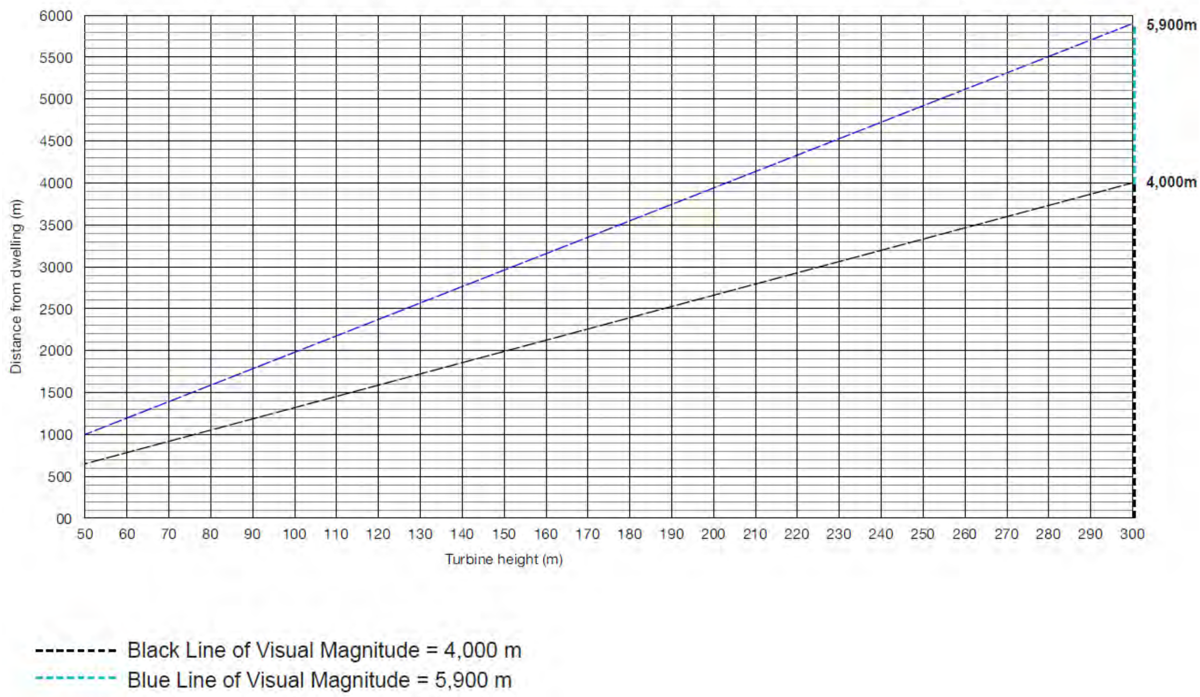


Figure 6-10 Visual magnitude based on a turbine tip height of 300m

A total of 14 non-associated dwellings within 8,000 m of the nearest turbine have been identified for further assessment through the use of the visual magnitude tool.

Of the 14 non-associated dwellings identified:

- Two (2) non-associated dwellings (R15a and R15b) have been identified within 4,000 metres of a proposed wind turbine location (within the black line).
- Two (2) non-associated dwellings (R13 and R24) are located between 4,000 - 5,900 metres of a proposed wind turbine (within the blue line).
- 10 non-associated dwellings are located between 5,900 - 8,000 metres of a proposed wind turbine (within the LVIA Study Area).

Multiple wind turbines

The multiple wind turbine tool provides a preliminary indication of potential cumulative effect of multiple turbines from a single viewpoint. The LVIA used the tool to establish the number of 60 degree segments in which existing or proposed wind turbines within eight kilometres can be seen from viewpoints. The Keri Keri Wind Farm, Tchelery Wind Farm and Wilan Wind Farms were included in the assessment.

Figure 6-11 provides examples of where a dwelling or key public viewpoint may have views to turbines in multiple 60° sectors. Where turbines are located in three or more sectors, the assessment gives detailed consideration to the potential cumulative impacts of multiple turbines.

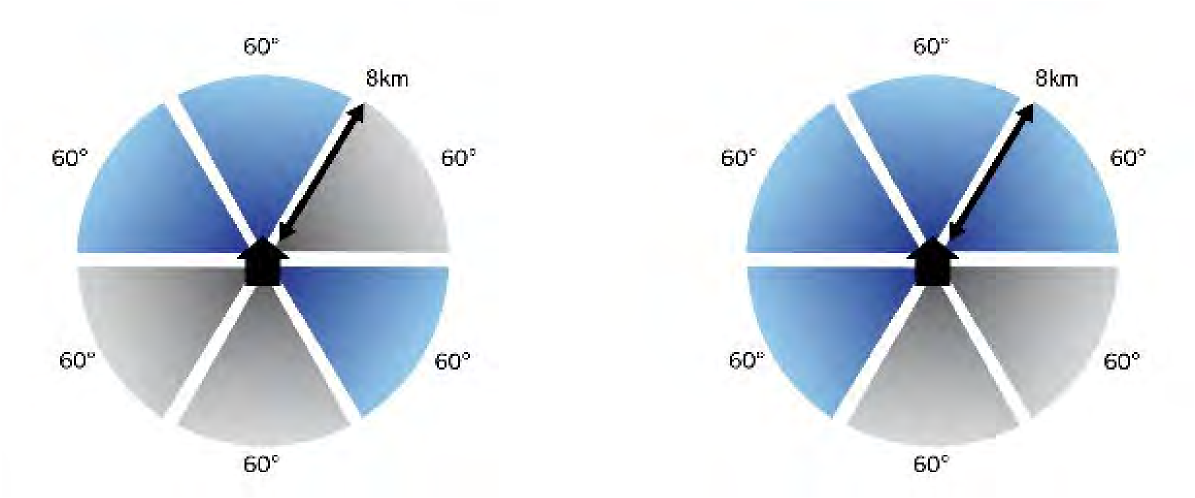


Figure 6-11 Multiple Wind Turbine Tool

When applied, the 2D Multiple Wind Turbine Tool identified that 5 of the of 14 non-associated dwellings within 8,000 m of the Project have the potential for views of turbines associated with the Project and the surrounding wind farms. The dwelling with wind turbines within the most sectors is R12, with turbines in six 60 degree segments.

Zone of visual influence

The zone of visual influence is an additional check of turbine visibility that uses an elevation model to determine where turbines would be visible based on topographic features. This check does not consider intervening screening such as vegetation.

Due to the flat topography that characterises this landscape, the majority of turbines associated with the Project are likely to be visible from most areas surrounding the Project based on topography alone. This includes all receivers within 8,000m of the turbines.

Visual Influence Zone

Visual Influence Zones (VIZ) have been established from dwellings and key viewpoints within the Project Area. This establishes the relative landscape significance against which the potential impacts of wind turbines may be assessed. The Visibility Distance Zone, Viewer Sensitivity Level and Scenic Quality Class of each viewpoint have been assessed which, when combined, result in an overall Visual Influence Zone (refer to Figure 6-12)

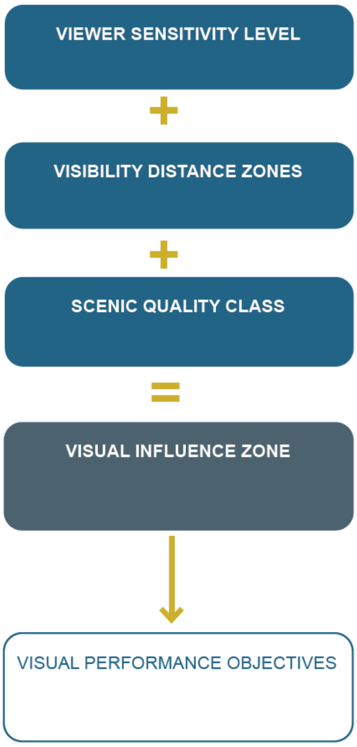


Figure 6-12 VIZ methodology

There are three prescribed VIZs as follows.

- Visual Influence Zone 1: High (VIZ1)
- Visual Influence Zone 2: Moderate (VIZ2)
- Visual Influence Zone 3: Low (VIZ3)

Only two VIZs were noted in the LVIA for the Project, VIZ2 and VIZ3. Table 6-19 summarises the VIZ specific performance objectives outlined in the Bulletin for VIZ2 and VIZ3 relating to visual magnitude, landscape scenic integrity and key feature disruption. Multiple wind turbine effects , shadow, flicker, glint, glare and aviation hazard lighting are also performance objectives, but they are considered equally across the VIZs.

Table 6-19 VIZ performance objectives

Visual performance parameter	VIZ2 objectives	VIZ3 objectives
Visual Magnitude	• Manage impacts as far as practicable, justify residual impacts, and describe proposed mitigation measures below the black line • Consider screening between the blue line and the black line.	• Consider screening below the black line.
Landscape Scenic Integrity	• Wind turbines should not cause significant modification of the visual catchment • Turbines may be visually apparent and could become a major element in the landscape but should not dominate the existing visual catchment.	• No Visual Performance objective applies.
Key Feature Disruption	• Minimise impact of wind turbines or ancillary facilities that result in the removal or visual alteration/disruption of identified key landscape features. This includes any major or visually significant landform, water form, vegetation or cultural features that have visual prominence or are focal points	• No Visual Performance objective applies.

Detailed assessment

Dwelling assessment

The LVIA included on-site dwelling assessments using representative viewpoint photography at all dwellings within 8,000m of the nearest turbine. This provided the basis for the dwelling assessment. It should be noted that for some of the dwellings that occurred in clusters, representative viewpoints were taken from one location only. This was the case for R4a, R4b, R5a, R5a, R5b and 5c & R20a and R20b.

The impacts from each dwelling are categorised based on eight factors and ranked as negligible, low, moderate or high. The categories are, distance, type of view (i.e. where the primary view from the dwelling points in relation to the project), direction of view, extent of visibility, scale of change, degree of contrast, duration of change, mitigation options.

Table 6-20 below provides a summary of the assessment and Figure 6-13 provides a visual aid for the dwelling locations.

R13 and R24 are the only dwellings with a potential moderate visual impact rating. Figure 6-14 shows an indicative before and after representation for R13 from the main viewing direction to the Project. The dwelling at R24 is unoccupied and considered derelict.

In accordance with the Bulletin, there is no requirement for screening for VIZ3 receptors such as R13 when located between the black line (4,000 m) and blue line (5,900 m) of the nearest turbine. However, due to the flat terrain and open views characteristic of the area, screen planting has been recommended and offered to R13.

Similarly screen planting is recommended to be offered to R24 (currently derelict property) should there be plans for the dwelling to be habitable in the future. R24 is considered a VIZ2 receptor.

The LVIA includes a more extensive array of photomontages displaying the proposed view from dwellings and public viewpoints.

Table 6-20 Dwelling assessment summary

Receiver ID	Nearest turbine (from photomontage point)	Number of turbines in the black zone (4000m)	Visibility distance zone	Scenic quality rating	Visual influence zone performance objectives	Assessment summary and Visual impact rating (before mitigation)	Mitigation measures
R07	6.94km	0	Far Middleground	Low	**VIZ3 (Low)** ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to two (2) 60 degree sectors which is deemed acceptable in accordance with the Bulletin	Existing scattered vegetation in the middleground is likely to limit views of some turbines. The majority of the turbines are located in the distance of the view. Visual impact Rating = **Low**	Mitigation measures are not deemed necessary from this dwelling.
R13	5.11km	0	Far Middleground	Low	**VIZ3 (Low)** ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to two (2) 60 degree sectors which is deemed acceptable in accordance with the Bulletin.	Existing scattered vegetation in the middleground, farm infrastructure and a localised rise in topography are likely to limit views of some turbines. Visual impact Rating = **Moderate**	Additional screen planting to the western boundary would assist in fragmenting views toward the Project. It is recommended that this is undertaken in consultation with the land owner.
R15a	3.66km	1	Near Middleground	Moderate	**VIZ2 (Moderate)** ***Visual Magnitude:*** One (1) turbine is located within the black line of visual magnitude. Nine (9) turbines are located between the black and blue lines of visual magnitude. ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to three (3) 60 degree sectors. However, vegetation reduces the visibility of the Project from this location. ***Landscape Scenic Integrity:*** The Project is not likely to be visible at this location. Therefore there is not likely to be an impact on the landscape scenic integrity. ***Key Feature Disruption:*** There are no key landscape features impacted by the Project.	Existing vegetation surrounding the dwelling screens views toward the Project. Visual impact Rating = **Negligible**	Mitigation measures are not deemed necessary from this dwelling.
R15b	3.77km	1	Near Middleground	Moderate	**VIZ2 (Moderate)** ***Visual Magnitude:*** One (1) turbine is located within the black line of visual magnitude. Eight (8) turbines are located between the black and blue lines of visual magnitude. ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to three (3) 60 degree sectors. However, vegetation reduces the visibility of the Project from this location. ***Landscape Scenic Integrity:*** The Project is not likely to be visible at this location. Therefore, there is not likely to be an impact on the landscape scenic integrity. ***Key Feature Disruption:*** There are no key landscape features impacted by the Project.	Existing vegetation surrounding the dwelling screens views toward the Project. Visual impact Rating = **Negligible**	Mitigation measures are not deemed necessary from this dwelling.

Receiver ID	Nearest turbine (from photomontage point)	Number of turbines in the black zone (4000m)	Visibility distance zone	Scenic quality rating	Visual influence zone performance objectives	Assessment summary and Visual impact rating (before mitigation)	Mitigation measures
R27	6.62km	0	Far Middleground	Low	**VIZ3 (Low)** ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to one (1) 60 degree sector which is deemed acceptable in accordance with the Bulletin.	Existing scattered vegetation in the middleground is likely to limit views of some turbines located to the northwest of the dwelling. Visible turbines are located in excess of 6,600 m of the viewpoint. Visual impact Rating = **Low**	Mitigation measures are not deemed necessary from this dwelling.
R24	5.17km	0	Near Middleground	Low	**VIZ2 (Moderate)** ***Visual Magnitude:*** There are no turbines within the black line of visual magnitude and three (3) within the blue line of visual magnitude from this dwelling. ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to two (2) 60 degree sectors which is deemed acceptable in accordance with the Bulletin ***Landscape Scenic Integrity:*** The majority of the Project is likely to be visible at this location. The turbines will have moderate impact on the landscape scenic integrity. ***Key Feature Disruption:*** The turbines will be visible in the landscape, however there are no key landscape features impacted by the Project.	Dwelling is derelict and not habitated. While existing scattered vegetation in the distance offers limited screening, views from this location are primarily open and therefore the majority of the turbines will be visible. Visual impact Rating = **Moderate**	Screen planting is proposed to the east of the dwelling, should there be plans for the dwelling to become habitable in the future.
R20a & b	6.41km	0	Far Middleground	Low	**VIZ3 (Low)** ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to four (4) 60 degree sectors, however it is noted that three (3) 60 degree sectors are occupied by the KKWF and two (2) 60 degree sectors are occupied by the Project. Views in up to two (2) 60 degree sectors is deemed acceptable in accordance with the Bulletin.	A representative viewpoint was selected in consultation with the owner and was taken from the east of 20b to represent views from this dwelling. An aerial photo suggests that there is some scattered vegetation and buildings to the south east and east of the dwelling which will assist in screening views of the Project. The representative viewpoint also demonstrates that there is existing dense vegetation in the middleground to the east of the dwelling. This is likely to screen some of the turbines from this location. Visual impact Rating = **Low**	Mitigation measures are not deemed necessary from these dwellings.
R12	7.01km	0	Far Middleground	Low	**VIZ3 (Low)** ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to six (6) 60 degree sectors, however it is noted that only one (1) 60 degree sector is occupied by the Project. Views in up to two (2) 60 degree	A lack of intervening vegetation results in the majority of turbines being visible, however they will appear as distant objects due to the dwellings	Mitigation measures are not deemed necessary from this dwelling.

Receiver ID	Nearest turbine (from photomontage point)	Number of turbines in the black zone (4000m)	Visibility distance zone	Scenic quality rating	Visual influence zone performance objectives	Assessment summary and Visual impact rating (before mitigation)	Mitigation measures
					sectors is deemed acceptable in accordance with the Bulletin.	significance distance from the turbines. Visual impact Rating = **Low**	
R04a & b & R05a, b , & c	6.21km	0	Far Middleground	Low	**VIZ3 (Low)** ***Multiple Wind Turbine Effect:*** Based on topography alone, turbines have the potential to be visible in up to two (2) 60 degree sectors which is deemed acceptable in accordance with the Bulletin Of the two (2) sectors occupied from 5c, one (1) is occupied by Keri Keri WF. Turbines associated with Wilan WF have not been considered in this assessment as the dwelling is associated with WWF.	Existing scattered vegetation in the middleground to the east is likely to limit views of some turbines. Views towards turbines to the south east are likely due to lack of intervening elements in this direction, however they will appear as distant objects due to the dwellings significance distance from the turbines. There are no key landscape features impacted by the Project. Visual impact Rating = **Low**	Mitigation measures are not deemed necessary from these dwellings.

Detailed Dwelling Assessment Locations

Baldon Wind Farm

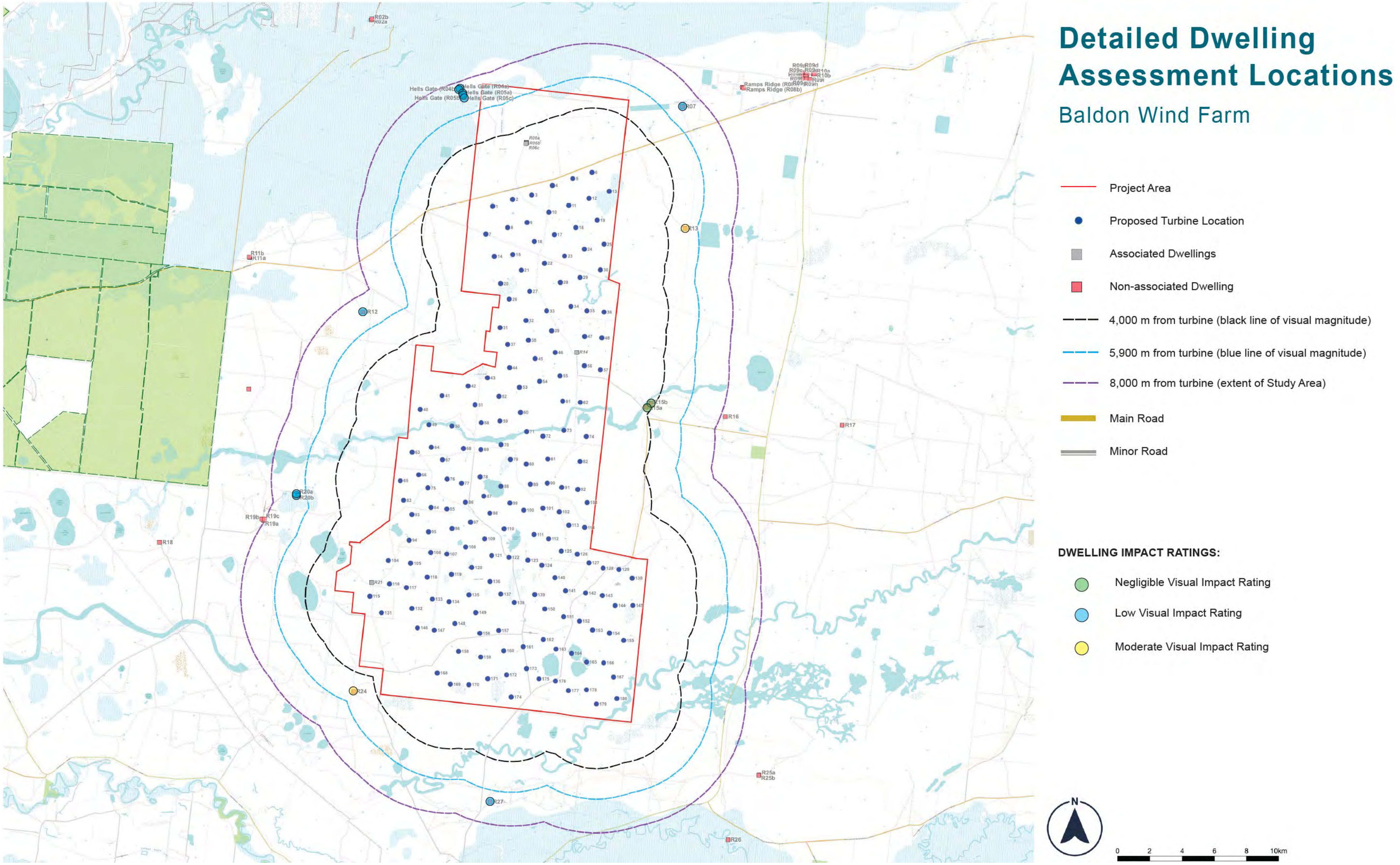


Figure 6-13 Dwelling assessment

Proposed View | 180º Photomontage - Without Mitigation Measures Implemented

Proposed View | 180º Photomontage - With Mitigation Measures Implemented

Figure 6-14 Proposed view from R13 with and without vegetation screening

Dwelling entitlement

An overview of the visual assessment for 25 lots with dwelling entitlements identified within 4,000 m of the nearest turbine was included in the LVIA.

An assessment based on topography alone suggested that the majority of the Project will be visible on all lots with dwelling entitlements. While there is no requirement for mitigation, the LVIA includes notes on how a potential future dwelling could be situated on each lot to minimise views to the Project.

Public viewpoint assessment

The LVIA included assessment of 13 public viewpoints shown on Figure 6-16. Each public viewpoint was carefully selected to be representative of the range of views within the LVIA study area.

Viewpoints were selected to illustrate a combination of the following;

- viewpoints identified by the community in community consultation phase of scoping paper,
- present landscape character types,
- areas of potentially high landscape or scenic value,
- range of distances,
- varying aspects and elevations,
- varying extent of wind farm visibility (full and partial visibility), and
- sequential views along specific routes.

Each public viewpoint were assigned a VIZ.

Two public viewpoints (VP06 and VP07 (St Pauls Rest Area) were assessed as being Visual Influence Zone 2 (VIZ2 -moderate). Photomontages have been prepared from VP06 and VP07 demonstrating that turbines have the potential to dominate the visual catchment due to the close proximity to the Project. Pragmatic mitigation measures are recommended in Section 6.3.4 to minimise impacts.

The remaining 11 public viewpoints were assessed as being within VIZ3 – low. There are no performance objectives for public viewpoints in VIZ3 as such no additional assessment of these locations was undertaken.

PM16 St Pauls Rest, Sturt Highway, Maude

Figure 6-15 VP07 St Pauls rest area photo montage with modelled wind turbines (60° crop)

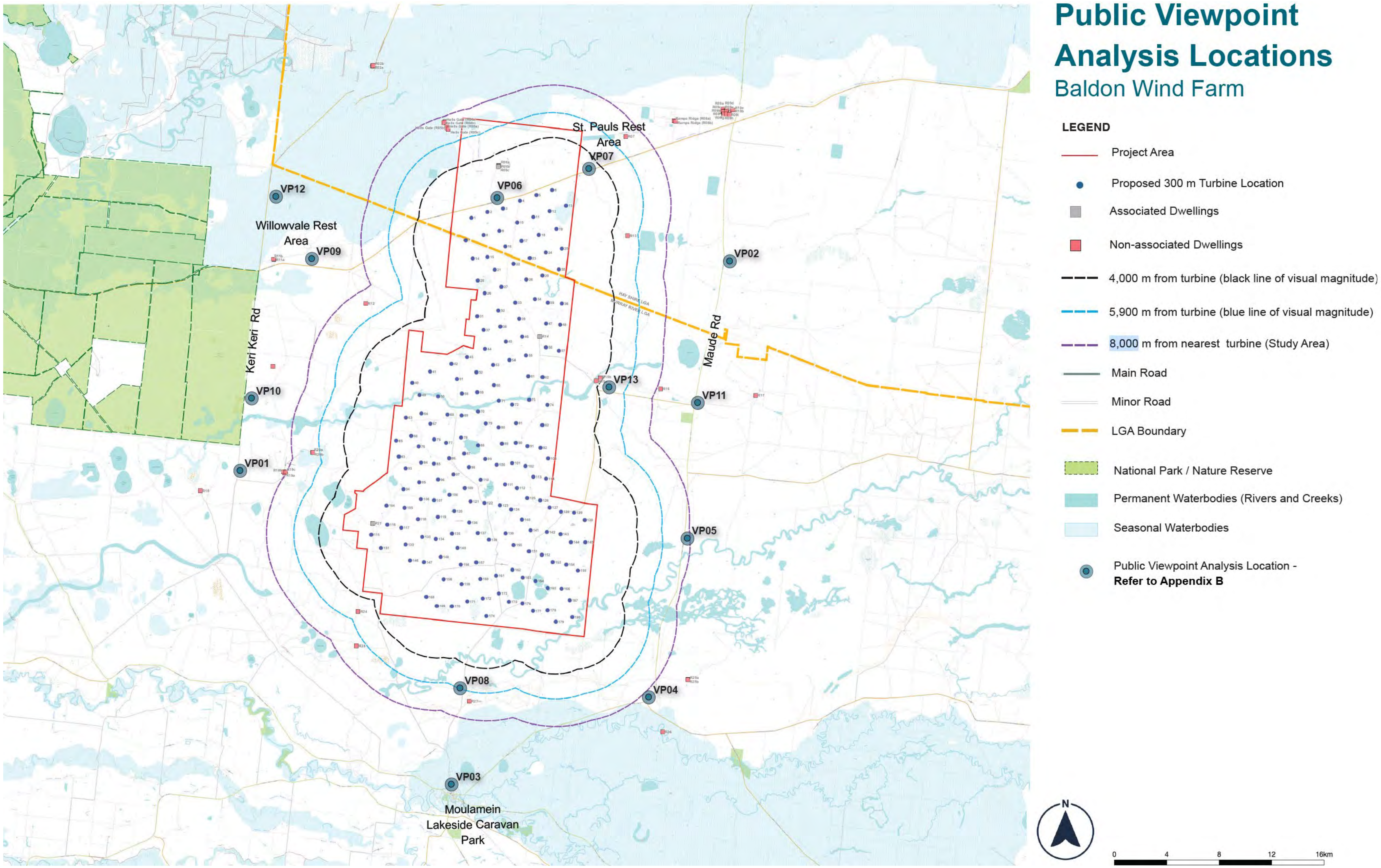


Figure 6-16 Public viewpoints

Shadow flicker and blade glint assessment

Shadow flicker is defined as the visual effect that occurs when rotating turbines cause moving shadows as the blades pass in front of the sun. The effect will occur under circumstances where the turbine is located such that at certain times of day the sun's rays pass through the swept area of the rotating blades, potentially affecting the viewpoint. The effect is diminished by the distance of the viewpoint from the turbine.

The LVIA modelled shadow flicker was conducted using specialist industry software (Wind Pro), assessing the largest turbine (based on a 300 m maximum tip height) proposed for the Project (refer to Figure 6-17). The model considers the following variables**:**

- The aspect of the residence relative to the turbine(s) (window locations, living area locations etc)
- The extent of natural or screening vegetation between the turbine(s) and the receptor
- The existence of other screening elements (buildings, structures etc) between the turbine(s) and the receptor
- The time of year
- The proportion of daylight hours in which the turbines operate; and
- The frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon).

No non-associated dwellings were identified with potential shadow flicker hours. However, it was identified that portions of the Sturt Highway and Balranald Road are likely to experience shadow flicker. The shadow flicker is projected to be experienced on average 83 hr/per year during late September to early February over a 10km stretch of the Sturt Highway. There are no permanent sensitive receivers along this section of road. Outside of these times of year and day, there is not likely to be shadow flicker along the Sturt Highway. As a result, impacts do not require mitigation.

Baldon Road runs generally north south to the east of the Project, and through the Project Area for approximately 12 km in the south. Due to the close proximity, shadow flicker is likely experienced on average 490 hr/per year. This stretch of Baldon Road is a low use road. Impacts along Baldon Road would not require mitigation.

The turbines selected for the Project will be finished with a low reflectivity surface treatment in accordance with the requirements of the Bulletin, as such the risk of blade glint is negligible.

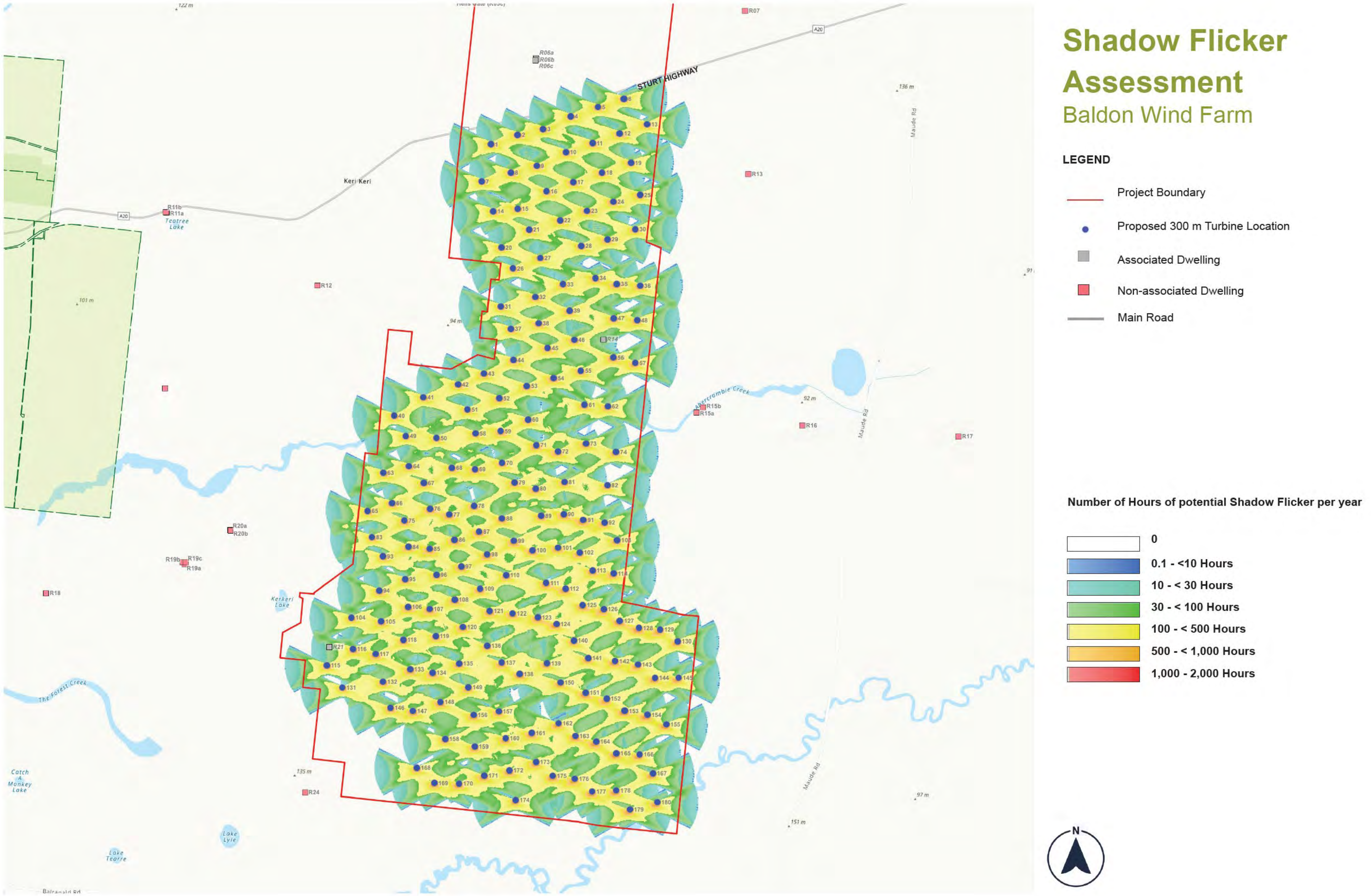


Figure 6-17 Shadow flicker assessment

Night lighting assessment

The LVIA included a detailed night lighting assessment. Potential light sources include:

- Aviation Hazard Lighting (AHL) on nacelle of wind turbines (height of up to 180 metres AGL)
- Night lighting for safety and security on ancillary structures.

Aviation lighting

Night lighting of turbines is not proposed for the Project in line with the recommendations of the AIA in Appendix F.9. If aviation hazard lighting were required the theoretical assessment in the LVIA would be referenced.

Ancillary lighting

Night lighting is proposed onsite but minimised as much as possible. Proposed lighting onsite includes:

- Motion sensor or infrared security lighting would be installed at the substations, BESS and O&Ms, however this lighting would only be switched on during night-time maintenance or emergency purposes where permitted
- A light at the entry of each turbine that can be turned on and off as required by site staff (default setting is off at night).
- Internal and external lighting at operational buildings as required.

External lighting would be installed to comply with Australian/New Zealand Standard *AS/NZS 4282:2019 – Control of Obtrusive Effects of Outdoor Lighting*, or its latest version. The external operational lighting would be used only when there are staff on site, as part of night works (where required), site security or during emergency situations including through remote operation to allow improved camera visibility.

The LVIA lists a number of additional design principles that would be applied to all operational lighting onsite. These are included in measures in Section 6.3.4 that would ensure there are no night time visual impacts.

Cumulative impact assessment

The LVIA considered all active renewable projects within 100km and five outside 100km in the cumulative impact assessment. Detailed assessment focused on the three wind farm proposals within 8km of the Project. These are Tchelery Wind Farm, Keri Keri Wind Farm (and solar farm), and Wilan Wind Farm (refer to Figure 6-18). The key impacts noted were to the nearest dwellings and to the broader landscape character.

A number of wireframe montages were undertaken to better understand the cumulative visual impacts from dwellings. The LVIA determines that the impact of the additional wind farms to all dwellings is not significant when considering the main dwelling assessment and mitigations implements. R12 is considered the dwelling with the highest cumulative impacts, however, this dwelling is located within the centre of the Keri Keri Wind Farm and experiences high visual impacts from those turbines. R12 is associated with the Keri Keri Wind Farm As such the Baldon WF is only a minor contributor to the overall visual impact. The wireframe montage for R12 is shown in Figure 6-19. The cumulative impact assessment on dwellings concluded that no additional mitigation measures are required.

There is the potential for simultaneous distant views of all three wind farm projects whilst travelling along the Sturt Highway between Hay and Balranald. Due to the lack of any significant landscape features, the wind farms have the potential to become a defining character element along this route. It is noted that no scenic or key landscape features will be impacted by the projects. As such no additional measures are considered to address cumulative visual impacts along the Sturt Highway.

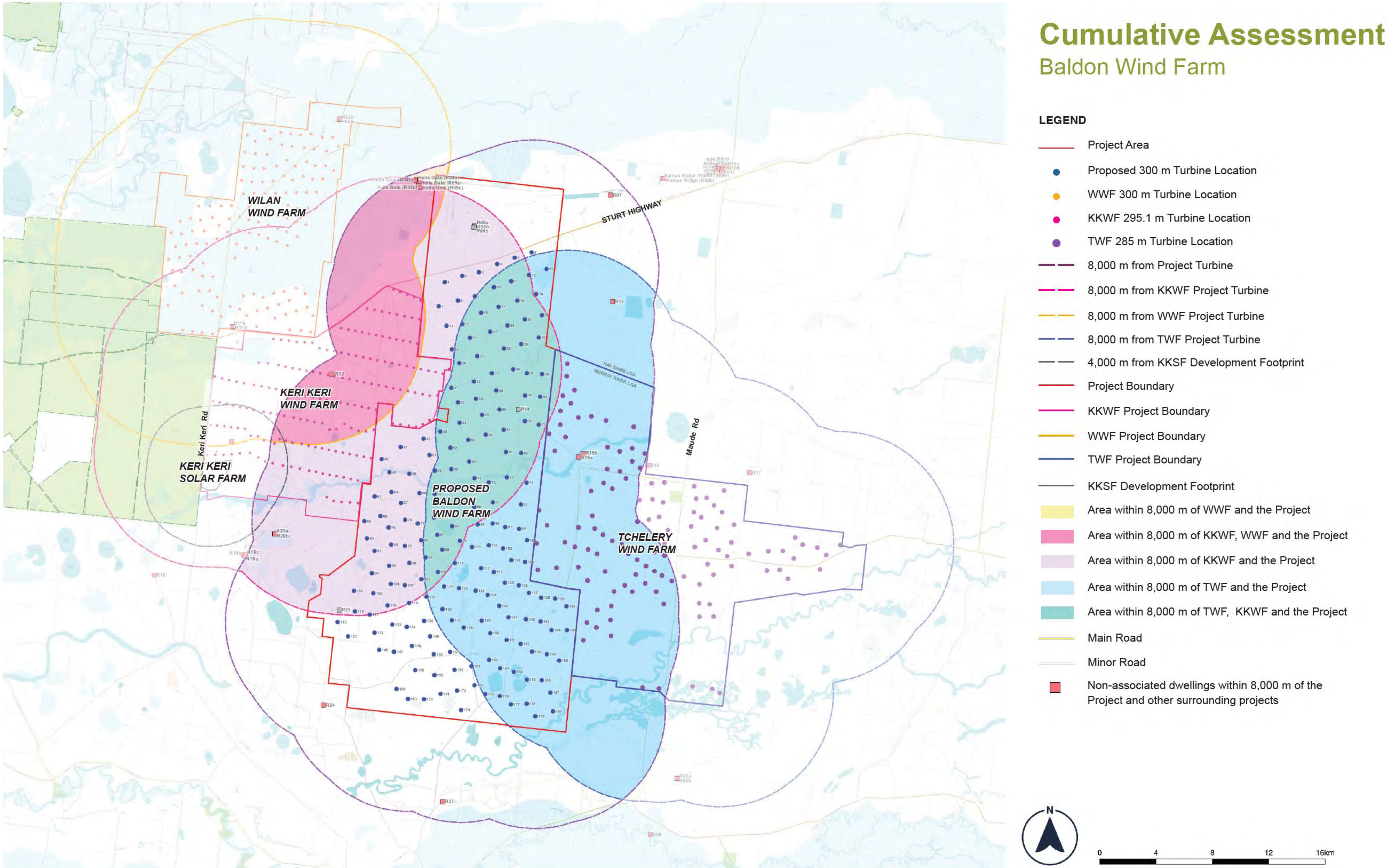
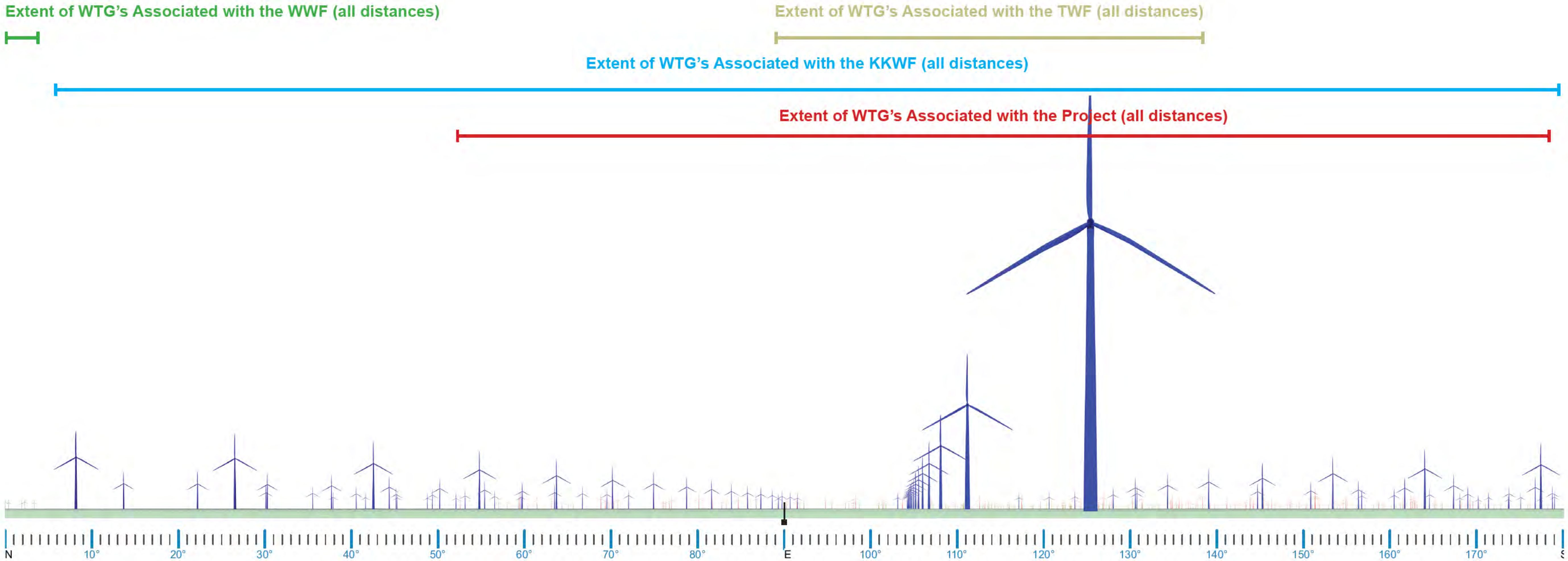
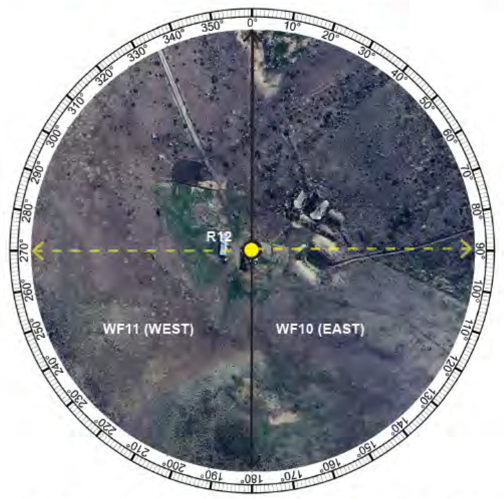


Figure 6-18 Cumulative visual impact

Dwelling R12: Sturt Highway, Keri Keri NSW





LEGEND

- Direction of the Wireframe
- Extent of Panorama
- Wind Turbine associated with the Project
- Wind Turbine associated with KKWF
- Wind Turbine associated with WWF

Aerial Image - Wireframe Location (Aerial Image Source: Google Earth 2024)

NOTES
Turbine Layout for WWF, TSF and KKWF is as per the Major Projects Website.

OVERVIEW OF CUMULATIVE VISUAL IMPACTS ON DWELLINGS:			
Distance to nearest WWF turbine:	Distance to nearest KKWF turbine:	Distance to nearest Project turbine:	Distance to nearest TWF turbine:
3.35 km	0.27 km	7.01 km	16.04 km

Figure 6-19 Cumulative impact wireframe from R12

Associated infrastructure

In addition to the proposed wind turbines, associated project infrastructure may contrast with the existing landscape. Access roads, transmission lines and other ancillary structures have the potential to alter the existing visual landscape. An overview of the potential visual impact resulting from associated project infrastructure is provided in Table 6-21.

Table 6-21 Associated infrastructure

Project component	Impact discussion
On-site substations, switching stations, and BESS	The substation, BESS and switching station areas are generally located away from existing roads and dwellings. The closest publicly accessible road (Sturt Highway) is located approximately 4,800m of the nearest BESS/substation area and the closest dwellings (R15a, R15b and R24) are located in excess of 7,000m east of the nearest BESS/substation area As a result, the visual impacts associated with these elements will be low.
Overhead Transmission Lines	It is acknowledged that the proposed transmission towers and lines will be a visible element in the landscape from the surrounding area. However, the transmission towers and lines will not contrast with the existing landscape character (which already includes transmission lines) or features and the visual impacts of the proposed transmission towers and lines are expected to be low.
Operations & Maintenance (O&M) buildings	The assessment has been undertaken based on an assumed building height of up to 3.5m. Due to the low horizontal scale and distance, the O&M Facility may be visible in the 1,200m distance from the Sturt Highway, though it will be difficult to discern. It is likely to appear in keeping with the farm infrastructure typical of the surrounding area. As a result, the visual impacts associated with these elements will be low.
Meteorological monitoring masts	Up to five (5) permanent meteorological monitoring mast of up to 130m in height are proposed to be located within the Project Area to record wind speed and other meteorological data. The wind monitoring masts will be fitted with various instruments such as anemometers, wind vanes, temperature gauges and other electrical equipment. Due to the existing flat terrain, views towards the meteorological masts are likely to be available and have the potential to be a feature from public viewing locations surrounding the Project. The nearest meteorological monitoring mast to the Sturt Highway is 2,400m south and 4,800m northeast of the nearest receiver (R13). However, it is noted that no key landscape features are likely to be impacted.
Internal & External	Due to the existing agricultural land use of the Study Area, farm roads traversing the landscape form a significant part of the existing landscape

Project component	Impact discussion
Roads	character. The proposed access roads are likely to be viewed as part of the existing character of the landscape. Mitigation measures are included in Section 6.3.4 that would ensure residual impacts are reduced.

Key uncertainties in the assessment

The impact of changes in the landscape or to particular views can be subjective. This assessment follows the standardised assessment method prescribed in NSW for utility wind farms.

As there is not capacity in the SWREZ for all renewable Projects currently being proposed, the Baldon Wind Farm Project’s cumulative assessment approach is conservative, assuming all proposed projects will be constructed.

6.3.4 Mitigation measures

The measures below are proposed to mitigate visual impacts (refer to Table 7-1).

Table 6-22 Visual impact mitigation measures

ID	Safeguards and mitigation measures	Project stage
V1	The turbines will have a matte white finish and consist of three blades which is consistent with the current turbine models being considered.	Construction Operation
V2	Site specific planting for the purposes of visual screening is offered to landholders of receivers R13 and R24 (if the dwelling is planned to be occupied in the future). The following principles will be adhered to when implementing vegetation screening: • Planting is recommended post construction in consultation with the landowner. • Planting should remain in keeping with existing landscape character. • Species selection is to be typical of the area. • Planting layout should avoid screening views of the broader landscape. • Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation.	Operation
V3	The following night lighting design principles will be implemented: 1. Control the level of lighting: • Only use lighting for areas that require lighting ie. paths, building entry points • Switch off lighting when not required • Consider the use of sensors to activate lighting and timers to switch off lighting 2. Lighting Design: • Use the lowest intensity required for the job • Use energy efficient bulbs and warm colours • Direct light downwards • Ensure lights are not directed at reflective surfaces • Use non-reflective dark coloured surfaces to reduce reflection of lighting • Keep lights close to the ground and / or directed downwards • Use light shield fittings to avoid light spill	Operation
V4	Access roads will be designed and constructed to reduced residual visual impacts by applying the following mitigations: • Where possible utilise or upgrade existing roads, trails or tracks to provide access to the proposed turbines to reduce the need for	Construction

ID	Safeguards and mitigation measures	Project stage
	new roads • Allow for the provision for down sizing roads or restoring roads to existing condition following construction where possible • Any new roads must minimise cut and fill and avoid the loss of vegetation.	

6.4. Social and economic

A Social Impact Assessment (SIA) was prepared by NGH on behalf of Baldon Wind Farm Pty Ltd (the Applicant). It is summarised below and appended in full in Appendix F.4. The assessment aims to identify, predict and evaluate the likely social impacts and benefits arising from the Baldon Wind Farm Project, and to propose appropriate responses to mitigate and manage negative impacts and enhance positive benefits.

6.4.1 Assessment approach

The SIA is prepared to comply with the Department of Planning, Housing and Infrastructure's (DPHI) *Social Impact Assessment Guideline for State Significant Projects* (the SIA Guideline) (DPE, 2023a).

The SIA builds on the initial social impact scoping and engagement undertaken by the Applicant at the Project scoping phase. An overview of the key phases and tasks is presented in Figure 6-20.

Project Scoping

- Review project information to date
- Define the social locality
- Establish the social baseline within the social locality
- Identify likely social impacts across the social impact categories for each of the project activities (undertaken during Phase 1 Scoping by the Applicant)

SIA community and stakeholder engagement

- Identify relevant stakeholders and communities
- Undertake semi-structured interviews with key stakeholders
- Conduct SIA online community survey
- Other targeted SIA engagement activities tailored to the project context

Impact assessment and management

- Review and integrate findings from stakeholder and community engagement and relevant EIS technical studies
- Evaluate the magnitude and likelihood of social impacts to determine the significance rating
- Identify relevant/appropriate mitigation, management and enhancement measures
- Assess significance of residual impacts after effective application of mitigation measures

Figure 6-20 Overview of SIA methodology

The social locality or 'social area of influence' for this Project has been determined by identifying the main place-based or populated communities where people live, work and visit, as well as the existing networks of travel between them, with consideration of the nature and scale of potential impacts arising from the development. The areas and communities of interest that comprise the social locality for this Project are outlined in Table 6-23 and shown in Figure 6-21.

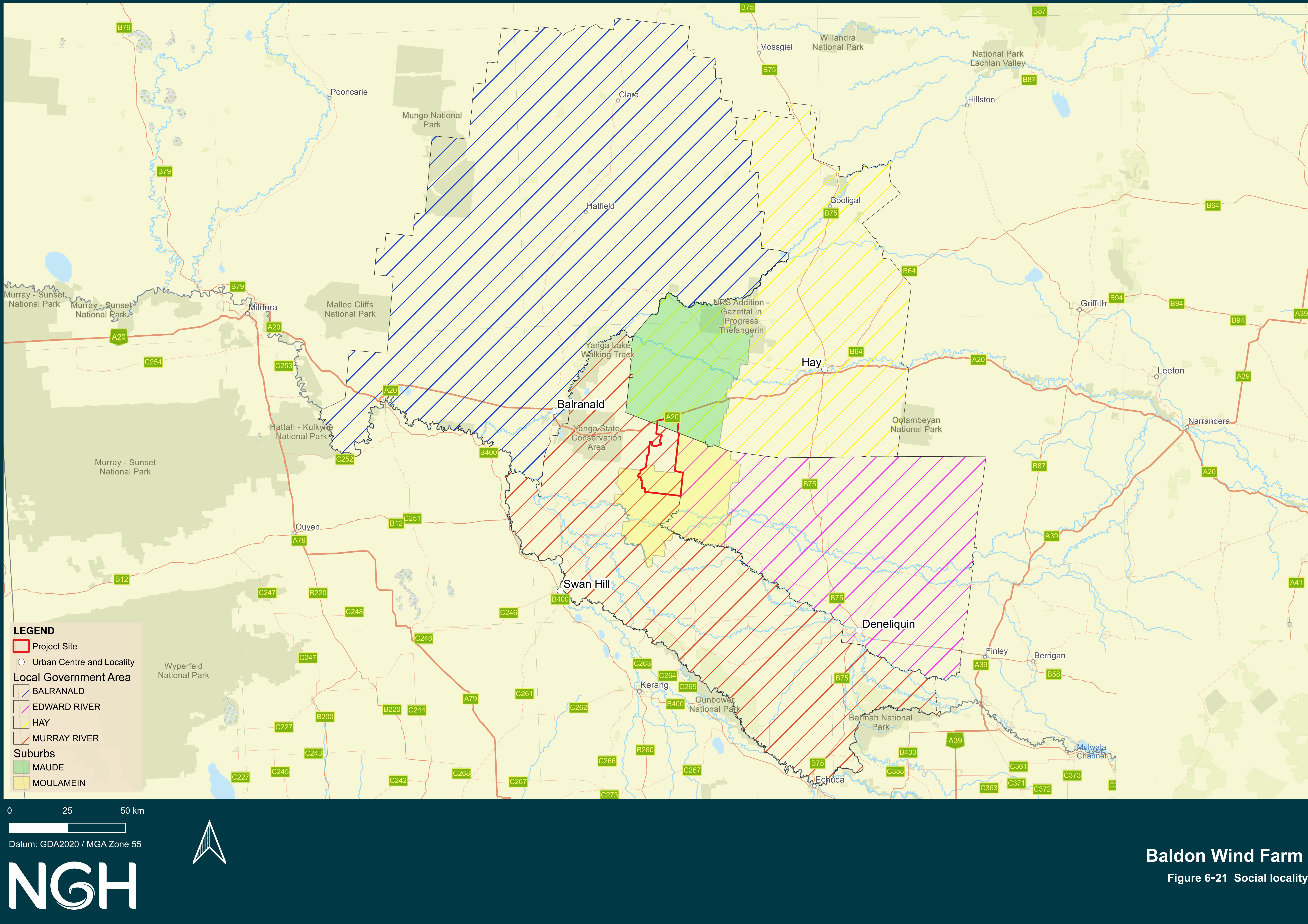
Table 6-23 Areas of interest within the social locality

Area of interest (ABS/ ASGS/ State classification)	**Name**
Host localities/communities **(Suburbs and Localities – SAL)**	Moulamein Maude
Key towns and cities **(Urban Centre and Locality – UCL)**	Hay Balranald Deniliquin Swan Hill
Local Government Area **(LGA)**	Murray River Council Hay Shire Council Edward River Council
Region **(NSW DPE)**	Riverina Murray
State (for comparison of averages)	NSW

A social baseline profile for the social locality was developed to describe the existing social context and establish a benchmark against which potential social impacts can be assessed. Due to the small populations of Moulamein and Maude, the social baseline has a primary focus on the Murray River and Hay Shire LGAs, and the larger towns in the social locality. The social baseline was informed by both primary and secondary data sources.

SIA stakeholder engagement was also undertaken to inform and validate the social baseline and assessment of social impacts. This involved:

- A community survey, available for participants both online and as a paper version (n=25).
- Targeted, semi-structured interviews (n=15 interviews, 24 participants).
- Attendance at community information sessions in Balranald, Hay and Moulamein.



NGH

Baldon Wind Farm

Figure 6-21 Social locality

Building on the preliminary SIA undertaken by the Applicant during the scoping phase of the Project, the social impacts for each Project activity were then evaluated across the social impact categories as defined in the SIA Guideline:

- Way of life
- Community
- Accessibility
- Culture
- Health and wellbeing
- Surroundings
- Livelihoods
- Decision-making systems

The evaluation involved review relevant EIS technical reports, stakeholder and community engagement findings, and comparative studies.

The likely significance of each potential impact was determined, based on its predicted magnitude and likelihood as defined in the SIA Guideline, Table 6-24. Finally, measures to avoid, minimise or mitigate potential negative impacts and enhance positive benefits were developed to address impacts. This included an assessment of the significance of residual impacts post-application of mitigation measures.

Table 6-24 Significance criteria; SIA Guideline (DPE, 2023a).

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

Source: SIA Guideline – Technical Supplement (DPE, 2023)

6.4.2 Existing environment

Relevant to the social context of the Project, the Project is situated on the Hay Plains in the Riverina Murray region of southwest NSW, within the Murray River and Hay Shire LGAs and adjacent to the Edward River LGA. Located to the west of the Great Dividing Range and extending along the state border with Victoria, the Riverina Murray region, encompasses 20 LGAs, contains vast waterways and river systems. The west of the region is dominated by open plains of native grasslands and semi-arid shrublands and is home to the Yanga, Kalyarr, Oolambeyan, and Murray Valley National Parks and the Ramsar-listed NSW Central Murray Forests.

Murray River LGA

In 2021, the Murray River LGA had an estimated population of 12,850 people with a median age of 49 years (ABS, 2021). Over 85% of the population lives in the main towns of Moama and Barham or in the other settlements of Koraleigh, Mathoura, Moulamein, Murray Downs, Tooleybuc, and Wakool (Wakefield Planning, 2023). Many of the LGA's settlements are cross-border, neighbouring communities that are separated only by the Murray River, including Murray Downs/Swan Hill, Barham/Koondrook and Moama/Echuca. These twin towns operate together, with services, commerce, infrastructure and employment provided on either side of the river utilised by people on both sides of the border (MRC, 2020). The NSW Murray River communities have stronger social and economic connections to communities in northern Victoria and Melbourne than to other parts of NSW (DPE, 2023c).

Hay Shire LGA

In 2021, Hay Shire had an estimated population of 2,882 people with a median age of 48 years. The majority of residents (79%) live in the township of Hay and its immediate surrounds (ABS, 2021). The remaining population resides in the rural areas and small villages within the shire, including Maude and Booligal.

Hay Shire lies in the middle of the NSW State Government's nominated South West REZ. Hay is centrally located to Project EnergyConnect with a strong pipeline of construction within or near the LGA, which presents opportunities for growth (HSC, 2022b).

Edward River LGA

In 2021, the Edward River LGA had an estimated population of 8,456 residents with a median age of 46 years. The majority of the LGA’s residents (88%) live in Deniliquin and surrounds (ABS, 2021). The remaining population is located within the rural villages and localities of Blighty, Booroorban, Conargo, Mayrung, Morago, Pretty Pine and Wanganella.

The Edward River region supports both dryland and irrigated agriculture. Key enterprises include rice, other cropping including cereals, hay and horticulture, dairy and extensive grazing of sheep for meat and wool, and cattle. Deniliquin is home to Sun Rice, the largest rice mill in the southern hemisphere. In recent years, drought conditions and reduced water allocation and availability have detrimentally impacted agricultural production in the region, which has triggered substantial flow on effects to processing and service industries.

Local setting

The community around the Project area is rural with a strong focus on agriculture and a very low population density. Some properties cover large areas and have significant operations. There are approximately 14 non-associated dwellings located within 8km of the Project site.

Moulamein is the nearest town to the Project, located approximately 15km to the south. The township is small and constrained by flood issues. The 2021 population of 489 people is ageing with a median age of 48 years and substantial growth in the proportion of residents aged 65 to 74.

The closest larger population centres are the regional NSW towns of Balranald, Barham, Hay, and Deniliquin, and the Victorian city of Swan Hill. A high-level summary of townships/localities is presented in Table 6-25 below.

Table 6-25 Summary of townships/localities

Township/ locality	Distance from Project Boundary	Population (2021 Census)	Services and facilities
Moulamein	15km south	489	Small town with some services (e.g., hotel, supermarket, post office, school, bowling club, caravan park, Council business centre, library).
Maude	23km northeast	110	General store, hotel, caravan park and post office.

Township/ locality	Distance from Project Boundary	Population (2021 Census)	Services and facilities
Balranald	44km west	1,063	Regional centre with services (e.g., district hospital, schools, accommodation, Council business centre, Service NSW Agency).
Kyalite	44km west	87	Pub, general store, caravan park.
Swan Hill	56km southwest	10,869	Major regional centre with a range of higher order health (hospital, specialist, allied health), education, and transport services (coach, rail).
Hay	64km northeast	2,208	Regional centre with services (e.g., hospital, schools, TAFE etc.).
Barham	65km south	1,569	Regional centre with services (e.g., schools, retail, accommodation etc.).
Deniliquin	100km southeast	6,431	Regional centre with services (e.g., hospital, schools, TAFE etc.).

Social baseline

The Project area contains the indeterminate boundaries between the Mutthi Mutthi, Watthi Watthi, Wemba Wemba / Wamba Wamba and Nari Nari language groups. In 2021, a relatively high percentage of the population identified as Aboriginal and Torres Strait Islander in Hay (9.3%) and Balranald (9.6%), whereas only 2.5% identified as Aboriginal and/or Torres Strait Islander in Moulamein.

Around a quarter of the population in Hay Shire (23%) and Murray River (29%) were aged 65 and over, compared to 18% across NSW. All three LGAs had a higher median age than the state median of 39 years, ranging from 46 years in Edward River to 48 years in Hay Shire and 49 years in Murray River.

The median household weekly income across the three LGAs was well below the NSW median of $1,829, ranging from $1,236 in Hay Shire LGA to $1,260 in Murray River LGA. The Murray River LGA was relatively advantaged, with a decile of 7 for the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD), while the Hay LGA had the highest level of relative disadvantage with a decile of 3. The towns of Moulamein and Balranald were both assigned deciles of 2, while the larger urban centres of Deniliquin and Swan Hill were assigned deciles of 3 (ABS, 2023).

In 2021, around 90% of residents across the three LGAs lived in separate houses, much higher than the NSW average of 66%. All townships and localities included in the social locality had a higher proportion of dwellings that were owned outright compared to the NSW average (32%).

The broader Murray Riverina region has been struggling with housing unaffordability for several years, made worse by the pandemic, population growth, and a lack of appropriate and affordable accommodation types for the resident population as well as for seasonal and construction workforces. Consultation confirmed that the region is experiencing severe housing and rental shortages. In SIA consultations, issues related to housing were raised by nearly all stakeholders and community members who highlighted the lack of housing stock as well as lack of developable blocks.

Since 2018, the broader Western Murray region has recorded consistent population growth and decreasing unemployment, which are contributing to challenges in the housing market (DRNSW, 2023b). Between June 2018 and June 2022, median house prices in the Murray River LGA increased 78% from $320,000 to $570,000 and by 85% to $353,000 in the Edward River LGA (DRNSW, 2023a). It is estimated that since 2021, median house prices have risen by 44% to $201,000 in Hay Shire and by 26% to $220,000 in Balranald Shire (DRNSW, 2023b).

Many parts of the region were experiencing very tight labour market conditions and acute workforce shortages. The average LGA unemployment rate over 12 months to June 2023 ranged from 1.6% in Balranald Shire and 1.9% in Murray River, to 3.1% in Hay Shire, 3.3% in Swan Hill and 3.9% in Edward River (JSA, 2023). Aboriginal unemployment rates were lower than the NSW Aboriginal unemployment rate of 9.8%, while Hay LGA (10.9%) and Balranald LGA (12.2%) were slightly higher. However, as these rates are all significantly higher than the NSW unemployment rate of 4.9%, an ongoing focus is needed on maximising opportunities to support economic participation and economic prosperity for Aboriginal communities across the Murray and Western Murray regions.

The agriculture, forestry and fishing industry sector, centred on cropping and livestock grazing, is the Murray River LGA's largest economic contributor. The sector accounts for 27% of total output ($450.2 million). It is also the largest employer, supporting an estimated 1,167 jobs (24%). Other important industries are manufacturing, construction, health and community services, professional services, retail trade and accommodation and food services (Remplan, 2023).

Many of the settlements in the Murray River, Balranald, and Swan Hill LGAs are cross-border, neighbouring communities, separated by the Murray River, but operating together. The Victorian city of Swan Hill, neighbour to the NSW township of Murray Downs, is an important regional centre that services many regional settlements within the western part of the Murray River LGA and has strong ties to Balranald and Moulamein. Swan Hill offers a range of higher order health (hospital, specialist, allied health), education, and regional transport services (bus and train) that are relied upon by Murray River residents.

Balranald and Hay, and to a lesser extent, Moulamein and Barham, offer a more limited range of medical, community health, aged care, and allied services. As with many regional communities, it has been difficult to attract and retain healthcare services and workforce (DRNSW, 2023a). The health facilities in Hay are sufficient for the town's size, but there are issues with distance from specialised services (HSC, 2020). The Moulamein Community Health Centre is the only access to any form of health care in the district. The town does not have a GP, ambulance or pharmacist, with residents forced to travel to Swan Hill for basic medical care (Polkinghorne, 2023).

6.4.3 Potential impacts

The potential for the Project to have adverse social impacts was evaluated for each phase of the Project, for each category defined in the SIA Guideline. The residual impact significance rating represents the likely significance of an impact once the proposed mitigation measure has been successfully implemented. In terms of the highest predicted residual impact significance ratings, the assessment identified:

Highest positive risks for:	• Culture - Pre-construction Construction and Operation • Livelihoods – Construction and Operation • Community - Construction and Operation
Medium positive risks for:	• Access - Operation • Surroundings - Operation
Medium negative risks for:	• Way of life / Health & Wellbeing – Construction • Livelihoods – Construction and Operation • Access - Construction and Operation • Surroundings - Construction and Operation

	• Culture - Construction and Operation and Decommissioning
Low positive risks for:	• Decision making systems - Construction and Operation and Decommissioning
Lowest negative risks for:	• Health and wellbeing - Pre-construction Construction • Community - Construction and Operation • Surroundings - Construction and Operation and Decommissioning • Decision making systems - Construction and Operation and Decommissioning

No high negative risks were identified.

The mitigation measures relevant to each impact are set out in the summary table below. Enhancement measures for all low negative as well as positive impacts have also been developed to enhance the social impact mitigation approach for the Project as a whole.

Throughout the development of the Project to date, the Applicant has demonstrated their commitment to avoid potential Project impacts through amending the Project design. This has particularly been through avoidance of environment, visual and cultural heritage impacts. Significant amendments have been made to limit biodiversity impacts, areas of highest Aboriginal cultural values, and to reduce visual impacts for neighbouring properties.

This assessment of social impacts shows that the likely social impacts and benefits arising from the Baldon Wind Farm Project are well understood and can be managed. The evaluation below has been used to develop appropriate responses to mitigate and manage negative impacts and enhance positive benefits of the Project.

Table 6-26 Social impact summary

*Potential positive impacts are shown in normal text and potential **negative impacts** are shown in **bold.***

Social impact category	Project phase	Potential impact (unmitigated)	Affected stakeholder group	Stakeholder significance (perceived)	Impact significance (unmitigated)	Mitigations / enhancement measures	Residual impact significance
Health & wellbeing	**Pre-construction** **Construction**	**Health and wellbeing impacts for near neighbours (negative)**	Host landholders Near neighbours Broader community	Low	Medium (possible, minor)	Open, transparent, timely and accessible communication of Project information with the aim of minimising uncertainty and to address concerns.	**Low (possible, minimal)**
Culture	Pre-construction Construction Operation	Increased general community awareness of Aboriginal cultural heritage and assets (positive)	Aboriginal stakeholders Broader community Visitors & tourists	Medium	Medium (possible, minor)	Through Community Benefit Sharing and in partnership with local Aboriginal stakeholders, explore potential for support for activities relating to protection and understanding of cultural assets and values or other programs (such as: a program to preserve some high value, less degraded examples of earth mounds, or specific artifacts found at the Project site or within the region more broadly; Indigenous Ranger program; support key local Aboriginal stakeholders access land for cultural purposes where appropriate). Ensure that local Aboriginal people are given opportunity to facilitate Aboriginal Cultural Heritage Awareness Inductions and other related programs for the Project.	High (likely, moderate)

Social impact category	Project phase	Potential impact (unmitigated)	Affected stakeholder group	Stakeholder significance (perceived)	Impact significance (unmitigated)	Mitigations / enhancement measures	Residual impact significance
Way of life **Access** **Health & Wellbeing**	**Construction**	**Increased traffic and road safety impacts (negative)**	Near neighbours Broader community Agricultural producers Local businesses Emergency services Local government Road users	High	High (likely, moderate)	Implement traffic management measures outlined in the Construction Traffic Management Plan. Communicate traffic management measures to the local community. Engage with medical and emergency services about the scale, timing and workforce arrangements for the Project's construction phase. Develop accessible, adequate and responsive grievance and remedy mechanisms in the event of complaints. Open, transparent, timely and accessible communication of Project information, including transport routes. Develop policies and guidelines detailing expectations for Project workforce behaviours and safety.	**Medium (possible, minor)**
Health & wellbeing	**Construction**	**Risks to the construction workforce's health and wellbeing (negative)**	Construction workers	Low	Medium (possible, moderate)	Develop policies and guidelines detailing expectations for Project workforce behaviours and safety, and to support the workforce's health and mental health. Prohibit drugs or alcohol on-site at all times. If an onsite worker accommodation village (WAV) is utilised, consider the inclusion of telecommunication systems, gym and recreation spaces.	**Low (possible, minimal)**
Way of life	**Construction**	**Construction related social amenity impacts (traffic, air quality, noise) (negative)**	Host landholders Near neighbours Residents along haulage route Broader community	Low	High (likely, moderate)	Implement measures outlined in the Construction Environmental Management Plan, including traffic and noise management measures. Develop accessible, adequate and responsive grievance and remedy mechanisms in the event of complaints. Open, transparent, timely and accessible communication of Project information, including transport routes.	**Medium (possible, minor)**

Social impact category	Project phase	Potential impact (unmitigated)	Affected stakeholder group	Stakeholder significance (perceived)	Impact significance (unmitigated)	Mitigations / enhancement measures	Residual impact significance
Livelihoods	Construction Operation	Increased local employment opportunities Increased training opportunities Increased procurement opportunities (positive)	Job seekers Local and regional employment and training service providers Local and regional businesses, contractors and suppliers Local government Broader community	High	Medium (possible, minor)	Develop Industry Participation Plan in consultation with local stakeholders. As part of this, develop Local Jobs and training Program, Local Procurement Policy, Local Business Participation Plan and Aboriginal Participation Plan. Specific intent and mitigation measures for these plans are outlined in the SIA.	High (likely, moderate)
Livelihoods	Construction Operation	Strengthened economies (positive)	Local and regional businesses, contractors and suppliers Local accommodation providers, retailers, and food services Local government Broader community	High	High (likely, moderate)	Develop Industry Participation Plan in consultation with local stakeholders. As part of this, develop Local Jobs and Training Program, Local Procurement Policy, Local Business Participation Plan and Aboriginal Participation Plan. Specific intent and mitigation measures for these plans are outlined in in the SIA. Community Benefit Sharing Program. Communicate strategies clearly to community as per Community and Stakeholder Engagement Strategy. Collaborate with local councils and other key regional economic development stakeholders to support regional economic development initiatives.	Very high (likely, moderate)
Livelihoods	**Construction** **Operation**	**Local labour force impacts (negative)**	Residents Local businesses Broader community	Medium	High (likely, moderate)	Collaborate with local councils and other key regional economic development stakeholders to support local workforce development.	**Medium (possible, minor)**

Social impact category	Project phase	Potential impact (unmitigated)	Affected stakeholder group	Stakeholder significance (perceived)	Impact significance (unmitigated)	Mitigations / enhancement measures	Residual impact significance
Community	**Construction** **Operation**	**Changes in community composition, character, and cohesion (negative)**	Broader community	Medium	Medium (possible, minor)	Develop policies and guidelines detailing expectations for Project workforce behaviours and safety. Continue regular engagement with Councils and the community (through an elected community committee), particularly during construction, to discuss and adaptively respond to any emerging community and business concerns. Develop accessible, adequate and responsive grievance and remedy mechanisms in the event of complaints.	**Low (unlikely, minor)**
Access **Livelihoods**	**Construction** **Operation**	**Increased pressure on housing and accommodati on (negative)**	Residents Local businesses Service providers Broader community Visitors & tourists	High	High (likely, moderate)	Prioritise the use of the workers accommodation village at Balranald for most of the construction workforce. Explore the potential to accommodate some construction and operational personnel in Moulamein. This could be through use of existing short-term accommodation, and/or through development of housing stock in Moulamein for later use by Project staff or other form of community use. In locations where Project workers may live (particularly Hay and Moulamein), work with councils and other stakeholders to unlock both a) land for additional housing development, and b) the underutilisation of the existing housing stock (e.g. in Hay). Continue regular engagement with Councils, particularly during construction, to discuss and adaptively respond to any emerging community and business concerns. Engage with accommodation providers to avoid negatively impacting on tourism opportunities and vulnerable populations who are utilising temporary accommodation. Collaborate with local councils and other key regional economic development or social sector stakeholders to support housing responses in the region. Communicate workforce accommodation strategies clearly to community as per Community and Stakeholder Engagement Strategy.	**Medium (possible, minor)**

Social impact category	Project phase	Potential impact (unmitigated)	Affected stakeholder group	Stakeholder significance (perceived)	Impact significance (unmitigated)	Mitigations / enhancement measures	Residual impact significance
Access	**Construction** **Operation**	**Increased pressure on social infrastructure and services (negative)**	Broader community Local government Service providers	Medium	High (likely, moderate)	During construction, ensure some level of medical staffing at the worker accommodation village and at the Project site or within the town of Moulamein. Continue regular engagement with Councils and social service providers, to discuss and adaptively respond to any emerging community and business concerns. Develop policies and guidelines detailing expectations for Project workforce behaviours and safety. Engage with medical and emergency services about the scale, timing and workforce arrangements for the Project's construction phase. Community engagement as per the Community and Stakeholder and Engagement Strategy.	**Medium (possible, minor)**
Community	Construction Operation	Increased community investment (positive)	Broader community Community groups Environmental groups Local service providers Local government Vulnerable community members	High	Medium (almost certain, minor)	Development and implementation of the Community Benefit Sharing Program with Council and key stakeholders, including the local Aboriginal stakeholders. Provide ongoing opportunities for the local community (particularly the Moulamein community) to be involved in decision-making processes relating to the Project and the Community Benefit Sharing Program. Communicate strategies clearly to community as per Stakeholder and Community Engagement Plan.	High (almost certain, moderate)
Surroundings	**Construction** **Operation**	**Changes to landscape character and visual amenity (negative)**	Near neighbours Broader community Visitors and tourists	Medium	Medium (likely, mild)	Amendments to Project design to avoid areas of potentially high visual amenity impact. Implement measures outlined in the LVIA. Community engagement as per the Stakeholder and Community Engagement Plan.	**Medium (likely, mild)**

Social impact category	Project phase	Potential impact (unmitigated)	Affected stakeholder group	Stakeholder significance (perceived)	Impact significance (unmitigated)	Mitigations / enhancement measures	Residual impact significance
Surroundings	**Construction** **Operation** **Decomm.**	**Concern about impacts to the environment (negative)**	Host landholders Near neighbours Broader community Environmental groups	Medium	Medium (likely, minor)	Implement proposed soil, dust, and water management measures as outlined in the Construction Environmental Management Plan. Robust engagement with the community to allay concerns about the real and perceived impacts to the environment.	**Low (possible, minimal)**
Culture	**Construction** **Operation** **Decomm.**	**Potential harm to Aboriginal cultural values and heritage (negative)**	Aboriginal stakeholders	High	High (almost certain, moderate)	Amendments to Project design to avoid areas of potentially high cultural value. Implement mitigation measures outlined in the Aboriginal Cultural Heritage Assessment (ACHA), including preparation of a Cultural Heritage Management Plan (CHMP). Ongoing engagement with Aboriginal stakeholders throughout construction. Ensure that local Aboriginal people are given opportunity to facilitate Aboriginal Cultural Heritage Awareness Inductions and other related programs for the Project.	**Medium (unlikely, moderate)**
Surroundings	**Construction** **Operation** **Decomm.**	**Public safety and hazard risks (negative)**	Host landholders Proximal landholders Broader community Emergency services Environmental and community groups	High	Low (unlikely, minor)	Implement mitigation measures outlined in the Preliminary Hazards Assessment (PHA). Include biosecurity protocols as part of the Construction Environmental Management Plan. Communicate strategies clearly to community as per Stakeholder and Community Engagement Plan.	**Low (unlikely, minimal)**
Way of life **Health and wellbeing**	**Operation**	**Amenity impacts due to wind farm operations**	Host landholders Near neighbours	Low	Low (unlikely, minimal)	Amendments to Project design to meet operational noise criteria at all neighbouring dwellings. Implement mitigation measures outlined in the NIA. Communicate strategies clearly to community as per Community and Stakeholder Engagement Strategy.	**NA (as mitigations not required)**

Social impact category	Project phase	Potential impact (unmitigated)	Affected stakeholder group	Stakeholder significance (perceived)	Impact significance (unmitigated)	Mitigations / enhancement measures	Residual impact significance
		(noise) (negative)				Develop accessible, adequate and responsive grievance and remedy mechanisms in the event of complaints.	
Surroundings **Access**	Operation	Generation of renewable energy (positive)	Broader community Energy consumers NSW Government Federal Government	Medium	Medium (almost certain, minor)	Work with economic development stakeholders to showcase the Project and the industry within the region. Tell the positive story of the Project's success.	Medium (almost certain, minor)
Livelihoods **Surroundings**	**Operation**	**Concern about loss of agricultural land and productivity (negative)**	Broader community Agricultural producers Local businesses	Low	Low (likely, minimal)	Mitigation measures not required for low negative impact, however: Rehabilitation of land as per Environmental Management System.	**NA**
Decision-making systems	**Construction and Operation and Decomm.**	**Potential for lack of procedural fairness (negative)**	Near neighbours Broader community	Low	Medium (possible, minor)	Open, transparent, timely and accessible communication of Project information. Provide multiple Project contact options and feedback mechanisms for the community and stakeholders. Community feedback is demonstrably considered in Project planning. Develop accessible, adequate and responsive grievance and remedy mechanisms in the event of complaints. Provide ongoing opportunities for the local community (particularly the Moulamein community) to be involved in decision-making processes relating to the Project and the Community Benefit Sharing Program.	**Low (unlikely, minor)**
Decision-making systems	Construction and Operation and Decomm.	Increased agency for the local	Moulamein community	Medium	Medium (possible, moderate)	Support the Moulamein community in community planning and advocacy in negotiations with Council and other planning arenas.	NA

Social impact category	Project phase	Potential impact (unmitigated)	Affected stakeholder group	Stakeholder significance (perceived)	Impact significance (unmitigated)	Mitigations / enhancement measures	Residual impact significance
		community (positive)				Provide ongoing opportunities for the local community (particularly the Moulamein community) to be involved in decision-making processes relating to the Project and the Community Benefit Sharing Program.	

Note: If the stated impact has relevance within more than one category of social impact, this has also been listed.

Key uncertainties of the assessment

This assessment has included interviews with and surveys from stakeholders to understand social values. The sample sizes are small and may misrepresent the broader trends summarised. Notwithstanding, the results have provided important information to direct a risk-based assessment approach. No high negative risks have been identified.

6.4.4 Mitigation measures

As Table 6-26 identifies, the central component of managing social impacts is the framework provided by the:

1. Community and Stakeholder Engagement Strategy (CSES)
2. Industry and Aboriginal Participation Plan (IAPP)
3. Community Benefit Sharing Program (CBSP).

Where relevant, some of the mitigation and enhancement measures outlined in Table 6-26 have been consolidated into these overarching management strategies. As well, some social impacts of the Project will be managed primarily through the various environmental management plans identified in this EIS. These include the Cultural Heritage Management Plan, Construction Traffic Management Plan, Construction Noise Management Plan, Emergency Response Plan, and the Construction Environmental Management Plan. The Community and Stakeholder Engagement Strategy (CSES) will be the platform that ensures adequate linkage between these management plans and community concerns relating to these matters.

Further detail regarding the social mitigation and management measures is provided in the SIA (refer Appendix F4) and this will be sourced as more detailed management plans are developed for the Project.

Table 6-27 Social impact mitigation measures

ID	Mitigation measures	Project stage
SE 1	The Community and Stakeholder Engagement Strategy will be adaptive and updated as needed to respond to emerging community and stakeholder concerns. It will be updated in accordance with the recommendations of the Social Impact Assessment and the EIS community and stakeholder engagement program. The CSES will: • Facilitate open, transparent, timely and accessible communication of Project information with the aim of minimising uncertainty and to addressing concerns. • Address concerns about potential environmental, amenity and safety impacts (e.g., traffic, noise, visual). • Continue regular engagement with Councils. • Develop accessible, adequate and responsive grievance and remedy mechanisms in the event of complaints. • Provide ongoing opportunities for the local community (particularly the Moulamein community) to be involved in decision-making processes relating to the Project, the Community Consultative Committee, and the Community Benefit Sharing Program. • Ensure representation of Traditional Owners and other key local Aboriginal stakeholders.	Prior to construction

ID	Mitigation measures	Project stage
	• Communicate workforce accommodation plans • Engage with accommodation providers to avoid negatively impacting on tourism opportunities and vulnerable populations who are utilising temporary accommodation. • Communicate transport routes and local traffic management plans. • Collaborate with local councils and other key regional economic or social development stakeholders to support regional economic and social development initiatives. • Work with economic development stakeholders to showcase the Project and the industry within the region. Tell the positive story of the Project's success. • Ensure adequate linkage between environmental management plans stemming from the EIS and community concerns relating to these matters. • Engage with medical and emergency services about the scale, timing and workforce arrangements for the Project's construction phase.	
SE 2	Establish a Community Consultative Committee (CCC) in accordance with NSW Department of Planning, Housing and Infrastructure guidelines for State significant projects, with the intention to: • Establish good working relationships and encourage the proponent, committee members and other relevant stakeholders to share information • Allow the proponent to seek feedback from community representatives, stakeholder groups and councils or respond to project-related matters • Give community representatives, stakeholder groups and councils a forum to ask for information or give feedback on a project. • Provide ongoing opportunities for the local community (particularly the Moulamein community) to be involved in the CCC. Ensure representation of Traditional Owners and other key local Aboriginal stakeholders.	Pre construction and construction
SE 3	Develop an Industry and Aboriginal Participation Plan (IAPP) to achieve positive local employment and business outcomes for the Project. The IAPP will include the following components: • Local Jobs and Training Program • Local Procurement Policy and Local Business Participation Program • Aboriginal Participation Plan	Pre construction and construction

ID	Mitigation measures	Project stage
	• Workforce Management and Accommodation Plan See the SIA for more detail regarding specific measures that should be included within these plans.	
SE 4	Development of a Community Benefits Sharing Program (CBSP) which would aim to provide meaningful contributions to social and economic outcomes within the local and regional areas. Goldwind intends to invest $1,100 per MW / annum over the life of the Project (indexed to CPI) commencing from the time the Project becomes operational. The CBSP would consider benefits at both the local and regional scales. The program will include funding through two key streams: Voluntary Planning Agreements: • Funding contributions to projects that meet strategic community need. • Managed as two distinct agreements/funds by a) Murray River Shire Council and b) Hay Shire Council. Communities Fund: • Strategic community partnerships and/or projects • Community sponsorships • Education and employment initiatives (including Scholarship Program) • First Nations Initiatives, e.g., funding for local initiatives for community and/or employment purposes, education opportunities, support for cultural awareness in the local school network, cultural heritage protection support, support for activities relating to protection and understanding of cultural assets and values, especially those potentially relating to raising community understanding of Aboriginal cultural heritage values found at the site The communities Fund would be managed by Baldon Wind Farm in partnership with the community and key stakeholders. The First Nations component would be managed by an independent committee (yet to be determined) in partnership with the local Aboriginal community. The CBSP will also include consideration of a pre-construction sponsorship fund as well as the potential for in-kind contributions. Recommendations for community investment received during the Social Impact Assessment and the EIS community and stakeholder engagement program will be considered. See the full SIA at Appendix E4 for more detail.	Pre construction, construction and operation

ID	Mitigation measures	Project stage
SE 5	The developer would cooperate with other developers and wind farm operators in the region as necessary to address any cumulative social impacts (and potential cumulative benefits) that emerge, including participating in public forums organised by community groups, local Councils or government agencies, where relevant.	Construction and Operation

6.5. Traffic and transport

Amber Organisation Pty Ltd was engaged by NGH Pty Ltd to conduct a Traffic Impact Assessment (TIA) of the Baldon Wind Farm on behalf of Baldon Wind Farm Pty Ltd (the Applicant). The TIA is attached as Appendix F.5 of this EIS. The TIA includes separate haulage route studies completed by Rex J Andrews.

6.5.1 Assessment approach

The Traffic Impact Assessment was prepared to assess the construction, operational, and decommissioning traffic impacts, and the access arrangements of the Project.

The assessment responds to the SEARs and details how road impacts of the Project traffic, particularly from heavy vehicle use and oversize/overmass (OSOM) vehicles, will be avoided or managed using road-use management strategies.

More specifically, the TIA addresses the following key matters:

- Details of both light and heavy vehicle traffic volumes and proposed transport routes during construction, operation, and decommissioning;
- An assessment of the potential traffic impacts of the Project on road network function and safety;
- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the Project, including OSOM vehicles;
- Details of measures to mitigate and/or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control dust generated by traffic volumes; and
- Details of access roads and how these connect to the existing road network and ongoing operational maintenance.

The traffic assessment has been undertaken in accordance with the RTA Guide to Traffic Generating Developments (RTA Guide) and relevant Austroads Guidelines.

6.5.2 Existing environment

The Project area is currently used for agricultural purposes and has access to the road network via a network of internal tracks which connect with Sturt Highway and the surrounding local road network.

Sturt Highway is a NSW State road under the care and management of Transport for NSW (TfNSW). It runs in a general east-west alignment between Tarcutta in New South Wales and Gawler in South Australia. Within the vicinity of the site, it has a carriageway width of approximately 11.0m accommodating one 3.5m wide traffic lane and a 2.0m wide shoulder in each direction. A speed limit of 110 km/hr applies along the road.

Baldon Road is a municipal local road that runs in a general north-south alignment between the Project area and its continuation as Tchelery Road in Moulamein. It has an unsealed carriageway with a typical useable width of approximately 6.0m which accommodates two-way vehicle movement. The road is subject to the default rural speed limit of 100 km/hr.

Traffic volumes

Amber commissioned a tube count on Sturt Highway near the proposed site access in order to determine the existing road environment. The tube count was undertaken from Monday 5 February to Sunday 11 February 2024. The hourly traffic volumes have been separated into westbound and eastbound vehicles and are shown in Figure 6-22. The survey results are provided in Appendix C of TIA.

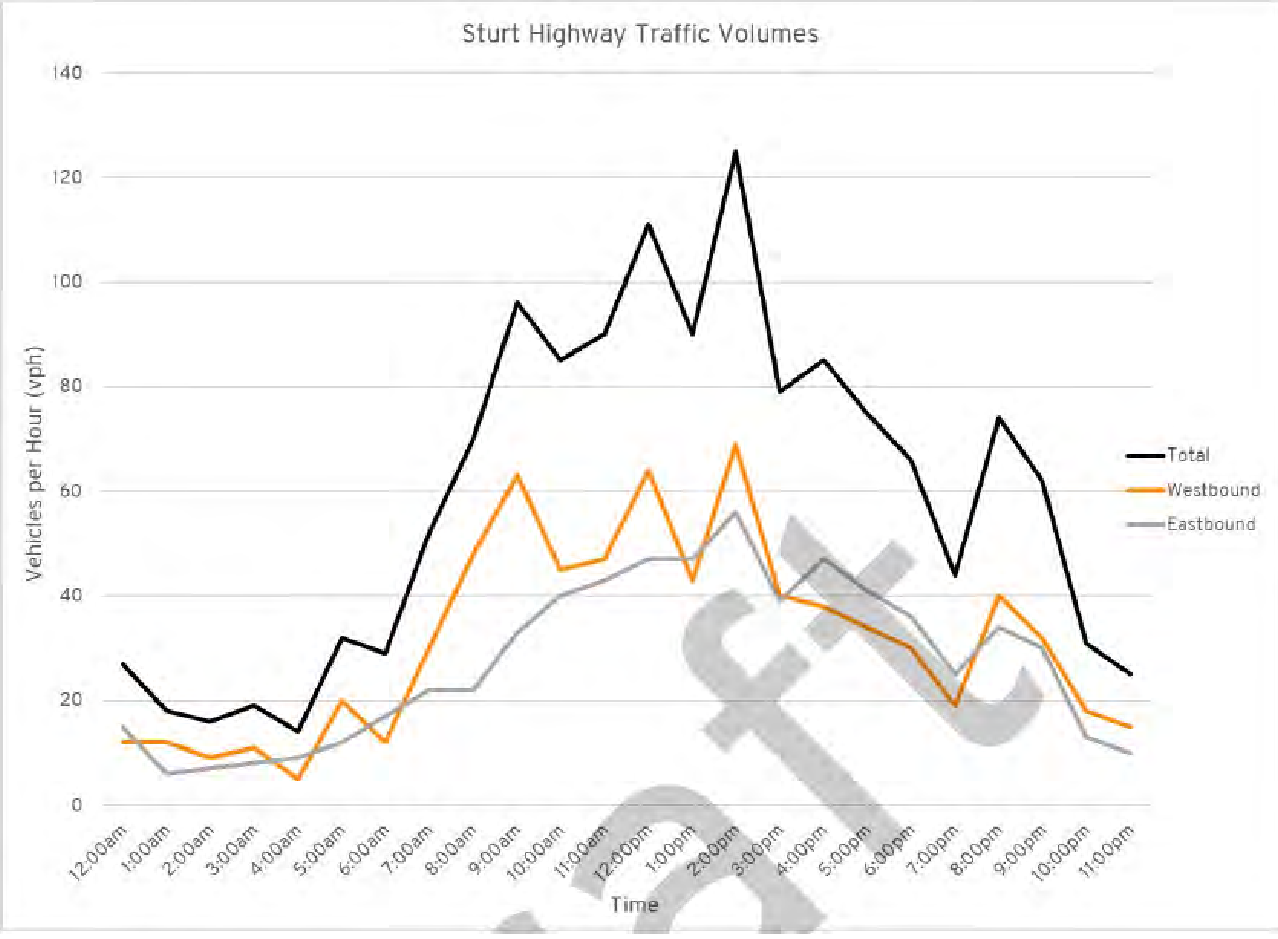


Figure 6-22 Sturt Highway weekday traffic volume data

The survey data indicated Sturt Highway currently experiences most vehicular traffic between the hours of 7:00am and 10:00pm. The data also indicates the road experiences a relatively even distribution of traffic across the day in both directions, although there is a bias toward westbound traffic during the morning hours. Overall, the survey results indicate Sturt Highway currently accommodates a low level of traffic for its road classification.

No traffic volume data was available for Baldon Road. Amber carried out an on-site inspection of the road between 15-16 February 2024 which indicates that the road accommodates approximately 20 vehicles per day.

Public transport

Regional Bus Service 725/726 (Cootamundra-Mildura) operates along Sturt Highway in the vicinity of the site, with the nearest stops located within the townships of Balranald and Hay. A single service operates daily in each direction, passing the site at approximately 6:15am in the eastbound direction (toward Hay) and 8:30pm in the westbound direction (toward Balranald).

Moore's Bus Lines has advised that the following services travel near the Project Area:

- A school bus service operates between Balranald and Waugorah Road. Buses travel along Sturt Highway around 8:15am eastbound and 3:40pm westbound on school days.
- A charter service operates between Buronga and Lockhart. Buses travel along Sturt Highway 9:00-9:30am eastbound and 7:00-7:30pm westbound every second Sunday.

Restricted vehicle access

The TfNSW Restricted Vehicle Access Map for the surrounding area shows that the Project area has access to the B-Double approved road network via Sturt Highway and the surrounding State road network which are approved for **26m B-Doubles**. The Project Area also has convenient access to the **Class 1 OSOM** approved road network via Sturt Highway and the surrounding State road network.

Accordingly, the Project area has access to the **SPV Level 4 and 12t per axle** approved road network via Sturt Highway between Hay and Balranald. It is noted that **Level 6 SPV** vehicles may have limited route options to access the site due to restricted structures (bridges) including:

- Bridge over Murrumbidgee River in Hay;
- Bridge over Murrumbidgee River in Balranald; and
- Bridges no. 1-3 approach over Murrumbidgee River Flood Plain in Balranald

Crash history

Amber had conducted a review of the TfNSW Centre for Road Safety Crash and Casualty Statistics database for all injury crashes within the surrounding area of the Project. The crash search indicates that there are no discernible crash trends within the surrounding road network, and the crashes are generally distributed along Sturt Highway. A total of 19 casualty crashes were recorded along a 130km length of Sturt Highway which equates to an average of 0.03 crashes per kilometre per annum over the five-year search period. It is noted that this is significantly lower than the criteria for a 'Black Spot' road length which is an average of 0.2 casualty crashes per kilometre per annum.

The most common crash type involved vehicles leaving the road. Two 'head on' fatal crashes were also recorded. The crash types and number of recorded crashes would not be unexpected on a long section of undivided rural road.

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

6.5.3 Potential impacts

Impacts of the Project on local traffic could include:

- Damage to the road assets, including Baldon Road which is a Council asset.
- Delays for local traffic.
- Increased risks to road users.

Impacts are most relevant to peak construction, when Project traffic volumes would be at their highest, but operational impacts are also considered where relevant in the evaluation below.

Construction impacts

Traffic volumes and distribution

The construction of the Project is anticipated to commence in Q4 of 2025 and would take approximately 3.5 years, with a rotating roster for the various staff and contractors necessitating 7 days per week (6am – 6pm) working hours. Various activities will be required to occur outside these hours to meet environmental and technical requirements, such as concrete pours and turbine installations. Any construction outside of these normal working hours would only be undertaken with prior approval from relevant authorities and consultation with impacted road users.

The peak construction period expected to occur between months 9 to 24 (i.e. the peak construction period would be 15 months). A construction workforce of up to 400 full-time equivalent personnel would be on-site during the peak construction phase. It is proposed the Project would utilise the existing Energy Connect accommodation camp in Balranald for approximately 300 staff with shuttle buses provided for workers to access the site. In the event that the Balranald camp is not available for use by the Project, an on-site accommodation camp would be provided. The remaining 100 personnel will primarily be drawn from the nearby towns of Balranald and Hay with a very small proportion potentially residing in Moulamein.

The construction schedule and the number of workers expected on-site throughout the various stages are provided in Section 3. The indicative number of return vehicle trips generated throughout the construction period are provided in Figure .

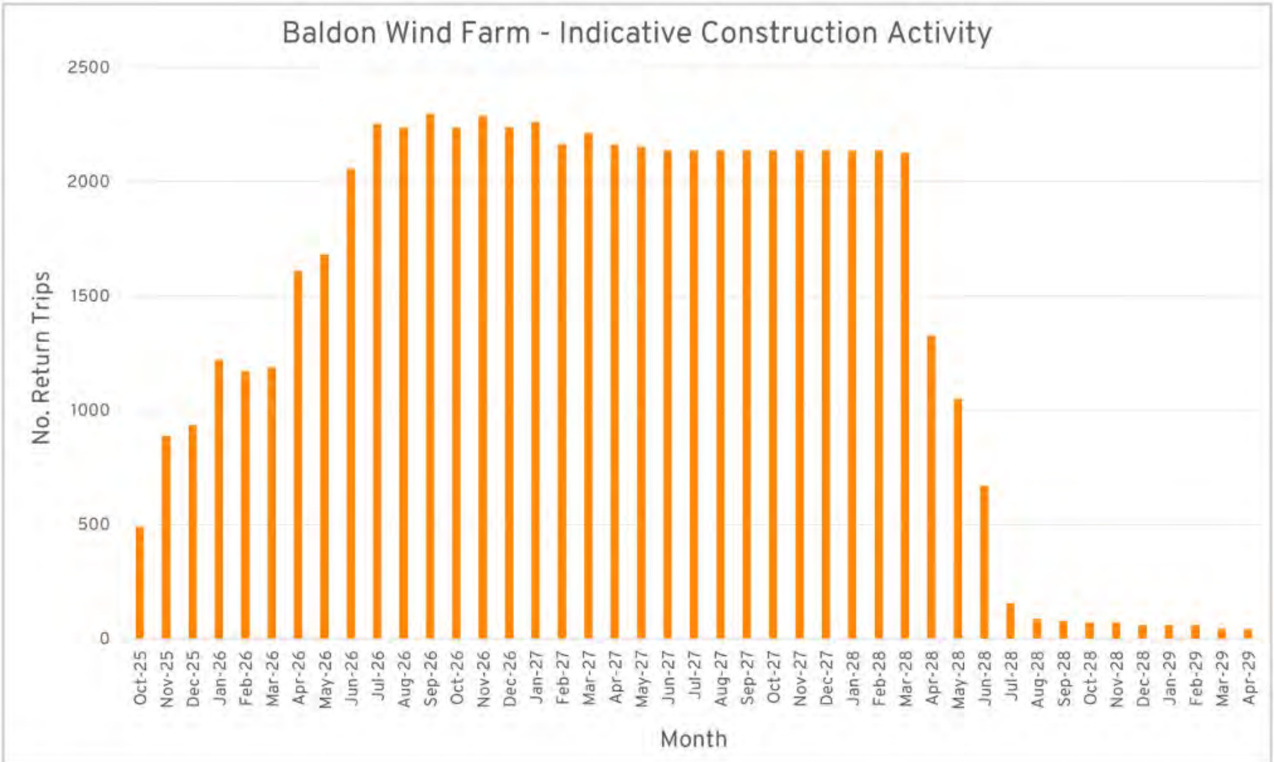


Figure 6-23 Indicative vehicle trips during construction (source Goldwind)

For the purposes of the traffic impact assessment, it has been assumed that the accommodation camp would be located in Balranald which represents a conservative (worst-case) scenario for traffic generation.

All oversize/overmass (OSOM) deliveries would originate from the Port of Adelaide or Port of Newcastle including the wind turbine components. The remaining plant would be imported via Port of Adelaide and can be transported to the site using B-Doubles or shorter configurations. Materials and equipment will generally be sourced from within the surrounding area where practicable. All vehicles are proposed to access the Project area via Sturt Highway.

Materials including gravel and reinforcing steel, and equipment such as cranes, excavators, and trench diggers, as well as water required during construction will be sourced from within the surrounding area where practicable. Construction also includes fixed or mobile concrete batching plant(s), and office buildings and substations for the construction and operational phases (e.g. maintenance) of the Project.

Construction traffic generated by the Project on a day-to-day basis can be broadly separated into the following categories as outlined in Table 6-28.

Table 6-28 Standard construction traffic

Vehicle	Definition
Light vehicles	Light vehicles will be associated with transporting the workforce to/from the Project. A conservative vehicle occupancy of 1.5 people per car has been adopted to calculate the light vehicle traffic generation noting the workforce would be encouraged to carpool.
Shuttle Buses	Shuttle buses are proposed to transport the majority of the workforce between the Project area and the accommodation camp in Balranald. It is estimated that each shuttle bus would transport an average of 50 personnel.
Rigid trucks	Rigid trucks will be used to deliver raw materials and smaller plant and have a typical length between 8 and 13 metres.
Truck and Dog	Truck and Dog vehicles consist of a rigid truck towing either a dog trailer or a pig trailer and are not more than 19 metres in length. A dog trailer is a trailer with axles at either end of the trailer, a pig trailer has the axles centred on the trailer. These vehicles will be utilised to transport the majority of quarry materials to/from the site.
Semitrailers	Semitrailers will be used to transport larger equipment and materials. These vehicles consist of a truck and a single trailer with a total length of 19 metres.
B-Doubles	B-Doubles will also be used to transport larger plant. B-Doubles consist of a truck with two trailers and have a maximum length of 26 metres.

The peak hour for construction traffic will occur at the start and end of the day when workers are transported to/from the Project area. The assessment expects most workers to arrive on-site between 5:00am and 6:00am and depart between 5:00pm and 7:00pm.

It is anticipated that during peak construction the Project would generate up to 134 light vehicles and 142 heavy vehicles per day. Table 6-29 summarises the forecast traffic volumes expected to be generated during the construction period of the Project.

Overall, the Project is expected to generate up to 87 vehicles per hour in the morning and evening peak hours during the peak construction period, with an average of 54 vehicles per hour during the peak hours across the entire construction period.

Table 6-29 Estimated traffic generation during construction period

Vehicle type		Average vehicle movements per day (Construction period)		Peak vehicle movements per day (Construction period)	
		Daily (vph)	Peak hour (vph)	Daily (vph)	Peak hour (vph)
Light Vehicle		80	40	134	67
Heavy Vehicles	Shuttle Bus	8	4	12	6
	Rigid Trucks	6	1	10	1
	Truck and dog	66	7	108	11
	Semitrailer	4	1	6	1
	B-Double	4	1	6	1
	HV Subtotal	88	14	142	20
Total		**168**	**54**	**276**	**87**

Vehicles built for a purpose other than carrying goods such as a mobile crane, a concrete pump or drill rig are defined as Special Purpose Vehicles (SPVs) and may also be classified as oversized and overmass (OSOM) vehicles. OSOM vehicles will contribute the smallest percentage of vehicles accessing the Project area during the construction period and are subject to separate permit applications and regulations. The movement and impact of these vehicles, and the subsequent road upgrades required, are discussed within Appendix F.5.

During the morning peak all vehicles would travel towards the Project area and in the evening peak all vehicles would travel away from the Project area. Heavy vehicles would be distributed throughout the day and the number of inbound and outbound vehicles would be split evenly.

The resulting peak hour volumes generated by the Project along Sturt Highway are outlined in Figure 6-24.

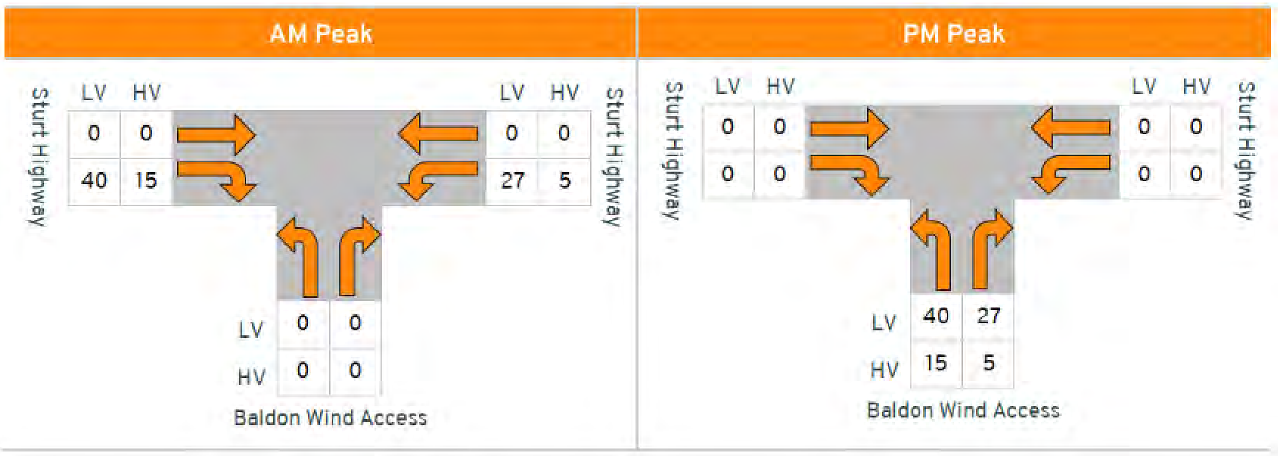


Figure 6-24 Project traffic at the intersection of Sturt Highway and site access

Cumulative impacts

The primary traffic impact of the Project is generated during construction which is anticipated to commence in Q4 of 2025 and take approximately 3.5 years. A summary of the major projects proposed in the surrounding area is assessed. Four projects have the potential to generate additional traffic along Sturt Highway between Balranald and Hay during the construction period. These projects are Tchelery Wind Farm, Keri Keri Wind Farm, Keri Keri Solar Farm and Wilan Wind Farm.

The 330KV Project Energy Connect Transmission line has a 1270MW capacity limitation and access to this network is dependent on obtaining access rights from the NSW Government. Therefore, it is unlikely that the Baldon Wind Farm and neighbouring projects will all gain access rights and be constructed. While it is not possible to determine which projects will be successful, the TIA considered that the potential for cumulative traffic impacts with neighbouring projects is limited by the overall transmission capacity and therefore reduces risk of the cumulative impacts on the operational road network.

Intersection performance

In order to determine the ability of the road network to accommodate the traffic expected to be generated during the peak construction period, an analysis of the operation of the site access on Sturt Highway was carried out using the SIDRA computer modelling program.

The modelled traffic volumes at peak hours consist of the sum of the following:

- Existing surveyed traffic volumes along Sturt Highway adjusted by a 1.5% compounded annual growth rate to reflect the end of the construction period in 2029
- Construction traffic volumes outlined within Figure 6-24.

The result of SIDRA analysis indicated the following:

- The intersection is expected to operate with minimal queue lengths on all legs of the intersection;
- The overall average delay at the intersection is 6.2 and 0.4 seconds in the morning and evening peak hours respectively, which predominantly reflects vehicles slowing to manoeuvre at the intersection; and
- The intersection is expected to operate with good level of service. It is noted that the intersection would not change from LOS A.

Accordingly, the site access on Sturt Highway is expected to be able to readily accommodate the traffic movements generated during peak construction once upgraded.

Turn Treatments

The requirement to provide turn facilities at the site access on Sturt Highway is primarily generated during the morning peak hour when the workforce access the site, which occurs from 5:00am to 6:00am. The traffic volumes used for the assessment are provided in Figure 6-24.

The associated traffic volumes have been plotted within the Austroads Guide to Traffic Management chart which shows that the site access would require a Basic Right Turn (BAR) and Basic Left Turn (BAL) treatment. The required turn treatments are proposed to be provided at the site access and have been designed in accordance with the requirements of the Austroads Guide. The proposed layout is shown in Appendix F of TIA.

In order to confirm the site access can accommodate B-Double vehicles a swept path assessment has been provided within Appendix F using the Autodesk Vehicle Tracking software. The assessment demonstrates that the vehicle is able to suitably turn to/from Sturt Highway with the inclusion of the proposed turn treatments. A swept path assessment is also provided within the RJA Report which indicates that the OSOM vehicles are able to suitably access the site. Accordingly, it is concluded that the site access has been suitably designed and is able to accommodate the vehicles expected to access the site.

Sight distance

The required SISD along Sturt Highway at the site access is 341m based on a design speed of 120km/hr and a reaction time of 2.5 seconds. The available sight distance exceeds the requirements of the Austroads Guide given the relatively flat and straight alignment of the road network with vegetation limited to low-level ground cover.

The secondary access on Baldon Road forms a continuation of the existing local road alignment which also provides suitable sight distance. Accordingly, vehicles are expected to be able to safely enter the road network from the Project area.

Mid-block assessment

Sturt Highway currently carries in the order of 71 vehicles in the PM peak hour which would increase to approximately 126 vph with the Project traffic (approximately one vehicle every 30 seconds on average). Although the traffic would consist of 50% of heavy vehicles, the impact of additional heavy vehicles on peak hour flow along level terrain roads is relatively low. The assessment indicates that there is adequate capacity within the road to accommodate the additional light and heavy vehicle traffic.

Baldon Road carries estimated daily traffic of up to 20 vehicles per day. Accordingly, the additional light vehicles would be readily accommodated on the local road network given the road width (6m) which accommodates a very low level of existing traffic and provides adequate road width for two-way light vehicle movement.

Route assessment

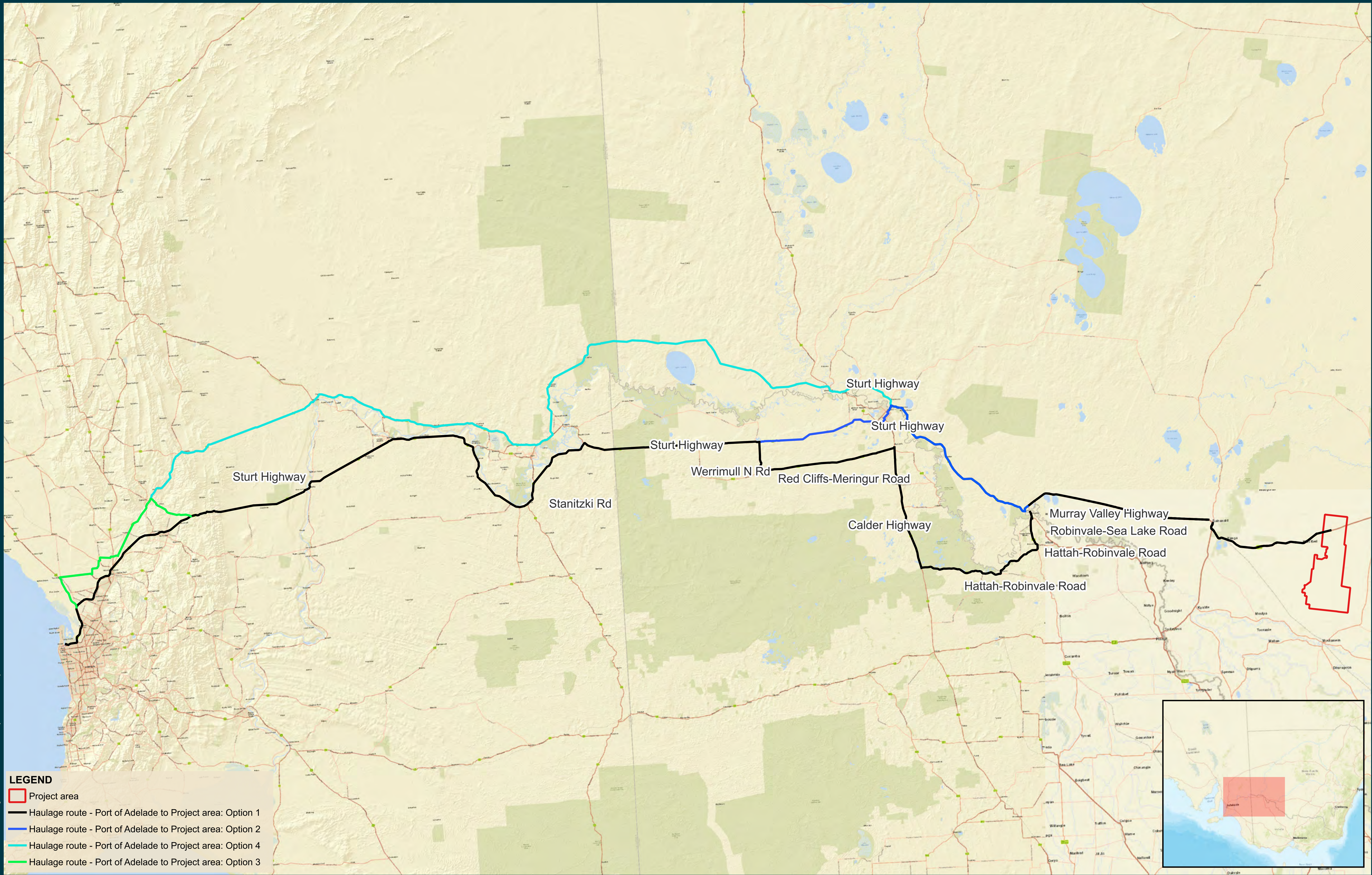
A route assessment was carried out from both the Port of Adelaide and the Port of Newcastle to the Project area as shown in Figure 6-25 and Figure 6-26.

<u>Adelaide route</u>

For the Port of Adelaide route four route options, responding to dimension and weight constraints, were assessed as described in Table 6-30.

Table 6-30 Proposed OSOM access routes from Port of Adeliade

Route No	Description	Components	Distance (km)
1	Port Adelaide to Baldon Wind Farm via Robinvale	All vehicles transporting the blades which are transported in one piece and form the longest component.	676
2	Port Adelaide to Baldon Wind Farm Via Mildura	All other components which are up to 40m overall load length and have a maximum loaded height of up to 5.2m.	628
3	Port Adelaide to Baldon Wind Farm - High Load Detour Route Option 1	All other components which have a maximum loaded height between 5.2m and 6.3m (e.g. tower sections and transformers)	654
4	Port Adelaide to Baldon Wind Farm – High Load Detour Route Option 2		677



Baldon Wind Farm

Proposed Haulage route from Port of Adelade to Project area

Datum: GDA2020 / MGA Zone 55

NGH

0 50 100 150 200 km

Ref: 22-366 Baldon Wind FarmStream buffer 20240412 \ Haulage route Port of Adelade to Project area Author: Kyle Mercer Date created: 31.07.2024 © NGH 2024 © ESRI 2022

The Adelaide access routes will utilise the local road network from the Port of Adelaide to access the State Road network via Port River Expressway and then North-South Motorway. Routes 1 and 2 both continue onto Sturt Highway, with Route 1 bypassing Mildura to cross into NSW near Robinvale, while Route 2 enters the State from Mildura. Routes 3 and 4 detour around the Northern Expressway in South Australia via Roseworthy and Kapunda. Route 3 then continues onto Sturt Highway to access the site via Mildura, while Route 4 utilises the Thiele Highway, Goyder Highway and Renmark Road before joining the Sturt Highway near Mildura.

Regular passing opportunities are provided along each route to allow general traffic to pass OSOM vehicles given there are a number of sections which would require the OSOM vehicles to utilise the full width of the road. Rest areas have been identified which would allow for regular driver breaks and passing opportunities for general traffic.

Use of the rest stops will be included as part of the future Traffic Management Plan for OSOM vehicle access that is to be prepared by the appointed contractor prior to construction.

The route assessment report identifies a number of railway level crossings along each of the access routes. Written approval will be sought from the relevant rail authorities for all level crossings as part of the TMP. The impacts of OSOM traffic on the level crossings are expected to be suitably managed through the proposed treatments and mitigation measures outlined in the advice from each of the rail authorities.

A detailed review of the load limits on all bridges and structures along the route will be undertaken as part of the permit process for the OSOM vehicles. It is noted that the majority of the bridges have been traversed previously with similar loads, and therefore it is expected that the Project loads will be within the allowable limit for bridges, culverts and other structures on the State Road network.

The route assessment report identifies the relevant overhead structures along each route which limit overall loaded heights as outlined below:

- Routes 1 and 2: Subject to 5.2m maximum loaded height due to overpasses along the Northern Expressway (SA)
- Routes 3 and 4: Subject to 6.3m maximum loaded height due to overpasses along Northern Connector (SA).

A review of the OSOM access routes has been undertaken to identify locations where vulnerable road users may be present on the road network. The assessment focused on facilities such as schools and hospitals that are attended by vulnerable road users including children or people with disabilities. Table 16 of TIA identifies locations where these facilities are provided, and locations identified where there is a possibility for OSOM vehicles to interact with vulnerable road users are highlighted within the table. The peak operating times at these locations should be identified and, where possible, OSOM transport avoided near these facilities during peak times which would be included as part of the TMP.

Port of Newcastle route

For the Port of Newcastle route three route options, responding to dimension and weight constraints, were assessed as described in Table 6-31.

Table 6-31 Proposed OSOM access routes from Port of Newcastle

Route No	Description	Components	Distance (km)
1	Port of Newcastle to Baldon Wind Farm via Wagga Wagga Distance (km) (max. loaded height 4.9m)	All vehicles transporting the blades which are transported in one piece and form the longest component.	957

Route No	Description	Components	Distance (km)
2	Port of Newcastle to Baldon Wind Farm via Dubbo (max. loaded height 6.2m)	All vehicles transporting the tower sections which form the widest and tallest components.	1,029
3	Port of Newcastle to Baldon Wind Farm via Wagga Wagga (max. loaded height 5.3m)	All vehicles transporting other components such as nacelles, drivetrains, hubs and smaller components.	957

Routes 1 and 3 travel south from Newcastle via the Sydney metropolitan area and make use of the same roads except Route 1 utilising M11 (Northconnex) while Route 3 detours via Pennant Hills Road to achieve a greater height clearance. Route 2 travels west from Newcastle to access the Project Area via regional NSW, bypassing towns along the route where possible.

Regular passing opportunities are provided along each route to allow general traffic to pass OSOM vehicles given there are a number of sections which would require the OSOM vehicles to utilise the full width of the road. Rest areas have been identified which would allow for regular driver breaks and passing opportunities for general traffic.

Use of the rest stops will be included as part of the future Traffic Management Plan for OSOM vehicle access that is to be prepared by the appointed contractor prior to construction.

The route assessment report identifies a number of railway level crossings along each of the access routes. Written approval will be sought from the relevant rail authorities for all level crossings as part of the TMP. The impacts of OSOM traffic on the level crossings are expected to be suitably managed through the proposed treatments and mitigation measures outlined in the advice from each of the rail authorities.

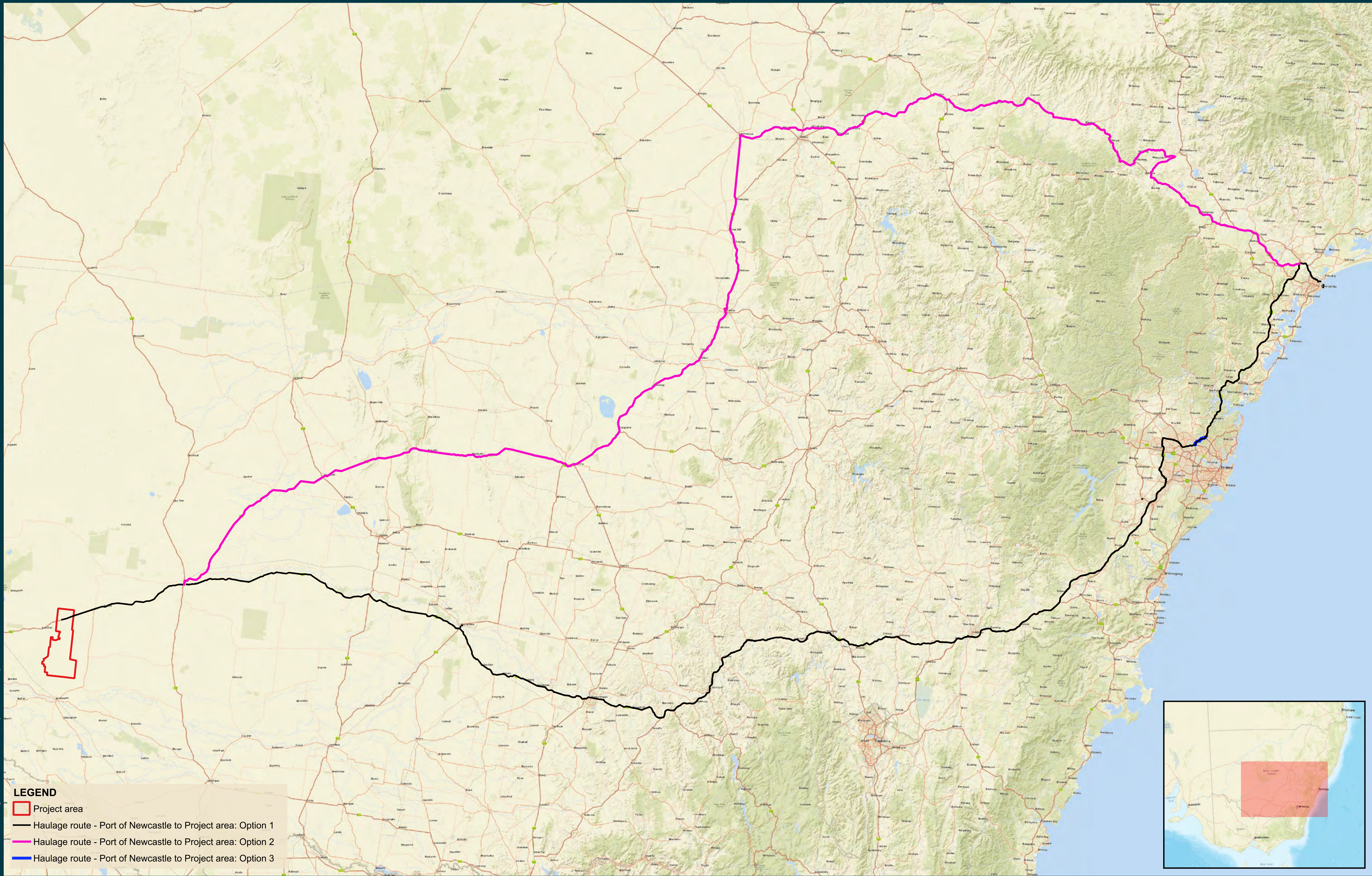
A detailed review of the load limits on all bridges and structures along the route will be undertaken as part of the permit process for the OSOM vehicles. It is noted that the majority of the bridges have been traversed previously with similar loads, and therefore it is expected that the Project loads will be within the allowable limit for bridges, culverts and other structures on the State Road network.

The route assessment report identifies the relevant overhead structures along each route which limit overall loaded heights as outlined below:

- Route 1: Subject to a 4.9m maximum loaded height due to M11 Motorway (Northconnex) tunnel.
- Route 2: Subject to a 6.2m maximum loaded height due to gantry along New England Highway at Hexham.
- Route 3: Subject to a 5.3m maximum loaded height due to M1 Motorway bridge under Morgans Road in Mount White.

Furthermore, it is noted that the blade route (Route 1) passes beneath a rail bridge on Sturt Highway (Edward Street) in Wagga Wagga. While the bridge has a minimum height clearance of approximately 5.25m, a detailed vertical curve assessment will be required given the length of the blades and profile of the road. The RJA Report notes that there is no feasible alternative to avoid this bridge and in the event that the route is found to be unsuitable, it is likely that the Port Adelaide option would be utilised for OSOM transport.

A review of the OSOM access routes has been undertaken to identify locations where vulnerable road users may be present on the road network. The assessment focused on facilities such as schools and hospitals that are attended by vulnerable road users including children or people with disabilities. Table 20 of the TIA identifies locations where these facilities are provided, and locations identified where there is a possibility for OSOM vehicles to interact with vulnerable road users are highlighted within the table. The peak operating times at these locations should be identified and, where possible, OSOM transport avoided near these facilities during peak times which would be included as part of the TMP.



Ref: 22-366 Baldon Wind FarmStream buffer 20240412 \ Haulage route Port of Newcastle to Project area Author: Kyle Mercer Date created: 31.07.2024 © NGH 2024 © ESRI 2022

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Baldon Wind Farm

Proposed Haulage route from Port of Newcastle to Project area

Operation impacts

During operation the Project is expected to generate a minimal level of traffic associated with maintenance and operation services. The wind farm is expected to be operated by up to 35 maintenance staff resulting in a traffic generation of up to 70 vpd which would result in a negligible change to the traffic environment. There would also be occasional light commercial vehicles delivering parts to the site but only as required for maintenance.

Decommissioning impacts

Traffic generation during decommissioning would be similar to traffic generation during the construction period. A comprehensive Traffic Management Plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained.

Key uncertainties of the assessment

Traffic numbers are estimated in advance of the construction program being developed in detail. Limitations are stated that will ensure any higher requirements will trigger additional assessment. Cumulative traffic loads factoring in other large developments cannot be known with certainty so far in advance of construction. A mitigation measure to address this is captured below.

Findings

The Project is expected to generate the highest level of traffic during the peak construction period. The assessment presented above indicates that the road network is able to accommodate the Project traffic during the peak construction period. The site access on Sturt Highway is expected to operate within minimal queues and delays, and the mid-block sections within the vicinity of the site are also expected to continue to operate with a good level of service.

During construction the traffic volumes throughout the middle of the day are expected to be predominantly associated with heavy vehicles with approximately 9 vph. This increase in traffic can be readily accommodated on the road network given the existing low traffic volumes and the fact that the road network would operate with less vehicles than during the peak hours.

It is anticipated that approximately 1,203 OSOM vehicles would be required to access the site during the construction period. The vehicles would be unloaded and kept to their smallest practicable dimensions when departing the site.

During operation the periodic increase in traffic of up to 70 vpd associated with the maintenance personnel would result in a negligible change to the traffic environment.

The road network is able to readily accommodate the traffic generated by the Project during the construction, operation, and decommissioning periods. Specific mitigation measures have been included to address road safety risks and ensure that road asset impacts are borne by the Applicant.

6.5.4 Mitigation measures

Safeguards and mitigation measures to address hydrology and hydraulic risks are provided in Table 6-32.

Table 6-32 Traffic and transport impact mitigation measures

ID	Mitigation measures	Project stage
T1	A Construction Traffic Management Plan (CTMP) will be prepared and implemented. The TMP should be prepared in consultation with TfNSW and relevant councils and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. The TMP would provide additional information regarding the traffic volumes, distribution and vehicle types broken down into: • Hours and days of construction. • Schedule for phasing/staging of the Project. • The origin, destination and routes for: o Employee and contractor light vehicles. o Heavy vehicles. o OSOM vehicles The TMP will include but not be limited to the following key safety initiatives: • Designated transport routes, access and delivery schedules, • Emergency access, • Driver Code of Conduct, • Implementation of the shuttle bus program, • OSOM vehicle haulage and operating protocols, • Heavy vehicle scheduling to avoid peak school bus times to limit the interaction of larger vehicles and vulnerable road users • Key information relating to road safety to be provided to all staff, • Consultation with neighbours and local authorities regarding heavy vehicle and OSOM deliveries, • Regular dilapidation reports to be provided to ensure the road network is kept in a safe condition, • Suitable signage on Sturt Highway and surrounding roads to advise road users of changed conditions, and • On-site requirements including: o Parking o Loading, unloading and storage o Speed restrictions o Appropriate dust suppression measures o o Maintenance program for access tracks to ensure safe access	Prior to and during construction
T2	Provide turn treatments at the site access on Sturt Highway to accommodate construction traffic.	Prior to construction

ID	Mitigation measures	Project stage
T3	Implement road upgrades (and obtain relevant approvals) where required to facilitate OSOM transport vehicles successfully accessing the site from the Ports of Adelaide or Newcastle.	Pre/during construction (prior to movements)
T4	Three identified secondary access points would only be used in the event of emergency. The southern secondary access point on Baldon Road may be used by up to 10 light vehicles per day travelling to/from Moulamein. All other vehicles associated with the Project construction and/or decommissioning will enter and exit the Project area via the designated primary site access location off the Sturt Highway.	Construction
T5	Shuttle buses would be used to transport workers to and from the Project area from the existing accommodation camp in the nearby town of Balranald (if used).	Construction
T6	Where possible the movement of OSOM vehicles is timed to not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network.	Construction

6.6. Hydrology

6.6.1 Assessment approach

Interrelated soil and water impacts

The aim of investigating and managing hydrology and hydraulic impacts is to ensure that the Project activities and components are designed and located so that run off, flood extent and velocity are not substantively changed. This maintains the morphology and stability of river banks. It maintains the existing health of waterways, including the habitat, water quality and volumes they provide. It maintains existing flow paths, protecting vegetation communities and habitats adapted to this pattern. It also ensures that structures and other assets are protected from flood impacts.

Hydrology, Water and Soils are interrelated areas, as set out below. Hence, cross references are made to the Water and Soils section of the EIS (Section 6.8), where appropriate, to avoid duplication.

- Hydrology: This chapter addresses the likely impacts of the Project on flooding, on surface and groundwater resources traversing the site, surrounding watercourses, drainage channels, wetlands and riparian land.
- Water and Soil: Section 6.8 considers impacts of soil disturbance and water use. It considers water availability, allocations and impacts on water sources and includes impacts to farm dams, groundwater dependent ecosystems and acid sulfate soils, related farm infrastructure, adjacent licensed water users and basic landholder rights.

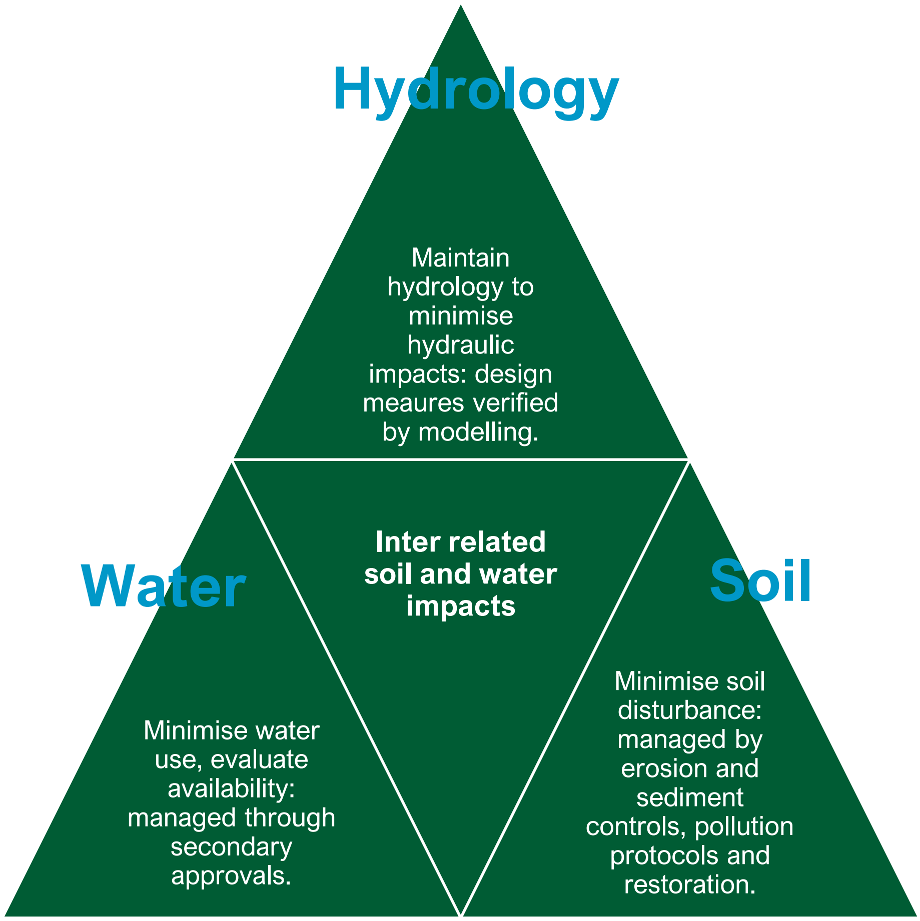


Figure 6-27 Interrelated soil and water impacts and management measures

Risk-based approach

To understand the existing environment, a hydrological risk analysis examining data from nearby waterways, including the Murrumbidgee and Edward Rivers was undertaken. Collaboration with the three intersecting councils (Hay, Murray River, and Edward River Councils) and the Department of Planning, Housing and Infrastructure facilitated the gathering of available relevant information. Specifically, the review included:

- Previous flood studies, mapping, and historical data near, but not covering, the Project area
- Stream gauge data analysis, and
- Examination of available topographical and mapping information.

The Applicant has taken a qualitative risk-based approach to assessing impacts on local hydrology and commits to performance-based outcomes. Quantitative modelling is committed to during the detailed design phase to verify the proposed performance criteria have been met. This section sets out a transparent risk assessment which identifies potential unmitigated risks and qualitatively assesses if feasible mitigation is readily achievable in the later detailed development of Project. This is considered appropriate on the basis that low risks have been identified and mitigation strategies able to address them are standard with high levels of confidence.

6.6.2 Existing environment

Surface water and topography

The Project area is situated between the major waterways of the Murrumbidgee River to the north and the Edward River to the South. To the north and south are floodplains that form part of the Murrumbidgee and Murray drainage systems. Land immediately adjacent the northern boundary of the Project area is identified as forming part of the Lowbidgee floodplain (Uara Creek). The broader regional waterways are shown in Figure 6-28.

The most significant surface water feature is Abercrombie Creek (Strahler 9th order) which passes through the middle of the Project area at a slightly lower elevation than areas to the north and south of its alignment. This is an ephemeral creekline that is predominantly dry except during significant periods of rainfall.

The Abercrombie Creek catchment is the main contributing catchment to the Project area. Forest Creek to the southeast also intersects the Project area, however the catchment's area of influence is primarily to the south outside of the proposed Project's Disturbance corridor.

Moores Creek is the nearest perennial stream to the south of the Project area. This creek runs over Baldon Road about 10km south of the Project's southern access point.

Throughout the site there are natural depressions including Gunyah Swamp that is located within the southern portion of the Project area, Rawley's Lake and several unnamed watercourses (refer to Figure 6-29). All of the natural water features onsite are ephemeral (refer to Figure 6-30 and Figure 6-31). The only permanent waterbodies on the site are man-made farm dams.

There are 265 historical irrigation canals present on the subject land. Many of these are currently dry and none remain operational.

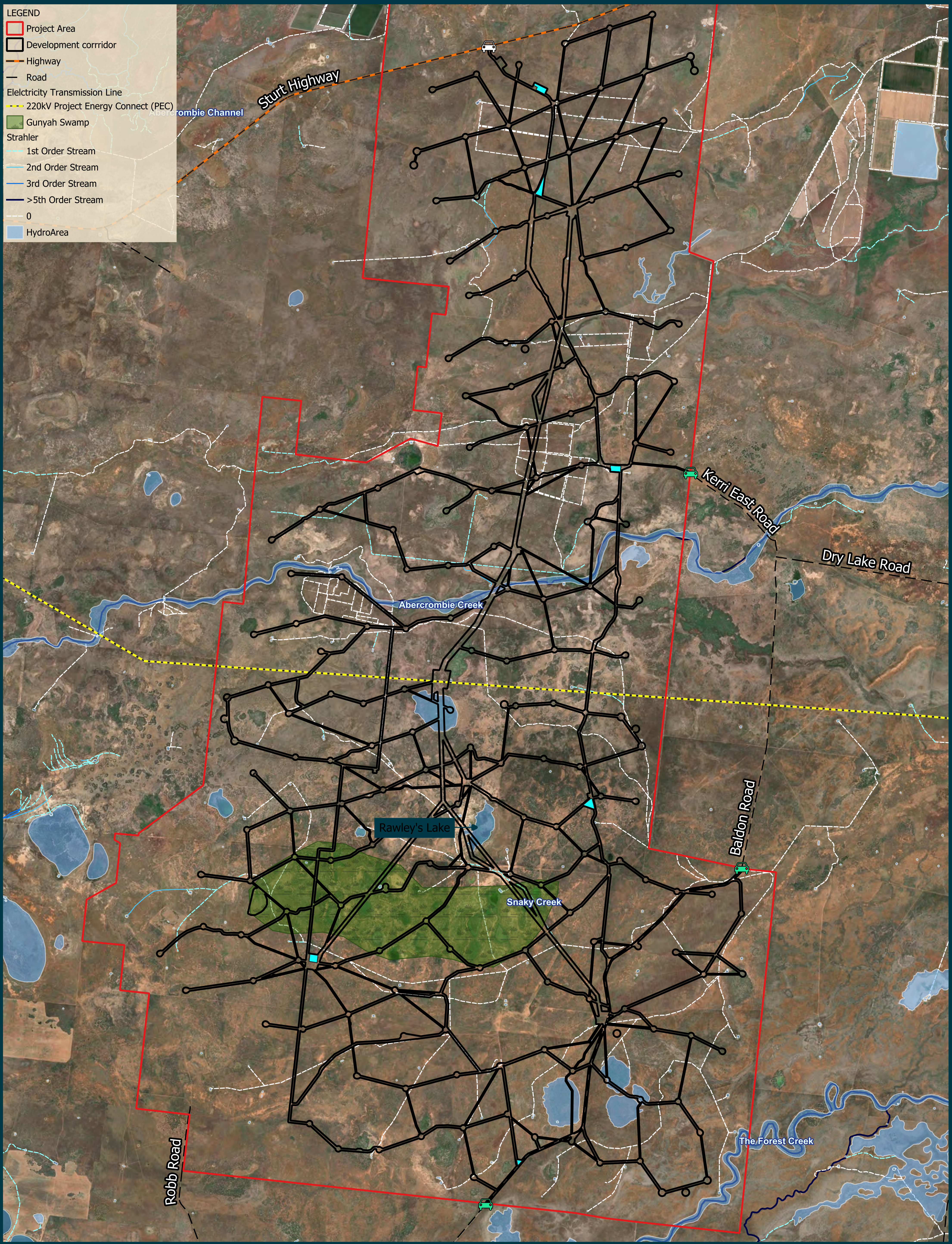
0 10 20 km

Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

Figure 6-28 Regional waterways



0 2,500 5,000 m

Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

Figure 6-29 Surface hydrology features

Ref: 22-366 Baldon Wind Farm EIS 20240229 \ Hydrology features Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022 © NSW SEED

Figure 6-30 Gunyah swamp following rains in 2023

Figure 6-31 Rawley's Lake landform in 2023

Catchments and drainage

Within the Project area there are two primary contributing catchments (refer to Figure 6-32), the Abercrombie Creek catchment and the Forest Creek catchment:

- Abercrombie Creek: This waterway flows through the middle of the Project area, covering an approximate catchment size of 2,050km². It is anticipated that breakout flows from the Murrumbidgee River might contribute to Abercrombie Creek. These contributions are expected to be independent events due to longer time of concentration.
- Forest Creek: Located in the southeast corner of the Project area, Forest Creek is fed by an eastern catchment covering approximately 1,480km². Similar to Abercrombie Creek, this catchment is not precisely defined and is susceptible to breakout flows from Billabong Creek, a tributary of the Edward River. The definition of these contributions is challenging due to the flat terrain

The Project area exhibits notably flat terrain, with the Abercrombie Creek's bed level dropping only 1.5m over a 14km stretch from the eastern to the western boundary of the Project area. The creek itself is not sharply defined, potentially causing large floodplain areas to be inundated during flood events. However, these floods are anticipated to be shallow and slow-moving due to the flat slope:

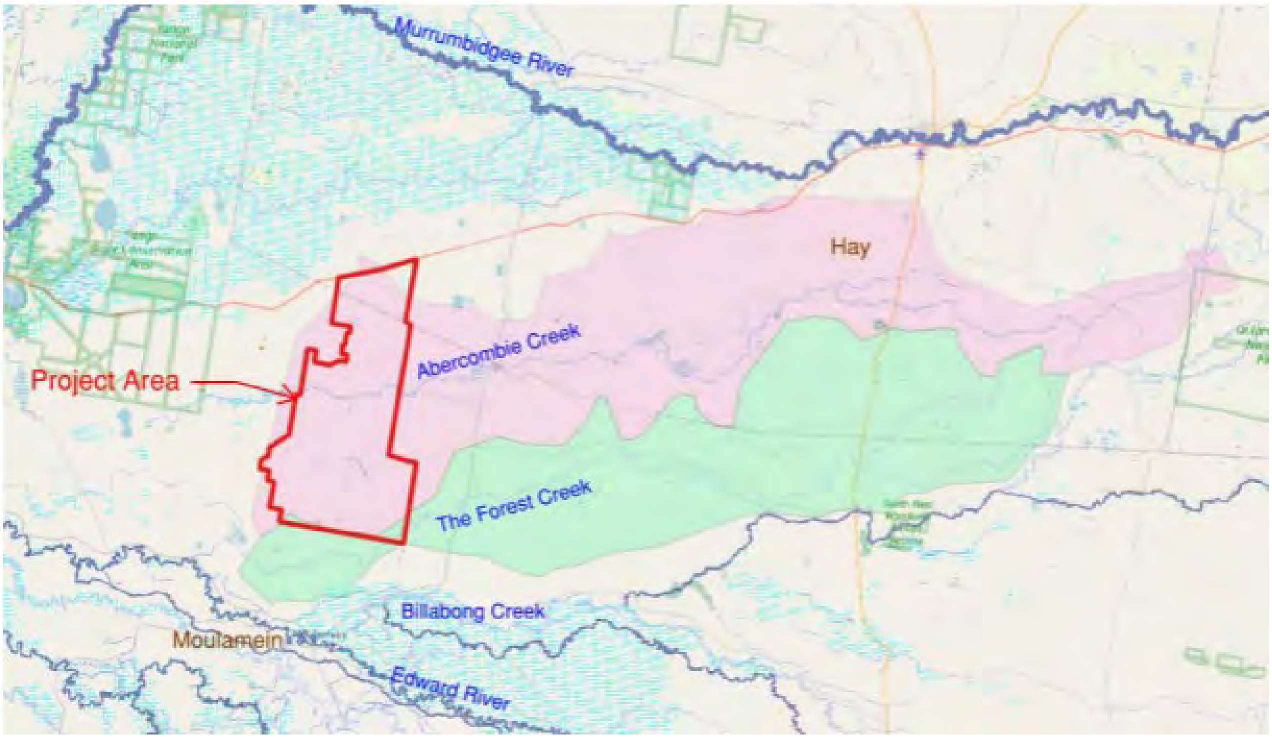


Figure 6-32 Contributing catchments

Flooding

The land is very flat with limited drainage lines. The drainage lines are also low relief, not heavily incised and subject to movement; recent aerial imagery differs slightly from mapped alignments. The soil substrates and rock units are composed of floodplain alluvium from present to Cenozoic, but generally older than alluvium within the Murray and Murrumbidgee catchments.

Water movement after flooding is slow, leaving some areas temporarily inundated, such as Gunyah Swamp. Native vegetation communities include grassland species and treed riparian areas but are primarily comprised of low height shrublands and are adapted to slowly receding flood events on an intermittent basis.

The Project area is not within areas mapped as Flood Prone Land under any LEPs. No prior flood studies or flood mapping available for the Project area specifically. It is understood that neighbouring developments have been developing flood models that could be built upon during detailed design. The site catchment does not have potential to impact major settlements downstream. There are no major rivers within the Project area, leading to a lack of directly applicable historical studies.

Climate

Local climate conditions from the Moulamein Post Office (station number 075046) located about 12.5km south of the Project area have been sourced. The post office climate station has been operational from 1888 for rain data and only between 1971 and 1975 for temperature data (BOM, 2024). More recent temperature observations reference to Balranald RSL station (station number 49002) which includes data from 1907 to present.

Annual rainfall is around 350-60mm. There is no clear wet or dry season however most of the higher rainfall months run from around May to December (refer to Table 6-33). The highest ever daily rainfall event was recorded on the 17th of November 1889. However a more recent monthly rainfall record was set on the 10th of March 2011 (correlating with the 2011 Victorian floods). The next most recent daily record was in 1973, suggesting that these events are relatively infrequent.

The hottest month on average is January and the coldest month is July (refer to Table 6-33).

Climate modelling predicts that local rainfall will decrease in spring, with projected rainfall increases in summer and autumn (OEH, 2014). Long- term 1910 to-2011 observations in the Murray Murrumbidgee Region show that temperature has been increasing since 1950 and will continue this trend with extreme heat events becoming more common.

Table 6-33 Moulamein Post Office rainfall statistics (BOM, 2024) (data in mm)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	P.A
Mean	24.5	23.8	26.2	25.8	33.9	33.6	30.7	33.7	31.1	34.8	28.0	30.6	357.2
Median	13.6	12.5	15.7	18.9	30.0	27.0	29.1	27.8	24.6	27.5	19.4	19.2	353.0
Highest Daily **Date / Year**	97.3 4th 1941	76.2 3rd 1934	64.8 10th 2011	64.8 26th 1973	52.3 13th 1918	79.2 4th 1923	35.6 14th 1955	73.7 15th 1958	53.3 10th 1906	48.8 23rd 1939	130.8 17th 1889	111.8 16th 1930	N/A

Table 6-34 Balranald RSL temperature statistics (BOM, 2024) (data in oC)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	P.A
Mean max temperature	33.1	32.5	29.2	24.0	19.4	16.1	15.7	17.5	21.0	24.6	28.1	30.9	24.3
Mean min temperature	16.5	16.4	13.7	9.6	6.8	4.4	3.6	4.8	7.2	9.9	12.7	14.9	10.0

Soil stability

The soil's response to disturbance and ability to be rehabilitated will affect the degree of impact attributable to Project activities.

The site's soils are comprised of vertosols, dermosols, chromosol and sodosols. These include clay-rich layered soils which can shrink, swell and disperse with changes in moisture content. They have moderate to high constraints to ongoing cultivation given their susceptibility to erosion. Soil property information along with consideration of impacts is detailed further in Section 6.8.

6.6.3 Potential impacts

The Baldon Wind Farm footprint is linear in nature and as a percentage of the Project area the overall disturbance is low and sparsely distributed. Around 2% of the site would be disturbed in construction, reducing to 1% in operation. Surfaces include all weather roads and gravel hardstand and substation grounds but few impervious treatments, with the exception of runoff from limited site buildings, substation buildings and infrastructure such as wind turbines. The above ground structures which may act to impede surface flow (site buildings, substations, wind turbines, refer Table 3-2 of the Project Description chapter) account for less than 1% of the site.

A summary of the hydrology risks presented by the Project is presented below; Table 6-35. The key Project activities to consider are the design and construction of waterway crossings and tracks. The last two columns demonstrate the ability to reduce the risk to the environment through standard mitigation measures and environmental safeguards. Decommissioning risks would be similar and less than construction.

Table 6-35 Hydrologic and hydraulic risk summary

Project activity	Receiving environment	Nature of risk	Unmitigated risk	Mitigated risk
Construction				
Compound areas, parking, laydown.	Low relief terrain. Slow to rehabilitate. Flood waters slow to recede.	Short term and localised: • Erosion from areas of disturbance exacerbated during flood / high rainfall / windy events. • Plant / materials may become mobilised in floodwaters. • Localised change to hydraulic environment if compound areas are built up above natural ground level.	Low: • These areas represent much less than 1% of the site area and the risk is short term	Low risk if: • Design criteria to locate out of flood hazard zones. • Progressive rehabilitation. • Flood protocols to protect assets and address pollution risks.
Track construction.	Low relief terrain. Shrink, swell, dispersive soils based on moisture.	Long term and localised: • Erosion from areas of disturbance. • Localised change to hydraulic environment if built up above natural ground level.	Moderate: • These areas represent much less than 1% of the site area but could lead to longer term localised hydrological changes.	Low risk with: • Design criteria to maintain hydraulic flow and local hydrology.
Excavation of footings and trenches.	Erodible soils, slow to rehabilitate. Low relief terrain. Few waterways. Flood waters slow to recede.	Short term and localised: • Erosion from areas of disturbance. • Exacerbated in during flood / high rainfall / windy events.	Low: • These areas represent much less than 1% of the site area and the risk is short term.	Low risk with: • Progressive rehabilitation. • Protocols to address pollution risks (ie stock pile management).

Project activity	Receiving environment	Nature of risk	Unmitigated risk	Mitigated risk
Operation				
Waterway crossings.	Low relief terrain. Few waterways and limited riparian vegetation. Flood waters slow to recede.	Short term and localised: • Temporary removal or reduction in riparian vegetation until revegetated. • Long term and localised: • Change to hydraulic environment. • Long term reduction in riparian vegetation due to loss of vegetation, growing medium and seed bank	High: • Localised risk to waterway crossings.	Low risk with: • Best practice guidelines applied to restoration. • Design criteria to maintain hydraulic flow and local hydrology.
Above ground assets: **wind turbines, substations, transmission structures.**	Low relief terrain. Flood waters slow to recede.	Long term and localised: • Change to hydraulic environment.	Low: • These structures represent much less than 1% of the site area	Low risk if: • Design criteria to maintain local hydrology.

Flooding has the potential to interfere with construction and decommissioning and poses a safety risk for workers onsite and exacerbate surface water impacts. The proposal has potential to create the following hazards in the event of a localised flood:

- Electrical hazards to staff, emergency workers and assets due inundation of infrastructure.
- Pollution risks from leakage of stored pollutants (hydrocarbons, pesticides, solvents).
- Physical damage from the mobilisation of components in flood waters.

During operation, the location of permanent infrastructure in areas susceptible to flooding can:

- Increase the risk of flood occurrence or severity, where they impede flow paths,
- Create hazards in the event of a flood to workers onsite
- Cause pollution risks from leakage of stored pollutants (hydrocarbons, pesticides, solvents).

Short term flooding risks have been identified where water flow impediments may be created during the construction phase; such as for temporary compound sites, parking, laydown areas and stockpiles. If built up, areas may act as water barriers and change the water flow and velocity. Longer term flooding risks are most relevant to tracks and waterway crossings. While limited in area, these features may impact water flow and velocity, increasing damage during flooding and change existing vegetation community associations, habitat values and catchment processes.

Both can be mitigated by ensuring Project activities and components are designed and located so that runoff, flood extent and velocity are not substantively changed. Design measures can be employed to ensure surface water drainage would remain intact, following existing flow paths and velocities. The Project commits to modelling completed at detailed design phase with the following performance objective:

No offsite hydrological impacts would be caused by the Project.

This is of most relevance to compound areas, which may require flood protection, and access tracks, which may be built up to increase site accessibility during wet weather. The Project will minimise its hydrology and surface water impacts by clear commitments to design measures to maintain local hydrology and thereby limit hydraulic impacts. This includes:

- Civil design including excavation for tracks, trenches and footings will be undertaken with input from detailed hydrological modelling to ensure minimal hydrological impacts are attributable to the Project
- Structures including water way crossings, will be designed and constructed in accordance with best practice measures to maintain existing flow regimes and fish passage and restore any impacted riparian vegetation.
- Detailed hydrological analysis will be undertaken prior to the submission of the final detailed design of the wind farm to DPHI. Design measures have been captured in the mitigation measures presented in Section 6.6.4. Key safeguards include avoiding permanent infrastructure in high hazard areas (H5 and above), above the 1% AEP flood level and ensuring sufficient freeboard to prevent infrastructure being damaged.
- Verification will be demonstrated by modelling the final civil infrastructure footprint a part of the detailed design, prior to construction. This ensures robust analysis of the final civil infrastructure footprint and reduces errors due to assumptions at this early phase of the Project design. This approach is considered warranted given the low level of risk assessed for this Project area (low relief with few waterways) and type (discrete linear impact footprint).

The methodology for this verification would likely involve:

- Develop existing scenario hydrology and flood modelling:

  - A rain on grid (RoG) TUFLOW model will be developed, using Australian Rainfall and Runoff (ARR) 2019 data and methodology to facilitate design flood simulation of the 5%, 1%, 0.5%, 0.2% AEP (Annual Exceedance Probability) and PMF events. The 0.5% and 0.2% AEP events will be proxies for climate change impacts.
  - Modelling will include the entire catchment upstream of the site and will extend downstream to adequately capture flood behaviour.
  - Once critical durations and temporal patterns are confirmed, the model will be used to simulate existing flood behaviour for a range of design flood conditions (5%, 1%, 0.5% and 0.2% AEP and PMF).
- Development scenario hydrology and flood modelling:
  - Following the definition of existing scenario flood conditions for the study area, the proposed development will be incorporated into the TUFLOW model and the model will be resimulated for the 5%, 1%, 0.5% and 0.2% AEP and PMF events.
- Flood impact assessment:
  - Peak flood level and velocity impact mapping will be prepared, by comparing results from the developed and existing scenarios for all modelled events.

Alternative modelling options exist. The modelling will be developed in consultation with relevant regulators prior to Project determination.

Key uncertainties of the assessment

Key uncertainties include the development of detailed flood and hydrology models for the Project area. This will be developed in consultation with relevant regulators prior to Project determination. It will reflect greater detailed design refinement at this later stage, to ensure robust analysis of the final civil infrastructure footprint whilst reducing errors due to assumptions at this early stage of the Project design. This approach is considered warranted given the low level of risk assessed for this Project area (low relief with few waterways) and type (discrete linear impact footprint) and recently developed knowledge of the catchment for neighbouring projects.

6.6.4 Mitigation measures

Safeguards and mitigation measures to address hydrology and hydraulic risks are provided in Table 6-36. It is noted that surface water quality and erosion and sediment controls and soil rehabilitation measures are detailed separately in Section 6.8.

Table 6-36 Hydrology safeguards and mitigation measures

ID	Safeguards and mitigation measures	Project phase
H1	Access tracks will be designed and constructed in accordance with an Australian Standard civil design specification as tailored for the Project requirements and giving regard to the velocity of floodwaters to minimise potential for scouring during flood events.	Pre construction Construction
H2	A detailed Hydrological and Hydraulic Assessment Report will be completed prior to construction in consultation with Council, BCD and DPHI, to verify that local hydrology would be maintained and that hydraulic impacts would be minimal. This work will inform the final civil design and works methods. Key considerations include:	Pre-construction

ID	Safeguards and mitigation measures	Project phase
	• Access roads would be constructed to avoid or minimise obstruction to floodwaters or changes to local hydrology. • Waterway vehicle crossings preferably bed level crossings, constructed flush with the bed of the watercourse on first and second order watercourses to minimise hydraulic impacts. • Buildings and structures (including wind turbines) are to be located outside high flood hazard areas where they may have significant impact on flood behaviour.	
H3	To protect assets, the design of buildings, equipment foundations and footings for electrical componentry and wind turbine footings would be designed to take into account the 1% AEP flood level to minimise impacts from potential flooding including: • The turbines would be designed to withstand the forces of floodwater (including any potential debris loading) up to the 1% AEP flood event plus 500mm freeboard, giving regard to the depth and velocity of floodwaters. • All electrical infrastructure, including inverters and batteries, would be located above the 1% AEP flood level plus 500mm freeboard. • Where electrical cabling is required to be constructed below the 1% AEP flood level it would be capable of continuous submergence in water. • Fencing would be constructed in a manner which does not adversely affect the flow of floodwater. • The finished floor level of all buildings should be a minimum of 500mm above the 1% AEP flood level.	Pre-construction
H4	Waterway crossings (vehicular or service) would be designed and implemented in accordance with the following guidelines: • Guidelines for Controlled Activities on Waterfront Land; **Invalid source specified.** • Guidelines for Watercourse Crossings on Waterfront Land (DPI, 2018). • Guidelines for Laying pipes and Cables in Watercourses on Waterfront Land **Invalid source specified.** • Why do fish need to cross the road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003). • Policy and Guidelines for Fish Friendly Waterway Crossings (NSW DPI, 2003).	Pre-construction Construction
H5	A Flood Response Plan would be prepared and incorporated into the overall Emergency Response Plan. The plan would: • Be prepared in general accordance with the NSW SES "Business Floodsafe Toolkit and Plan". • Detail who would be responsible for monitoring the flood threat and how this is to be done.	Pre construction Construction Operation Decommissioning

ID	Safeguards and mitigation measures	Project phase
	• Detail specific response measures to ensure site safety and environmental protection. • Outline a process for removing any necessary equipment and materials offsite and/or out of flood risk areas. • Consider site access in the event that some tracks become flooded. • Consider appropriate vehicles used to transport staff to and from site, with 4WDs being the preferred vehicle. • Establish an evacuation point. • Define communication protocols with emergency services agencies.	
H6	Flood warning signs and flood level indicators placed on each approach to any watercourse crossings subject to significant inundation.	Pre-construction Construction Operation Decommissioning

6.7. Noise and vibration

6.7.1 Assessment approach

A Noise and Vibration Impact Assessment (NVIA) has been prepared to assess potential noise and vibration impacts for the Project. for the Baldon Wind Farm proposal. The complete report is available as Appendix F.6 of this EIS.

The approach for the noise and vibration assessment included:

- Identifying noise sensitive receivers for the area surrounding the Project, and classifying associated and non associated dwellings.
- Undertaking onsite noise monitoring to determine the background noise level at a representative non associated dwelling.
- Determining the applicable noise performance criteria for the surrounding receivers during construction and operation.
- Model potential noise impacts from the construction, decommissioning and operation of the Project for receivers and assess against noise performance criteria.
    - Construction noise predictions have been made using the CONCAWE1 noise propagation model. This assessment provides noise predictions for CONCAWE Weather Category 6 (worst-case) noise-enhancing meteorological conditions.
    - Environmental noise predictions for operation of the wind turbines have been made using the ISO 9613-2:1996 “Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation”
    - Environmental noise predictions for operation of all other ancillary equipment have also been made using the CONCAWE noise propagation model.
- Assessment of the cumulative noise impacts (considering other developments in the area).
- Identify appropriate mitigation measures.

Noise and vibration impacts were assessed with regards to the following policies, guidelines and standards relating to construction/decommissioning and operation:

- Construction
  - o *NSW Interim Construction Noise Guideline* (ICNG) (DECC, 2009)
  - o *Assessing Vibration: A technical guideline* (DECC, 2006)
  - o *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZEC 1990)
  - o *NSW Road Noise Policy* (RNP) (DECCW, 2011).
- Operation
  - o *NSW Noise Policy for Industry* (NPfI) (EPA, 2017)
  - o *Wind Energy: Noise Assessment Bulletin for State Significant Wind Energy Development* (DPE/ EPA, 2016) (Noise Bulletin); Based on the 2009 South Australian document- *Wind Farms Environmental Noise Guidelines* (EPA SA, 2009) (SA Noise Guidelines);
  - o *Draft Wind Energy Guidelines - Technical Supplement for Noise Assessment* (NSW Department of Planning and Environment 2023,
  - o *NSW Road Noise Policy* (RNP – DECCW, 2011).

Construction and Decommissioning - noise performance criteria

Construction will generally be undertaken during the standard recommended construction hours of the ICNG. However, there may be a need on occasion to undertake some work outside of the standard recommended construction hours.

Construction noise predictions in the NVIA have been made using the CONCAWE1 noise propagation model. This assessment provides noise predictions for CONCAWE Weather Category 6 (worst-case) noise-enhancing meteorological conditions.

The ICNG provides for establishing noise management levels (NMLs) for construction work that occurs within and outside of the recommended standard work hours. The noise management levels are determined based upon the rating background level (RBL) (refer to

Table 6-37).

Additional consideration is also given by the ICNG for preventing sleep disturbance and the presence of noise sources with annoying noise characteristics. Annoying characteristics include:

- Tonal noise
- Low-frequency noise
- Intermittent noise

A 5 dB(A) adjustment for annoying noise sources has been applied.

Table 6-37 Noise management levels

Time of day	Noise management level $L_{eq\ (15\ min)}$[14]
Recommended standard Hours: Monday to Friday 7 am to 6 pm Saturday 8am to 1 pm No work on Sunday or public holidays	Noise affected RBL + 10 dB(A)
	Highly Noise affected 75 dB(A)
Outside recommended standard hours	Noise affected RBL + 5 dB(A

Construction and Decommissioning - vibration

The Assessing Vibration: A Technical Guideline (AVTG) defines three types of vibration; continuous, impulsive, and intermittent. The AVTG provides preferred and maximum vibration criteria for each vibration type based upon the assessment period time of day and the direction in which the vibration is experienced.

Blasting

Blasting may be required to occur at the foundations of each wind turbine. In accordance with the ICNG, overpressure and vibration from blasting are to be assessed against the levels in the *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZEC 1990). ANZEC 1990 also recommends that blasting should be restricted to the hours of:

- 9am to 5pm on Monday to Friday,
- 8am to 1pm on Saturday,
- with no blasting activity on Sunday or public holidays.

To provide some indication of the likely levels of ground vibration and airblast overpressure from blasting at the closest non-associated dwelling, R15a, which is approximately 3.7km from the nearest wind turbine, predictions have been made using the conservative (high noise and vibration) model inputs based upon Australian Standard AS 2187.2-2006 Explosives – Storage and use, Part 2: Use of explosives.

Operation - noise performance criteria

Environmental noise predictions of the wind turbines have been made using the ISO 9613-2:1996 *"Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation"* for the wind turbine noise.

The noise impact from the operation of the wind turbines has been assessed in accordance with the Noise Bulletin. The Bulletin provides noise performance limits from wind turbines at each relevant receiver based upon measured background noise levels. The predicted equivalent noise level (LAeq, 10 min) for each integer wind speed, when adjusted for special noise characteristics (being tonality and low frequency noise), should not exceed the greater of the following:

- 35 dB(A), or
- The background noise (LA90, 10 min) by more than 5 dB(A)

[14] Equivalent noise level over 15 minutes.

The Project's noise trigger levels are presented in Table 6-38. In addition to the trigger levels there is also consideration given to sleep disturbance and annoying noise.

Table 6-38 NPfL Project noise trigger levels for ancillary equipment (Noise Management Levels [NML])

Receiver	Time of day	Trigger level $L_{eq\ (15\ min)}$
Receiver – rural	Day	40dB(A)
	Evening	35dB(A)
	Night	35dB(A)
Area specifically reserved for passive recreation (eg National Parks)	When area is in use	48dB(A)

The operation of ancillary equipment, including the BESSs, have been assessed in accordance with the Noise Policy for Industry (NPfI) for the ancillary equipment. Environmental noise predictions of ancillary equipment have been made using the CONCAWE noise propagation model. The NPfI requires the use of either:

- Noise-enhancing meteorological conditions, or
- Standard meteorological conditions, where it can be shown that the noise-enhancing meteorological conditions occur for less than 30% of the time.

The NVIA provides noise predictions for CONCAWE Weather Category 6 (worst-case) noise-enhancing meteorological conditions.

6.7.2 Existing environment

The Project and surrounding areas are predominately zoned as RU1 – Primary Production, with the nearby Yanga Parks (consisting of Yanga State Conservation Area, Yanga Nature Reserve and Yanga National Park) zoned as C1 – National Parks and Nature Reserves.

The existing background and ambient noise at the Project area are typical of rural areas, and are dominated by natural sources, such as wind in trees, insects and birds.

Noise sensitive receivers

All noise sensitive receivers (residential dwellings) have been identified within 16km of for the area surrounding the Project . Associated dwellings are where the landowner has reached a written agreement in relation to the Project impacts (including noise impacts). These do not require assessment. Non-associated dwellings must be fully assessed (refer to Figure 6-33 for identification of associated and non-associated dwellings). The full assessment of noise provided in Appendix F.6 includes both associated and non-associated dwellings. This summary focuses on non-associated dwellings only. Mitigation is provided only where required for non-associated dwellings.

Noise sensitive areas include National Parks. The predicted noise level at the closest National Park boundary has also been considered in this assessment.

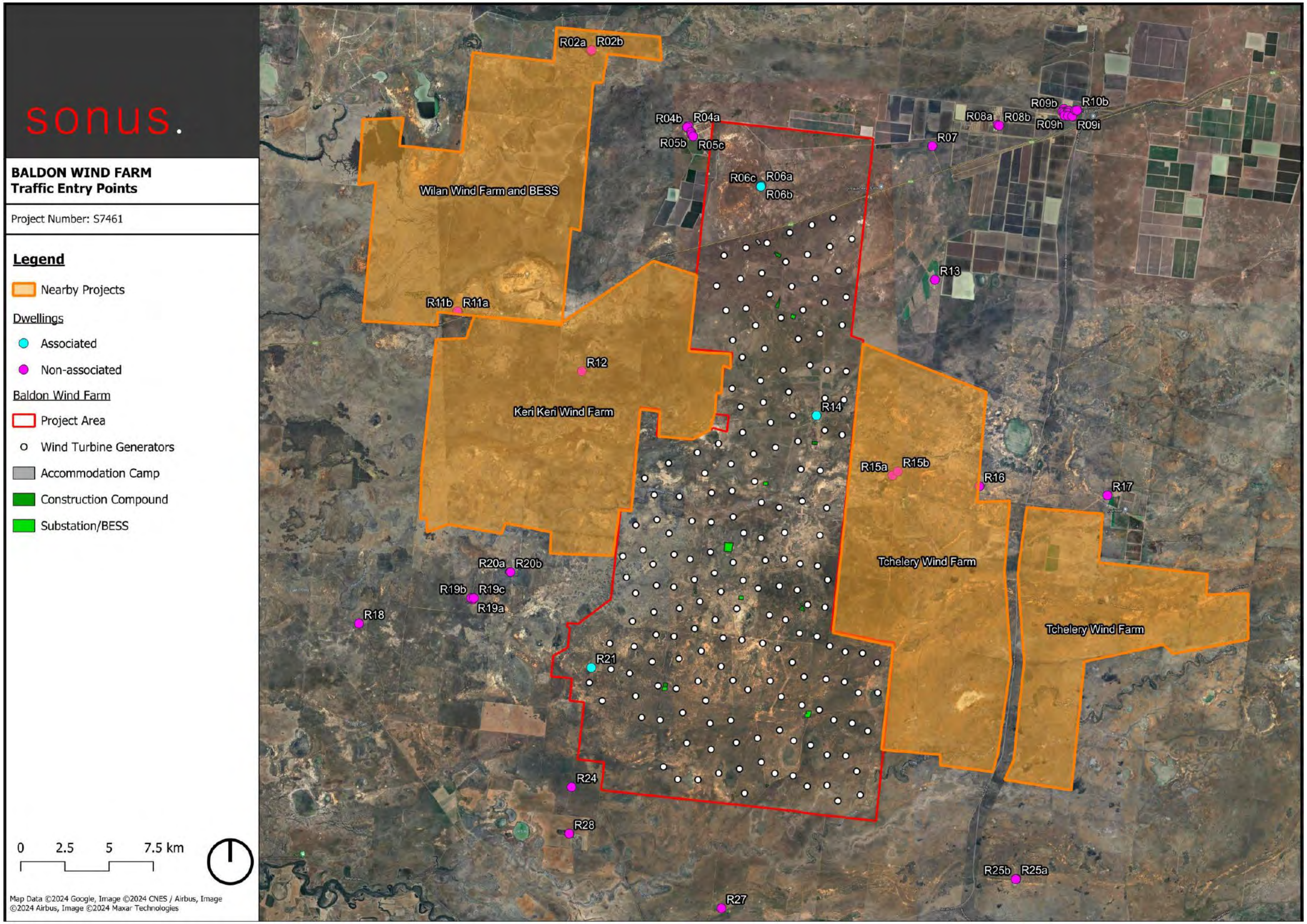


Figure 6-33 Receivers and nearby projects considering in the NVIA

Background noise

Environmental

The background noise monitoring was conducted in accordance with the Noise Bulletin and the location was selected as the potential worst case affected dwelling at the time for which access was permitted by a landholder. The background noise levels were measured at one location (R15a) in the vicinity of the proposed wind farm over a six week period between 15 June 2023 to 27 July 2023. Background noise levels did not exceed 27dB(A).

Traffic

Existing traffic volumes were determined through the NSW Traffic Volume Viewer for the Sturt Highway. This is the most relevant road to consider for traffic noise. The most recent available traffic surveys for 2006 and 2010 indicate that there are approximately 930 vehicles per day.

6.7.3 Potential impacts - noise

Construction and decommissioning

The construction noise and vibration assessment was based on the construction activities/schedule and construction hours described in Section 3.0.

Construction hours – noise modelling

The minimum rating background noise level (RBL) during the ICNG standard construction hours is 35 dB(A) and therefore the construction NML for noise within the ICNG standard construction hours is 45 dB(A).

Predicted noise levels at all non-associated dwellings are compliant with the NMLs for standard construction hours during all phases. The highest noise level is predicted to be 39 dB(A) at R15a (during the earth works stage), which is below the NML.

No non-associated dwellings are predicted to exceed the construction NMLs within or outside of standard construction hours (refer to Table 6-39).

Table 6-39 Predicted highest construction noise levels construction noise generation at non-associated receivers during construction hours

Stage	**Rating background noise level (RBL) dB(A)**	**NML for noise within the standard construction hours dB(A)**	**Highest Non-Associated Predictions *(inclusive of "particularly annoying" noise source adjustment)***	
			$L_{eq\ (15\ min)}$ dB(A)	**L_{max} dB(A)**
ICNG standard construction hours				
Stage 1 – Site Establishment	35dB(A)	45dB(A)	33 *(38)* dB(A)	35*(40)* dB(A)
Stage 2 – Earthworks	35dB(A)	45dB(A)	39 *(44)* dB(A)	40 *(45)* dB(A)
Stage 3 – Construction and Installation	35dB(A)	45dB(A)	28 *(33)* dB(A)	29 *(34)* dB(A)
Stage 4 – Commissioning and Testing	35dB(A)	45dB(A)	25 *(30)*dB(A)	26 *(31)* dB(A)
Future Stage – Decommissioning	35dB(A)	45dB(A)	33 *(38)*dB(A)	34 *(39)* dB(A)
Outside standard construction hours				
Outside standard hours - – wind turbine foundation pours - Blade installation - Temporary accommodation facilities	30-35dB(A)	35-40dB(A)	22(27)) 25(30) dB(A) <20 (25)	

Sleep disturbance

No associated or non-associated dwellings are predicted to experience noise greater than the Lmax 52 dB(A) external screening noise level for sleep disturbance.

Blasting

Whilst blasting is unlikely the specialist report establishes that if required the airblast overpressure criterion of 115dB, as well as the level of ground vibration criterion of 5mm/s, is readily achievable at the closest non-associated dwelling, R15a, which is approximately 3.7km from the nearest wind turbine.

Road noise

Based upon the projected maximum daily trips during construction and the existing traffic within the areas, no noise impact is expected for receivers located along Sturt Highway (refer Appendix F.6).

Local traffic has been assessed for receivers located along Kerri East Road and Baldon Road. Whilst is unlikely that the full one-hour peak traffic would travel past the R15a dwelling, the peak hourly road traffic was assumed to be introduced to these roads during construction for conservative assessment.

The closest non-associated receiver (R15a) is 110m from Baldon Road and has a predicted noise level of 45dB(A).

The noise from traffic during construction of the Project is below the of 55 $L_{Aeq,(1\ hour)}$ (day) and 55 $L_{Aeq,(1\ hour)}$ (night) criteria set by the NSW Road Noise Policy at all non-associated dwellings.

Operation

Wind turbine generators

Compliance at receivers

Wind turbines generators generate noise that may impact the environment and nearby receivers. Audible noise is generated by the movement of the turbine blades through the air, mechanical components in the turbine and interaction of the turbine with the wind. The noise can be perceived as a steady hum which may be disruptive to nearby receivers particularly at night when background noises are lower.

The noise from wind turbines has been predicted for the wind speed where the highest noise is produced by the wind turbine and compared against the 35 dB(A) baseline criterion.

- The non-associated dwelling that is most affected has a predicted noise level of 33 dB(A) (R15a).
- The associated dwelling that is most affected has a predicted noise level of 44 dB(A) (R14).
- At national parks and reserves, the highest predicted noise level (at their boundary) is 22 dB(A), which is well below the requirement of 50 dB(A) at 4m/s.

No non-associated dwelling is predicted to be in exceedance. Figure 6-34 shows the modelled noise contours where the yellow contour shows the 35 dB(A) baseline criterion.

The full results included in Appendix F.6 show compliance with the baseline criteria at all locations.

Special noise characteristics

Low frequency noise and tonality have also been considered (refer Appendix F.6) with no further consideration warranted. These may travel further and penetrate buildings more effectively than higher-frequency sounds. Low-frequency noises can be perceived as vibrations or pulsations that may cause discomfort or annoyance to nearby receivers.

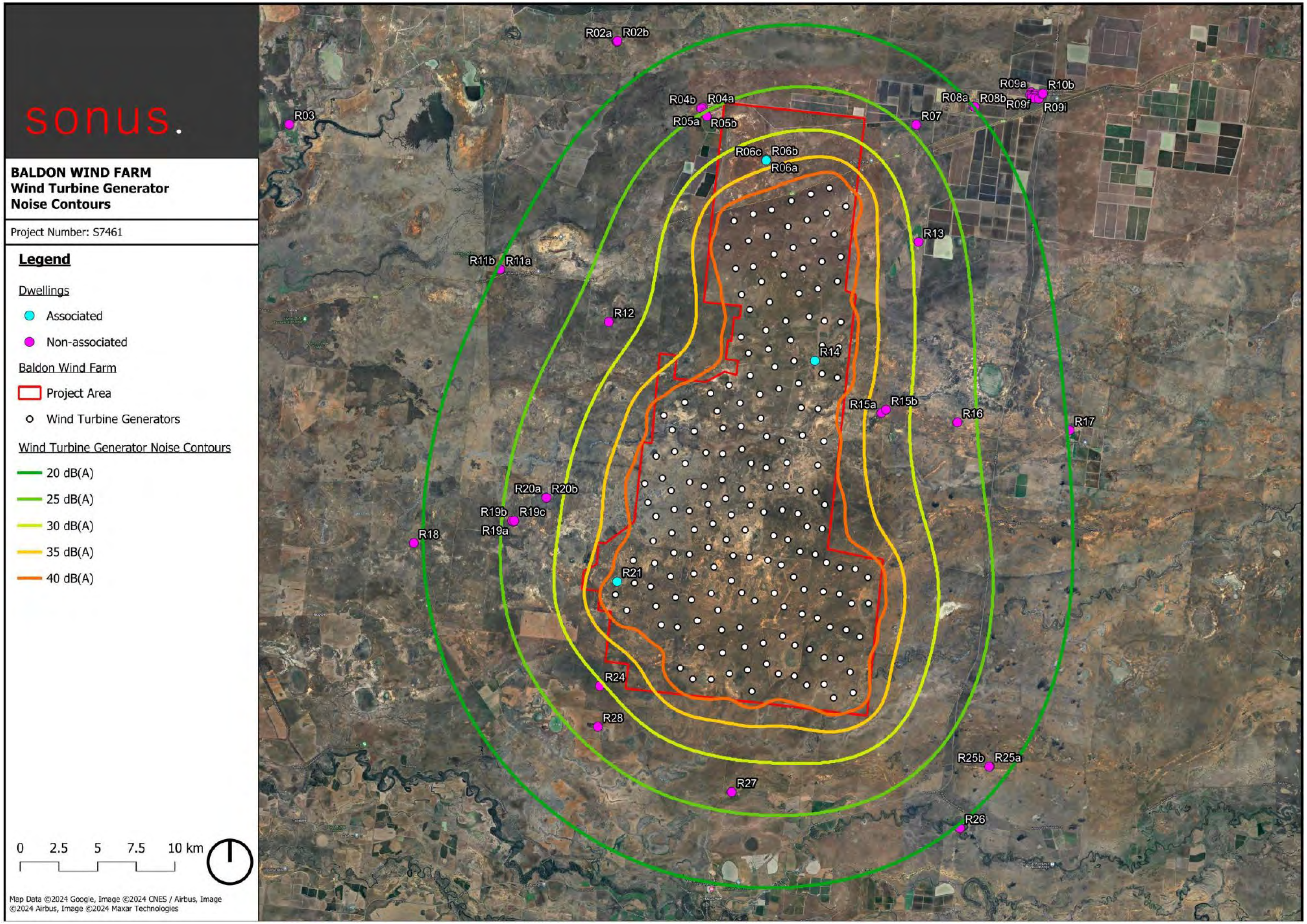


Figure 6-34 Noise contours

Ancillary equipment

The centralised BESS option has been modelled with BESS at each potential substation location. The closest receivers to BESS noise sources are:

- Associated 4km
- Non-Associated 7km
- National Park 16km

The predicted noise levels show that at all potential locations, the BESS operational noise levels are less than 20 dB(A) at all non-associated receivers during both the day and night time periods.

The NPfI NPTL criteria of 40 dB(A) and 35 dB(A) during the day and evening / night respectively are readily achieved. Predictions also show noise levels below 20 dB(A) at the closest national parks. The low noise levels are due to the large separation distances between the noise sources and the sensitive receivers.

Annoying noise characteristics

Equipment selections are not yet finalised, and therefore the frequency spectrum of noise predicted at a noise sensitive receiver may change. However, based upon the predicted noise levels, the application of the maximum adjustment of 10 dB(A) for annoying characteristics would not result in the PNTLs being exceeded at any noise sensitive receiver.

Sleep disturbance

No dwellings (non-associated or associated) are predicted to experience noise greater than Leq,15min 40 dB(A), therefore achieving the requirement for sleep disturbance.

Road noise

The operational traffic generated by the Project is understood to be less than the construction traffic generated. Based upon the projected maximum daily trips during construction and the existing traffic within the areas, no noise impact is expected for receivers located along Sturt Highway.

Local traffic has been assessed for receivers located along Kerri East Road and Baldon Road. Based upon the peak hourly road traffic being introduced to these roads during construction, the noise from traffic during construction of the Project is below the criteria set by the NSW Road Noise Policy at all non-associated dwellings.

6.7.4 Potential impacts - vibration

Potential vibration impacts from heavy machinery during construction activities include:

- Structural damage
- Discomfort for occupants.
- Equipment damage
- Safety concerns
- Aesthetic damage

It is expected that the main sources of construction vibration will be the vibratory roller operation during the internal roads and hard stand construction. The level of vibration at a distance would be subject to the input of the equipment and the local ground conditions. The distances required to achieve the construction vibration criteria provided in Assessing Vibration: A Technical Guideline AVTG are in the order of 20m. All dwellings are in excess of 100m, vibration from these activities is unlikely to be detectable.

Vibration impacts are not considered during operation as the risk is expected to be nil.

6.7.5 Cumulative impacts

There are four nearby projects within 20km which may contribute to cumulative noise impacts (refer to Table 6-40 below).

Cumulative noise impacts during construction of the Project from three proposed neighbouring wind farms, Wilan, Keri Keri and Tchelery may occur, if construction activities are undertaken concurrently. Therefore, it is recommended that construction activities from all projects be coordinated (where possible) to minimise noise impacts at the nearest noise sensitive receivers.

During operation, based upon the predicted noise levels from the Project, cumulative noise impacts are not expected.

Project EnergyConnect is also in the vicinity, however it is anticipated that Project EnergyConnect would be completed prior to the construction of the Project and as such, no cumulative noise and vibration impacts are expected to be negligible.

Table 6-40 Nearby projects

Project	Distance from Project
Keri Keri Wind Farm (Planning)	0km (adjacent)
Tchelery Wind Farm (Planning)	0km (adjacent)
Wilan Wind Farm and BESS (Planning)	5km (west)
Project EnergyConnect (NSW-Eastern Section)	0km (within Project area)

6.7.6 Mitigation measures

No adverse noise impacts have been identified at non-associated dwellings. However several good practice environmental management measures have been included in Table 6-41 to further minimise the noise impacts of the Project.

Table 6-41 Noise mitigation measures

ID	Safeguards and mitigation measures	Project phase
N1	Develop and implement a construction noise management plan	Construction Decommissioning
N2	Establish and implement a complaints management system	Construction Operation Decommissioning
N3	Revised noise modelling following the finalisation of selected equipment.	Operation
N4	Implement an operational noise management plan inclusive of post construction testing at sensitive land uses, or representative locations to confirm the noise levels achieve the requirements predicted.	Operation
N5	If blasting is required, a blasting specialist would be engaged to achieve the project criterion of 115dB	Construction

6.8. Water and soil

6.8.1 Assessment approach

Interrelated water and soil impacts

The protection of water and soil resources is most relevant to construction, when areas of soil disturbance required for laydown areas, trenching and foundations for structures, can quickly lead to erosion, soil loss and water pollution, if left unmitigated.

However, hydrology, water and soils are interrelated areas, as set out below. Hence, cross references are made to the Hydrology section of the EIS (Section 6.6), where appropriate, to avoid duplication.

- Water and soil: This chapter considers impacts of soil disturbance and water use. It considers water availability, allocations and impacts on water sources and includes impacts to farm dams, groundwater dependent ecosystems and acid sulfate soils, related farm infrastructure, adjacent licensed water users and basic landholder rights. This section is informed by soil surveys as well as desktop investigations.

- Hydrology: Section 6.6 addresses the likely impacts of the Project on flooding and local hydrology including surrounding watercourses, drainage channels, wetlands and riparian land.

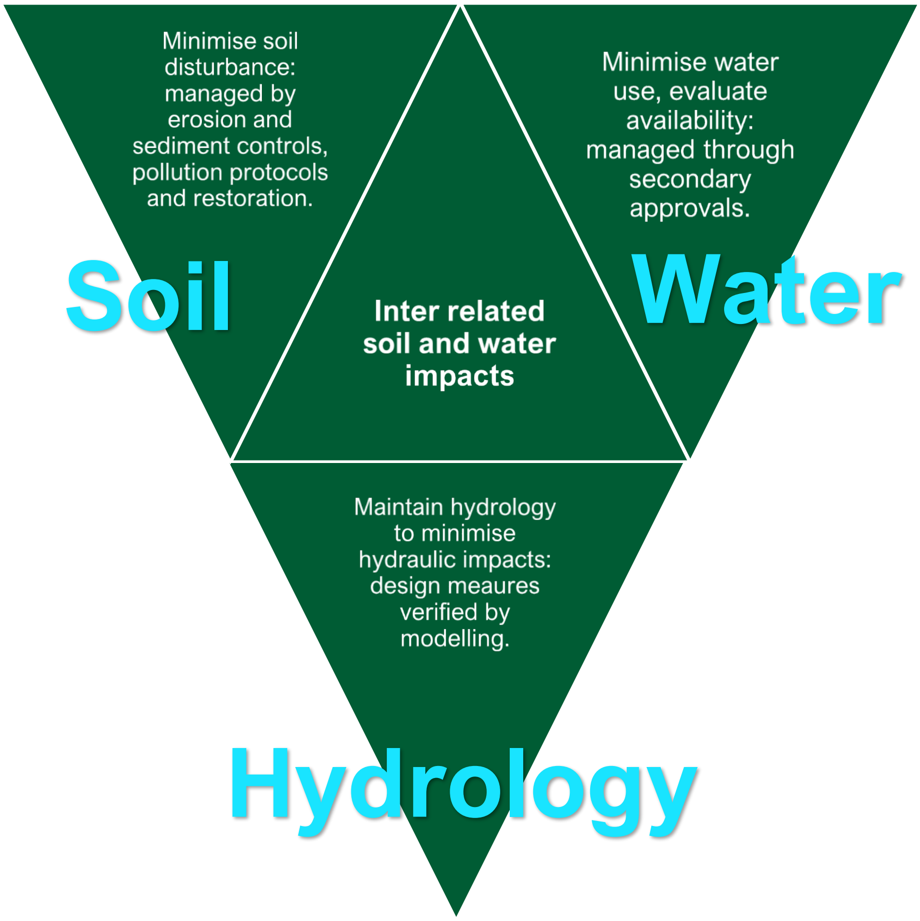


Figure 6-35 Interrelated soil and water impacts and management measures

The assessment in this chapter was conducted to satisfy the requirements set out by the SEARs (Appendix B), and in consideration of the following guidelines:

- *Guidelines for Controlled Activities on Waterfront Land* (NRAR, 2018);
- *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (DPI (Fisheries), 2003)
- *Policy & Guidelines for Fish Habitat Conservation & Management* (DPI, 2013)
- *Managing Urban Stormwater: Soils & Construction* (the 'Blue Book') (Landcom, 2004)

The following Water Sharing Plans under the *Water Management Act 2000* apply to the Project area:

- 'Water Sharing Plan for the Murrumbidgee Alluvial Groundwater Sources Order 2020'
- 'Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012'
- 'Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources Order 2020'

6.8.2 Existing environment

Topography, geology and soils

NGH's site observations and discussions with landholders and Local Land Services have established that the site has a history of soil disturbance, with over grazing leading to substantial soil loss in the past leading to rehabilitation trials in the 1990's to stabilise soils. The key strategy used was the planting of saltbush in rows, which appears to have been highly successful. The rows are still apparent and have increased native plant diversity and improved soil conditions. This has been observed by the NGH ecology field team in surveys conducted between 2022 – 2024.

The riverine plains that characterise the Project area have extremely low gradients. The underlying geology of the Project area consists of Shepparton Formation which formed in a fluvio-lacustrine environment between the Pleistocene and Holocene with the dominant lithology consisting of alluvial floodplain deposits.

The soil features are of riverine and aeolian origin; they are deposited by water and wind rather than from weathering bedrock. Riverine features of the plains are, great alluvial fans which are complex in a broad natural system of river courses changing with time, and are associated with complex of deposits which vary rapidly both laterally and in depth. That is, they have been formed and shaped with changing river patterns and varying flooding events, so soil types and characteristics can change dramatically over a seemingly small area.

Soil surveys undertaken by Minesoils (refer Appendix F.7) indicated that the soil landscape units were consistent with the following Australian Soil Classification (ASC) soil types (refer to Figure 6-36):

- Calcarosols
- Chromosols
- Rudosols
- Vertosols

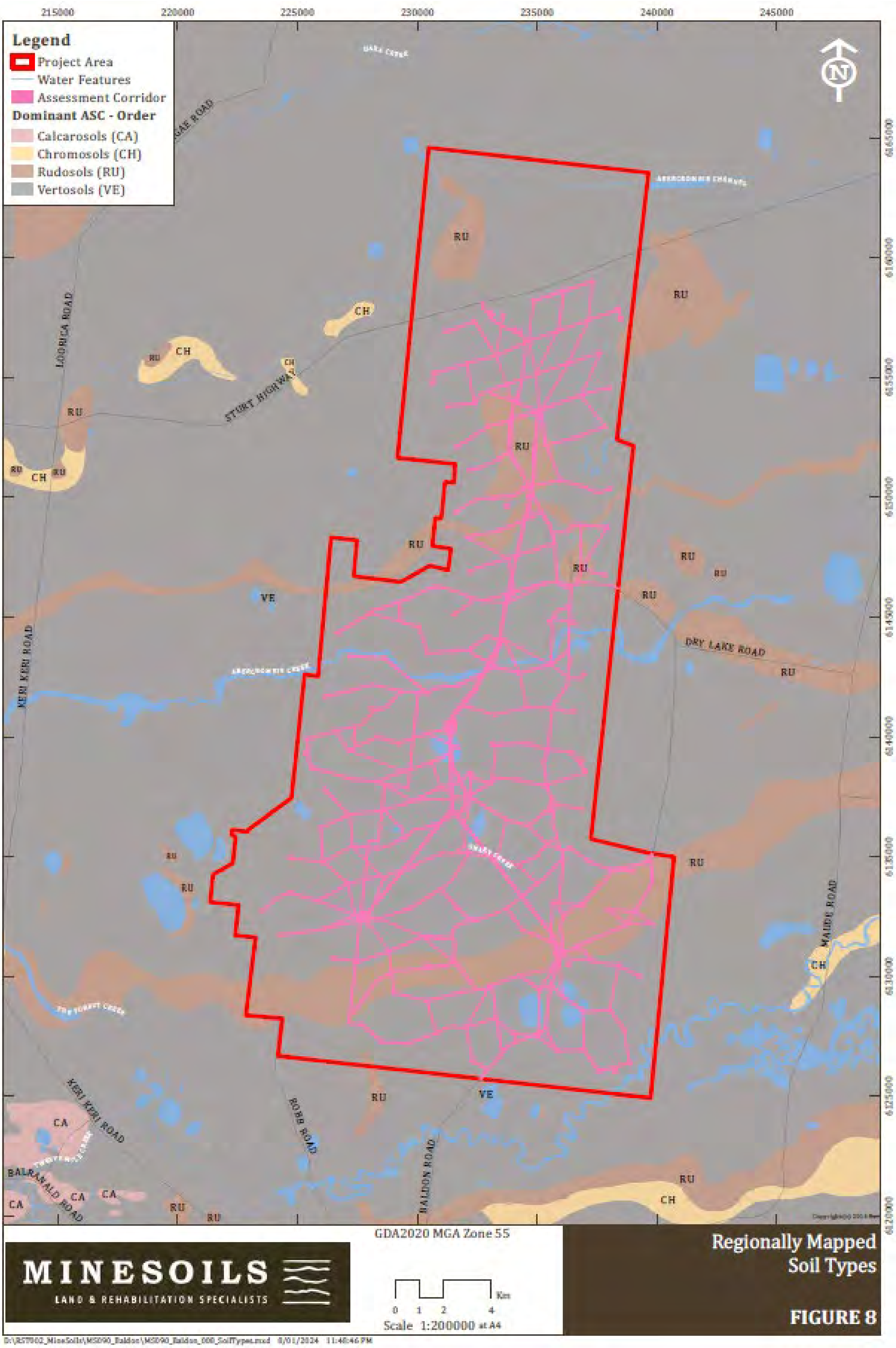


Figure 6-36 Soils mapping for the Project area.

The Land and Soil Capability (LSC) mapping for NSW can also be used to evaluate the susceptibility of soils to impacts. It is a measure of the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. It is a function of landscape features and processes and is influenced by terrain, soil and climatic attributes and their interactions. The LSC classification takes into consideration eight hazards and limitations. For higher LSC classes (up to 8) there are greater limitations to land use with higher levels of inputs, expertise and investment needed to manage the land sustainability. Lower LSC classes (1-3) are considered high to extremely high capability land which is capable of a wide variety of land uses. The Project area has been identified as LSC 5 and LSC 6 and has high to severe limitations, as detailed below in Table 6-42.

Table 6-42 LSC in Project area

LSC Class	Capability rating	Comment	Within the Project area
LSC class 5	Moderate-low capability land	Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.	26,022ha.
LSC class 6	Low capability land	Very severe limitations for a wide range of land uses and few management practices available to overcome these limitations. Land generally is suitable only for grazing with limitations and is not suitable for cultivation. Soil erosion can be very severe without adequate erosion control measures. Salinity can be a very severe hazard.	20,237ha.

The classifications have been verified by soil surveys. Key observations of the soils assessment are that all soils in the Project area:

- Have a wind erosion and sedimentation risk associated with the topsoils
- Have high levels of sodicity
- Have moderate to high risk for dispersion

While sodic soils are generally dispersive, it is important to acknowledge that not all sodic soils disperse, and that not all dispersive soils are sodic. However, given the ranges in salinity of the soils tested within the Project area, all sodic soils in the Project area should be considered dispersive (refer Appendix F.7).

Desktop searches show that no contaminated land or acid sulfate soils are known to occur on site. Agricultural properties may contain buried rubbish including contaminants such as herbicides that may be encountered during excavation. No indications of potential sources of contamination were identified during the site assessment

Surface water environment

Section 6.6 Hydrology, sets out the broader catchment context for the Project and hydrology. This soil and water section focuses on local surface water quality and its use and regulation.

The Project lies in an area of relatively flat terrain between the Murrumbidgee and Edward Rivers. It has very little slope and waters are likely to drain very slowly to Abercrombie Creek that intersects the middle of the Project area flowing in an east/west general direction, as shown in Figure 6-32. The Forest Creek also intersects the south eastern corner of the Project area however the catchment's area of influence is to the south outside of the proposed Project's Disturbance corridor.

Local surface water features of the Project area (refer Figure 6-29) include several mapped naturally occurring hydro areas including dams, lakes (one named – Rawleys Lake) and the two creeks (Abercrombie and The Forest Creeks) both of which are ephemeral streams. There are also a large number of unmapped depressions capable of holding water for a period of time. As shown in Table 6-43, there are 16 1st order Strahler streams mapped on site. The only permanent waterbodies on the site however, are man-made farm dams.

Table 6-43 Summary of key waterway features within the Project area

Named Tributary	Strahler order	Key Fish Habitat	Stream type	Features
Abercrombie Creek	9	No	Ephemeral	Flows East-west through the middle portion of the Project area
The Forest Creek	9	Yes	Perennial	Traverses south eastern corner. The Project's Disturbance corridor is outside of the creek catchment
Snaky Creek	1	N	Ephemeral	Located in the middle of the southern section. Connects to several natural depressions.
Unnamed (11)	1	N	Ephemeral	Located in isolated sections of the Project area.
Unnamed (5)	2	N	Ephemeral	Located in isolated areas of the Project area.
Unnamed (265)	0	N	Ephemeral	Irrigation channels historically used for diverting water for agricultural purposes.

Water quality objectives

The NSW water quality objectives (WQO) are agreed environmental values and long-term goals to achieve healthy surface waterways and their associated catchments across the State. The WQO include a range of water quality indicators to help assess current conditions of waterways and their ability to support its respective uses and values. Water quality objectives and their relevance to the Project are outlined in Table

6-44 and Table 6-45 for the Murrumbidgee (surface) catchment and Murrumbidgee Alluvium groundwater resource respectively.

Table 6-44 Murrumbidgee catchment water quality objectives

Water quality objective	Relevance to Project
Maintain water quality to protect First nations People's water dependent values and uses	The objective is to ensure water quality is sufficient to maintain the spiritual, social, customary and economic values and uses of water by First Nations people.
Maintain water quality to protect and restore water dependent ecosystems	The objective is to ensure water quality is sufficient to o Protect and restore ecosystems and ecosystem functions o Ensure ecosystems are resilient to climate change o Maintain the ecological character of Ramsar wetlands
Maintain the quality of surface water for recreational use.	The objective ensures a low risk to human health from water quality threats posed by exposure through ingestion, inhalation or contact during recreational use of Murrumbidgee Water resources
Maintain good levels of water quality	The objective is to maintain the value of a water quality characteristic if it is at a level that is better than the target value set out in Section 6 of the WQMP for the Murrumbidgee water resource plan.
Maintain the quality of raw surface water for treatment for human consumption.	
Maintain the quality of surface water for irrigation use.	

Table 6-45 Summarised water quality objectives in the Murrumbidgee Alluvium water resource plan area (groundwater)

Water quality Objective	Relevance to Project
Maintain water quality to protect First Nations people's water dependent values and uses	The objective is to ensure water quality is sufficient to maintain the spiritual, social, customary and economic values and uses of water by First Nations people.
Maintain water quality to protect and restore water dependent ecosystems	The objective is to ensure water quality is sufficient to: o Protect and restore ecosystems and ecosystem functions o Ensure ecosystems are resilient to climate change, o Maintain the ecological character of the Murrumbidgee Ramsar wetlands.
Maintain water quality of raw groundwater for treatment for human	The objective is to ensure groundwater is not interfered with by the Project.

Water quality Objective	Relevance to Project
consumption	
Maintain the quality of groundwater for irrigation use	The objective is to ensure the quality of groundwater, when used in accordance with the best irrigation and crop management practices and principles of ecologically sustainable development, does not result in crop yield loss or soil degradation.
Maintain good levels of water quality	The objective is to maintain the value of a water quality characteristic if it is at a level that is better than the target value set out in Section 5 of the Murrumbidgee Alluvium water resource plan area.

Surface water regulation framework

The *Water Management Act 2000* (WMA) is the key piece of legislation for water resource management in NSW. Under the WMA, Water Sharing Plans (WSPs) have been developed to protect the environmental health of water sources, whilst securing sustainable access to water for all users. The WSPs specify maximum water extractions and allocations and provide licenced and unlicensed water users with a clear picture of when and how water will be available.

Surface water extracted from the Billabong Creek (Lower Billabong Anabranch) near Moulamein is managed under the Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012 (amended 2020) under the WMA. The Lower Billabong Anabranch is considered a disconnected water source, that is, the streams within the catchment are disconnected. The Lower Billabong Anabranch is listed as having access and trading rules applied as a disconnected water source (NSW DPI, 2016).

Any surface water take by the Project would be required to be in accordance with applicable water sharing plan rules and regulations. A water access license would be required and purchase of available water would be required from the open market. There are daily extraction limits set for Billabong Creek and these would be required to be adhered to.

Water users

Currently there are 868MLof surface water entitlements associated with the Billabong Anabranch water source and is variable depending on seasonal availability (WaterNSW, 2024). Water allocations are the amount of water distributed to water entitlement holders each water year. Allocations can change based on rainfall and water storage levels. Water entitlements are rights to an ongoing share of available water within a system. Licensed surface water use in the management zone and water sources in the Project area are primarily for stock and domestic use.

Table 6-46 Surface water access units

Registered users Lower Billabong Anabranch Water Source	
Basic Landholder Rights	**Water Access licenses**
7	868

Data Source: NSW Water Register. Note: each share represents an entitlement to extract 1 ML/year of water from the water source during periods where full allocations are made available by DPIE Water.

Groundwater environment

The Project is located within the Lower Murrumbidgee Groundwater Source (NSW DPIE, 2021). The Lower Murrumbidgee Groundwater Source consists of two aquifers known as the Lower Murrumbidgee Shallow which is to the bottom of the Shepparton formation, approximately 40m deep, and the Lower Murrumbidgee Deep consists of gravel, sand and clay deposits of the Calivil Formation and Renmark Group greater than 40 m deep These overlie the Lachlan Fold belt (fractured rock aquifer). This aquifer is rarely accessed due to its low yield and variable water quality (DPIE, 2023).

A search of the Bureau of Meteorology Groundwater Explorer on 19 April 2023 indicates the groundwater level across the Project area is variable with bores drilled from 11 to 180 meters below ground level (Bureau of Meterology, 2024). Bores to the north of the site range from 11.5 to 121.9m, bores in the middle of the site near Abercrombie Creek range between 44 and 55m. Data for Bores in use is limited with no assigned value. There are thirteen bores within the Project area registered for the following uses.

- Water supply (1 bore)
- Unknown (1 bore)
- Water table monitoring (2 bores)
- Stock and domestic use (9 bores)

The most common bores for stock and domestic use are drilled from 12.2m to 54.9m in depth highlighting the water table is variable.

Aquifer Interference Policy

The *NSW Aquifer Interference Policy* (2012) describes the assessment process for protecting and managing potential impacts of aquifer interference activities on the water resources of NSW.

Section 3.3 of the Aquifer Interference Policy identifies activities such as trenching, construction of access tracks and hardstands as activities defined as having minimal impact on water dependent assets. The Project is therefore considered as having minimal impact with the most significant potential impacts being associated with excavation works for hardstands and wind turbine foundations to depths of approximately 3m-5m. Aquifer interference mitigation is proposed.

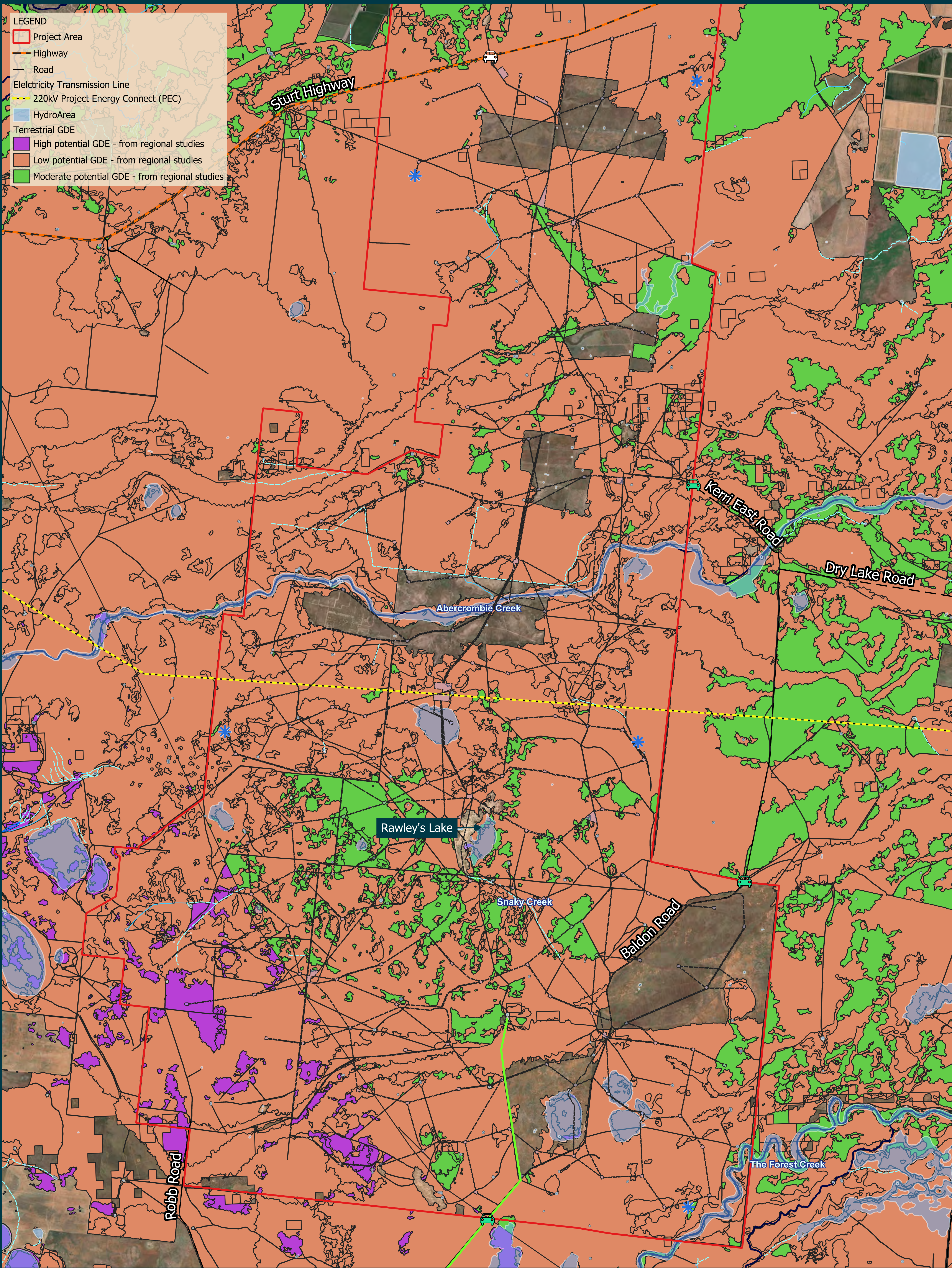
Groundwater Dependent Ecosystems (GDE)

Groundwater dependent ecosystems are environments that depend on groundwater to survive, they can include wetlands, streams, lakes, swamps and some vegetation communities. Changes to groundwater, such as through over extraction or through contamination, may affect these terrestrial and aquatic communities.

- Terrestrial – The majority of the site is mapped as low potential terrestrial groundwater dependent ecosystems from regional studies, there are pockets of mapped High potential GDE mapped from regional studies and mapped areas of moderate potential derived from regional studies (refer Figure 6-37).

- Aquatic – There are several areas mapped as low potential aquatic GDE from national assessment (refer Figure 6-38).

There is a small area of mapped groundwater vulnerability on the northern end of the Project area. In its broadest context, ground water vulnerability refers to the risk an underlying aquifer will become contaminated as a result of activities at the land surface. The Development Corridor lies about 2km south of the nearest mapped area of groundwater vulnerability Figure 6-40 and is highly unlikely to be impacted by the Project.



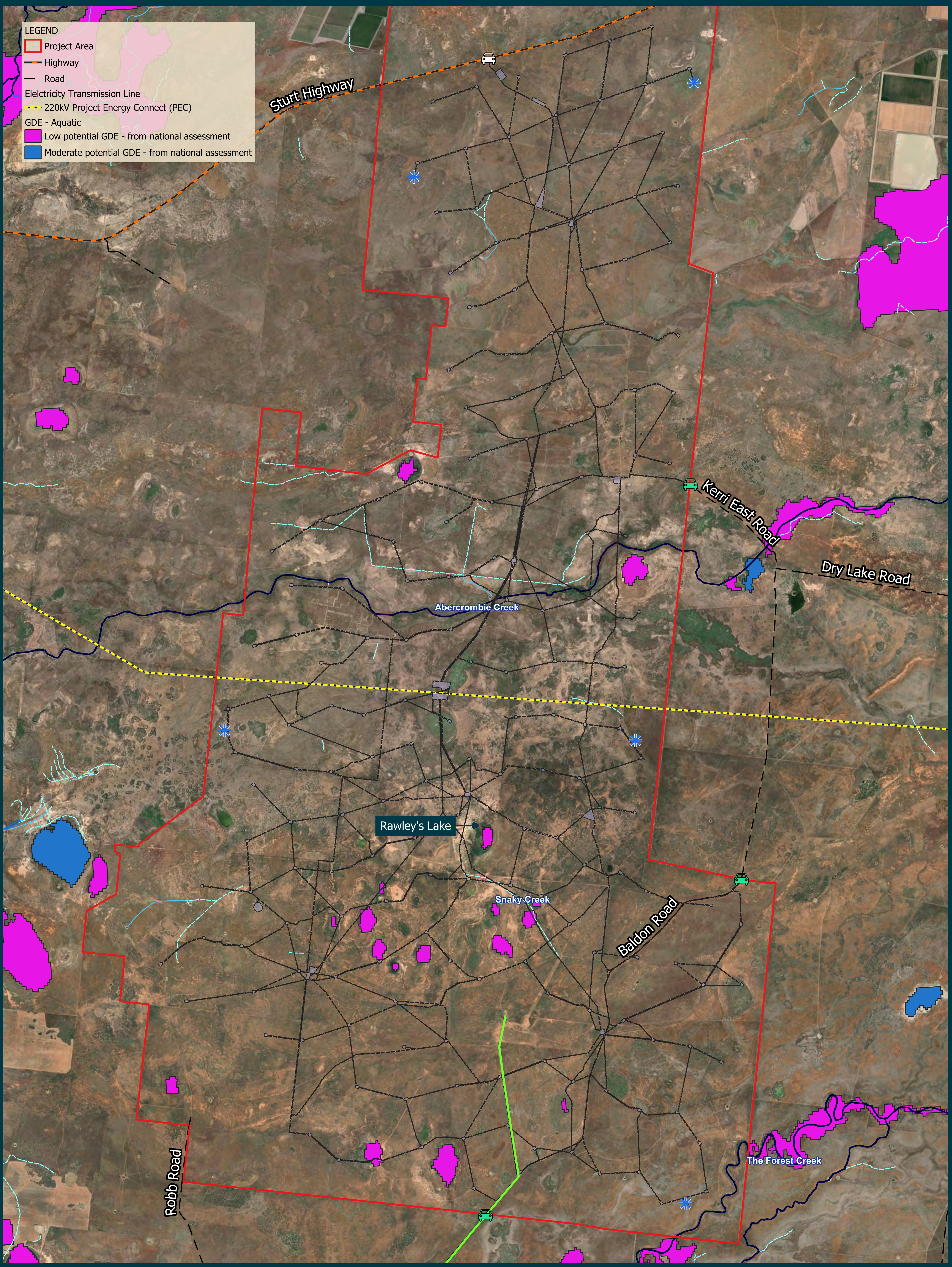
Datum: GDA2020 / MGA Zone 55

NGH

0 2,500 5,000 m

Baldon Wind Farm

Figure 6-37 Groundwater Dependent Ecosystems

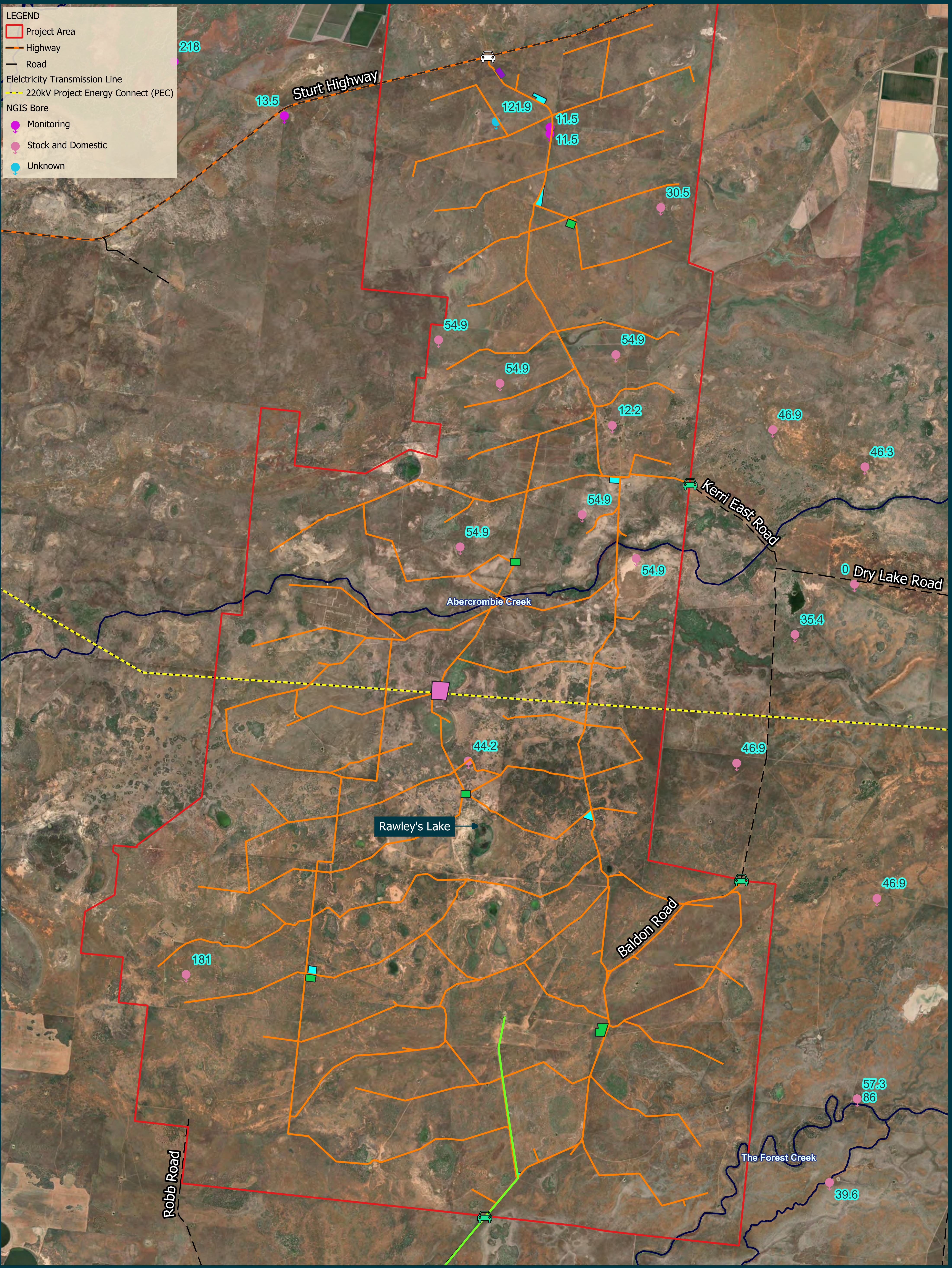


Datum: GDA2020 / MGA Zone 55

0 2,500 5,000 m

Baldon Wind Farm

Figure 6-38 Groundwater Dependent Ecosystems Aquatic



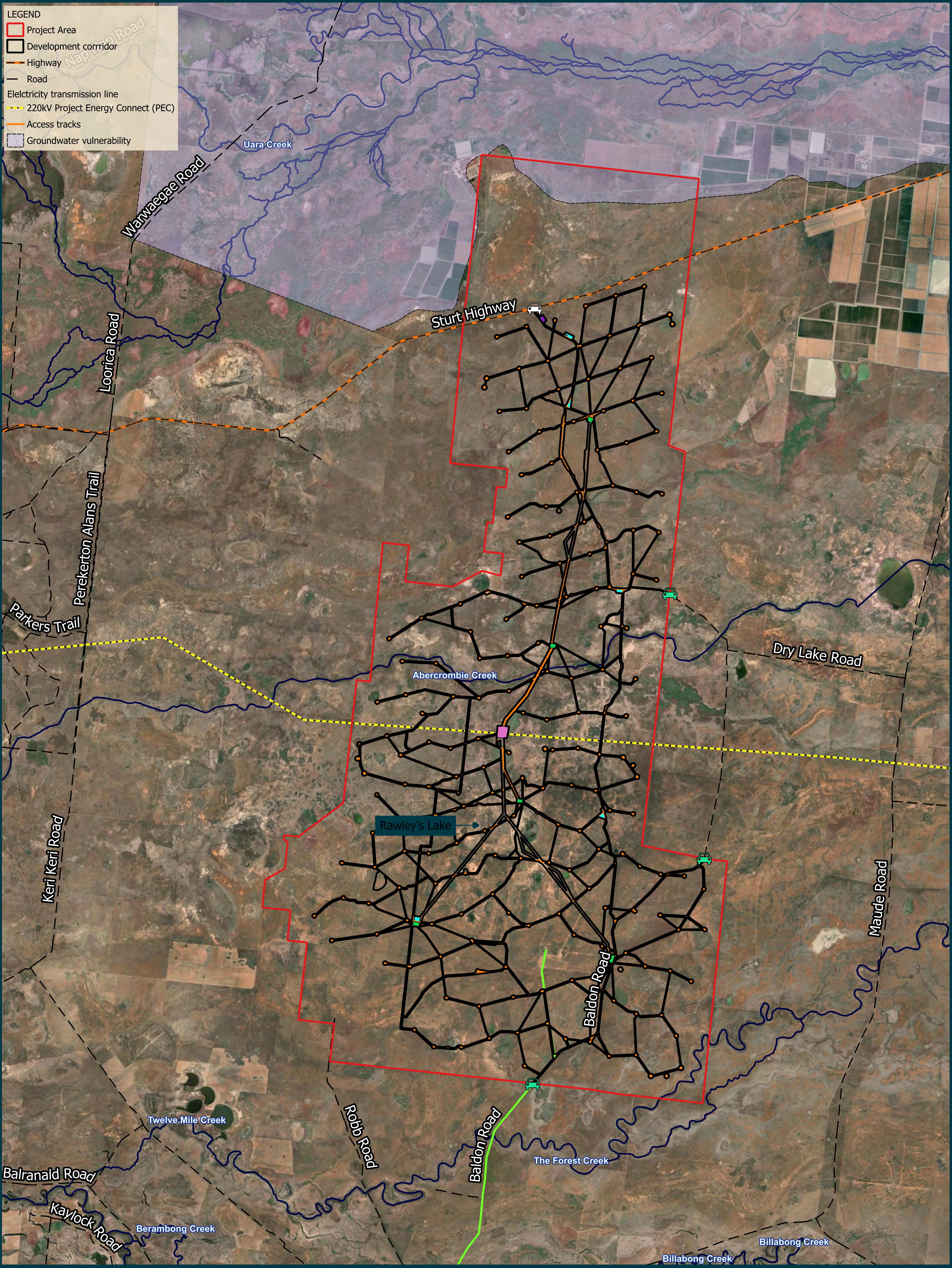
Datum: GDA2020 / MGA Zone 55

NGH

0 2,500 5,000 m

Baldon Wind Farm

Figure 6-39 Current bore depths in the Project area



Datum: GDA2020 / MGA Zone 55

0 2.5 5 km

Baldon Wind Farm

Figure 6-40 Groundwater vulnerability

Ref: 22-366 Baldon Wind Farm EIS 20240229 \ Groundwater vulnerability Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022 © NSW SEED

Groundwater regulation framework

The Lower Murrumbidgee Groundwater Source is governed under the WMA by the Water Sharing Plan for the Murrumbidgee Alluvial Groundwater Sources Order 2020, and the Murray-Darling Basin Water Resource Plan Area – Groundwater (NSW Murray Darling Basing Fractured Rock).

Under the WMA, landholders can take water under basic landholder rights. Owners or occupiers of land which overlies an aquifer can take water for domestic consumption or stock watering.

To access groundwater for purposes other than stock and domestic (Basic Landholder rights) a general Water Access License is needed to then purchase water through the temporary trade system for the Lower Murrumbidgee Groundwater Source. Very little trade occurs within this groundwater source.

Ground water extraction limits are determined by historic take and meeting sustainable extraction levels as shown in Table 6-47. Current data indicates a drop in the Lower Murrumbidgee Groundwater Source water table level for both the shallow and deep aquifer since records began in the early 1970's and identifies the extraction limits for the two aquifers which both underlie the Project area (the relevant extraction limits are shown in Table 6-47).

Table 6-47 Extraction limit for Lower Murrumbidgee Groundwater Source aquifers (DPIE, 2021)

Groundwater source	Extraction limit (ML/year)
Lower Murrumbidgee groundwater source Shallow **(up to 40m deep or to the base of the Shepparton formation)**	26,875
Lower Murrumbidgee groundwater source Deep **(greater than 40m deep)**	273,625

Extraction in the Lower Murrumbidgee Shallow alluvium is less than extraction in the Deep alluvium in response to varying demand associated with drought and flood conditions and to the declining access available under the Water Sharing Plan for that area and is outlined below.

Table 6-48 outlines the number of existing licensed bores accessing the groundwater source. There are approximately 1390 and 1240 registered bores across the Lower Murrumbidgee Deep and Lower Murrumbidgee Shallow groundwater alluvium respectively. The majority of these bores are for stock and domestic purposes. Production bores are generally used by enterprises and activities that are higher water users than stock and domestic purposes. The higher extraction levels from the Deep water source are attributed to the higher number of production bores accessing this water source compared to the Shallow water source.

Table 6-48 Approximate number of licensed bores in Lower Murrumbidgee groundwater sources (at June 2021) (DPIE, 2021).

Groundwater Source	Registered Bore Purpose		
	Basic Landholder Rights	**Production**	**Local Water Utility**
Lower Murrumbidgee Shallow	1199	39	0
Lower Murrumbidgee Deep	846	484	9

6.8.3 Potential impacts

Activities which disturb soils, surface water and groundwater can result in:

- Loss of topsoil resource, or reduction in chemical or structural fertility, reducing land capability
- Pollution of soils and waterways (surface and groundwater resources)
- Reduced or overallocated surface or groundwater resources
- Drop of groundwater level

Project activities that can have this effect include:

- Compaction in trafficked or laydown areas
- Earthworks and land forming activities, including excavation and trenching
- Spills from fuels / herbicides / pesticides / sanitary wastes, but also from erosion, where it enters waterways
- Water extraction for staff facilities, concrete batching, dust suppression and rehabilitation activities.

These activities are most relevant to construction and removal of infrastructure during decommissioning. Rehabilitation of areas disturbed by the Project will be required as part of the Project post construction and decommissioning.

Construction phase impacts

Soils and surface water quality

Erosion and sedimentation are considered the primary risk to soil and surface water resources for the Project.

There is a moderate to high potential risk for dispersion where soils are disturbed by Project construction efforts within the Project Area. Higher impact activities such as where earthworks are necessary for construction of wind turbine hardstands and substation pads or site facilities are very likely to result in increased dispersive behaviour when soil is remoulded, compacted or pulverised. In addition, wind erosion has the potential to occur where soils are disturbed or vegetation is removed as a result of the Project, especially in coarser textured topsoils, such as those in Soil Unit 3.

Due to flat nature of the landscape, the risk of soil erosion from surface water flows is very low. However, the aeolian processes observed to be operational within the Project Area, along with the chemical instability of the laboratory tested soils, indicate an erosion risk that must be considered and appropriately controlled by

Project mitigation measures. Nonetheless, the impact areas will be a small proportion (less than 2%) of the Project area, distributed in a linear pattern (and so at low density) and will not impact the general land capability.

The key mitigation measure applied during construction and operation of the Project will be the implementation of appropriately designed erosion and sediment controls (ESCs). ESCs will be designed, installed and maintained in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Volume 2 (DECC, 2008) (the 'Blue Book'). Erosion and sedimentation risk is highest during the construction and decommissioning phases. Erosion and sedimentation risk during operations will be controlled through the establishment of effective site stabilisation measures following construction in relation to maintenance of access tracks, waterway crossings, wind turbine hardstands and other areas susceptible to erosion.

Risk of erosion and sedimentation impacts on land capability and agricultural activities as a result of the Project is low, during operation and following the Project's decommissioning. Land use is discussed specifically in Section 6.9.

Erosion and sedimentation can also generate dust. Dust generating activities such as road building, traversing access track during the peak of construction would lead to the raising of dust on access tracks during construction. Air quality is discussed specifically in Section 0.

In addition to erosion and sedimentation impacts, the construction phase has potential to impact surface water quality where other pollutants maybe be mobilised, entering local waterways. Activities that may contribute to this include:

- A hydrocarbon spill risk from use and re-fuelling of construction vehicles and machinery
- On-site concreting for building and equipment foundations
- Wash off from curing asphalt pavement and road seal
- Storage and use of paints, cleaning solvents and other chemicals
- Pesticide and herbicide storage and use
- Fertilisers used for revegetation
- Runoff from waste materials
- Wastewater management from onsite septics

The site has no perennial waterways but in times of flood, pollutants can be transported further. Standard storage and handling protocols can be adopted to address these risks, in addition to clean up and notification procedures. Wastewater from amenities would be managed in accordance with local government provisions.

Water use

The Project would require up to 250ML per annum during construction, sourced primarily from existing and proposed onsite bores and / or from Billabong Creek. This non potable water would be sourced from a combination of surface water harvestable rights from associated landowners, bore water harvest rights and purchased on the open market from appropriately licensed water users pursuant to Lower Billabong Anabranch water source regulations.

There are two types of water access licence (WAL) that may be acquired to support the Project, these being a zero-share access licence or a controlled allocation licence. A zero-share access licence is granted with zero entitlement in the water source and entitlement is acquired onto it through trade on the water market. In water sources that are not fully committed, the right to apply for new water access licence can be provided through a controlled allocation order. Currently, the Lower Murrumbidgee groundwater source is fully committed, a zero-share access licence would need to be applied for and any water would be purchased on the water market.

If the full 250ML/annum was to be extracted from the water source, this would equate to approximately:

- 30% of annual surface water entitlements in this area
- 0.9% of the annual extraction limit for the Lower Murrumbidgee Shallow aquifer
- 0.09% of the annual extraction limit for the Lower Murrumbidgee Deep aquifer water source

Potable water for site amenities during construction and operation would be sourced from rainwater harvesting or licenced water tankers.

Given the small extraction amounts, water use impacts from extraction are expected to be negligible as extraction volumes spread between all three sources in low in comparison to the water available. Any extraction would operate within the specific rules and regulations governing the Billabong Anabranch water source, Lower Murrumbidgee groundwater source or any other water source used by private water contractors.

Dams, stream stability and fish passage

The Project does not intend to dewater dams onsite. While these are man made structures they provide biodiversity values and would be retained. No irrigation infrastructure will be impacted.

To maintain stream stability and fish passage, best practice design and rehabilitation measures are included within the mitigation strategies below. This is a low risk considering the low elevation and lack of incised stream beds within the Project area.

Rehabilitation considerations

After minimising the impact footprint and installing erosion and sediment control devices to restrict impacts during the construction phase, rehabilitation of disturbed areas is the key measure to preserve soils and water resources.

Rehabilitation of areas disturbed by the Project will be required as part of the Project. This will apply post construction as well as during decommissioning. In both cases, the intention will be to progressively stabilise areas of disturbance, making them resilient to erosion and weed infestation, and secondarily to re-establish appropriate vegetation cover. The Project will likely be constructed with multiple active construction fronts however, this would still be only a proportion of the total footprint is being disturbed (and rehabilitated) at any one time. The Operational footprint is 348ha and the balance of the Development footprint (819ha) will be rehabilitated post-construction. Most of the Operational footprint will be rehabilitated as part of decommissioning.

Operational impacts

Soil and surface water impacts during operation would be very low. Vehicles will be restricted to the formed access tracks and no soil disturbance or sedimentation risks are predicted. Pollution risks during maintenance activities will continue to be managed by standard protocols, similar to construction.

Water demands for the operational phase are expected to be minimal and limited to usage at amenities and provisions for firefighting which would be stored in tanks in preparedness of such an event.

- Water take would be from surface water or groundwater sources in accordance with licensing rules and water availability.
- Potable water would be trucked in from an appropriately licenced supplier and stored on site in rainwater tanks for use in amenities and drinking purposes.

Decommissioning impacts

Removal of all above ground infrastructure (with the exception of TransGrid assets and a number of internal access tracks that the landholders wish to retain) and rehabilitation of areas disturbed by this process will be the key decommissioning impact. As for construction, the Project will progressively stabilise areas of disturbance, making them resilient to erosion and weed infestation, and secondarily to re-establish appropriate vegetation cover. Some tracks are likely to be retained by the landowner and as such impacts would be less than the construction stage and will benefit from the lessons learned during earlier rehabilitation activities at the site.

Water take would be similar to the construction phase and would be utilised for dampening of dust on internal access tracks.

- Water take would be from surface water or groundwater sources in accordance with licensing rules and water availability.
- Potable water would be trucked in from an appropriately licenced supplier and stored on site in tanks for use in amenities and drinking purposes.

Key uncertainties of the assessment

Soils surveys and data from bores onsite have informed this assessment. However, soils and groundwater characteristics have been noted as variable across the large Project area and the surface water resources are highly ephemeral. This assessment has adopted standard mitigations strategies that have high confidence of success. The environmental management system will include monitoring and will be adaptive. These measures are considered appropriate to address the inherent uncertainties of the assessment.

6.8.4 Mitigation measures

Mitigation measures for water and soil are provided in Table 6-49.

Table 6-49 Soil and water mitigation measures

ID	Safeguards and mitigation measures	Project stage
SW1	A Soil and Water Management Plan (SWMP) including site specific progressive Erosion and Sediment Control Plan (ESCP) would be prepared, implemented and monitored during construction to minimise impacts to soil and surface water. They would be prepared in accordance with the ‘Blue Book’ Volume 1 Managing Urban Stormwater: Soils and Construction (Landcom 2004) and include the following specific provisions: • Stage works to minimise the extent of ground disturbance at any one time. Areas of disturbed soil would be rehabilitated promptly and progressively during construction. • Prior to the commencement of ground disturbing works, and progressively during construction, install erosion and sediment control measures in accordance with the progressive ESCP. • Regular inspections and maintenance of erosion and sediment controls, particularly following rainfall, including maintaining an inspection register.	Construction

ID	Safeguards and mitigation measures	Project stage
	• Ensure that machinery leaves the site in a clean condition to avoid tracking sediment onto public roads. • During all excavation activities, separate subsoils and topsoils and ensure that they are replaced in their natural configuration to assist revegetation. • Stockpile topsoil appropriately to minimise weed infestation, maintain soil organic matter, and maintain soil structure and microbial activity. • Manage stockpiles in accordance with the Blue Book (Landcom 2004). • Manage works in consideration of heavy rainfall events. • Refuelling of plant and machinery to occur in a bunded area and not within 50 m of a waterbody or drainage line. • Plant and machinery to be appropriately maintained. • Procedure to manage spills and requirement to provide spill kits. • No concrete wash-out will occur within 50 m of a waterbody or drainage line. Concrete washout will occur in a sealed and bunded area. • Unexpected Finds Procedure for contaminated soil. • Procedure for management of waste soil (spoil) including classification.	
SW2	Design and rehabilitation of works required within waterways will adhere to the following guidelines: • *Guidelines for Controlled Activities on Waterfront Land* (NRAR, 2018); • *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (DPI (Fisheries), 2003) • *Policy & Guidelines for Fish Habitat Conservation & Management* (DPI, 2013)	Construction
SW3	Should access to groundwater and surface water be required, the Applicant will apply for a Water Access License (WAL) and any other relevant approvals.	Construction / operation / decommissioning
SW4	Disturbance to soils will be limited during operation by restricting vehicle movements to formed access tracks and roads.	Operation

ID	Safeguards and mitigation measures	Project stage
SW5	Following construction, all disturbed areas will be rehabilitated as agreed with the landowner. Consideration should be given to: • Grazing restrictions until vegetation is established • Seed bank protection and seed collection protocols for rehabilitation where appropriate. • Forward planning for seasonal windows and contingencies to address risks identified to sourcing required materials. • Monitoring of rehabilitated areas until success criteria are achieved.	Construction

6.9. Land use

To investigate impacts on land use, a Soils, Land and Agriculture Impact Assessment report was prepared by Mine Soils Pty Ltd on behalf of Baldon Wind Farm Pty Ltd (the Applicant). It is summarised below and appended in full in Appendix F.7.

6.9.1 Assessment approach

In lieu of guidelines that relate to the assessment of soil, land and agriculture for wind farm projects, this assessment has referenced the Large-Scale Solar Energy (LSSE Guidelines) (NSW DPIE, 2022) in relation to the verification of land and soil capability (LSC) in accordance with Land and Soil Capability Assessment Scheme (LSC Scheme) (EOH 2012).

While the LSSE Guidelines stipulate a Level 1 (basic) assessment approach for this Project, based on the absence of Class 4 soil landscapes on or adjacent to the Project, a more conservative Level 2 approach was adopted to provide more certainty in relation to impacts on soils and land use. The Level 2 assessment:

- Describes the nature, location, intensity and duration of the Project.
- Establishes the regional context and site characteristics and land use
- Describes the nature and location of agricultural land with the potential to be impacted by the development.
- Describes the current agricultural status and productivity of the proposed development area and surrounding locality including the land capability.
- Includes a Land Use Conflict and Risk Assessment (LUCRA) of potential land use conflicts in accordance with the Department of Industries' Land Use Conflict Risk Assessment Guide
- Identifies strategies which may be adopted to mitigate potential impacts on agricultural land and minimise land use conflict.

6.9.2 Existing environment

Land zoning and land use

The Project area is zoned RU1 – Primary Production under both the Hay Local Environmental Plan 2011 and the Wakool Local Environmental Plan 2013.

The majority of the Project area is currently grazed by both Merino sheep for wool, and Hereford cattle at low stocking rates on mostly native pastures for breeding and fattening. Grazing of Merino sheep is the current and historically dominant livestock enterprise within the Project area. Livestock are watered through a series of farm dams which are supplemented with piped in water from offsite surface waters or from stock and domestic bores accessing underground water supplies.

Unused irrigation channels and historically irrigated paddocks exist on site. However previously held water allocations have been traded and are no longer available for irrigation.

Regional land use and immediate near neighbour land use are consistent with the Project area and include livestock grazing, broad acre dryland cropping, and some instances of irrigated cropping. No sensitive agricultural activities such as intensive plant or livestock agriculture were observed within the Project Area or its immediate surrounds.

Figure 6-41 The Project Area contains open plain lands dominated by low shrubs and native pasture for grazing

Figure 6-42 The Project Area contains areas of soil surface scald as a result of agriculture land use and aeolian processes.

Figure 6-43 Merino sheep are the current and historically dominant livestock enterprise on the Project Area

Figure 6-44 Agricultural infrastructure within the Project Area includes farm dams.

Soils and Land Soil Capability (LSC)

The soils on site are characterised as light clays, loams and sands over a clay sub horizon. The Project area has been identified as LSC 5 and LSC 6 by published NSW Land and Soil Capability mapping. These classes have high to severe limitations (further detail on soils and potential impacts is provided in Section 6.8).

Table 6-50 LSC in Project area

LSC Class	Capability rating	Comment	Within the Project area
LSC class 5	Moderate-low capability land	Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.	26,022ha.
LSC class 6	Low capability land	Very severe limitations for a wide range of land uses and few management practices available to overcome these limitations. Land generally is suitable only for grazing with limitations and is not suitable for cultivation. Soil erosion can be very severe without adequate erosion control measures. Salinity can be a very severe hazard.	20,237ha.

The soil surveys undertaken by Minesoils agree with this mapping (refer Appendix F.7).

It is noted that the site has a history of disturbance and overgrazing. The key strategy used to remediate the site in the 1990's was the planting of native saltbush in rows, to stabilize and capture soil. The rows are still apparent today and have assisted to restore habitat and improve soil conditions. This demonstrates, that while the soils have limitations, they are also able to be remediated after disturbance.

Topography and geology

The Project area is characterised by almost flat topography with extremely low gradients dominated by the open plains of native grasslands and semi-arid shrublands. The underlying geology of the Project area consists of Shepparton Formation which formed in a fluvio-lacustrine environment between the Pleistocene and Holocene with the dominant lithology consisting of alluvial floodplain deposits. This is further described in Section 6.8.

Water sources and other infrastructure

Water sources are currently from farm dams supplemented by stock and domestic groundwater license with some surface water being pumped in from Moores Creek (refer to section 6.8).

There is limited infrastructure located on the property and includes stock yards with loading ramp, water points, fencing, gates, cattle grids, grain silos. Limited water infrastructure in the form of historic irrigation paddocks and channels exist on the property. Currently no irrigated agriculture or licenses to permit this, except for stock and domestic water uses.

Figure 6-45 Agricultural infrastructure within the Project Area includes stock yards

Figure 6-46 Agricultural infrastructure within the Project Area includes load-out ramp.

Figure 6-47 Agricultural infrastructure within the Project area includes cattle grids and access tracks.

Figure 6-48 Agricultural infrastructure within the Project area includes stock fences and gates.

Figure 6-49 Agricultural infrastructure within the Project area includes silos.

Figure 6-50 Agricultural infrastructure within the Project area includes irrigation channels

Agricultural production

Agricultural production in the Project area is limited to the sale of wool (Merino), lambs and Hereford calves. Due to the low rainfall the stocking density is low at 1.5 Dry Sheep Equivalent[15] (DSE)/ha which limits potential earning capacity off the available land.

[15] DSE is dry sheep equivalent based on early research on a dry non lactating 50kg merino ewe. DSE is the standardised unit used to compare feed requirements of different classes of stock or to assess the carrying capacity and potential productivity of an area of grazing land.

The proposed Disturbance area includes approximately 820 ha of land that is currently subject to agriculture land use. This is less than 2% of the wider Project area. As outlined in Appendix E7 productivity of the Disturbance area can be estimated in two ways:

1. **The NSW Department of Primary Industries (DPI) (2023) Gross Margin Budgets for Livestock can be used to provide a broad estimation of the productivity of the Disturbance area (820 ha) for grazing.**

   Based on modelling conservative enterprises of Merino ewes (20 micron) – Merino rams as a stocking rate of 1.5 DSE/ha, the estimated productivity of the Disturbance area is $57,773.10 per annum.

2. **The productivity of the Disturbance area can be estimated by analysing the information presented from ABS agricultural census data and the gross commodity value of livestock slaughtered and livestock products across the two LGAs.**

   This results in a $/ha ratio of $45/ ha for Hay Shire and $144/ha for the Murray River LGA. By applying these rates to the Disturbance area, the productivity is estimated to range between $36,900 and $118,080 per year.

6.9.3 Potential impacts

Given the use of the site, the key land use impacts of the Project are the potential to impact agricultural land uses; onsite, on neighbouring properties and whether any local or regional impacts to agricultural services may be relevant.

As set out in Section 4, while wind farms (and electricity generation) is not specified in item 2 or 3 of the RU1 Primary production land use table under Part 2 of the relevant Local Environmental Plans, the provisions of the State Environmental Planning Policy (Transport and Infrastructure) 2021, override the LEP's allowing the proposal to be undertaken with consent. Therefore, some impacts on RU1 Primary production land for the purpose of the Project can be considered permissible.

The Project would impact around 2% of the Project area during construction, reducing to around 1% during the operational phase of the Project. The direct loss of agricultural land relates to these areas specifically. However, impacts may extend beyond these boundaries and may include positive as well as negative impacts:

- Potential benefits for the involved landholders arising from the Project include:
  - Additional formed tracks increasing property access and for assisting access during bushfires and wet weather – during the operational phase.
  - Additional income stream to supplement their agricultural enterprises – during the life of the Project but especially relevant during drought or flood conditions that curtail agricultural productivity.
- Potential adverse impacts include:
  - Loss of agricultural production and potential offsite economic impacts.
  - Impacts on farm management including:
    - Disruption to farm management activities and practices
    - Biosecurity impacts
    - Erosion impacts
  - Effects on neighbouring land uses
  - Effects on regional farm values and land uses
  - Effects on agricultural support services

While the impacts on involved landholders are not required to be assessed, these impacts are considered below to provide transparency regarding how these impacts might extend beyond the site boundaries and be managed appropriately.

Agricultural production

For the purpose of assessment and to apply a conservative approach, it was assumed that agriculture will cease throughout the Disturbance area for the duration of the Project. Therefore, there will be a temporary decrease of approximately 820 ha of land used for agriculture for the duration of the Project including construction, operation and decommissioning. The remaining 45,439 ha of the Project Area will be able to continue to be used for livestock grazing.

It is estimated that temporary loss of this 820ha during construction, operation and decommissioning would equate to a result in a net loss of approximately 547 DSE capacity, equivalent to production of between $36,900 and $118,080 per annum (detailed in Appendix F.7).

Farm management

Activities

The disruption to usual farm activities will be highest during the construction phase due to the intensity of activity during this phase. A multiple construction fronts progress there will be higher volumes of vehicle and heavy machinery traffic than during the operational phase of the Project. Usual farm activities will be disrupted less during the operational phase of the project, other than during an emergency breakdown or maintenance of the wind turbines. This would be managed between the landowner and the operator.

If protocols for the operation of access gateways are not adhered to by construction and maintenance contractor crews, sheep could potentially escape through boundary gates and impact on passing traffic (become a traffic hazard), be stolen (livestock theft) or box (mix management groups).

Disturbance of ewes during lambing could lead to lamb loss, mismothering or loss of ewe and lamb unit (especially maiden ewes) leading to both short term and long-term financial losses.

The impacts on livestock management would be greatest during construction compared to the operation phase which is directly related to the intensity of activity including increased volume of on-site activities and vehicle movements during construction.

Biosecurity

Biosecurity is an issue of significant concern to the wider agricultural community. In NSW Biosecurity Management plans must be adhered to (from August 2019) when in place. Failure to comply with these arrangements may be an offence under the Biosecurity Act 2015. There are certain actions that a producer must legally take to be biosecure (DPI, 2024). These include rules around:

- High risk and priority pests and diseases that must be reported
    - Notifiable pests and diseases
    - Prohibited matter
    - Biosecurity events
- Controlling the movement, keeping and release of pest animals
- Controlling movement, treatment and importation of plants
- Having the right accreditation, registrations, certificates and permits

During the Project construction and operation, the movement of equipment, vehicles, machinery and personnel increases the risk that disease and pests could be introduced or transferred between properties by construction and maintenance contractor crews. If boundary gates are breached by livestock as a result of

Project personnel damaging or inappropriately leaving gates open, there could also be biosecurity issues such as transmission of internal and external parasites, transmission of footrot or ovine Johne's disease. A biosecurity management plan would be designed and implemented for all phases of the Project.

Erosion

There is a moderate to high potential risk for dispersion where soils are disturbed by Project construction efforts within the Project Area. Higher impact activities such as where earthworks are necessary for construction of sub-station pads or site facilities are very likely to result in increased dispersive behaviour when soil is remoulded, compacted or pulverised. Wind erosion must also be considered and soils exposed as a result of construction should be sown with grass and pasture species with starter fertiliser to provide stabilising ground cover.

Due to the flat nature of the landform and existing aeolian processes, the risk of erosion and sedimentation impacts on agriculture as a result of the Project is low. With the implementation of soil and water mitigation measures detailed in Section 6.8, it is expected that direct and indirect erosion and sedimentation risks would be limited and manageable.

Neighbouring land uses

Agricultural productivity of land outside of the Project area is not anticipated to be affected by the Project as the associated agricultural resources outside of the Disturbance area will not be affected. It is noted that the adjacent neighbours east and west of the Project area are both considering wind farm developments. At the time of writing a State Significant Development application has been submitted and placed on public exhibition for the western neighbour, Keri Keri. Cumulative impacts considering this change in landuse are considered in Section 7.5 of this EIS.

Impact on regional values and land uses

Due to the limited reduction in agricultural activity as a result of the Project and given the nature and scale of the established agricultural industries within the region and wider state, there will be no impact to critical mass thresholds of agricultural enterprises needed to attract and maintain investment in regional agricultural industries and infrastructure.

Regional values and land uses would not be impacted by construction activities or by Project infrastructure or Project related activities. There would not be a significant loss of production or changes that would impact on land uses.

Agricultural support services

The reduction of the number of animals being grazed on site could impact on contracting services including mustering contractors, shearing crews, lamb handling contractors (lamb marking), fencing, feed distributors, animal health distributors.

The Project will have a negligible impact on the viability of local and regional agricultural services and employment or on employees or contracting services currently engaged (i.e., stock mustering services). Changes to the supply and viability of agricultural support services in the main service centres of Hay and Balranald are driven by social and market trends. These drivers far exceed the scale of the negligible reduction in agricultural land use and productivity as a result of the Project.

6.9.4 Land use conflict risk assessment (LUCRA)

A LUCRA was prepared by Minesoils Pty Ltd (refer Appendix E7) in accordance with the NSW Department of Industry's Land Use Conflict Risk Assessment Guide (DPI, 2011) to more specifically assess the interactions of the Project with neighbouring properties. LUCRA is a system that is used to identify and assess the potential for land use conflict to occur between neighbouring land uses. It helps land managers and consent authorities to assess the possibilities for and potential level of future land use conflict.

The risk evaluation and definitions are drawn from the LUCRA guide. A Risk Ranking Matrix is used to rank the identified potential land use conflicts. The risk ranking matrix assesses the environmental, public health and amenity impacts according to the:

- Probability of occurrence
- Consequence of the impact.

LUCRA aims to:

- Accurately identify and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises.
- Objectively assess the effect of a proposed land use on neighbouring land uses.
- Increase the understanding of potential land use conflict to inform and complement development control and buffer requirements.
- Highlight or recommend strategies to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.

Land use conflicts occur when one land user is perceived to infringe upon the rights or impact the values or amenity of another. In rural areas land use conflicts commonly occur between agricultural and residential uses. However, land use conflicts can also occur between different agricultural enterprises and other primary industries.

LUCRA Findings

The following land use conflict risk items were identified for the Project:

- Construction noise
- Construction dust
- Construction ground disturbance
- Construction traffic
- Construction workforce
- Construction work
- Project infrastructure
- **Land removed from agriculture**
- Operational traffic
- Operational noise
- Visual amenity
- Property devaluation
- Biosecurity
- Erosion and sedimentation
- Livestock
- **Decommissioning and rehabilitation**
- Cumulative impacts

Within these risk item categories, 28 potential conflicts were considered as part of the LUCRA. The high and moderate potential conflicts are summarised in Table 6-51. The complete LUCRA methodology and assessment including risk ranking matrix, risk reduction controls and performance targets is included in Appendix F.7.

The LUCRA has confirmed the key interactions to be considered for this Project. These issues have been considered in detail in other sections of the EIS and have been considered manageable with mitigation (such as aviation, soil and water, biodiversity, visual impact, traffic safety).

Table 6-51 LUCRA high and moderate risk items summary

Potential conflict		Conflict risk
Safety - Aerial farm services	Aerial farm service providers in the locality may be concerned that wind turbine structures and associated turbulence in the Project Area may pose safety risk.	**High**
Surface and groundwater	Neighbouring landholders and agricultural operators withing the wider region may be concerned about the required surface water and groundwater take of the Project.	**Moderate**
Biodiversity – construction impacts	Stakeholders may be concern about potential impacts to biodiversity within the site and locality from construction activities.	**Moderate**
Visual amenity	Stakeholders in the locality who wish to maintain views of the existing landscape may be concerned about the change in visual amenity resulting from the wind farm	**Moderate**
Traffic risks	Land users in the locality may be concerned about the possibility of increased vehicles during construction or operation may result in an accident with livestock, farm machinery or wildlife on roads.	**Moderate**
Aerial spraying restrictions	Neighbouring landholders may be concerned that aerial spraying undertaken on properties within the locality may be limited by wind turbine structures and associated turbulence in the Project Area.	**Moderate**
Biodiversity – collision risks	Stakeholders may be concern about potential impacts to biodiversity including birds and bats from wind turbines.	**Moderate**
Biosecurity	Land users in the locality may be concerned about biosecurity breaches including weed, plant pest, plant disease or pest animal introduction and/or spread, as a result of the Project.	**Moderate**

Key uncertainties of the assessment

Soil surveys use a sampling approach and may not accurately portray the full variation of the soil landscapes in the Project area. Nonetheless, with reference to applicable guidelines, a conservative Level 2 approach was adopted to improve certainty in relation to impacts on soils and land use. The findings agreed well with NSW Land and Soil Capability mapping.

The LUCRA has confirmed the key interactions to be considered for this Project. All moderate and high potential conflict issues have been considered in detail in other sections of the EIS and have been considered manageable.

6.9.5 Mitigation measures

In addition to the mitigation measures provided in other sections of the EIS, specific to land use, the Project commits to managing the interactions with host landholders to minimise disruption to agricultural operations. Specific rehabilitation provisions for decommissioning have also been included, informed by the Minesoils assessment in Appendix F.7.

Table 6-52 Land use compatibility mitigation measures

Reference	Mitigation measure	Timing
L1	Stock fences, farm dams, and access tracks to be retained as agreed with the land owner to accommodate continued grazing and farm operations within the Project area and (where possible) the Disturbance area.	Operation
L2	• Agriculture land use will be re-established over the operational footprint (unless otherwise agreed with the landowner and/or regulatory authorities). • The operational footprint will be returned to an agricultural productivity potential that is approximately equivalent of pre-Project status.	Decommissioning
L3	A Decommissioning and Rehabilitation Management Plan will be prepared (approximately 18 months ahead of planned closure) that outlines the rehabilitation objectives and strategies to rehabilitate the wind farm site to pre-wind farm land and soil capability (or an appropriate standard in consultation with the landholder) during the decommissioning phase. The plan would include: • Reinstating soil growth medium of disturbed land at a safe and stable depth in order to mitigate long term effects on the land and soil capability of the Disturbance area (except in areas otherwise agreed by the landowner).	Decommissioning

Reference	Mitigation measure	Timing
	• Soil capping material will be obtained from stripped and stockpiled topsoil from the construction phase of the Project. Soil capping material should be consistent with surrounding environment. • All remaining below ground infrastructure to be capped with minimum 0.5m of soil of suitable texture and preparation to mitigate long term wind erosion in order to restore pre-disturbance LSC classes. • The following re-spreading and seedbank preparation techniques are recommended to prevent excessive soil deterioration and dispersion over disturbed land . o Topsoil should be spread to a depth that reflects adjacent soil horizons, while also considering the surrounding landform. Soil stabiliser agents may need to be applied if adverse weather conditions and seasonal variation is not supportive of regrowth (e.g. drought conditions). o Where necessary soil should be treated with fertiliser and seeded in one consecutive operation, to reduce the potential for topsoil loss to wind and water erosion. Thorough seedbed preparation should be undertaken to ensure optimum establishment and growth of vegetation.	

07 Assessment of additional impacts

7. Assessment of additional impacts

7.1. Historic heritage

7.1.1 Assessment approach

The section considers the following information in its assessment of Non-Aboriginal Heritage impact:

- Searches of national and state heritage databases. This includes the Australian Heritage Database (World, National and Commonwealth Heritage Lists), and the Heritage NSW State Heritage Inventory (State Heritage List, Section 170 registers and local heritage lists) (NSW Heritage Division, 2016).
- Searches of Murray, Wakool and Hay Local Environmental Plans and Development Control Plans (LEPs and DCPs).
- Review of relevant literature.
- Site visit, carried out in conjunction with the Aboriginal heritage survey program, throughout the following dates:
  - 27 February to 3 March 2023;
  - 6 March to 10 March 2023;
  - 20 March to 24 March 2023;
  - 27 March to 31 March 2023;
  - 7 August to 11 August 2023;
  - 14 August to 18 August 2023;
  - 28 August to 1 September 2023; and
  - 25 September to 29 September 2023.
- Assessment against the seven NSW Heritage Significance criteria, and determination of any potential heritage impacts on the Project area.

Recommendations are provided accordingly that would help to avoid, minimise or mitigate against impacts to the identified cultural heritage values of the Project area.

7.1.2 Existing environment

Local European historical context

The first records of European exploration of the local region dates to when Captain Charles Sturt entered the Murrumbidgee River at the mouth of the Lachlan River in 1829 and passed through to the junction of the Murray River (Hastie, 1951). Explorer Major Thomas Mitchell followed Sturt's journey in 1836.

The Moulamein township, the closest town to the Project, was laid out by Surveyor Thomas Townsend in April 1851. However, Townsend's survey shows that by this year the "Court House, Chief Constable's house, E. Bloxham's Inn, the house of Thomas Hanly (carrier) and some buildings belonging to Thomas Sheean" were already in existence. The design of Moulamein was approved by the Governor and the Surveyor-General informed by letter on 7 July 1851. The first sale of allotments was held on 13 November 1851.

In 1866, the Murray Telegraph Line was opened, and in 1870, the Post Office and Telegraph Office were amalgamated. The telegraph network throughout NSW was in heavy use until 1945, after which telephone usage took over as the main telegraphy service.

Moulamein became a crossroad and port where the paddle steamers plying the Edward River could exchange cargo and at this time, the river system was the most effective means of transport. In 1926 came the opening of the railway line from Barnes to Balranald and in October 1927.

Between 1935 and 1964, the NSW Water Conservation and Irrigation Commission created irrigation networks in the southern Riverina, from Mulwala to Moulamein to secure reliable stock, farming and domestic water to an area which had been regularly devastated by drought from the 1910s onwards. Part of this irrigation system was the installation of the Dethridge wheel.

The Dethridge wheel was invented in 1910 by John Stewart Dethridge, the Victorian State Rivers and Water Supply Commissioner, and consists of a drum on an axle, with eight y-shaped vanes fixed to the outside, and it sits laterally across a channel and is turned by water flow refer to Figure 7-1. Today, the Dethridge wheel does not meet the accuracy required for a modern irrigation system and does not meet the current Australian Metering Standards. There are likely to be Dethridge wheels remaining on properties throughout the local area, as this type of irrigation system was still being used within the last 20 years.

Figure 7-1 Photograph showing a Dethridge wheel at an outlet point on an irrigation channel at Leeton, NSW (Australian News and Information Bureau, 1964)

Historical landholdings

The southern part of the Project area, now known as the properties of Kingle and Baldon, once comprised the property of Mooloomoon. Today, the Project area comprises the pastoral stations of Kingle, Baldon and Keri East and is located on rural land which is primarily used for sheep grazing. The Jeraly property comprises the northern most portion of the Project area, north of the Sturt Highway where no Project infrastructure is currently proposed.

Heritage register searches

There are no listed Non-Aboriginal heritage items within the Project area. The nearest heritage item is the Yanga Pastoral Station Complex (listed under the Under Section 170 of the Heritage Act) located approximately 12km west of the Project area.

The Project area is not heritage listed and does not meet any of the criteria for listing at a State of Local level.

Site survey results

Fences and gates were present throughout the entire Project area and there were some stock yards, however neither were considered to have heritage significance. Abandoned telegraph poles were identified at different locations in the Project area, associated with the former Murray River Telegraph Line (refer to Figure 7-2). Dilapidated structures such as a steel water tank were also discovered onsite (refer to Figure 7-3). A former Dethridge wheel for the decommissioned irrigation system was observed between the Glenn (Kingle) property and Shippen (Baldon) property (refer to Figure 7-4).

Assessment and statement of significance

There are no telegraph poles listed on the NSW State Heritage Inventory and there is one listed on the Australian Heritage Database, however it is not in NSW and has since been removed from the Register of National Estate. Twelve telegraph poles were identified within the Project area and two within the Disturbance area, (refer to Figure 7-5, Figure 7-6 and Figure 7-7). Due to the small footprint of each telegraph pole, the Project will avoid impacts to any telegraph poles by micro siting of development infrastructure during the detailed design phase. Due to this mitigation, no telegraph poles would be impacted by the Project and no further assessment of their heritage significance is proposed.

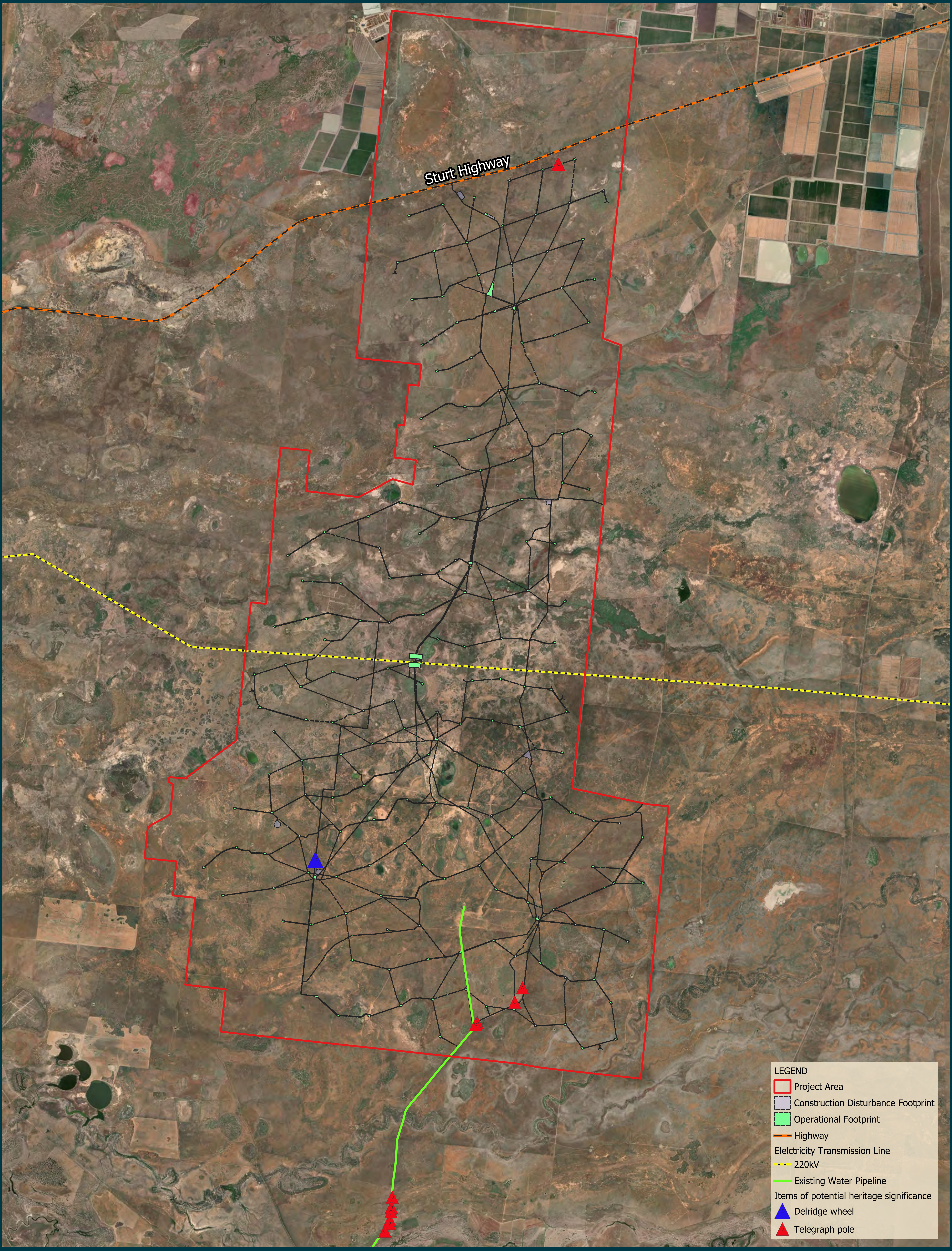
The Dethridge wheel is located in close proximity to the Disturbance area, just outside of its western boundary, and the proposed works will not impact the wheel. There are currently no heritage listed Dethridge wheels in NSW, however the Dethridge wheel in the Project area may have some historical potential.

As there are no listed heritage items within the Project area and none identified by the site survey that would be impacted, no statement of significance has been written for the Project area.

Figure 7-2 Telegraph pole

Figure 7-3 Steel tank

Figure 7-4 Dethridge wheel



NGH

Baldon Wind Farm

Figure 7-5 Items of potential heritage significance overview

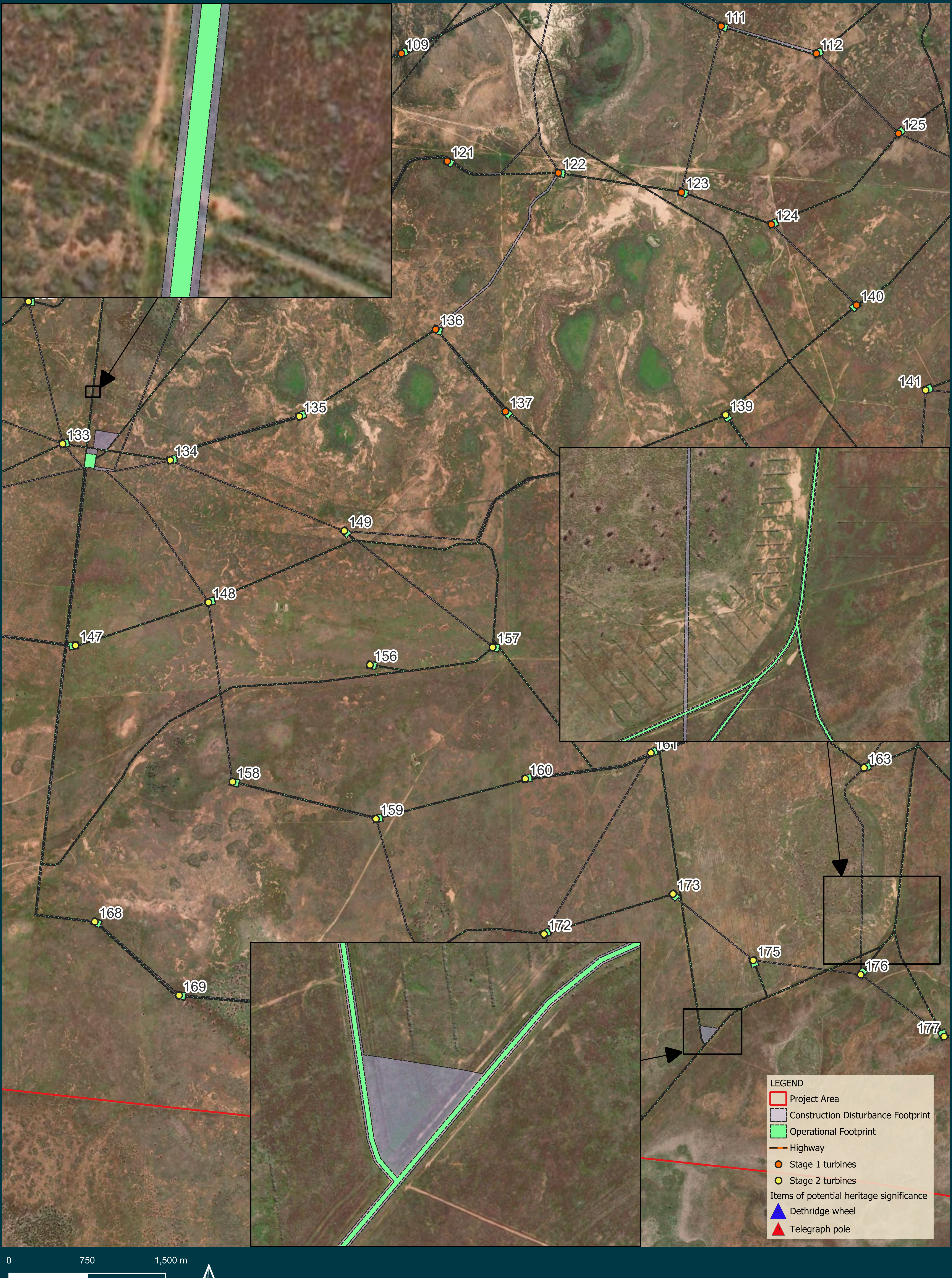
Ref: 22-366 Baldon Wind Farm EIS 20240229 \ Non-Aboriginal Heritage Author: Jared Graham-Higgs Date created: 01.08.2024 © NGH 2024 © ESRI 2022

Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

Figure 7-6 Items of potential heritage significance northern section



Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

Figure 7-7 Items of potential heritage significance southern section

7.1.3 Potential impacts

The Project area is not listed on any heritage register at a State or Local level and the site visits did not identify any items of heritage significance within the Disturbance area that could not be avoided in the final layout. The proposed development of the Baldon Wind Farm will not have a negative overall heritage impact on the Project area or the surrounding areas. In addition, the proposed works will not result in an overall significant physical or visual impact on any items of surrounding heritage.

7.1.4 Key uncertainties of the assessment

The precise location of all historic heritage sites have not been comprehensively mapped for the Development corridor. Mitigation measures below address this risk and will assist to further minimse impacts during detailed design. While it is possible that not all unrecorded sites have been identified in the survey effort to date, an Unexpected Finds Procedure will also assist to address this risk.

7.1.5 Mitigation measures

The measures below are proposed to mitigate impacts to historic heritage, in line with potential impacts (refer to Table 7-1 below).

Table 7-1 Historic heritage mitigation measures

ID	Safeguards and mitigation measures	Project phase
NAH1	Surveys must be completed by an archaeologist to ground validate the standing location of all telegraph poles within the Disturbance Area.	Detailed design
NAH2	No telegraph poles or the Dethridge wheel are to be impacted at any phase of the Project. Where appropriate, their locations should be noted in the field with flagging tape.	All phases
NAH3	Further historical significance assessment and site inspection will be undertaken if the final detailed design indicates proposed works impact any identified historic heritage items with heritage potential.	Detailed design
NAH4	In the event any heritage finds are identified, works must cease and the Unexpected Finds Procedure (refer to procedure in the ACHA) should be implemented	Construction Operation Decommissioning

7.2. Hazards and risks

7.2.1 Battery storage - Hazardous and Offensive Development

Assessment approach

Preliminary risk screening was undertaken to determine whether the Project qualifies as a 'potentially hazardous industry' in the context of SEPP Resilience and Hazards. This is a development which, if it were to operate without measures to reduce or minimise its impacts, would pose a significant risk to the locality in terms of human health, life, or property, or to the biophysical environment.

To determine whether the Project is potentially hazardous, the *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (Hazardous and Offensive Development Guideline) was used to undertake the risk screening process. The risk screening process considers the type and quantity of hazardous materials to be stored on site, distance of the storage area to the nearest site boundary, as well as the expected number of transport movements.

The Preliminary risk screening (included as part of Appendix F.8) includes a summary of these matters as well as the relevant SEPP screening threshold. It also addresses the Hazardous and Offensive Development Guideline risk factors to identify hazards outside the scope of the risk screening method. It found that the Project would not be considered a 'potentially hazardous industry' and therefore, on this basis, the Project does not trigger the requirement for a Preliminary Hazard Analysis (PHA), because:

- The storage and transport of hazardous materials for the Project would not exceed the relevant risk screening threshold
- There are no other risk factors identified that could result in significant off-site impacts
- The Project is not considered as 'potentially hazardous' with respect to the storage and transportation of dangerous goods.

Notwithstanding the outcome of the preliminary risk screening, the *Hazards and Risks* assessment requirements of the SEARs require a PHA to be prepared.

A Preliminary Hazard Analysis (PHA) was prepared by Sherpa Consulting (refer Appendix F.8). The PHA identifies the hazards and assesses the risks associated with the Project and details measures to reduce these hazards and risks. The PHA considers proposed Project infrastructure including battery enclosures [16] and electrical conversion systems (e.g. inverters and transformers), the on-site substation, transmission line connection infrastructure, operations and management buildings and ancillary infrastructure. The PHA focused on the risk of these facilities to surrounding land uses and receivers. It is summarised below.

Assessment of BESS separation distances

The SEARs required the Project to consider '*all recent standards and codes'* and *'demonstrate that the separation distances between the BESS to onsite or off-site receptors and the separation distances between BESS sub-units prevent fire propagation'*. Specifically, the Applicant must demonstrate that the proposed BESS capacity would be able to fit within the land area designated for the BESS accounting for separation distances between the:

- BESS sub-units (racks, modules, enclosures, etc.), to ensure that a fire from a sub-unit does not propagate to neighbouring sub-units

[16] In accordance with the Project description in Section 3, the PHA considered the option for a centralised and distributed battery energy storage system.

- The overall BESS and other onsite or off-site receptors.

The PHA:

- Reviewed separation distances/clearances provided between the BESS sub-units against applicable codes and standards and manufacturer specification.
- Verified that the required land area for the proposed BESS capacity would fit within the land area designated for the BESS.
- Reviewed the separation distances between the BESS and onsite and off-site receptors.

Separation distances between BESS sub-units

The National Fire Protection Agency (NFPA) 855 *Standard for the Installation of Stationary Energy Storage Systems* is widely viewed as the most comprehensive set of best practice guide in the industry. A review of NFPA 855 was undertaken to determine the required separation distances between the BESS units. NFPA 855 specifies the default maximum allowable energy storage and minimum separation between units and walls. However, NFPA 855 also specifies that the BESS may be installed in units with larger energy storage or smaller separation if they meet the fire and explosion testing in accordance with UL 9540A *Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems*. The UL 9540A testing is a method used for various means, including to assist in assessing or developing mitigation measures for a failure event, propagation of a failure, or consequences of an event. It is currently considered to be the most appropriate methodology to provide comprehensive, consistent, and reliable data for battery failure testing.

The product datasheet provided by the Applicant and included in the PHA indicates that the BESS units are compliant with UL 9540A and the Project layout, including fire detection and protection systems, is in accordance with the manufacturer's recommendations.

On-site receptors

The closest onsite receptors to the BESS will be other proposed Project infrastructure including:

- Wind turbines
- Substation
- Main Operations & Maintenance building.

The temporary construction accommodation facility will be decommissioned prior to operation of the BESS and is not considered as an onsite receptor.

For both BESS configurations (centralised and distributed), the separation distances to the nearest onsite receptors are shown in Table 7-2.

Table 7-2 Separation distances to onsite receptors

Onsite receptors	Approximate separation distance from	
	Centralised BESS	**Distributed BESS**
Wind turbine	240 m (Substation near WTG 133 to WTG 133)	Within turbine hardstand area
Substation	Adjacent within the overall substation compound footprint	240 m (Substation near WTG 133 to WTG 133)
Main O&M building (near site entrance)	3,495 m (Main O&M area to Substation near WTG 23)	680 m (Main O&M area to WTG 10)

O&M = Operations and Maintenance

Off-site receptors

Existing non-associated residences or occupied areas were considered as sensitive receptors for determination of off-site impact in the PHA. The separation distance from the proposed BESS to the sensitive receptor was used to determine off-site impacts. Based on the completed consequence analysis for a BESS unit on fire, the results indicate that the impact distance is approximately 15 m.

A review of the separation distances between the BESS configurations and nearest sensitive receptors found:

For the centralised BESS configuration, the nearest separation distance to a sensitive receptor is approximately 7.2km (R15a).

For the distributed BESS configuration, the nearest separation distance to a sensitive receptor is approximately 3.6km (R15a).

Therefore, off-site impacts are not expected based on the distances to sensitive receptors. For both centralised and distributed configurations, The PHA concluded:

- The indicative configuration (battery and transformer units) included clearances between the units that would meet the minimum or recommended clearances specified by the original equipment manufacturer (OEM).
- The designated/allocated land area can accommodate the proposed BESS units to meet the proposed capacity.
- To minimise fire propagation between the BESS units and onto other adjacent infrastructure, the BESS configurations will follow the specified clearances required by the manufacturer and/or applicable standards.
- Off-site impacts are not expected based on the separation distances to existing sensitive receptors (non-associated residential dwellings).

Hazard identification and risk assessment

Hazard Identification (HAZID) aims to identify all reasonably foreseeable hazards and associated events that may arise due to the operation of the facilities and defining the relevant controls through a systematic and structured approach. The identified hazards, events, applicable infrastructure and the relationships with causes, consequences and controls are summarised in the HAZID register that is contained at Table 8.5 (discussed further below) of the PHA. The findings show:

- A total of 16 hazardous events were identified, with none assessed to have a significant off-site impact due to their consequences and controls.
- A battery thermal runaway event may result in a BESS unit on fire (exposure to heat radiation and release of toxic gas). Based on the separation distances from the BESS units to the sensitive receptors, the effects from a BESS unit fire are not expected to result in significant off-site impacts (serious injury and/or fatality to the public or off-site population).
- A BESS unit on fire has the potential for escalation, affecting the entire BESS infrastructure. To minimise fire propagation between the BESS units and onto other adjacent infrastructure, the BESS configurations will follow the specified clearances required by the manufacturer and/or applicable standards.
- With respect to impact on the BESS from a wind turbine tower collapse or blade throw event:
    - For the centralised BESS configuration: the nearest separation distance from the potential BESS locations to a WTG is approximately 240 m (Substation near WTG 133 to WTG 133). The PHA noted that the BESS compound location will be selected (out of the 7 substations/switching stations considered) during detailed design[17]
    - For the distributed BESS configuration: as the BESS units would be located within the turbine hardstand area there is a potential impact from either wind turbine tower collapse or blade throw event.

The risk assessment definitions and a risk summary table is provided below (Table 7-3).

Table 7-3 Risk assessment matrix

Severity	Likelihood				
	Very Unlikely - 1	Unlikely - 2	Possible - 3	Likely - 4	Very Likely - 5
No or Marginal Impact - 1	1	2	3	4	5
Minor Impact - 2	2	4	6	8	10
Moderate Impact - 3	3	6	9	12	15
High Impact - 4	4	8	12	16	20
Major Impact - 5	5	10	15	20	25

Risk severity and likelihood determine the risk class (refer to Table 7-4 and Table 7-5).

The qualitative risk results for the identified events are summarised in Table 7-6. A more detailed table as well as the list of controls to be implemented can be found in the full PHA in Appendix F.8.

The HAZID found that for all identified events the resulting consequences are not expected to have significant off-site impacts, based on the key considerations that the proposed BESS would be situated in a rural area and the nearest sensitive receptor is located approximately ≥ 3.6km away (using the most conservative assumption of a distributed BESS configuration).

Table 7-4 Risk severity definitions

Severity	Rating definition
Major impact	Multiple fatalities, or significant irreversible effects to numbers of people

[17] Goldwind would consider the findings of the blade throw risk assessment when selecting the centralised BESS location(s).

Severity	Rating definition
	Single fatality and/or severe irreversible disability to one or more persons
High impact	Moderate irreversible disability or impairment to one or more persons
	Includes Serious Personal Injuries where a person is on WC for a continuous period of 1 month
Moderate impact	Lost time injury
	Hospitalisation required
Minor impact	Medium term largely reversible disability to one or more persons
	Medical treatment provided by medical practitioner
	Reversible disability
No or marginal impact	First Aid incident

Table 7-5 Risk likelihood definitions

Likelihood	Rating definition
Very likely	Happens often / Could occur “within days to weeks”
	Probability of occurrence: over 70%
Likely	Could easily happen / Could occur “within weeks to months”
	Probability of occurrence: 30-69%
Possible	Could happen, has occurred before / Could occur within “a year or so”
	Probability of occurrence: 5-29%
Unlikely	Has happened in the industry but not likely / Could occur “after several years”
	Probability of occurrence: 1% - 4%
Very unlikely	Exceptionally unlikely / Conceivable, but only in extreme circumstances
	A “100-year event”
	Probability of occurrence: less than 1%

Table 7-6 Risk results summary

Hazard	Event	Significant off-site impact?	Risk analysis (off-site and public impact)		
			Severity	Likelihood	Risk class
Electrical	Exposure to voltage	No	No or marginal impact	Unlikely	2
Energy	Arc flash	No	No or marginal impact	Unlikely	2
Fire	BESS fire	No	No or marginal impact	Unlikely	2
Fire	Substation/switching station fire	No	No or marginal impact	Unlikely	2
	Bushfire	No	No or marginal impact	Unlikely	2
Chemical	Release of battery electrolyte (liquid/vented gas) from the battery cell	No	No or marginal impact	Unlikely	2
Chemical	BESS coolant or refrigerant leak	No	No or marginal impact	Unlikely	2
Explosive gas	Generation of explosive gas	No	No or marginal impact	Unlikely	2
Reaction	Thermal runaway in battery	No	No or marginal impact	Unlikely	2
EMF	Exposure to EMF	No	No or marginal impact	Very Unlikely	1
External factors	Water ingress (e.g. rain, flood)	No	No or marginal impact	Unlikely	2
External factors	Escalated event from adjacent developments	No	No or marginal impact	Unlikely	2
External factors	Vandalism due to unauthorised personnel access and deliberate damage to the BESS	No	High impact	Unlikely	8
External factors	Lightning strike	No	No or marginal impact	Unlikely	2
External factors	Blade throw	No	No or marginal impact	Unlikely	2
External factors	Wind turbine collapse	No	No or marginal impact	Unlikely	2

Risk analysis findings – conclusion

In conclusion, the risk analysis found:

- Consequence: The worst-case consequence for the identified events is a BESS fire and/or explosion event which may result from causes such as battery thermal runaway, encroachment from off-site bushfire, blade throw or a substation fire. The study found that for all events, the impacts are not expected to have significant off-site impacts. This was assessed based on the location of the proposed BESS and separation distance between the BESS and the nearest sensitive receptors.
- Likelihood: The highest likelihood rating for the identified events is 'Unlikely' (i.e. has happened in the industry but not likely).
- Risk analysis:
  - The highest risk relates to 'vandalism due to unauthorised personnel access and deliberate damage to the BESS'. This was rated a 'Class 8' risk event and will trigger the requirement for active monitoring.
  - The PHA noted that the controls for this event are well understood. In addition to the rural location of the site, it is anticipated that security fencing, cameras and warning signs will be provided for the BESS compound and substations. Mitigation measures would also include onsite security protocol and presence of staff. In combination, these prevention and mitigation measures are expected to reduce the likelihood of this event. The likelihood rating for this event was rated as 'Unlikely'.
  - All other risks were rated 'Class 1-2'. These will be managed for continuous improvement and the possibility of further risk elimination.
  - Most of these events relate to fire and/or explosion events, with no significant off-site impact expected (i.e. more likely to affect onsite employees). The study identified proposed prevention controls to reduce the likelihood of these fire events and mitigation controls to contain the fires to minimise potential for escalated events. Based on the identified controls, the highest likelihood for these events were rated as 'Unlikely'.

The risk profile for the proposed BESS is assessed to be tolerable.

Assessment against HIPAP 4 criteria

Table 8.9 in the PHA provides an assessment against the HIPAP 4 qualitative land use planning risk criteria. In all respect, compliance is assessed to be achieved. An abridged version of the assessment is shown in Table 7-7 below, identifying full compliance with the risk criteria.

Table 7-7 Assessment against HIPAP 4 qualitative risk criteria

HIPAP 4 qualitative risk criteria	Complies?
All 'avoidable' risks should be avoided. This necessitates the investigation of alternative locations and alternative technologies, wherever applicable, to ensure that risks are not introduced in an area where feasible alternatives are possible and justified.	Yes
The risk from a major hazard should be reduced wherever practicable, irrespective of the numerical value of the cumulative risk level from the whole installation. In all cases, if the consequences (effects) of an identified hazardous incident are significant to people and the environment, then all feasible measures (including alternative locations) should be adopted so that the likelihood of such an incident occurring is made very low. This necessitates the identification of all contributors to the resultant risk and the consequences of each potentially hazardous incident. The assessment process should address the adequacy and relevancy of	Yes

HIPAP 4 qualitative risk criteria	Complies?
safeguards (both technical and locational) as they relate to each risk contributor.	
The consequences (effects) of the more likely hazardous events (i.e. those of high probability of occurrence) should, wherever possible, be contained within the boundaries of the installation.	Yes
Where there is an existing high risk from a hazardous installation, additional hazardous developments should not be allowed if they add significantly to that existing risk.	Yes

Safeguards and mitigation measures

Safeguards and mitigation measures relating to hazards centre on design measures and consultation. Controls are well understood and considered achievable to effectivity address the risks identified.

Table 7-8 Hazard mitigation measures

Mitigation number	Mitigation measure	Project phase
BESS1	Review the required clearances between the BESS units and other structures to minimise fire propagation once UL 9540A unit level test for the GW-ESS-EBL01-0745-2H1 battery system has been completed.	Design Construction Operation
BESS2	Review the investigation reports on the Victorian Big Battery Fire (occurred on 31 July 2021) and implement relevant findings for the Project. The publicly available investigation reports include: • Energy Safe Victoria: Statement of Technical Findings on fire at the Victorian Big Battery. • Fisher Engineering and Energy Safety Response Group: Report of Technical Findings on Victorian Big Battery Fire.	Design Construction Operation
BESS3	Consult with Fire and Rescue NSW (FRNSW) to ensure that relevant aspects of fire protection measures have been included in the design. This may include: • Type of firefighting or control medium. • Demand, storage, and containment measures for the medium. The above aspects will form an input to the Fire Safety Study, which may be required as part of the development consent conditions, for review and approval by FRNSW.	Design Construction Operation
BESS4	Apply the controls listed in the PHA HAZID register.	Design

Mitigation number	Mitigation measure	Project phase
		Construction Operation

7.2.2 Aviation safety

Assessment approach

Aviation Projects Pty Ltd completed an Aviation Impact Assessment (AIA) for the Baldon Wind Farm Project. It is summarised below and appended in full in Appendix F.10. It has been prepared in consideration of the NSW *Wind Energy Guideline for State significant Wind Energy Development 2016*, the *National Airports Safeguarding Framework (NASF) Guideline D: Managing the Risk to aviation safety of wind turbine installations (wind farms)/Wind Monitoring Towers* and specific requirements as advised by Airservices Australia.

The following methodology was applied:

1. Review relevant regulatory requirements and information sources
2. Conduct a site visit to properly investigate aviation safety aspects of the proposed Project area
3. Identify aviation assets and activities within the vicinity of the Project, and identify any aviation constraints to Obstacle Limitation Surfaces (OLS), Procedures for Air Navigation Services ‑ Aircraft OperationS (PAN-OPS) surfaces and designated airspace
4. Develop risk mitigation strategies where required in accordance with guidelines in ISO 31000:2018 Risk Management –Guidelines
5. Consult/engage with stakeholders to negotiate acceptable outcomes

Notifications

The following list of stakeholders were notified of the Project in relation to aviation safety:

- Airservices Australia
- Department of Defence
- Murray River Council
- Hay Shire Council
- Royal Flying Doctor Service
- NSW Rural Fire Service
- Aerial operators

Existing environment

Certified aerodromes and other aircraft landing areas

The locations of Balranald Airport, Ravensworth ALA and Moulamein ALA are shown in refer to Figure 7-8 (source: Goldwind, OzRunways 250K Topographic map). Balranald Airport (YBRN) is a Code 1, non-instrument certified aerodrome, which is operated by the Balranald Shire Council.

Obstacle Limitation Surfaces (OLS) are established for each aerodrome runway. For the Code 1 non-instrument runway at Balranald, the maximum lateral extent of the OLS is up to 2.7km for the conical surface and 1.6km for the take-off and approach surfaces. The Project area is located beyond the horizontal extent of the OLS. Therefore, the Project area will not impact the Balranald Airport OLS and this is not considered further in the assessment.

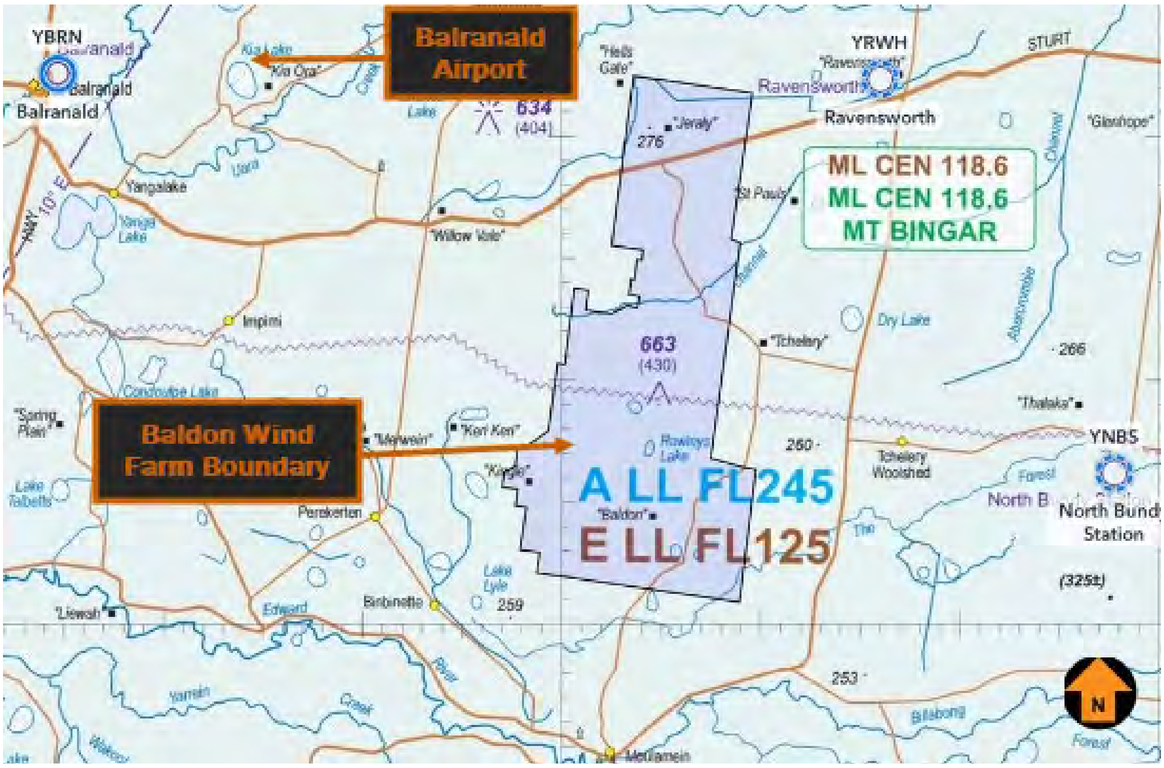


Figure 7-8 Balranald Airport, Ravensworth ALA and Moulamein Airport

Take-off and landing activities at an Aircraft Landing Area (ALA) are usually contained within an area of 3 nautical miles (nm) (5.6km) radius of an ALA. The only *certified airport* within the search area of the Project is Balranald Airport (YBRN) located approximately 24nm to the northwest of the Project. Within 3nm of the Project area there are two other ALA's as shown in Figure 7-9. These are:

- Baldon ALA - within the Project area
- Jeraly Station ALA - approximately 2.5 nm north of wind turbines and also located within the Project area

In addition, an unnamed ALA (Keri Keri Station) - located approximately 3.3nm from the Project.

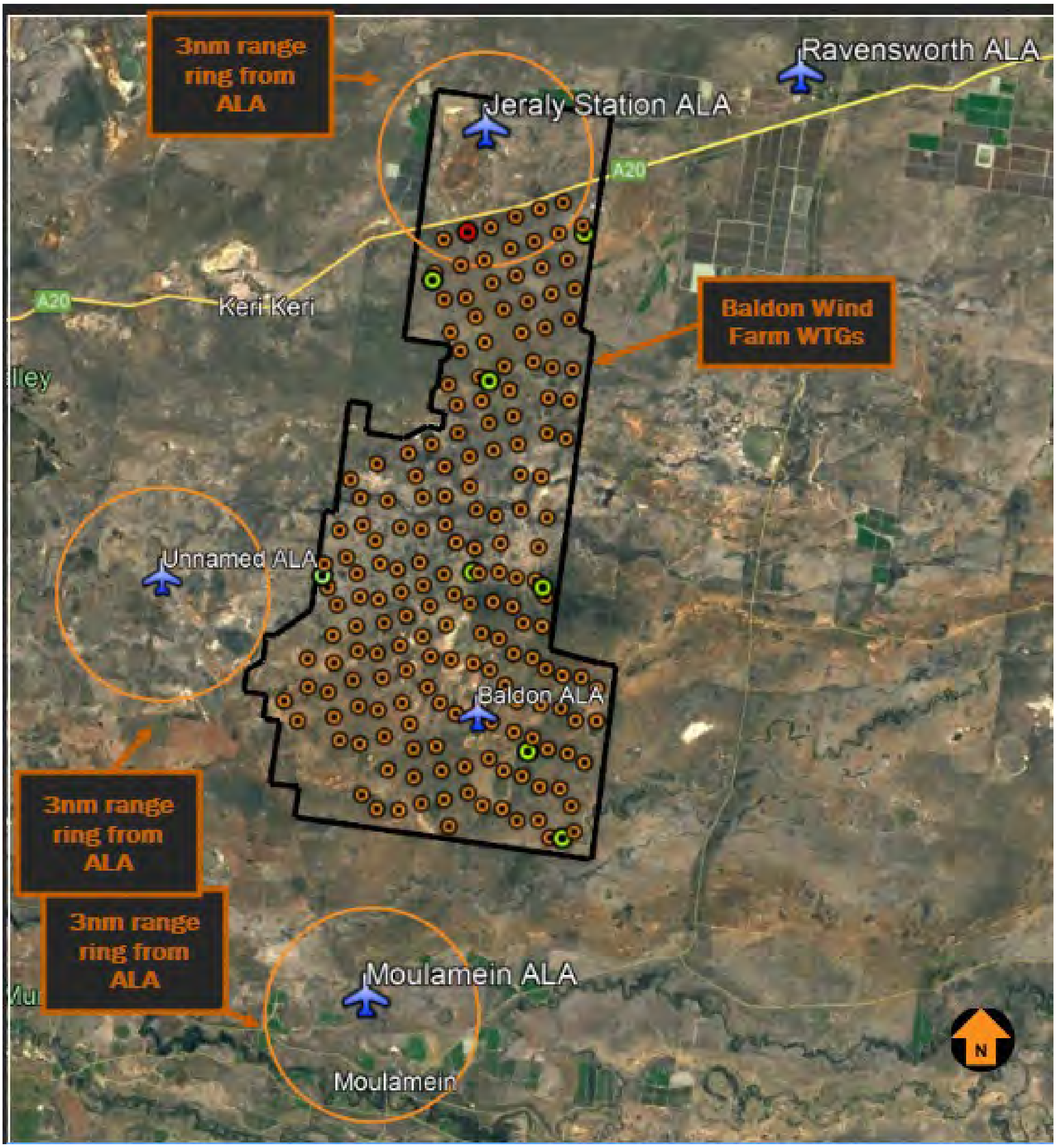


Figure 7-9 Nearby Aircraft Landing Areas (ALAs)

Potential impacts

Impacts on local Aircraft Landing Areas

Baldon ALA is located within the Project area on land associated with the Project. The ALA would be within the turbines during operation. As a result, this ALA would no longer be available for operations as a result of the Project.

Jeraldy Station ALA is located within the Project area on land associated with the Project. Several wind turbines are within the 3nm area. The Project is likely to create noticeable turbulence in southerly wind conditions while the wind turbines are turning, that could have an impact on circuit operations and during approach from the south and take-off to the south, at the ALA.

The unnamed ALA on the Keri Keri Station is not expected to be impacted by wake turbulence from the wind turbines, given its distance greater than 3nm from the nearest turbine. This ALA would be constrained by the Keri Keri Wind Farm if that project is approved.

Lowest Safe Altitude

A minimum of 1000ft clearance above the highest obstacle within the relevant airspace grid or air route tolerances is required in accordance with relevant guidelines. The Project area is located within two airspace grids with LSALTs of 1700 ft Above Mean Sea Level (AMSL) and 1800 ft AMSL which provide clearance above obstacles with heights up to 700 ft AMSL and 800 ft AMSL, respectively. Wind turbine 144 is the highest wind turbine in the 1700 ft Grid LSALT sector. With a maximum height of 1225 ft, wind turbine 144 is 525 ft higher than the 700 ft obstacle height limit. The 1700 ft Grid LSALT will need to be increased by 600 ft to 2300 ft AMSL to accommodate the wind farm. Impacts to the air route and the potential mitigation/solution is shown in Table 7-9.

Table 7-9 Air route impact analysis

Air route	Waypoint pair	Route LSALT	Obstacle Height Limit	Impact on airspace design	Potential solution	Impact on aircraft operations
W762	NATYA to TREST	2100 ft AMSL	1100 ft AMSL	Wind turbine 144 exceeds obstacle limit by 125 ft	Raise LSALT by 200 ft to 2300 ft AMSL	Nil
H247	NATYA to TOBOB	2000 ft AMSL	1000 ft AMSL	Wind turbine 144 exceeds obstacle limit by 225 ft	Raise LSALT by 300 ft to 2300 ft AMSL	Nil

AMSL = Above Mean Sea Level

Airspace protection

The Project area is located outside of controlled airspace (wholly within Class G airspace) and is not located in any Prohibited, Restricted and Danger areas. The lower limit of Class E airspace exists above the potential Project area at approximately 12,500 ft AMSL and Class C airspace at approximately 24,500 ft AMSL. Therefore, the Project area will not have an impact on controlled or designated airspace.

Aerial firefighting

Aerial firefighting operations (firebombing in particular) are conducted under daytime visual flight rules, sometimes below 500 ft above ground level. Under certain conditions visibility may be reduced/limited by smoke/haze. Most aerial firefighting organisations have formal risk management programs to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained. For example, pilots require specific training and approvals, additional equipment is installed in the aircraft, and special procedures are developed.

The Australasian Fire and Emergency Services Council (AFAC) has developed a national position on wind farms, their development and operations in relation to bushfire prevention, preparedness, response and recovery, set out in _Wind Farms and Bushfire Operations, version 3.0_ (afac, 2018). Of specific interest in this document is the section extracted verbatim from under the ‘Response’ heading, copied below:

> _Wind farm operators should be responsible for ensuring that the relevant emergency protocols and plans are properly executed in an emergency event. During an emergency, operators need to react quickly to ensure they can assist and intervene in accordance with their planned procedures._

The developer or operator should ensure that:

- _liaison with the relevant fire and land management agencies is ongoing and effective_
- _access is available to the wind farm site by emergency services response for on-ground firefighting operations_
- _wind turbines are shut down immediately during emergency operations – where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle._

Aerial personnel should assess risks posed by aerial obstacles, wake turbulence and moving blades in accordance with routine procedures.

Radar installations

Airservices Australia requires an assessment of the potential for the wind turbines to affect radar line of sight. The closest radar facility to the Project area is the Mt Macedon Secondary Surveillance Radar (SSR), which is located approximately 296km to the south. The Project area is outside the line of sight range of the Mt Macedon radar and will not impact this facility.

Mitigation measures

The Aviation Impact Assessment has found that local Aircraft Landing Areas will be affected. Changes to the Lowest Safe Altitude in the relevant airspace grids will be required. No impacts on certified airports, controlled or designated airspace or radar is anticipated.

The measures to mitigate impacts to aviation centre on notifications procedures, design measures and consultation to address the risks identified (refer to Table 7-10 below).

Table 7-10 Aviation mitigation measures

ID	Safeguards and mitigation measures	Project phase
AV1	Notifications and reporting: 1. As constructed' details of wind turbine and met masts exceeding 100 m AGL must be reported to CASA as soon as practicable after forming the intention to construct or erect the proposed object or structure, in accordance with CASR Part 139.165(1)(2). 2. As constructed' details of wind turbine and met mast coordinates and elevation will be provided to Airservices Australia, using the following email address: vod@airservicesaustralia.com. 3. Any obstacles above 100 m AGL (including temporary construction equipment) will be reported to Airservices Australia NOTAM office until they are incorporated in published operational documents. With respect to crane operations during the construction of the Project, a notification to the NOTAM office may include, for example, the following details: a. The planned operational timeframe and maximum height of the crane; and b. Either the general area within which the crane will operate and/or the planned route with timelines that	Pre-construction, Construction

ID	Safeguards and mitigation measures	Project phase
	crane operations will follow. 4. Details of the wind farm will be provided to local and regional aircraft operators prior to construction in order for them to consider the potential impact of the wind farm on their operations. 5. To facilitate the flight planning of aerial application operators, details of the Project, including the 'as constructed' location and height information of wind turbines, WMTs and overhead transmission lines should be provided to landowners so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.	
AV2	The rotor blades, nacelle and the supporting towers of the wind turbines will be white. No additional marking measures or obstacle lighting are required for wind turbines.	Design
AV3	Met masts will be marked according to the requirements set out in MOS 139 Section 8.10 (as modified by the guidance in NASF Guideline D). Specifically: a. marker balls or high visibility flags or high visibility sleeves should be placed on the outside guy wires b. paint markings to be applied in alternating contrasting bands of colour to at least the top 1/3 of the mast c. ensuring the guy wire ground attachment points have contrasting colours to the surrounding ground/vegetation.	Design
AV4	Overhead transmission lines and/or supporting poles that are located where they could affect aerial application operations will be identified in consultation with local aerial application operators and marked in accordance with CASR Part 139 MOS Chapter 8 Division 10 section 8.110 (7) and section 8.110 (8).	Pre-Construction Construction
AV5	Contact with local fire agencies will be ongoing to facilitate that during a fire emergency nearby the Project: a. Access is available to the wind farm site by emergency services response for on-ground firefighting operations b. Wind turbines are shut down immediately during emergency operations – where possible, blades should be stopped in the 'Y' or 'rabbit ear' position.	Operation
AV6	Triggers for review of the Aviation Impact Assessment are provided for consideration: a. Prior to construction to ensure the regulatory framework has not changed b. Following any significant changes to the context in which the assessment was prepared, including the regulatory framework	Pre-Construction Construction Operation

ID	Safeguards and mitigation measures	Project phase
	c. Following any near miss, incident or accident associated with operations considered in this risk assessment. d. Where layout changes have been made	

7.2.3 Telecommunications

Assessment approach

DNV has undertaken an independent assessment of the potential for telecommunications impacts associated with the operation of the Baldon Wind Farm. The results of the assessment are summarised in this section and the full assessment report is attached as Appendix F.10.

The assessment was undertaken taking into consideration the draft *National Windfarm Development Guidelines* (2010) (The Guidelines). The Guidelines recommend a radial distance of 50km to 60km from the centre of the windfarm be considered in assessment. The assessment undertaken by DNV extended out to 75km from the proposed Project to reduce the likelihood that radiocommunication links crossing the Project were inadvertently excluded from the assessment. To conduct the assessment, information regarding radiocommunications licences in the vicinity of the Project was obtained from the Australian communications and Media Authority.

The assessment investigates the potential for electromagnetic interference on:

- Fixed point – to – point links
- Fixed point – to – multipoint links
- Radiocommunication assets belonging to emergency services
- Meteorological radars
- Trigonometrical stations
- Citizen's band (CB) radio and mobile phones
- Wireless internet
- Satellite television and internet
- Broadcast radio and television

To inform the assessment, the following list of stakeholders were notified of the Project in relation to potential electromagnetic interference impacts:

- Bureau of Meteorology (BOM)
- Telstra
- Vodafone
- Optus
- Essential Energy
- Water NSW
- Murray Irrigation Ltd
- NSW Police Force
- St John Ambulance
- NSW SES
- NSW Telco Authority
- Local trigonometrical station 'Jeraly'
- Field Solutions Pty Ltd
- NBN Co
- VRA Rescue NSW
- Geoscience Australia
- NSW Spatial Services
- Murray Valley Transmitter
- NSW Rural Fire Service
- BAI Communications
- Field Solutions Group

- Australian Citizen radio Emergency Monitors Inc.

Existing environment

In the local area, currently there are:

No radio communication towers within 2km of the proposed turbine locations
14 fixed point to point links crossing the Project area
79 fixed point to multipoint link assignments within 75km of the Project area
1 base station within 20km of the Project area
9 emergency services point to point links cross the Project area.

The nearest mobile phone tower is located 3km east of the Project area.

Seven dwellings located in the south of the Project area currently receive Television Broadcast from Murray Valley Transmitter. Radio broadcasting from both AM and FM stations are received across the Project area. Most of the site has some level of mobile phone coverage from a range of different providers including, Vodaphone, Optus and Telstra.

Potential impacts

The two services that are most likely to be affected by the Project are television broadcast signals and fixed point to point links. Terrestrial broadcast signals are commonly used to transmit domestic television, while point to point links are used for line-of-sight connections for data, voice, and video. The interference mechanisms are different for each and therefore, there are different ways to avoid interference.

Table 7-11 provides a summary of the licence or service types and the expected impact from the Project. Generally, impacts to services are shown to be unlikely, including emergency services. Interference may occur to fixed point and multipoint links and meteorological radar. These can be managed.

Table 7-11 Services with potential to be affected by the Project

Licence or Service type	Description	Expected impact
Radio Communication Towers	No towers within 2km of proposed turbine locations	None
Fixed point to point links	14 links crossing Project boundary operated by: Ambulance Service of NSW • Essential Energy • NSW Govt. Telecommunications Authority • Optus, Vodafone	Unlikely to cause interference
Fixed Point to multipoint links	76 assignments within 75km of Project boundary. One base station	Potential for interference if link paths cross the Project near turbines

Licence or Service type	Description	Expected impact
	within 20km of Project boundary operated by Murray Irrigation Ltd.	
Emergency services	Point to Point links: nine links crossing boundary operated by Ambulance NSW, NSW Govt. telecommunications authority, NSW Rural Fire service Point to Area style communication: unlikely to be affected.	Point to Point links: unlikely to cause interference Point to area style communications: Unlikely to cause interference
Meteorological radar	Nearest radar 174km from Project	Potential for manageable interference of radar systems managed by the Bureau of Meteorology (BOM)
Trigonometrical stations	Located on the host land.	Unlikely to be impacted
Citizen's band radio (CB)	Unlikely to be affected. CB Radio signals would be intercepted by any existing obstructions such as terrain and vegetation and there's little evidence to suggest that wind turbines pose a particular risk to CB radios.	Unlikely to be impacted
Mobile phones	Towers exist to the east and west of the Project along the Highway. **Coverage** Telstra: Some 3G and 4G coverage to the north and south of the site, also within the Project area. Optus: Some 3G and 4G coverage to the north and south of the site, also within the Project area. Assessment notes that a additional antennae may be needed for areas to the north. Vodafone: 4G available across the north of the site, 3G available within he site, no coverage to the south.	Unlikely to affect areas with good coverage, may experience interference in areas with marginal coverage.

Licence or Service type	Description	Expected impact
Wireless internet	Wireless broadband providers: Field Solutions Group Pty Ltd. Telstra, Optus, Vodafone, NBN Co	Unlikely to affect areas with good coverage, may experience interference in areas with marginal coverage
Satellite television and internet	Geostationary satellites Low Earth Orbit (LEO) satellites	Geostationary satellites: low likelihood of interference to serviced intended for international audiences. LEO satellites: unlikely to be affected
Radio broadcasting	AM and FM signals Digital radio signals	AM and FM signals: Low likelihood of interference Digital radio signals – None, Project is outside the intended coverage area.
Television broadcasting	There are seven dwellings within the Murray Valley Transmitter digital television interference zone. Five of these dwellings are located in areas without any signal from the Murray Valley Transmitter. The remaining two dwellings are in areas of variable coverage.	Impacts could occur at the two dwellings with variable coverage, however they are both associated with the Project and currently uninhabited.

Mitigation measures

Detailed design will address the potential impacts identified, as set out below. To date no specific concerns have been raised by any notified stakeholders with the exception of the BOM. The BOM provided a list of requests that have been accepted by the Applicant and included in Table 7-12.

Table 7-12 Telecommunications mitigation measures

ID	Safeguards and mitigation measures	Project phase
TC1	Maintain open communication lines for all notified stakeholders throughout the development of the Project so that any signal concerns can be addressed and if required the costs of modifications to telecommunication infrastructure would be born by the Applicant.	All Phases
TC2	The Project commits to the following agreements with the BOM: • Inform the BOM of any changes to the Project Design, including changes to the turbine locations or height	Design

ID	Safeguards and mitigation measures	Project phase
	• Give the BOM at least two weeks' notice of any planned shutdown of the Project • Collaborate with the BOM in the event of a severe weather conditions in the interests of community safety.	
TC3	A review of fixed point to point links in the vicinity of turbines T115, T117 and T131, currently nearby but outside of current interference zones, should be undertaken during detailed design.	Pre construction

7.2.4 Electric and magnetic fields

Assessment approach

DNV has undertaken an assessment of potential health impacts regarding electric and magnetic fields (EMF) associated with the Project's proposed:

33kV underground cabling
330kV overhead lines
Substations proposed.

For underground cables, only magnetic field calculations were simulated as electric field strength would be significantly attenuated by the cables being buried underground. Electric *and* magnetic fields were simulated for overhead lines. The simulated EMF results were then compared to exposure limits recommended by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the World Health Organisation (WHO). The results of the assessment are summarised in this section and the full assessment report is attached as Appendix F.10.

Note: The EMF risks from the proposed BESS infrastructure is considered in the Preliminary Hazards Assessment (PHA) which is summarised in Section 7.2.1 and appended in full Appendix F.8.

Existing environment

EMF is produced by voltage and magnetic fields are produced by current. When electricity flows, EMFs exist close to the wires that carry electricity and close to operating electrical devices and appliances (WHO, 2007). Electric and magnetic field strength reduces rapidly with distance from the source, and while electric fields are insulated by air and insulation material, magnetic fields are not.

In Australia electrical devices including transmission lines and substations fall within the 50Hz frequency which is within the Extremely Low Frequency range of 0-300Hz (Repacholi, 2003). In comparison, radio frequency EMF ranges from approximately 100kHz to 300GHz and contains enough energy to heat tissues. Although high-level exposure to Extremely Low Frequency EMF has the potential to cause biological effects in humans, there is currently no conclusive evidence linking ELF EMF to any long-term adverse health effects (National Health and Medical Research Council , 2015).

Exposure limits recommended by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the World Health Organisation (WHO) are summarised below.

Table 7-13 Recommended electric and magnetic field exposure limits

Exposure characteristics	ICNIRP guidance levels		WHO recommendations
	General public	**Occupational**	**General public**
Electric field	5kV/m	10kV/m	Not specified
Magnetic field	200μT[2]	1000μT	100μT

Potential impacts

Underground cabling

Using their worst-case modelling parameters for underground cabling, DNV concluded that the magnetic fields produced by underground cabling would be under the exposure limits listed in Table 7-13. Figure 7-10 and Figure 7-11 show the magnetic fields for the two cable sizes modelled (3c 800mm^2 and 3x1c 1200mm^2) The maximum magnetic field strength at ground level due to the cabling is approximately 14μT for the 3c 800mm^2 cable and 15.53 μT fort eh 3x1c 1200mm^2 cable. These maximum values are well below the recommended exposure limits. No human health impacts would be anticipated from underground cabling.

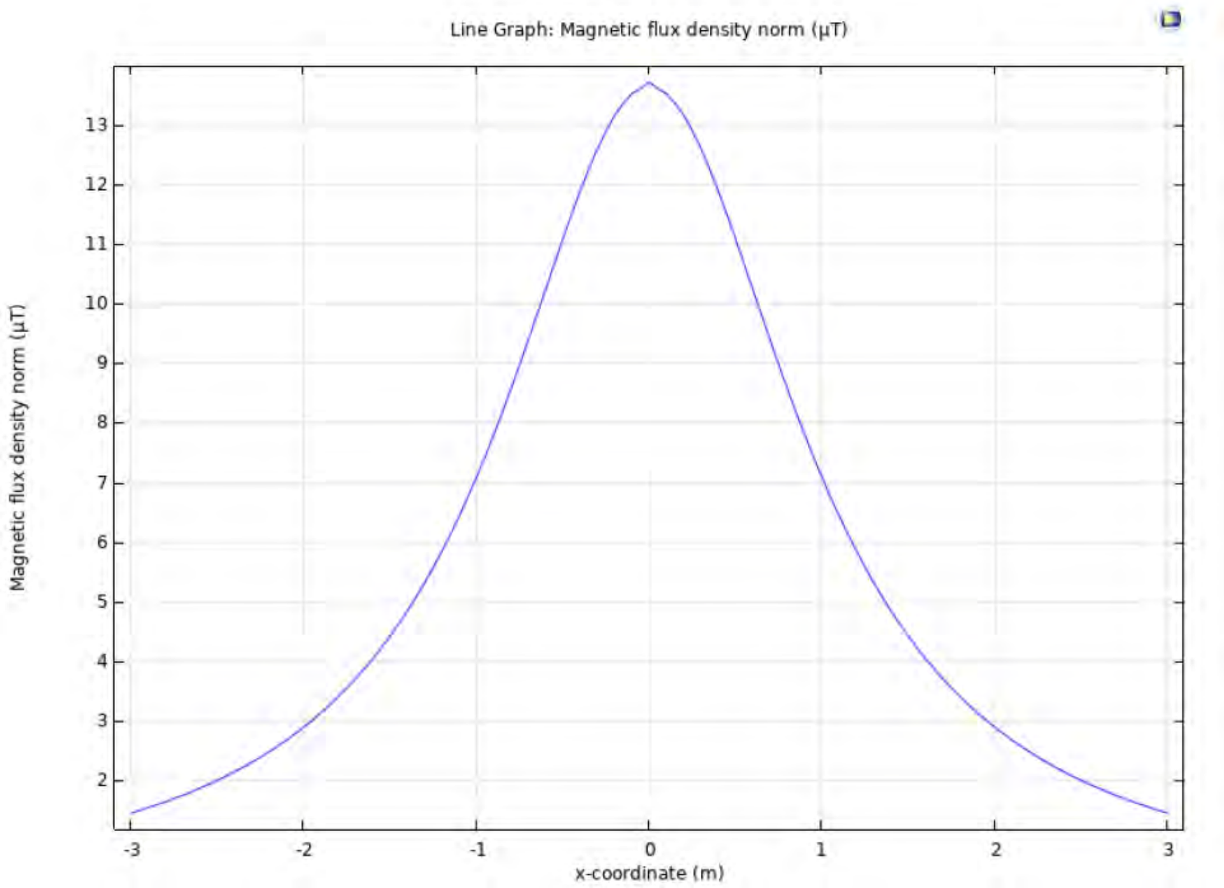


Figure 7-10 Magnetic field strength at ground level due to the underground cable under worst-case conditions, where x =0.0 is the location immediately above the 3c 800m^2 cable.

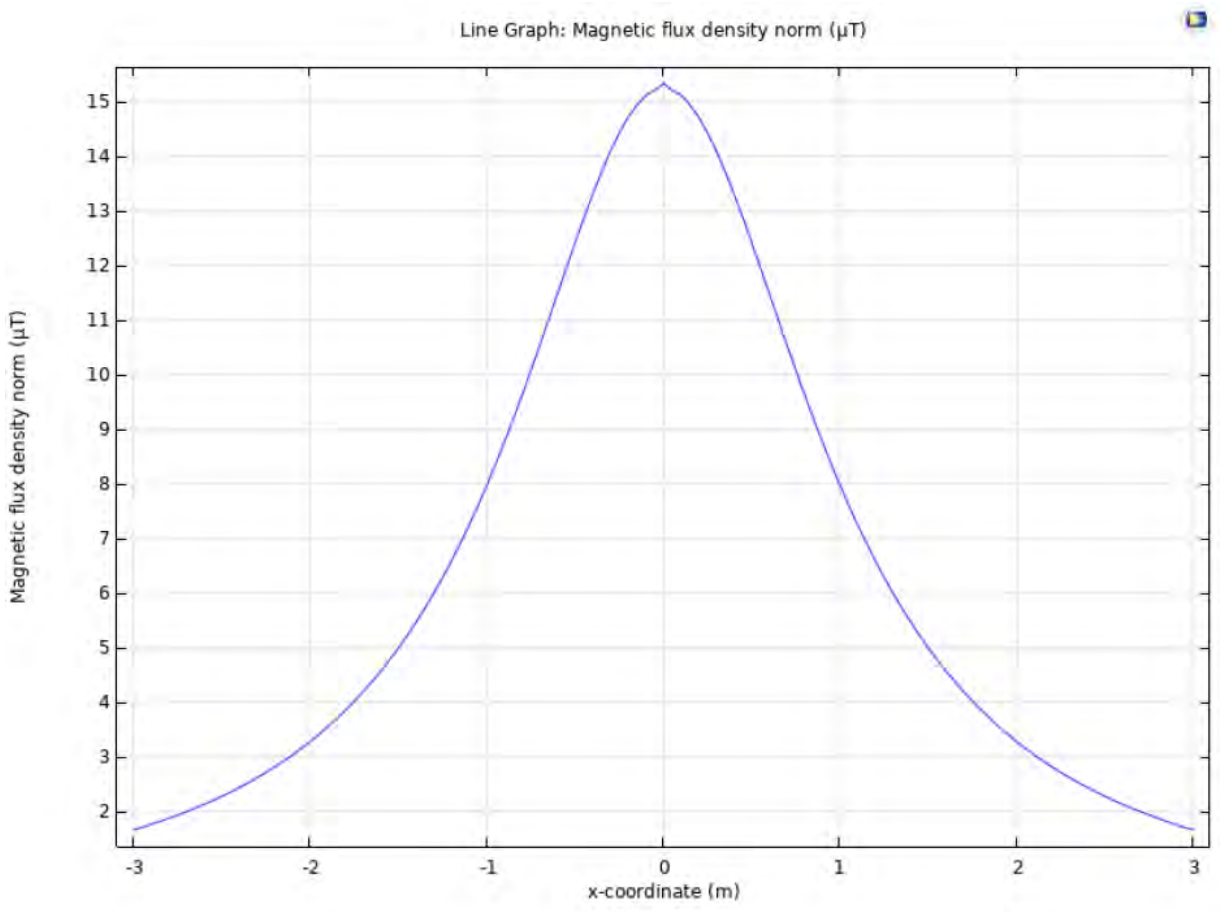


Figure 7-11 Magnetic field strength at ground level due to the underground cable under worst-case conditions, where x =0.0 is the location immediately above the 3x1c 1200mm^2 cable.

High-voltage overhead lines

Using their modelling parameters for a three-phase double circuit line 330kV overhead powerline, DNV concluded that no exposure limits listed in Table 7-13 would be exceeded.

DNV note that their model may not be conservative for magnetic field strength in comparison to some other high voltage line configurations but are confident that expected deviation would be no more than 10µT at the point immediately below the line. DNV also note their assumptions for electric fields can vary depending on the circuit configuration and phase arrangement. However, considering the potential health impacts of electric fields are of less concern than magnetic fields, and high-voltage lines can be designed and installed to minimise electric fields, the assumed circuit configurations used are considered appropriate for the high-level assessment of electric field strengths presented.

Electric and magnetic fields were modelled at heights of 1.5m and 2.0m above ground level (AGL) to account for the side of the typical adult. In this summary results at 2.0m as discussed only, for conciseness, as the field strengths at 1.5m are lower than at 2.0m.

Figure 7-12 shows the modelled magnetic strength at 2.0m AGL in the plan perpendicular to the overhead line at the lines maximum point of sag. At this located to the line is 16m AGL based on the assumed lower line height of approximately 24m at the tower with a maximum sag of 8m. Figure 7-13 shows the modelled electric field strength at 2.0m AGL using the same line parameters as the magnetic field figure.

The field strengths at 2.0m AGL are 7.0µT for the magnetic and 1.35kV/m for the electric field. Both measurements are well below the exposure limits listed in Table 7-13. Furthermore, since the magnetic field strengths for the assumed line arrangement and the phase configuration are at least 90µT less than the recommended exposure limits, any changes in the phasing that cause an increase in the magnetic field strength are not expected to result in field strengths that will exceed the recommended limits for general public exposure.

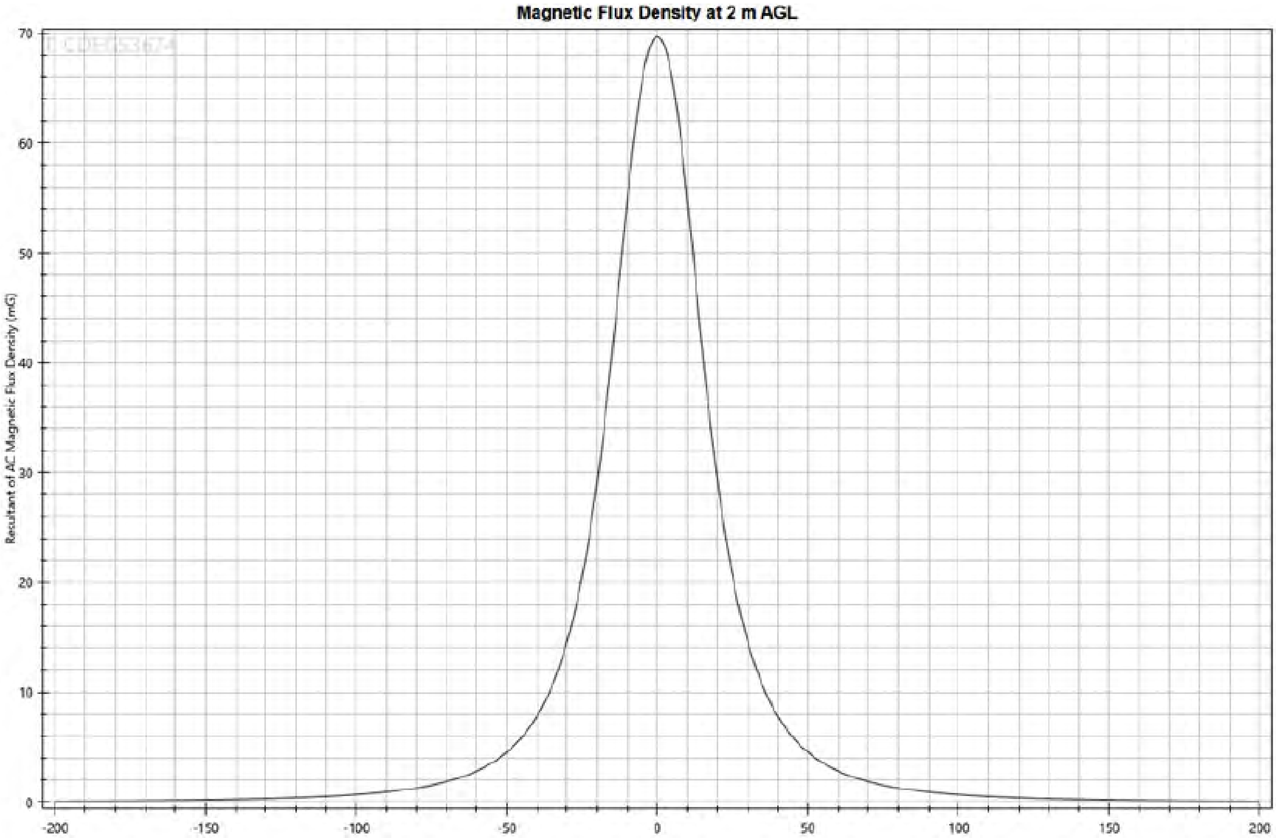


Figure 7-12 Magnetic field (μT) strength at 2m AGL due to high voltage overhead line, where x = 0 is the location immediately below the line at the point of maximum sag

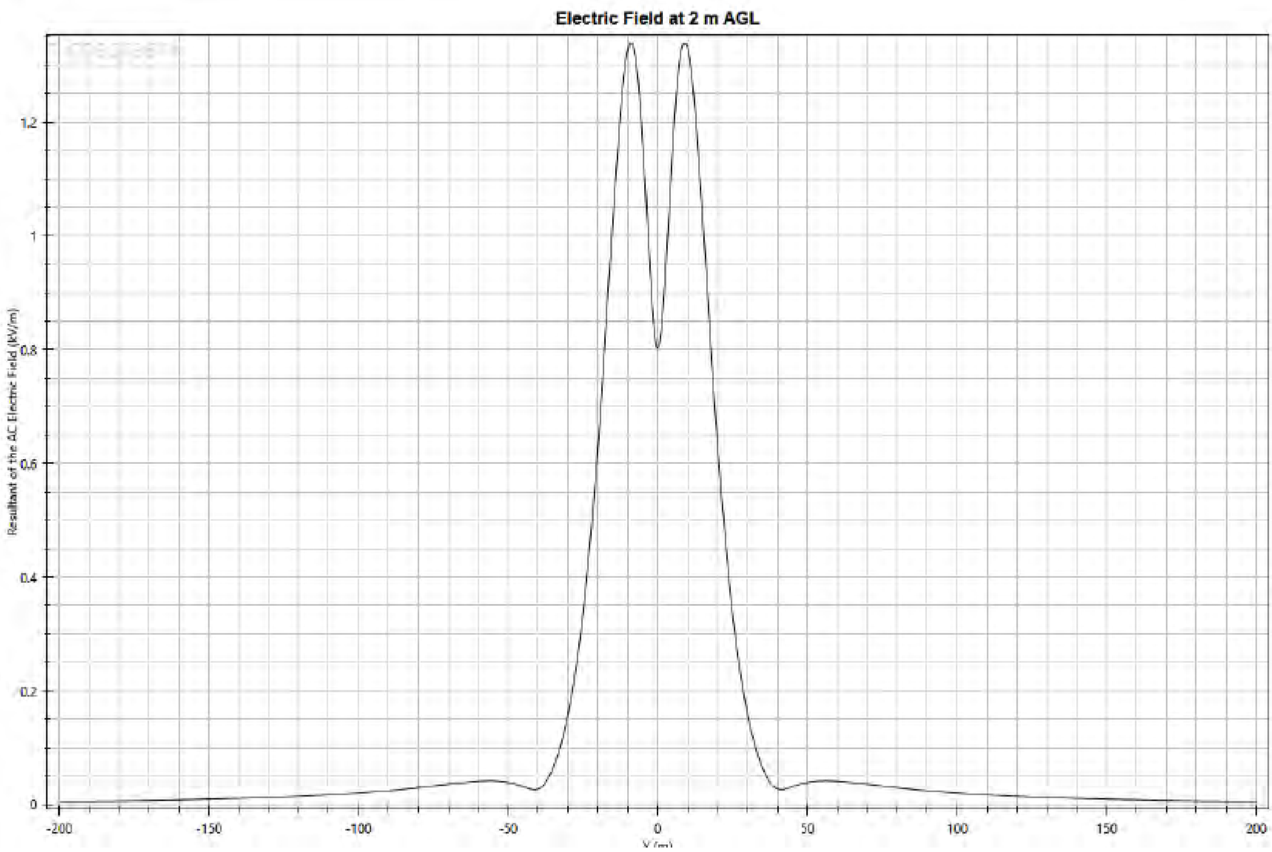


Figure 7-13 Electric field (kV/m) strength at 2m AGL due to high voltage overhead line, where x = 0 is the location immediately below the line at the point of maximum sag

Substation impacts

It is expected that other electrical equipment associated with the Project, including the substation, will be designed and installed in accordance within the relevant guidelines for EMF exposure. Although the substations have the potential to produce large amounts of magnetic fields, all identified dwellings are located more than 2.1km from the proposed substation locations. At this distance, attenuation of magnetic fields will be sufficient to ensure that the field strengths are below the exposure limits for the general public. It is also expected that the substation will be fenced off with sufficient clearances from the electrical equipment to ensure that EMF levels at the boundary are within the exposure limits.

No dwellings would experience any EMF impacts.

Cumulative impacts

The DNV report does not that there is a potential for cumulative EMF impacts at ground level points where the underground network passes below the proposed overhead line. The risk of cumulative impacts can be mitigated in detailed design of the electrical infrastructure, by designing the cabling and overhead lines such that the cumulative EMF strengths are within acceptable levels.

Mitigation measures

The EMF levels produced by the Project are expected to be within the recommended exposure limits at all publicly accessible locations in and around the wind farm site. The measures below centre on design criteria. A measure has been added to address uncertainty in relation to cumulative impacts.

Table 7-14 Electric and magnetic field impact mitigation measures

ID	Safeguards and mitigation measure	Project phase
EMF1	All electrical equipment will be designed in accordance with relevant codes and industry best practice in Australia	Design
EMF2	The final detailed design of the Baldon WF will ensure cumulative EMF is within acceptable ICNIRP and WHO exposure limits where underground and overhead transmission is proposed.	Design

7.2.5 Blade Throw

Assessment approach

DNV undertook a Blade Throw Assessment for the Baldon Wind Farm. The assessment is provided in full in Appendix F.11 and summarised below.

The assessment provides a review of existing blade throw studies for wind farm projects. This establishes a typical risk profile for blade throw that is then scaled to the Baldon Wind Farm's parameters. The risk assessment is based on the 2014 edition of the *Dutch Wind Turbine Risk Zoning Handbook* ("the Dutch Handbook"), which forms the basis of the 2020 *Dutch Wind Turbine Risk Zoning Guide* (DNV GL Netherlands, 2020). This guide is used in the absence to Australian or state guidelines.

The key scenarios that are considered are:

1. The frequency of a blade or blade fragment being detached and thrown from the turbine
2. The probability of the blade or blade fragment landing at any given location
3. The probability of the blade or blade fragment landing a location that would result in injury/death to a person or damage to a property/infrastructure.

The assessment considered the parameters in Table 7-15 when calculating the maximum potential blade and fragment throw for the Baldon Windfarm. Maximum blade and blade fragment throw distances were estimated through comparison of modelling by Sarlak and Sørensen for a theoretical turbine with a rotor diameter of 208 m and tip height of 312 m, and tip speeds of 70 m/s under normal operating conditions and 100 m/s under high tip speed conditions.

Acceptable risk limits were defined as set out in Table 7-16.

Table 7-15 Turbine dimensions

Turbine	Diameter (m)	Tip height (m)
Theoretical turbine representing maximum turbine dimensions	245	300

Table 7-16 Blade throw risk limits

Type of building or infrastructure	Risk limit
Dwellings and sensitive locations	1 in 1 million chance per year impact to the dwelling
Road	1 in 1 million chance per year impact to the individual

Existing environment

Figure 7-14 shows the locations of nearby dwellings and other sensitive locations, roads, and neighbouring properties in relation to the Project boundaries and proposed turbine locations.

Potential impacts

The modelling determined that the risk of a blade or blade fragment landing in a specific location per year is as follows:

- The risk is less than 1 in 100,000 at a distance of half the rotor diameter (122.5m) for all turbine parameters and conditions considered
- The risk is less than 1 in 1 million at a distance of either the turbine tip height (300m) or the maximum theoretical throw distance for an entire blade under normal operating conditions for that turbine, depending on the turbine parameters and conditions in which blade throw was assumed to have occurred
- The risk is in the order of 1 in 1 trillion within the maximum theoretical throw distance of 1886m for a blade fragment.

These are within the acceptable limits determined for the Project.

All dwellings (associated and non-associated) are more than 696m from the nearest proposed turbine location, which is 396m beyond the expected maximum throw distance for an entire blade under normal operating conditions at the maximum rotor speed. At distances of 696m or more from a turbine, the risk of an unprotected person who remains at a fixed location continuously for a whole year being hit and killed by a blade or blade fragment thrown from the Project is expected to be considerably less than 1 in 1 million, which is described as an “extremely remote” to “improbable” likelihood and “low” to “routine” risk. Therefore, the location-specific risk at all dwellings in the vicinity of the Project is expected to be well below the acceptable risk limit of 1 in 1 million per year shown in Table 7-16.

Figure 7-14 shows that there are no roads located within half the turbine rotor diameter, or 300m, of the proposed turbine locations, which suggests that the frequency at which a person who remains at any fixed location on a neighbouring road for a whole year would be hit and killed by a blade or blade fragment thrown from the Project is less than 1 in 1 million. This risk is considerably lower when you consider that vehicles travel along the Sturt highway at 100km/hr and has an estimated traffic volume of 896 vehicles per day.

According to the individual risk along the Sturt Highway for death caused by a blade throw incident is estimated to be 1 death in 121,015 years. This is approximately 242 times less than the limit identified as acceptable in Table 7-16. The risk of blade throw in other less trafficked roads around the site is even lower again due to lower traffic volumes. As such the risk for blade throw impacts to roads is classed as “improbable” likelihood and “routine” risk.

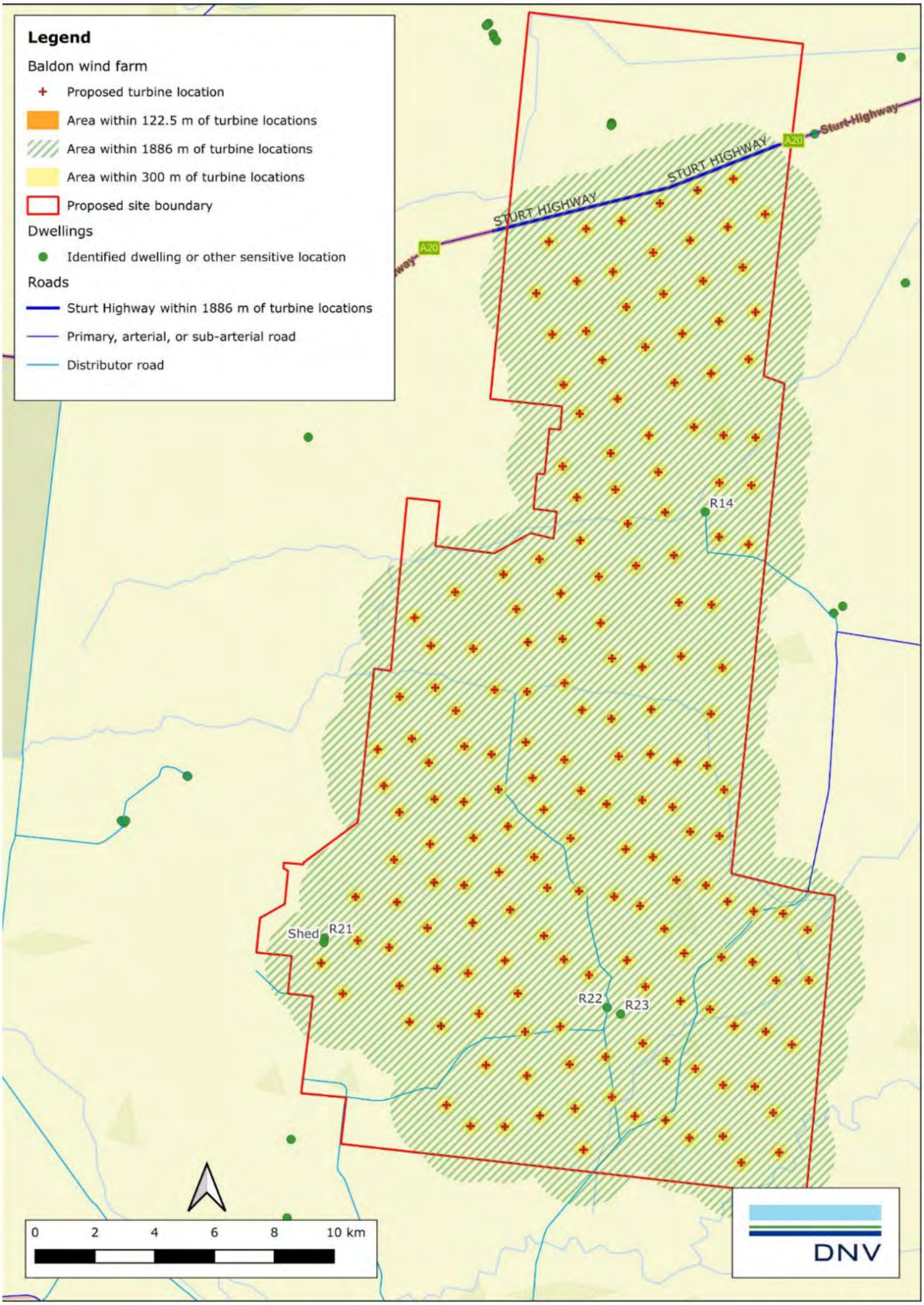


Figure 7-14 Location of dwellings, sensitive locations and roads

Safeguards and mitigation measures

Safeguards and mitigation measures relating to blade throw are provided below.

Table 7-17 Blade throw mitigation measures

Mitigation number	Mitigation measure	Project phase
BT1	Turbines will meet current best practice Australian and international (IEC 61400-23) safety standards and will be equipped with sensors that can shut down turbines if an imbalance in the rotor blades is detected.	Design Construction Operation
BT2	Turbines will be subject to regular maintenance and servicing within an ISO90001 Quality Assurance system.	Operation

7.2.6 Bush fire

Statutory context and approach

This Project is a SSD and is therefore exempt from requiring a Bush Fire Safety Authority (BFSA) under Section 4.41(f) *Environmental Planning and Assessment Act 1979*. Section 5.16(3) of the act requires "the Planning Secretary is to consult relevant public authorities and have regard to the need for the requirements to assess any key issues raised by those public authorities", which includes consulting with the New South Wales Rural Fire Service (NSW RFS) in regard to bush fire considerations.

This chapter has been completed in accordance to the NSW RFS *Planning for Bush Fire Protection 2019* (PBP), particularly regarding the provisions of Section 8.3.5 of the PBP which related specifically to wind and solar development) (NSW RFS, 2019). The requirements in the PBP would be managed throughout the life of the Project using a Bush Fire Emergency Management and Operations Plan (BFEMOP)

Existing environment

Bush fire presents a threat to human life and assets and can adversely impact ecological values. Bush fire risk can be evaluated and managed by considering environmental factors that increase the risk of fire (fuel load and type, topography and weather patterns), as well as specific activities (such as hot works) or infrastructure components that exacerbate combustion or ignition risks (such as transmission lines, energy storage systems and other electrical components).

Regional bush fire management

The Project is located within the South Western Zone Rural Fire Service (RFS) area command and lays between the Murrumbidgee Irrigation Area (MIA) RFS district of the Riverina Region (Associated with the Hay LGA) and the Mid Murray Zone (associated with Murray River LGA). The majority of the site is within the Mid Murray Zone which is managed by the Mid Murray Zone bush fire Management Committee bush fire Risk Management Plan (RFS Mid Murray Zone Bush Fire Managment Comittee, 2009). The nearest RFS headquarters to would be in Hay, about 78km east on the Sturt Highway.

The RFS declares total fire bans in the region when climatic conditions indicate a high bush fire danger. During these periods, human ignition sources are banned. This would include Project activities such as welding, grinding and soldering.

Existing water resources available within the Project area for firefighting include farm dams and bores that will be retained on the site. Additional bores are also proposed for the Project that could be utilised if required. In addition, to ensure water resources are available, especially during drought, water storage facilities are recommended for inclusion in the BFEMOP. This is a commitment of the Project.

The Yanga State Conservation Area is located about 12km west of the nearest proposed turbine. Within the Yanga State Conservation Area the National Parks and Wildlife Service (NPWS) are the primary bush firefighting agency responsible for protecting the ecological and recreational (namely the Willows campground) values of the area. Firefighting within the conservation area is facilitated through a network of firetails and managed in reference to the Yanga Precinct Fire Management Strategy (NPWS, 2014).

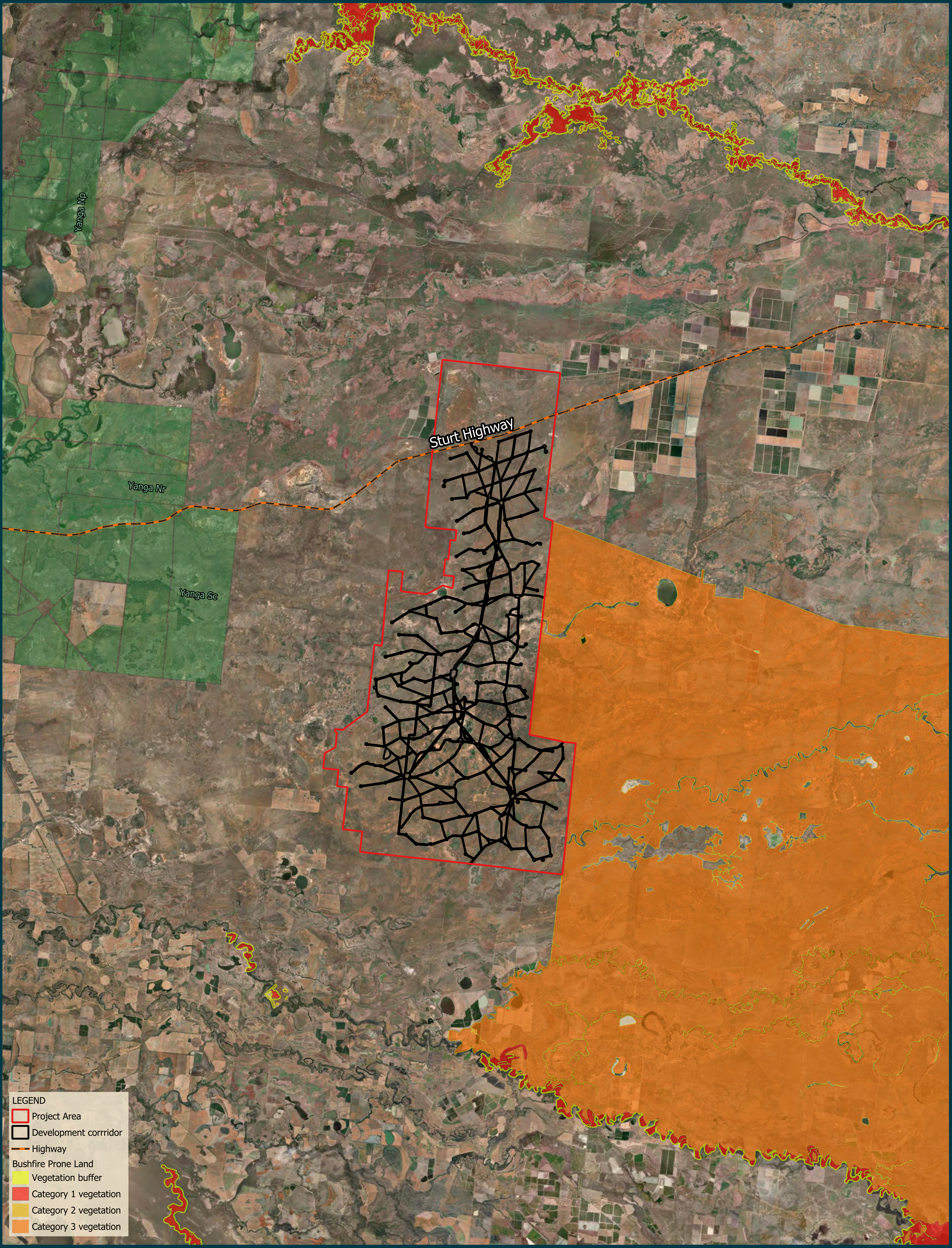
Fire landscape

The Project area is comprised of flat agricultural land and low growing native vegetation, with minimal elevation change. The land use is primarily grazing of sheep, and supporting agricultural practises. The Development corridor exhibits very low incidences of overstorey vegetation with a low tree density. With the exception of some scattered stands of Black Box open woodland associated with Plant Community Type 15 (PCT15) (refer to Section 6.1), native vegetation onsite is restricted to grasses and low shrubs.

The typical bush fire season in the region is from October/November through to March/April (RFS Mid Murray Zone Bush Fire Managment Comittee, 2009). During this period (and sometimes outside of these periods) high fire danger occurs when temperatures are high and winds blow from the west and/or north resulting in dry conditions. Generally, the winter months bring more rain and lower temperatures.

Bush fire prone land

In accordance with Section 10.3 of the EP&A Act, the NSW Rural Fire Service Commissioner designates bush fire prone land that Council's must record on a map for land within their LGAs. The Project area is not identified as bush fire prone land on as shown in Figure 7-15. Category 3 bush fire prone land is displayed directly east of the Project area within the Edwards River LEP mapping. It is suggested that the site would also be categorised as Category 3 and the open source mapping is not yet updated for the associated LEP's. Category 3 bush fire prone land is considered 'medium risk' vegetation (NSW RFS, 2015).



Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

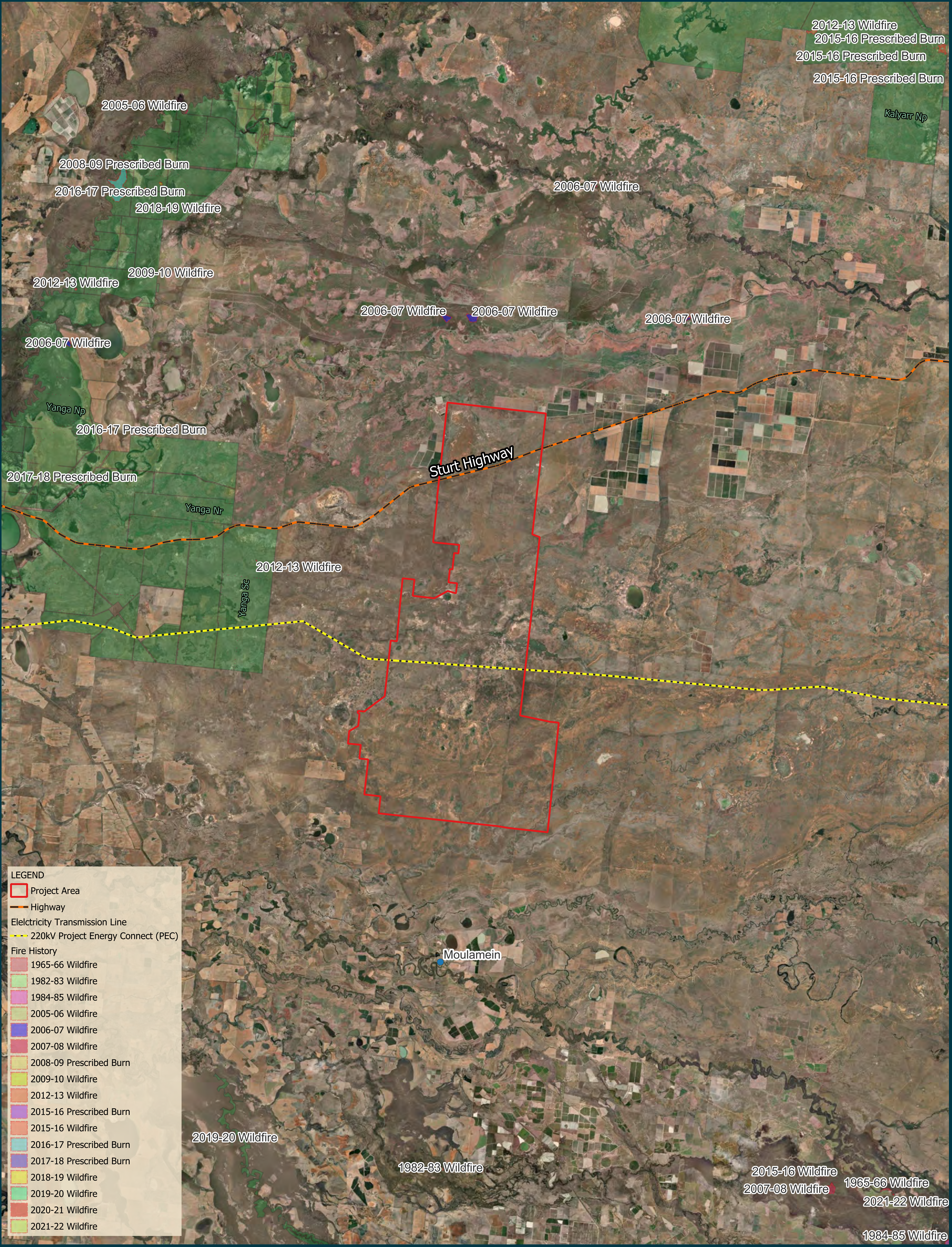
Figure 7-15 Bush fire Prone Land; current extent of mapping

Bush fire history

The Mid Murray Bush Fire Risk Management Plan covers an area of 24,191km^2. Section 1.3.4 of the Mid Murray Bush Fire Risk Management Plan states that there are on average 250 bush/grass fires per year, 6-10 of which are considered major fires (>20ha). The fires are typically ignited by lightning strikes, camp fires, power lines, machinery & traffic, escaped agricultural burns and spark creating equipment (RFS Mid Murray Zone Bush Fire Managment Comittee, 2009).

Open access mapping from the NSW SEED portal shows that notable bush fires recorded by bush fire planning authorities. The mapping indicates that fires (both wild and prescribed) surrounding the Project area are relatively patchy (refer to Figure 7-16) (DPE, 2024). The visible area within Figure 7-16 covers a total area of 9,978km^2 around and including the Project area. The nearest fire in the national park was located 13km east of the Project area boundary and burned 0.4ha of land within the park in 2012-13 fire season. The mapping reveals that overall fires in the Project's immediate locality have historically been isolated and quickly managed by firefighting agencies.

Considering the history of bushfire in the locality and the landscape, which is readily traversable, contains mostly groundcover vegetation and lacks steep slopes, it is expected that the risk of uncontrollable fire within the Project area is relatively low.



0 7.5 15 km

Datum: GDA2020 / MGA Zone 55

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Baldon Wind Farm

Figure 7-16 Local bush fire history

Ref: 22-366 Baldon Wind Farm EIS 20240229 \ Bush fire history Author: Jared Graham-Higgs Date created: 31.07.2024 © NGH 2024 © ESRI 2022 © NSW SEED

Potential impacts

Construction

The potential for increased bush fire risk coincides mainly with the construction and decommissioning phases of the Project. Ignition sources during these phases include:

- Earthworks and slashing machinery causing sparks
- Hot works activities such as welding, soldering, grinding and use of a blow torch
- Sparks and contact ignition from vehicles in long combustible vegetation
- Smoking and careless disposal of cigarettes
- Use of petrol-powered tools and vehicles, including refuelling
- Operating plant fitted with power hydraulics on land containing combustible material
- Electrical faults during testing and commissioning
- Storage of chemicals and hazardous materials.

The Disturbance footprint proposed is predominantly on land that represents a low risk, as set out in the section above. As such, bush fire risks during construction and decommissioning are considered to be highly manageable. A suite of mitigation measures is set out in Table 7-18 and form commitments of the Project.

Operation

The operational phase of the Project has the following associated bush fire risks:

- Overheating in the substation or BESS (BESS fire risks are discussed in Section 7.2.1)
- Wind turbine fire
- Grass fire ignition from vehicles and maintenance operations
- Interruption of aerial bush fire fighting abilities (aviation risks are considered in Section 7.2.2)
- Transmission line breakages.

Existing access roads and informal farm roads, as well as proposed APZs and wind farm service roads will provide RFS and emergency service improved access throughout the site during its operational phase, to address any of these occurrences. Such occurrences, while possible and requiring mitigation strategies, would be expected to be very infrequent.

Ignition risks

The operational phase of the Project has a low risk for ignition sources, as the turbines, substations, BESS and O&M compound will be located on hardstands (compact ground and gravel base) with APZs established around the perimeter.

The risk of bushfire ignition from electrical cabling will be minimised in consideration of the requirements described in Section 5.3.3, Table 5.3c, of the PBP 2019 guidelines:

- Where practicable, electrical reticulation will be installed underground
- Where overhead, electrical reticulation is proposed as follows;
  - Lines will be installed with short pole spacing of 30 m, unless crossing gullies, gorges or riparian areas; and
  - No part of a tree will be closer to an overhead line than the distance set out in *ISSC3 Guideline for Managing Vegetation Near Power Lines.*

The Project will comply with service providers requirements and guidelines in respect of vegetation management within the main transmission line easement. It is worth noting however that it is unlikely vegetation on site would reach the height of the overhead lines.

Risk to assets

There are dwellings within and neighbouring the Project area, dispersed across the landscape as discussed in preceding impact chapters (refer to Section 6.3 and Figure 1-4). The Moulamein township is the closest population centre to the Project. Other assets identified within and surrounding the Project area include:

- Stock
- Fences
- Bores and pumps
- Existing services (public roads, transmission network, telecommunications)
- Proposed infrastructure (turbines, substation, internal road upgrades).

All assets identified above, including operational and maintenance components of the Project, are at risk from a bushfire that may initiate either from within the Project area, or from an external fire threat offsite. The Project will incorporate suitable mitigation measures to reduce the risk of fire by managing the risk of its activities and ensuring bush fire fighting protocols and resources are available to fight fires within the Project area, regardless of how they were started.

Risks to Yanga State Conservation Area

As identified in the existing environment section Yanga State Conservation Area is located about 12km west of the nearest proposed turbine. Due to this separation distance, and the potential to manage risks within the Project area, it is unlikely that the Project presents significant additional risks to the reserve. It is noted however that the National Parks and Wildlife Service is a bushfire agency and may be a part of a co-ordinated bushfire response in the region. The Yanga State Conservation Area is managed in accordance with the Yanga Precinct Fire Management Strategy (NPWS, 2014). The strategy details and maps fire suppression information, water points, access roads and NPWS access points, as well as listing key contact details. It is a useful source of local fire information and it is considered in the mitigation measures adopted for the Project, set out below.

Mitigation measures

The Project would not present a high bush fire threat or represent an unacceptable hazard in the event of a bush fire affecting the Project area. Implementation of the mitigation measures in this EIS are considered sufficient in managing the identified risks. They centre on design measures and bush fire planning as stipulated below and summarised in Table 7-18.

Design measures

The Project has considered the NSW RFS *Planning for Bush Fire Protection 2019* guidance and applied these prescriptions to the Project:

Asset Protection Zones (APZs)

Section 8.3.5 of the PBP guidelines provides minimum APZ requirements for wind farm developments located in designated bush fire prone land. These APZ prescriptions would be applied to the wind farm infrastructure to provide defendable space and to manage heat intensities at the infrastructure interface.

In accordance with Section 8.3.5 of PBP, an APZ of a minimum width of 10m would be provided around the wind farm turbines, buildings, substation and BESS. All the APZs would be managed as an Inner Protection Area, to the specifications of Appendix 4 of PBP.

Fuel hazard management

According to the PBP guidelines, the APZ should provide a tree canopy cover of less than 15% located greater than 2m from any part of the roofline of a building and should not overhang any building. Trees should have lower limbs removed up to a height of 2m above the ground.

Vegetation fuel would be monitored and managed using stock grazing or slashing if required to maintain safe fuel levels. Grass height within the APZ would be maintained at or below 5cm throughout the October to April fire season.

Site access

Access specifications can comply with Section 7.4a of the PBP guidelines, including:

- A minimum carriageway width of 4m
- Minimum vertical clearance of 4m
- Where practicable, capacity for passing using reversing bays and/or passing bays every 200m suitable for fire tankers
- Property access roads are two-wheel drive, all-weather roads
- Property access must provide a suitable turning area in accordance with Appendix 3 (of PBP).

The turn radius and swept path clearance on access roads would be suitable for Category 1 Tankers (Medium Rigid Vehicle).

Fire-fighting resources and preparedness

Water storage tanks would be installed within the operational footprint for fire-fighting and other non-potable water uses, with a 65mm Storz outlet, a metal valve and a minimum of 20,000 litres reserved for fire-fighting purposes. The final volume water reserved for bush fire would be decided in consultation with the NSW Rural Fire Service (RFS) and Fire and Rescue NSW (FRNSW). Rainwater tanks installed beside site buildings for staff amenities would also enable RFS connectivity of Storz outlets. Onsite water carts (approximately 1000L capacity) would be available on a precautionary basis. Suitable fire extinguishers and PPE would be maintained at site buildings.

Bush fire and emergency planning

Bush fire risks would be managed through standard mitigation strategies facilitated by a Bush Fire Emergency Management and Operations Plan developed in collaboration with NSW RFS and FRNSW (refer to Table 7-18). The BFEMOP would be developed prior to commissioning in consultation with the local NSW RFS District Fire Control Centre to manage fire risks, resources and preparedness. Following commissioning of the wind farm, the preparedness of local RFS and Fire and Rescue brigades would be enhanced through site orientation and information events and the facilitation of training in the management of Li-ion battery fires. An Emergency Response Plan, including an Evacuation Plan, BFEMOP (with a specific battery fire response section) Flood Response Plan and Spill and Contamination Response Plan would also be developed to enable rapid, safe and effective incident response.

Table 7-18 Bush fire mitigation measures

ID	Safeguards and mitigation measures	Project phase
BF1	The Project would apply relevant NSW RFS *Planning for Bush Fire Protection 2019* guidance to the Project design, including: • Asset Protection Zones • Fuel hazard management • Site access specifications • Fire-fighting resources and preparedness	Design
BF2	Develop a Bush Fire Emergency Management and Operations Plan (BFEMOP) to include but not be limited to: • Detailed measures to prevent or mitigate fires igniting • Work that should not be carried out during total fire bans • Availability of fire-suppression equipment, access and water • Storage and maintenance dangerous or hazardous materials in accordance with AS1940-2004: *The storage and handling of flammable and combustible liquids* • Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate • Detail of automatic shutdown controls identified and implemented • A copy of the latest Yanga Precinct Fire Management Strategy • Appropriate bush fire emergency management planning. In developing the BFEMOP, NSW RFS and FRNSW would be consulted on the volume of water supplies, fire-fighting equipment maintained on-site, fire truck connectivity requirements, proposed APZ and access arrangements, communications, vegetation fuel levels and hazard reduction measures.	Construction Operation Decommissioning
BF3	An APZ of minimum 10m would be maintained around all buildings, turbines and BESS. Average grass height within the APZ would be maintained at or below 5cm on average throughout the October to April fire season.	Operation
BF4	Following commissioning of the wind farm, the local NSW RFS and Fire and Rescue brigades would be invited to an information and orientation day covering access, infrastructure, firefighting resources on-site, fire control strategies and risks/hazards at the site.	Operation

7.3. Air quality

7.3.1 Assessment approach

This section considers desktop information in relation to air quality and is supported by a technical appendix providing further detail in Appendix G.1. The impact assessment of the Project's potential to impact air quality is provided in the chapter only.

Due to the scale of the Project, the significance and impacts of dust from the construction of the Project have been determined from qualitative assessment that considers (from the construction disturbance footprint):

- The proximity of activities to sensitive receivers
- The assessment criteria
- The existing environment
    - Air quality conditions
    - Prevailing winds
- The nature and scope of the activities.

7.3.2 Legislative and policy setting

The Protection of the Environment Operations Act 1997 (POEO Act) sets the statutory framework for managing air quality in NSW, including establishing the licensing scheme for major industrial premises and offences and penalties for a range of air pollution issues. As a state significant wind farm seeking approval under Part 4 of the Environmental Planning and Assessment Act 1979, the Baldon Wind Farm would require a licence under this act.

7.3.3 Existing environment

The Project is located in a low population density area between Balranald and Hay and comprises of two landholdings. The largest nearby population centres are Hay, Balranald and Deniliquin. While the sealed Sturt Highway dissects the north of the Project site, all local roads in the vicinity of the site are unsealed.

The Baldon Wind Farm project site is approximately 46,259 hectares. It is primarily utilised for low density grazing; 1 sheep per 2 ha is typical for the region. Irrigation infrastructure onsite has been made redundant. Regional land use and immediate near neighbours land use are consistent with the Project area and include livestock grazing, broad acre dryland cropping and in some instances irrigated cropping. There are no facilities within the Balranald Shire LGA that are required to report their emissions as part of the National Pollutant Inventory (NPI).

In this plains country between the Murray River to the south and Murrumbidgee River to the north, the soil exposure is seasonally high due to limited rainfall in the area (336mm per year on average). Extensive onsite land degradation was apparent in the 1990's including soil loss. Rehabilitation trials in about 1995 – 97 accompanied with lesser stocking rates have seen the soils stabilised and the native vegetation communities restored to good condition in most of the site. This historical information was sourced for host landholders, Local Land Services and current conditions are verified by the ecological surveys reported in Section 7.1.

Existing sources of air pollution within the area are limited. They are primarily comprised of dust from unsealed local roads and tracks and machinery exhaust emissions associated with transportation and agricultural activities. Bushfires and dust storms are a source of seasonal air pollution.

There are 26 sensitive receivers (all dwellings) within a 10km buffer of the construction disturbance footprint that has been delineated for the Project. Five are considered 'project-associated' and as such, impacts for these dwellings do not require assessment.

Wind speed and direction plays vital part on how air pollutants are distributed in the atmosphere. Wind speed data for past 12 months at the nearest Bureau of Meteorology monitoring station at Balranald (RSL) station shows the wind speed is highest during summer months (Bureau of Meteorology, 2023). This coincides with the hotter conditions and therefore lower soil moisture content, which may increase dust.

The wind speed data shows that the area does not record high wind speeds. The wind direction is also noted to be predominantly northern and western during winter months of April to October and predominantly in southern direction during summer months of November to March. In drought and low rainfall periods, with reduced ground cover and increased wind activity, dry soils will be exacerbated

7.3.4 Potential Impacts

Potential air quality impact of the construction, operation and decommissioning of the Project have been reviewed. The potential for adverse impacts to air quality are most relevant to construction and decommissioning, and are considered temporary and manageable. It is anticipated that the Project will not generate significant air quality impact and the application of recommended mitigation measures would further reduce these impacts. This is discussed below.

Construction

The Baldon Wind Farm construction footprint is linear in nature and as a percentage of the Project site the overall disturbance is low (around 2% of the site). Furthermore, the construction methodology involves the progression of limited (2-3) construction 'fronts' and may be staged. As such, exposed areas of soil will be limited and able to be stabilised and rehabilitated progressively.

Given this context, the key Project risks to air quality centre on raised dust from traffic and construction activity, primarily limited to the construction phase. Visibility impacts at the Sturt Highway site access will require monitoring and mitigating, in summer months particularly and during periods of low rainfall, when southerly winds prevail. Peak construction would represent the highest impact period.

Dust would directly impact PM10, PM2.5 and deposited dust concentration in the surrounding air. As well as from traffic, dust generation would be associated with all soil disturbances activities including construction of tracks, hardstand areas and excavation of footings for turbines, substations and buildings. Dust may also be generated from:

- Stockpiles
- Concrete batching plants
- Aggregates and road base crushing

While emissions from the construction of the Project would include a variety of activities, the identified key risk is that from raised dust which is measured as particulate matter. Particulate matter is broken down into the following categories:

- Total suspended particulates (TSP)
- Particulate matter with equivalent aerodynamic diameter of 10 microns or less (PM10)
- Particulate matter with equivalent aerodynamic diameter of 2.5 microns or less (PM2.5)
- Deposited dust.

The air quality at sensitive receptors (non – associated dwellings) to the south and south west of the Project may be impacted throughout the year during construction if left unmitigated. The most 'at risk' receptors are located to the south of the Project; however, they are all located more than six kilometres from the nearest proposed turbines. At these distances, it is likely that the TSP and dust generated on site would have dispersed or settled before reaching the receptors and would, therefore, be unlikely to impact on air quality.

Additionally, road receptors on the Sturt Highway are at risk of dust impacts impacting visibility on the highway. The Sturt Highway to the north of the site is captured within the Project site boundary and will be used as a primary access point. Visibility on the highway may be impacted. To the south of the site the following roads may be impacted or impact other nearby roads from dust raised from the project:

Keri Keri Road (unsealed)

Rob Road (unsealed)

Baldon Road (unsealed)

Maude Road (sealed)

Keri East Road (unsealed)

It is likely that there will be increase in dust and other air pollutants during construction phase. However, they are not expected to go above the trigger levels set by NSW EPA at any receiver, in consideration of the mitigation measures applied during construction activities, existing environment, triggers levels and distances involved (detailed further in Appendix G.1).

Operational impacts

In operation, the Project will contribute to positive air quality outcomes as a part of the clean energy transition as the national grid moves to displace traditional fossil fuel generated electricity.

Adverse operational impacts would be expected to be low, as limited maintenance traffic and no soil disturbance activities are anticipated.

Decommissioning

Decommissioning of the site would involve removing all above ground infrastructure and some of those would have subsurface attachments which would need to be removed as well. These activities will disturb the soil and result in some dust pollutants to be suspended on air. Apart from dust, decommissioning would also involve increased vehicle movements to dismantle and transport wind farm components off site. The decommissioning phase for the Project would be shorter compared to construction, and would have the same mitigations strategies, therefore, the impacts would be less compared to construction stage and would benefit from the site specific information gained during construction.

Cumulative impact on air quality

Although the individual pollution levels are below the trigger levels, the total cumulative impact from other large construction projects or during harvest periods has potential to degrade air quality and increase hazards through reduced visibility. This combined effect is known as cumulative air quality impact.

There are currently several large scale projects prosed for the South West Renewable Energy Zone; more projects than the grid has capacity to accommodate. It is difficult to ascertain which projects will be progressed, however, this assessment has taken the ‘worst case’ scenario that all projects currently being planned may be approved with overlapping construction programs. Three of these projects are within 3km of the site and could possibly generate cumulative adverse air quality impacts; Kerri Kerri Wind Farm, Keri Keri Solar Farm and Tcherely Wind Farm. The impacts should be minimal if all Projects manage dust emissions during their respective construction phases.

Table 7-19 Evaluation of cumulative impacts from nearby proposed Major Projects

Project	Brief project description	Assessment
Keri Keri Solar Farm	Solar farm with a maximum installed capacity of 500MWp (MW-peak) and an alternating current capacity of up to 400 MWn (MW-nominal). The project will also include ancillary infrastructure.	There are minimal impacts expected from the project, with dust management likely to contain dust emissions during construction. The development of the Project should be monitored once more detail is available.
Keri Keri Wind Farm	Construction, operation and maintenance of a wind farm with up to 176 WTGs, BESS (up to 200 MW/800 MWh) and associated infrastructure.	There are likely to be minimal air quality impacts from construction and no impacts expected from the operation of the Project. The development of the Project should be monitored once more detail is available.
Tchelery Wind Farm	Construction, operation and maintenance of a windfarm with up to 180 WTGs, BESS and associated infrastructure.	If construction overlaps, there are likely to be minimal air quality impacts and no impacts expected from the operation of the Project. The development of the Project should be monitored once more detail is available.

Key uncertainties of the assessment

Key uncertainties of this assessment relate to exacerbating climatic factors and the potential for nearby construction programs to overlap with this project. They are addressed by adopting conservative assumptions in assessment and best practice mitigation strategies.

7.3.5 Mitigation strategies

Key air quality risks would be managed to minimise soil loss, air pollution and address the hazard posed by reduced visibility on tracks and local roads via the mitigation measures provided in Table 7-20.

Table 7-20 Air quality mitigation measures

ID	Mitigation measures	Project stage
A1	Air quality management measures will be included in the CEMP for the Project and would include but not be limited to: • Identification of high-risk construction activities with potential to generate dust, and control measures for the activities, specific to sensitive receivers; primarily at the site access / Sturt highway intersection. • A process for monitoring dust on-site and weather conditions, as well as procedures for altering management measures where required. • Protocols to notify relevant stakeholders regarding the nature	Construction

ID	Mitigation measures	Project stage
	and timing of works which may adversely impact them. • A protocol for responding to air quality-related complaints. • Watering and maintenance of haul routes in response to visual cues and vehicle speed restrictions entering, traveling within and leaving the site.	
A2	Stockpiles: • Will be covered or otherwise stabilised • Located sufficiently distant from haul routes, particularly the Sturt Highway access, to manage visual impacts from dust.	Construction/ decommissioning
A3	Works will be designed and programmed to minimise the extent and duration of disturbance.	Pre-construction, Construction
A4	Disturbed ground and exposed soils will be permanently stabilised and vegetated as soon as practicable following disturbance to minimise the potential for wind erosion.	Construction
A5	All plant and equipment used at the site will be maintained in accordance with the manufacturer's specifications.	All stages
A6	All plant and equipment accessing and utilising the public road network will be registered.	All stages
A7	Fires and material burning will not be undertaken.	All stages

7.4. Waste and resources

7.4.1 Assessment approach

This section considers desktop information in relation to waste and resources and is supported by a technical appendix providing further detail in Appendix G.2. The impact assessment of the Project's potential to impact waste and resource is provided in the chapter only. It addresses the key matters for consideration, commensurate with risk to the environment.

7.4.2 Statutory context and guidelines

The assessment has been carried out with the consideration of the following relevant legislation:

- NSW Protection of the Environment Operations Act 1997
- NSW Protection of the Environment Operations (Waste) Regulation 2005 (POEO Act).
- NSW Waste Avoidance and Resource Recovery Act 2001
- NSW Wate Avoidance and Resource Recovery Strategy 2014-2021
- NSW Waste and Sustainable Materials Strategy 2041, Stage 1: 2021:2027

- NSW Environmental Planning & Assessment Act 1979 (EP&A Act), specifically Ecologically Sustainable Development
- NSW Waste Classification Guidelines 2014
- NSW Water Management Act 2000
- Commonwealth Hazardous Waste Act 1989

7.4.3 Existing environment

The Baldon Wind Farm Project area is primarily utilised for low density grazing and current waste streams are minimal considering the size of the site; about 46,259 hectares in total. Existing waste streams pertain to:

- Agricultural inputs: chemical and container disposal
- Machinery waste: batteries, tyres, fuels and lubricants
- Building waste: packaging, fencing, building materials.

The region has low population density over large distances, which limits waste collection, separation, reuse and recovery options. Transport of resources and of waste is also highly relevant. Transport contributes proportionally higher resources costs (fuels) and wastes (vehicle emissions) as part delivering and servicing residents and commercial operations, including renewable energy projects, in the region. Sourcing local resources and disposal options and building local capabilities for separation, reuse and recycling become more important in this context.

Specific facilities are located at:

- Murray River LGA: three transfer stations and two land fill sites; only domestic quantities of recycling materials are accepted at these sites.
- Hay LGA: one transfer station and one land fill site (access is negotiable with Council); only domestic quantities of recycling materials are accepted at these sites.
- Edward River: three transfer stations (construction, demolition and industrial waste are not accepted) and one land fill site.
- Balranald LGA; one waste management facility.

Metal recycling is available at the Deniliquin Landfill Depot as well as in Wagga Wagga. Independent metal recycling contractors can support the collection and recycling of metal waste.

The Murray River, Edward River and Hay Shire are part of the Riverina and Murray Joint Organisation (RAMJO) Riverina Waste Group, providing for a collaborative approach across six council areas to reduce the amount of waste disposal at landfill sites and develop facilities which individual councils could not afford independently.

Funding for improved waste treatment for the region was secured in 2022. Hay Shire Council will construct a $1.8 million materials recovery facility; considered a major stepping-stone towards sustainable waste practices in the region and expected to boost employment.

7.4.4 Potential Impacts

Potential impacts of waste include:

- Excessive waste generation
- Excessive / inefficient use of natural resources
- Uncontrolled release of waste causing pollution and follow-on impacts including increase in vermin and pests and reduced visual amenity

- Controlled disposal of waste reducing the capacity of local facilities (recycling and disposal) to service the region.

The NSW Waste Avoidance and Resource Recovery Act 2001 sets out to encourage the most efficient use of resources to reduce environmental harm. Resource management options should be considered in the following order:

- Avoidance of unnecessary resource consumption
- Resource recovery (including reuse, reprocessing, recycling and energy recovery)
- Disposal, as a last option.

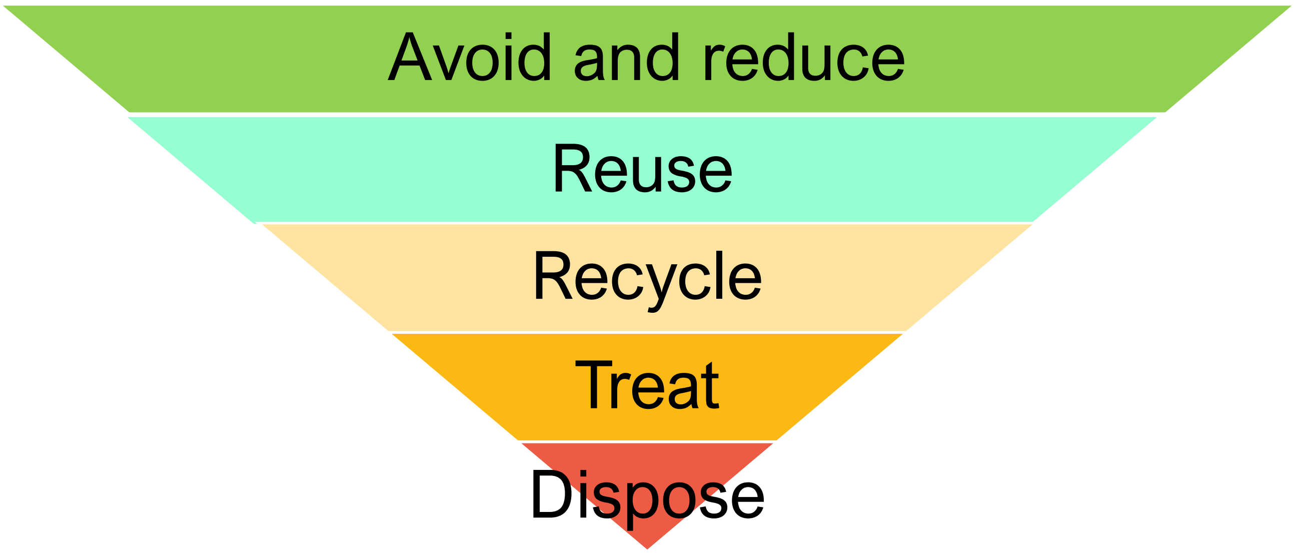


Figure 7-17 Waste hierarchy adapted from NSW EPA

When compared to the major electricity generating methods employed in Australia, wind farms are favourable in terms of the potential to reuse and recycle component parts as well as their short energy payback time in comparison to the life span of the project. For example:

- The wind turbines and transmission requirements contain high proportions of useful metals, able to be recycled.
- The payback time for wind turbines is found to be between 2.5 -10 months

While some of the larger components (batteries, wind turbine blades) have long life spans (10-30 years), there are currently limited commercially feasible end of life options. This need is the driver for an emerging industry. The concentration of large-scale renewable energy infrastructure in the Renewable Energy Zones is expected to assist the development of options in a way which benefits the regions. Of note:

- Batteries: Australia currently only recycles 2% of its lithium-ion battery waste, compared to 98% of lead acid batteries, however, the CSIRO is confident that lithium-ion batteries are highly recyclable would be used to manufacture new batteries in the future as the demand for these batteries increases (CSIRO, 2019).
- Wind turbine blades: There are currently limited commercially feasible end of life options for turbine blades. The most common way is mechanically breaking down the blades into short fibres or powder

for use in concrete batching or easier disposal to landfill. Emerging opportunities will see the use of resins that can be separated from the other components allowing the materials to be reused in other applications more easily. Blades can also be used largely intact as repurposed building structures, such as bus shelters.

- Approximately 85–94 per cent of a wind turbine (by mass) is recyclable and can be recycled in Australia – mostly steel, aluminium, copper and cast iron. This is well above the national average for commercial and industrial waste streams in 2018-19 (57 per cent) and the National Waste Policy Action Plan target (80 per cent average resource recovery rate across all industries by 2030) (Council Clean Energy, 2023).
- An estimated 15,000 tonnes of blade composite waste will have been created in Australia by 2034 due to decommissioned wind farms, and up to 4,000 tonnes in any given year (Council Clean Energy, 2023).
- Resale of components for reuse on other projects will also be feasible for many components.

The relatively low volume of composite wind blade waste to date has made it difficult to develop a recycling business built purely off wind blade waste streams; all sectors using composite materials must work together to find cost-effective solutions and value chains for the combined volume of composite waste (Council Clean Energy, 2023). This is an emerging opportunity for the Renewable Energy Zones to demonstrate coordinated reuse options within local communities, for construction wastes as well. Community and business initiatives could see substantial benefits from Project waste streams that lead to:

- Timber and metal supplied to trade schools and local craft workshops
- Composted materials supplied to local gardeners and farms
- Biowastes treated to allow for use as an agricultural land treatment

Specific wastes expected as part of the Baldon Wind Farm have been tabulated in Appendix G.2 and summarised in Table 7-21 with respect to the waste hierarchy options; avoid, reuse, recycle. Considering the quantities and the distribution of waste streams over the life of the project, and the potential for recycling / reuse / disposal, the following key issues have been identified:

- Construction waste – a high volume of waste will be generated in comparison to existing local recycling / reuse / disposal *capacity,* over the 3.5 year construction phase.

Decommissioning waste – a high volume of waste will be generated in comparison to current recycling / reuse *technologies,* at the end of the Project's life.

Table 7-21 Key sources of waste and their management options

Components	Quantification		Waste hierarchy options		
			Reduce/Avoid	Reuse	Recycle
Construction					
Excavated soils	Greatest during construction for turbine footings. Other activities will better achieve cut and fill balance.	180 turbine footings x approximately 2,200 m3 excavated soil per turbine.	☑ Minimise disturbance areas, ensure cut and fill balance.	☑ Soil to be retained and reused onsite.	✘ N/A
Excess construction materials: Concrete aggregates Timber products Masonry products Concrete wash	Greatest during construction.	Approximately 524 tonnes	☑ Reduce water consumption by installing water saving appliances	☑ Offer to local TAFE and high schools	☑ Recyclable material to be sorted and disposed at appropriate facilities
Paper and cardboard	Life of project.	Approximately 262 tonnes	✘ N/A	✘ N/A	☑ Recycled at appropriate facility
Packaging timber: Pallets, timber cable drums	Greatest during construction.	Approximately 0.8 tonnes	✘ N/A	☑ Offer to local TAFE, High School and Art community, local contractors	☑ Recycled at appropriate facility
Packaging (plastics)	Greatest during construction when highest volume of staff onsite.	Approximately 3.2 tonnes	☑ Packaging is minimised	✘ N/A	☑ Sort and recycle at appropriate facility
Packaging (ferrous and non-ferrous metals)	Greatest during construction.	Approximately 32 Tonnes	✘ N/A	✘ N/A	☑ Sort and recycle at appropriate facility
Putrescible waste: Food waste, food packaging	Greatest during construction when highest volume of staff onsite.	Approximately 20 tonnes	☑ Avoid plastic	✘ N/A	☑ Sort on site (glass, plastic, green) 90% recycle
Bio waste (septic) / black water	Greatest during construction when highest volume of staff onsite.	Approximately 1050 tonnes	☑ Install water saving appliances. Install bio-septic tank or worm farm waste composting septic (or similar) tank to reduce volume of biohazard black water.	☑ Utilise local composting facilities to incorporate into their activities for end use to be on farm (associated land) soil improvement.	☑ Treated and disposed of by appropriately licensed contractor
Desiccant	Greatest during construction	Approximately 721 kg	✘ N/A	✘ N/A	✘ N/A
EVA Foam	Greatest during construction	Approximately 333 kg	✘ N/A	☑ Offer to local TAFE and high schools	✘ N/A
Decommissioning					
Fuels and lubricants	All Stages but greatest during decommissioning; nacelles from all turbines will have to be emptied prior to disassembly.	180 turbines x approximately 22 L of fuels and lubricants each.	☑ Fuels and lubricants to be kept in appropriate containment areas.	✘ N/A	✘ N/A
Lithium-Ion batteries	During operation (component failure) but greatest during decommissioning when	Approximately 2,900 tonnes	✘ N/A	✘ N/A	☑ Recycled at approved recycling facility

Components	Quantification		Waste hierarchy options		
			Reduce/Avoid	Reuse	Recycle
	the battery is disassembled and removed. Components may also require disposal during operation as they reach the end of their life span.				
Electrical cables Recovered electrical cables	Greatest during decommissioning	Approximately 264 tonnes; some may be retained in situ where dependant on disturbance risks and recovery costs.	✘ N/A	✘ N/A	☑ Recycled at licensed and approved metal recycling facility
Turbine Components: Blades Towers Nacelle Footings	During operation (component failure) but greatest during decommissioning when the turbines are disassembled and removed. Components may also require disposal during operation as they reach the end of their life span.	180 turbines x approximately 160 tonnes of metal each.	☑ Use newest technology with recoverable resin and components.	☑ Second hand turbine market or stripped and components sold separately (domestic and international).	☑ Sort and recycle metal components. Recycle blades using most up to date and available technology.

7.4.5 Key uncertainties of the assessment

The fast-paced rate of renewable energy development and the long-lived nature of assets means that the some of facilities required for decommissioning specific components do not yet exist. However, the trend is very much toward longer life infrastructure and increased recyclable content. Recycling and reuse opportunities are increasing.

The Clean Energy Council of Australia has noted and recommends the following:

1. Creating incentives for industry to participate in composite recycling.
2. Funding research into new and alternative methods of composite recycling.
3. Consideration of repurposing old blades.

As the wind industry becomes established in NSW and the South West Renewable Energy Zone sees a greater number of developments, further opportunities are considered likely to be identified regarding local and regional reuse and recycle options as well as increased employment in this area.

7.4.6 Mitigation measures

Mitigating waste and resource impacts for the Project centres on:

- Accurate resource modelling to minimise surplus materials
- Consideration of alternatives to materials that are currently difficult to recycle
- Forward planning and coordination with local waste contractors and waste receiving facilities to develop opportunities for recycling, reuse and as a last resort disposal, where required.

The project commits to the following measures to manage waste and minimise resource use.

Table 7-22 Waste and resource mitigation measures

ID	Safeguards and mitigation measures	Project stage
R1	A Waste Management Plan (WMP) would be developed to minimise waste, including: • Identification of opportunities to avoid, reuse and recycle materials, in accordance with the waste hierarchy. • Quantification and classification of all waste streams. • Provision for recycling management on-site. • Tracking of all waste leaving the site and disposal of waste at facilities permitted to accept the waste. • Haulage requirements (such as covered loads / hazardous wastes). • An objective to ensure that any use of local waste management facilities does not exhaust available capacity nor disadvantage the local community	Construction/ Operation/ Decommissioning
R2	Lithium-Ion Batteries would be kept, stored, managed and transported according to manufacturer's instructions and the ADG Code. Any spent batteries would be recycled at a EPA permitted and licensed recycler of Li-Ion batteries.	Construction/ Operation/ Decommissioning

ID	Safeguards and mitigation measures	Project stage
R3	Any septic system would be installed, operated and maintained according to the Hay Council and Murray River Council LGA's regulations.	Construction/ Operation/ Decommissioning

7.5. Cumulative impacts

7.5.1 Assessment approach

Cumulative impacts are the amalgamated impacts caused by the combination of past, present, and reasonably foreseeable future actions. Cumulative impacts can accumulate over time and can be positive, negative or benign.

The chapters above have considered each Project impact in isolation and provided mitigation strategies where required to address impacts. As the site is very large and existing agricultural activities, grazing at low stocking rates, are considered highly compatible with the Project and have negligible cumulative impacts with the Project, this assessment of cumulative impacts is focused on the proposed activity's interaction with other projects in the vicinity, where construction and/or operational timeframes could be concurrent. As there is not capacity in the SWREZ for all renewable Projects currently being proposed, the Baldon Wind Farm Project's assessment is conservative in its assessment of impacts, assuming all may be developed.

This EIS addresses the NSW Government's Cumulative Impact Assessment Guidelines for State Significant Projects (DPE, 2022). It considers Strategic and Project-level Cumulative Impact Assessment (CIA).

Strategic-level CIA

The strategic-level CIA has been identified as positive cumulative impacts and are detailed in Chapter 2. In summary, they include the Project's cumulative contribution to:

- Federal and state regional renewable energy policies
- Regional and local land use plans
- Reduction of energy costs
- Understanding and protecting the site's unique environmental and social context
- Community benefits

No negative cumulative impacts have been identified at the strategic level.

Project-level CIA

The Project-level cumulative impact risks exist where the Project may interact with other large developments and thereby exacerbate the impacts of both projects. Being located in the declared South-West Renewable Energy Zone, local cumulative impacts could be relevant for several nearby utility scale renewable facilities (refer to Section 2.4.3). The key environmental considerations considered in this chapter include:

- Mandated by the Project SEARs:
    - Land
    - Noise and vibration
    - Biodiversity
    - Aviation safety
    - Traffic

- Project identified or guideline prescribed impacts:
  - Visual impacts
  - Aboriginal heritage
  - Social impacts

7.5.2 Existing environment

The Project is located within the South West REZ. This REZ has been located to maximise the benefits of and smooth the transition to greater renewable energy development for the state of NSW. The major EnergyConnect transmission line upgrade is underway and there are several projects constructed, being constructed and working through various phases of planning.

Table 7-23 below lists the State Significant Developments currently proposed as of June 2024 within the South-West REZ, their brief description, distance from the Project area their anticipated construction timeline and a statement on the key potential cumulative impacts. Section 2.4.3 provides the detail around cumulative impacts that have been considered. The distribution of these Projects is shown in Figure 7-18.

Deniliquin has a number of battery and solar projects proposed and directly east of the REZ the Coleambally locality has an approved solar farm and BESS. These Projects are considered sufficiently distant from the Project and are not considered further.

As stated in the Project description the Baldon WF existing indicative construction timeline is expected to run from Q4 2025 through to Q2 2029.

Table 7-23 Major Projects within the South-West REZ (Information based on latest public documentation on the NSW Major Projects website in June 2024)

Project / Proponent	Project phase as of June 2024	Project Description, maximum expected workforce (FTE) & Estimated Development Cost (AUD)	Approximate distance from the Project area	Stated construction and commissioning timeline	Key cumulative impacts considered
Project EnergyConnect (NSW – Eastern & Western Section) (Transgrid/ EnergyCo)	Approved	692km transmission line upgrade project within NSW that will be a new 330 kilovolt (kV) transmission line between the Buronga substation and the proposed new Dinawan substation near Coleambally, and a new 500 kV transmission line between the Dinawan substation and Wagga Wagga. 600 full time equivalent jobs during construction (west) 500 full time equivalent jobs during construction (east) $418 million EDC (west) $1.08 billion EDC (east)	Within the Project area	Construction: Started in 2022 final rehab works around the Buronga substation would be 46 months from start of construction. Final completion date unknown. Commissioning: Expected to start in 2024. Final completion date unknown. The construction of this project may overlap with the Baldon WF construction period.	Noise Traffic (local & regional) Social (concurrent service and supply demand)
Tchelery Wind Farm (NEOEN)	Prepare EIS	800MW with 120 wind turbines with a maximum tip height of 285m BESS considered by capacity not specified 500 full time equivalent jobs during construction 10 full time equivalent jobs during operation (up to 20 for maintenance) $1.36 billion EDC	Adjacent to the Project area to the east	Pre-Construction: Start Q1 2026 Construction: Q1 2026 to Q4 2027 Commissioning: Q2 2028 to Q4 2028 The construction of this project may overlap with the Baldon WF construction period.	Visual Noise Traffic (local & regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Keri Keri Wind Farm (Solar Farm also considered but not lodged) (Acciona Energy Australia Global Pty Ltd)	Response to submissions	884MW with 155 wind turbines with a maximum tip height of 291.5m 200MW/800MWh (4hour) BESS 650 full time equivalent jobs during construction 12 full time equivalent jobs during operation $2.9 billion EDC	Adjacent to the Project area to the west	Not provided 24 month construction period indicated in the EIS with peak at 12 months. The construction of this project may overlap with the Baldon WF construction period.	Visual Noise Traffic (local & regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Wilan Wind Farm (Kilara Energy)	Prepare EIS	MW capacity not stated with 138 wind turbines with a maximum tip height of 300m BESS considered by capacity not specified 400 full time equivalent jobs during construction 10-15 full time equivalent jobs during operation EDC not defined	6.8km west	Pre-Construction: Late 2024 Construction: Early 2025 for 24-30 months Commissioning: No stated The construction of this project may overlap with the Baldon WF construction period.	Visual Noise Traffic (local & regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Balranald Mineral Sands	Approved	5,346ha disturbance footprint	48km north west	The construction and operation of this project may overlap with the Baldon WF	Traffic (regional)

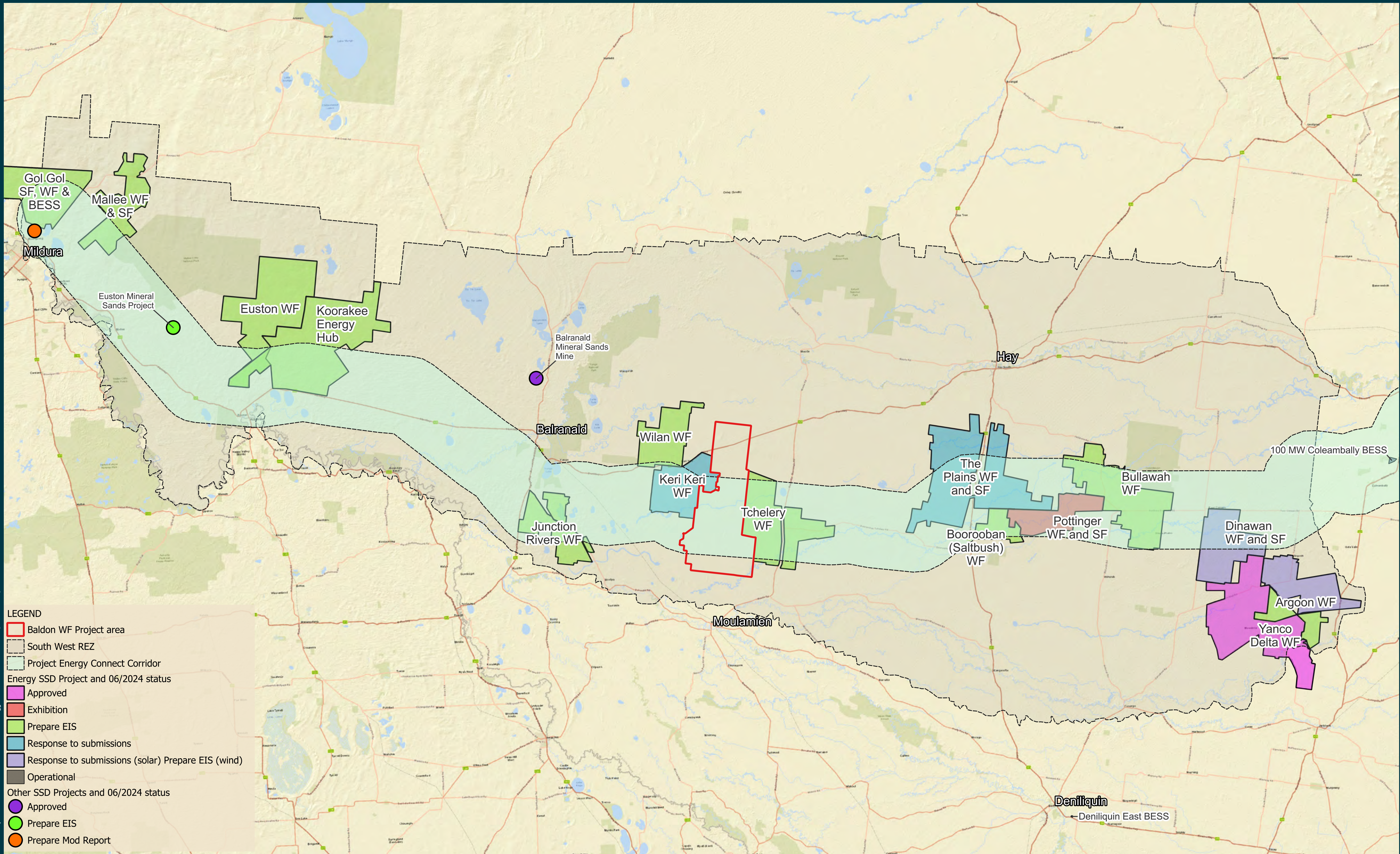
Project / Proponent	Project phase as of June 2024	Project Description, maximum expected workforce (FTE) & Estimated Development Cost (AUD)	Approximate distance from the Project area	Stated construction and commissioning timeline	Key cumulative impacts considered
		150 full time equivalent jobs during construction 366 full time equivalent jobs during operation (24/7 365 days a year) EDC not defined		construction period.	Social (concurrent service and supply demand)
Bullawah Wind Farm (BayWa r.e. Projects Australia Pty Limited)	Prepare EIS	MW capacity not stated with 170 wind turbines with a maximum tip height of 300m 500/2000MWh (4hour) BESS 400 full time equivalent jobs during construction 40 full time equivalent jobs during operation EDC not defined	80.0km east	Pre-Construction: Not stated Construction: 2025 over 24 months Commissioning: 2026 – 2027 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Junction Rivers Wind Farm (formerly Burrawong Wind Farm) (Windlab Developments Pty Ltd)	Prepare EIS	750MW with 107 wind turbines with a maximum tip height of 300m 250MW/500MWh (2hour) BESS 250 full time equivalent jobs during construction 10 - 15 full time equivalent jobs during operation $960 million EDC	22.5km west	Pre-Construction: Not stated Construction: 2023 (now passed) over 24 - 36 months Commissioning: Not stated The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Romani Solar Farm (Samsung C&T Renewable Energy Australia Pty Ltd)	Prepare EIS	312.4MW with unstated PV module number (870.5ha total area) 150MW/300MWh (2 hour) BESS 150 - 200 full time equivalent jobs during construction full time equivalent jobs during operation not stated $230 million EDC	36.0km east	Pre-Construction: Starting 2025 Construction: 2025 for 12-18 months Commissioning: 2026 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand)
The Plains Wind Farm (Engie Australia Pty Ltd)	Response to submissions	1.35GW with 188 wind turbines with a maximum tip height BESS not proposed 700 full time equivalent jobs during construction 46 full time equivalent jobs during operation $3.451 billion EDC	40.6km east	Pre-Construction: Starting January 2027 (2 months) Construction: Starting March 2027 over 40 months) Commissioning: Starting November 2027 over 18 months The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)

Project / Proponent	Project phase as of June 2024	Project Description, maximum expected workforce (FTE) & Estimated Development Cost (AUD)	Approximate distance from the Project area	Stated construction and commissioning timeline	Key cumulative impacts considered
The Plains Solar Farm (Engie Australia Pty Ltd)	Response to submissions	400MW with PV module number not stated (8,336 arrays) 400MW/1600MWh (4hour) BESS 150 full time equivalent jobs during construction 46 full time equivalent jobs during operation $1.136 billion EDC	40.6km east	Pre-Construction: Starting Q4 2026 Construction: from Q4 2026 for 18 months Commissioning: Starting September 2028 over 8 months The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand)
Sunraysia Solar Farm (Sunraysia Solar Project Pty Ltd)	Approved & operational	Operational 200MW Solar Farm with 750,000 PV modules No BESS 2 full time equivalent jobs during operation $275 million EDC	41.5km west	Operational with no active modifications. There would be no cumulative impact conflicts with the Baldon WF.	Complete, risk of ongoing cumulative impact is considered minimal.
Limondale Solar farm (Limondale Sun Farm Pty Ltd)	Approved & operational	Operational 250MW Solar Farm with a 200MW / 800MWh (4hours) battery Battery facilitating an additional 20 construction jobs via Mod 2 approved in 2022 $175 million EDC	43.7km west	Operational Additional BESS construction timelines not defined. The construction of this projects modification may overlap with the Baldon WF construction period.	BESS component likely complete by start of Baldon Wind Farm construction.
Boorooban (Saltbush) Wind Farm (Octopus Investments / Hay Plains Wind Farm Pty Ltd)	Prepare EIS	400MW with 70 wind turbines with a maximum tip height of 280m 600MW/1200MWh (2 hour) BESS 280 full time equivalent jobs during construction 28 full time equivalent jobs during operation EDC not defined	54.3km east	Pre-Construction: Starting 2028 Construction: 2028 for 30 months Commissioning: Mid 2030 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Pottinger Wind Farm (Someva / Pottinger Renewables Pty Ltd)	Exhibition	1.3GW with 247 wind turbines with a maximum tip height of 280m 500MW/2000MWh (4hour) BESS 900 full time equivalent jobs during construction 50 full time equivalent jobs during operation $2.152 billion EDC	66.8km east	Pre-Construction: Not stated Construction: Q4 2026 – Q3 2027 over 55 months Commissioning: Q3 2027 over 36 months The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)

Project / Proponent	Project phase as of June 2024	Project Description, maximum expected workforce (FTE) & Estimated Development Cost (AUD)	Approximate distance from the Project area	Stated construction and commissioning timeline	Key cumulative impacts considered
Pottinger Solar Farm (Someva)	Prepare EIS	300MW with 750,000 PV modules 500MW/2000MWh (4hour) BESS 220 full time equivalent jobs during construction 4 full time equivalent jobs during operation EDC not defined	66.8km east	Pre-Construction: Not stated Construction: 2026 –2027 Commissioning: 2027 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand)
Hay Solar Farm (Plains SF No1 Pty Ltd)	Approved	110MW with 430,000 PV modules 29MW/29MWh (1hour) BESS 150 full time equivalent jobs during construction 2 - 5 full time equivalent jobs during operation $126million EDC	68.0km north east	Pre-Construction: Starting 2024 Construction: 2024 - 2026 Commissioning: 2026 (Power Technology, 2024) The construction of this project may overlap with the Baldon WF construction period.	Likely complete by start of Baldon Wind Farm construction.
Koorakee Energy Park (Squadron Renewable Energy Developments Pty Ltd)	Prepare EIS	2GW energy park (1GW solar and 1GW wind) 167 wind turbines with a maximum tip height of 270m 1 GW/12 GWh (12hour) BESS 300 - 400 full time equivalent jobs during construction 10-15 full time equivalent jobs during operation EDC not defined	90.6km north west	Pre-Construction: Not stated Construction: Not stated, 24 – 36 months forecasted Commissioning: 2028-2029 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Euston Wind Farm (DP Energy /Euston Wind Farm Pty Ltd)	Prepare EIS	700MW with 96 wind turbines with a maximum tip height of 275m 500MW/2000MWh (4hour) BESS 250 full time equivalent jobs during construction 15 full time equivalent jobs during operation $1.2 billion EDC	109.3km north west	Pre-Construction: Not stated Construction: Q2 2025 over 18 – 24 months Commissioning: By Q2 2027 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Yanco Delta Wind Farm (Virya Energy Pty Ltd)	Approved	1.5GW with 208 wind turbines with a maximum tip height of 270m 800MW/800MWh (1hour) BESS 300 full time equivalent jobs during construction 30 full time equivalent jobs during operation	119.4km east	Pre-Construction: Not stated Construction: Not Stated over 36 months Commissioning: Not stated The construction of this project may overlap with the Baldon WF	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)

Project / Proponent	Project phase as of June 2024	Project Description, maximum expected workforce (FTE) & Estimated Development Cost (AUD)	Approximate distance from the Project area	Stated construction and commissioning timeline	Key cumulative impacts considered
		$3.45 billion EDC		construction period.	
Dinawan Solar Farm (Spark Renewables)	Response to submissions	300MW with 2 million PV modules 300MW/600MWh (2hour) BESS 400 full time equivalent jobs during construction 10 full time equivalent jobs during operation EDC not defined	116.6km east	Pre-Construction: Not stated Construction: 2025 over 18 - 36 months Commissioning: 2026 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand)
Dinawan Wind Farm (Spark Renewables)	Prepare EIS	1.5GW with 250 wind turbines with a maximum tip height of 280m 300MW/1200MWh (4hour) BESS 800 full time equivalent jobs during construction 50 full time equivalent jobs during operation $2.9 billion EDC	116.6km east	Pre-Construction: Not stated Construction: 2025 over 36 months Commissioning: 2027-2028 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Argoon Wind Farm (RES Australia Pty Ltd)	Prepare EIS	901MW with 106 wind turbines with a maximum tip height of 249m 460MW/2300MWh (5hour) BESS 340 full time equivalent jobs during construction 6 - 12 full time equivalent jobs during operation $1.5 billion EDC	132.6km east	Pre-Construction: Not stated Construction: Not Stated over 24 - 36 months Commissioning: Not stated The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Euston Mineral Sands	Prepare EIS	6,000ha disturbance footprint 250-350 full time equivalent jobs during construction 150-250 full time equivalent jobs during operation (24/7 365 days a year) EDC not defined	140km west	If approved, construction and operation periods could overlap with the construction of the Baldon Wind Farm.	Traffic (regional) Social (concurrent service and supply demand)
Mallee Wind Farm (Spark Renewables)	Prepare EIS	1GW with 150 wind turbines with a maximum tip height of 280m 300MW/1200MWh (4hour) BESS 250 full time equivalent jobs during construction 50 full time equivalent jobs during operation $2.0 billion EDC	156.3km north west	Pre-Construction: Not stated Construction: 2025 over 2.5 – 3 years Commissioning: 2027 – 2028 The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)

Project / Proponent	Project phase as of June 2024	Project Description, maximum expected workforce (FTE) & Estimated Development Cost (AUD)	Approximate distance from the Project area	Stated construction and commissioning timeline	Key cumulative impacts considered
Mallee Solar Farm (Spark Renewables)	Prepare EIS	600MW with 1.5 million PV modules 300MW/1200MWh (4hour) BESS 300 full time equivalent jobs during construction 10 full time equivalent jobs during operation $1.0 billion EDC	156.3km north west	Pre-Construction: Not stated Construction: Early 2026 over 24-36 months Commissioning: 6-12 months The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand)
Gol Gol Wind Farm (Squadron Renewable Energy Developments Pty Ltd)	Prepare EIS	840MW with 120 wind turbines with a maximum tip height of 280m No BESS proposed 300-400 full time equivalent jobs during construction 10-15 full time equivalent jobs during operation EDC not defined	171.0km north west	Pre-Construction: Starting late 2028 Construction: 2028 for 20 - 36 months Commissioning: Not stated 2030 – 2031 based on construction length The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand) Biodiversity (bird and bat collision)
Gol Gol Solar Farm (Squadron Renewable Energy Developments Pty Ltd)	Prepare EIS	600MW with unstated PV module number (1,500ha total area) No BESS proposed 200 full time equivalent jobs during construction 4 full time equivalent jobs during operation EDC not defined	171.0km north west	Timing not stated but development would be staged in tandem with Gol Gol Wind Farm and Gol Gol BESS which are subject to separate SSD assessments. The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand)
Gol Gol BESS (Squadron Renewable Energy Developments Pty Ltd)	Prepare EIS	1,500MW/12 GWh (8hour) BESS 150 full time equivalent jobs during construction 10 - 15 full time equivalent jobs during operation EDC not defined	171.0km north west	Timing not stated but development would be staged in tandem with Gol Gol Wind Farm and Gol Gol Solar Farm which are subject to separate SSD assessments. The construction of this project may overlap with the Baldon WF construction period.	Traffic (regional) Social (concurrent service and supply demand)
Buronga Landfill Extension	Prepare Mod Report	Expansion from 30,000 tonnes per annum to 100,000 tonnes per annum Increased employment from 6 full time directly employed to 36 full time direct employees and 66 full time equivalent indirect employees $122.6 million EDC	181km north west	Currently operational landfill that would be in operation during the construction of the Baldon Wind Farm.	Due to the distance from site and relatively small project scale no notable cumulative impacts are expected.



0 25 50 km

Datum: GDA2020 / MGA Zone 55

NGH

Baldon Wind Farm

Figure 7-18 Cumulative impacts - SSD Renewable Energy Projects

7.5.3 Potential Impacts

The headings below capture the key cumulative impacts which may occur for the Project. It considers that up to 25 State Significant Developments could be in their construction phase (or operational phase in the case of mining operations) concurrent with the Baldon Wind Farm Project.

Cumulative impacts to land

Agricultural activities

Local agricultural activities, grazing at low stocking rates, are considered highly compatible with the Baldon Wind Farm Project.

While the additional income streams may allow more options for host landholdings to stock at lesser rates, at a local and regional level, the wind farm projects considered are unlikely to reduce the agricultural output of the area.

Other projects set out in Table xx may be less compatible with local agricultural activities but in this landscape, are considered to be sparsely distributed and a small fraction of the available agricultural land.

It is possible that other projects may combine to impact the soil and water sources supporting local agricultural activities (considered below).

Soil resources (that support land capability)

The water and soils assessment in Section 6.8 demonstrates highly localized and manageable impacts to soils; not interaction with other project is expected.

Rehabilitation programs will be large commitments of these utility scale projects and measures have been included to address forward planning for seasonal windows and contingencies to address risks identified to sourcing required materials (such as water, seed and stabilising agents).

Surface and ground water (that support land capability)

The water and soils assessment in Section 6.8 demonstrates highly localized and manageable impacts to surface and groundwater resources and sets out the different water take options.

Water would be accessed using the appropriate licensing and abiding by the appropriate water sharing rules and regulations. These measures are designed to address the interactions between multiple water users in a catchment.

Cumulative noise and vibration impacts

Noise and vibration impacts for the Project, set out in Section 6.7, are all well within noise management levels; no exceedances on account of the Project will be experienced at any non associated residence during construction or operation.

While it is possible some cumulative noise impacts could be experienced during construction if noisy works are being undertaken concurrently with Wilan, Keri Keri and Tchlerery Wind Farms, it is considered highly unlikely, if these Projects are also managing noise impacts appropriately.

It is recommended that this resolved through communication between all projects to minimise impacts to common receivers.

Cumulative biodiversity impacts

The Biodiversity Assessment Method used to assess clearing impacts (and summarised in Section 6.1) considers the landscape context of the Project and the rarity and risk factors for biodiversity entities at a catchment level. The tool used to assess the impacts and calculate offset obligations is updated regularly to reflect increasing knowledge about species and threats.

The Project has avoided and minimised impacts where possible to ensure that its cumulative contribution to the state's clearing is as low as possible. It will contribute to in perpetuity biodiversity offsets calculated to be commensurate with this impact.

Positive cumulative impacts are highly likely to occur as well:

- As the extensive biodiversity management planning process that accompanies construction and operation of State Significant Developments will provide opportunities to address existing weed and pest animal populations locally. Specific to the Baldon Wind Farm Project, this will include measures that assist the threatened Plains Wanderer to persist onsite.
- As new stewardship sites are established locally to meet the credit requirements of these large projects. The Baldon Wind Farm has investigated a number of strategies to maximise these local benefits of strategic offsets (summarised in Section 6.1)
- As greater information is gained about the distribution and habitat preferences of local species identified in the extensive surveys accompanying these large projects.
- As operational monitoring addresses current assumptions about species collision risk profiles.

Specific to the movement patterns, and cumulative collision and alienation risks of other wind farms in the vicinity, the bird and bat risk assessments, appended in Appendix F.1, have considered the ability of species to avoid collision and to withstand losses. Based on the data to date, the Project has identified higher risk species with regard to cumulative impacts with other projects. These include:

- Black Falcon is considered to be of Medium risk
- Spotted Harrier and Little Eagle are considered to be at Low risk
- Pink Cockatoo is considered to be at Very Low risk
- Plains Wanderer is considered to be at Low risk

The mitigation strategy includes a Bird and Bat Adaptive Management Plan (BBAMP) developed in consultation with BCD that will consider the full data set of the Project's bird and bat utilisation surveys as well as include a more comprehensive assessment of cumulative impacts, informed by quantitative information where available for relevant surrounding projects.

Cumulative impacts to aviation safety

The cumulative effect to aviation safety of other nearby wind farms is considered minor as they are easily identified in weather conditions that allow visual flight by day and the protection surfaces above the wind farms for visual flight at night and instrument flying rules flights. Aviation impacts are discussed in Section 7.2.2 and Appendix F.9 and require project-specific notification to air strip operators.

Cumulative impacts to transport

Cumulative impacts to traffic and transport have been considered in Section 6.5 and Appendix F.5. The detailed traffic assessment identifies some nearby potential projects are expected to generate additional vehicle movements within the town of Hay and Balranald. These vehicle movements would be distributed on the surrounding road network and are expected to have a minimal cumulative impact on the operation of the local road network.

Estimated traffic volumes are not available for all nearby potential projects. As such, a comprehensive quantitative assessment of the cumulative impacts of these projects is unable to be undertaken, which has been discussed and agreed to with TfNSW. However, overall cumulative impacts are considered to be minimal as the number of neighbouring projects in the vicinity of the Project will be limited by the capacity of the transmission network. Not all proposed energy projects in the SWREZ will be able to be constructed.

The impacts on road assets will be addressed on a project-by-project basis.

The potential for road safety issues if multiple projects are constructed simultaneously is addressed on a project-by-project basis; requiring coordination with relevant projects.

Cumulative impacts to visual amenity

The visual assessment (summarised in Section 6.3 and available in Appendix F.3) assessed cumulative impacts on receivers within 8km of the Project and the following three potential wind farms:

- Tchelery Wind Farm
- Keri Keri Wind Farm (and Solar Farm)
- Wilan Wind Farm

The visual assessment determined that the impact of the additional wind farms to all dwellings is not significant when considering the main dwelling assessment and mitigations implemented.

The 2D preliminary screening Multiple Wind Turbine Tool established that six (6) of the 11 non-associated dwellings located within 8,000 m of the three (3) wind farm projects may have views of turbines in three (3) or more multiple 60 degree sectors. Up to two (2) sectors is deemed acceptable in accordance with the Bulletin.

Further 3D wireframe tools and then photomontages were used to consider topography and intervening vegetation and structures to confirm that cumulative impacts were not significant.

R12 is considered the dwelling with the highest potential cumulative impacts, however, this dwelling is associated with and located within the centre of the Keri Keri Wind Farm and experiences high visual impacts from those turbines. As such the Baldon WF is only a minor contributor to the overall visual impact. This dwelling is also currently derelict.

The visual assessment also considered the cumulative impact of transmission lines and the Projects broader impact to the landscape.

Considering the broader landscape the wind farms have the potential to become a defining character element along the Sturt Highway, however it is noted that no scenic or key landscape features will be impacted by the projects and community concern about this type of impact has been very low (evidenced in community consultation activities summarised in Section 5).

Cumulative impacts to Aboriginal heritage values

The assessment of impacts on Aboriginal heritage values addresses cumulative impacts to Aboriginal heritage in its consideration of the principles of Ecologically Sustainable Development (ESD) (refer to Appendix F.2).

It concludes that that while the Disturbance area would impact a number of the newly recorded Aboriginal heritage sites, the overall cumulative impact on the archaeological record for the region is likely to be minimal. This is based on the consideration of the disturbance which has occurred through farming practises to these sites prior to their identification as part of this assessment, and assuming that a similar density of artefact and hearth sites remain within the Project area and across the wider region.

The Project has also taken appropriate measures to avoid higher value sites identified through the ACHA process in consultation with the site RAPs (refer to Section 6.2). This type of project level assessment and mitigation is required for all similar Projects in the SWREZ.

Positive cumulative impacts are highly likely to occur as well:

As the extensive cultural heritage management planning process that accompanies construction and operation of State Significant Developments provides opportunities for salvage and protection of newly identified sites.

As greater information is gained about the heritage values of the locality and region, as identified in the extensive surveys accompanying these large projects.

Cumulative social impacts

The assessment of social and economic impacts (summarised in Section 6.4) centres on the combined effect of the Project on local community values and resources. Excluding the issues already addressed above, it identified the key positive cumulative social effects for this Project as:

- Positive economic impacts such as increased employment
- Additional procurement, and training opportunities
- Increased local and regional economic development and opportunities
- Increased generation of renewable energy
- Increased community investment

It also identified potential cumulative social 'pain point's' such as:

- Labour and skills shortages
- Pressure on social infrastructure, services and housing and accommodation
- Changes to the community feel of towns

A number of project specific measures are proposed in Section XX that ensure the Baldon Wind Farm addresses these cumulative risks.

Key uncertainties of the assessment

In the absence of certainty, this cumulative impact assessment chapter has considered that it is possible that all of the projects listed in Table 7-23 will progress to completion and be developed within the general parameters described therein. This is considered as a 'worst-case' scenario as a number of the projects are only proposed. Not all of these will be approved, and if approved, not all will be developed to their full scope.

Projects which may be proposed after this EIS will be required to take into account this Project (in addition to other relevant projects) in their consideration of cumulative impacts.

7.5.4 Mitigation measures

The chapters above have considered each Project impact in isolation and provided mitigation strategies where required to address impacts. No additional mitigation measures are proposed for the Project. It is considered that all mitigation measures included in each impact chapter and summarised in Appendix C will work together to minimise the risk of cumulative impacts with other projects.

08 Project justification

8. Project Justification

This EIS has set out in detail the Baldon Wind Farm Project's justification, considering its setting, the need for the Project, the community's views about the Project and the ability for the Project respond to the specific environmental impacts likely to accompany the construction, operation and decommissioning. This section draws together those key matters to provide a consolidated Project justification.

8.1. Project objectives

The objective of the Baldon Wind Farm Project is to generate and store renewable electricity for use throughout the state and beyond.

The Project would:

- Improve the security, stability and resilience of the NEM, while assisting the transition away from coal fired power generation.
- Be located to contribute to the development of the SWREZ, which enhances economies of scale efficiencies for new network infrastructure.

There is not capacity in the SWREZ for all renewable Projects currently being proposed. Baldon Wind Farm therefore aims to differentiate itself as an important Project worthy of support by regulators and the community. As set out in this EIS, it is a Project that:

- Is responsive to environmental, cultural and social values
- Is conservative in its assessment of impacts development of adaptive site-specific management strategies.
- Proactively seeks opportunities to maximise Project benefits for the environment and to the surrounding communities.

8.2. Responsive design and mitigation

The Baldon Wind Farm has been designed in response to the detailed assessment of the site's values, in consultation with relevant stakeholders, including the local community. Key factors influencing the Project design, in order of importance, have included:

- Aboriginal heritage – significant findings have been avoided, necessitating several changes to the Project's layout, provision for further micrositing during detailed design is included.
- Biodiversity – dams populated with Southern Bell Frog *Litoria raniformis* will be avoided and protected from impacts, provision for further micrositing during detailed design is included.
- Visual amenity – permanent infrastructure has been located south of the Sturt Highway only, to minimise the impact of views from the highway and northern neighbours.
- Local hydrology – Project-specific infrastructure flood modelling is proposed in tandem with detailed design, to address data gaps and mitigate flood risks. This performance-based approach ensures local hydrology, and the water quality and habitats that this parameter influences, will be protected.
- Community values – community values and concerns have been addressed in the assessment and development of social initiative which form part of the Project.

In addition to best practice design measures, the Project has adopted strong mitigation strategies to protect other site values, including:

- Cultural heritage management planning, in consultation with Aboriginal community stakeholders.
- Species-specific biodiversity mitigation strategies

- Maximizing strategic biodiversity offset opportunities
- Site specific rehabilitation strategy to reflect unique soil and floristic values and past experience on this site.

Cultural heritage management planning
The Project will include must be managed in accordance with the site-specific mitigation, including protocols for surface collection, storage and relocation of collected material, unexpected finds protocols and requirements for demarcating sites and further monitoring. Registered Aboriginal parties will be integral to this work.
Biodiversity mitigation strategies
Several threatened species have been identified in high numbers across the site. While avoidance is not possible, strong commitments to managing specific threats will protect these local populations in the long term. Two overarching management plans will work together to ensure the biodiversity impacts that cannot be avoided by the Project will be sufficiently minimised: 1. Biodiversity Management Plan (BMP), primarily targeting construction impacts 2. Bird and Bat Adaptive Management Plan, targeting operational risks
Strategic offset strategy
The Project's biodiversity offset requirements would form a condition of consent and would be retired in accordance with the Biodiversity Offset Scheme. Several opportunities have been identified in consultation with stakeholders that will influence the Project's approach to meeting the credit obligation. Baldon Wind Farm will endeavour to: • Maximise opportunities for local landholders, land councils and First Nations organisations to participate in management actions with the stewardship site and to provide local training and skill sharing. • Work with Nature Markets and Offsets Division to ensure managed grazing is allowable within the stewardship site, where appropriate. • Work with Nature Markets and Offsets Division to coordinate the stewardship site with other South West Renewable Energy Zone projects, where appropriate. • Maximise opportunities to build local capacity within local contractors to supply seed and plants that may assist to supply South West Renewable Energy Zone projects, in rehabilitation as well as in active management of stewardship sites.

Rehabilitation strategy
The Project will protect soils, water and agricultural resources. The Project's estimated disturbance area is a small proportion of the total site, which will retain its grazing land use practices during the operational phase of the Project. The site has demonstrated good recovery from past degradation and lessons learned from successful rehabilitation strategies at the site will ensure the site's resources are protected during the Project's life and at the decommissioning phase. Baldon Wind Farm commits to specific rehabilitation requirements for this Project, including detailed forward planning and consideration of synergies with offset active management (seed collection during preclearing surveys, in areas where this isappropriate).

8.3. Alignment with government policies and statutory requirements

The Baldon Wind Farm Project is well located to provide new renewable energy generation to drive the energy transition. The Project is located near the centre of the South West REZ and would connect directly into the Project EnergyConnect interconnector. Project EnergyConnect and the adjacent proposed HumeLink are scheduled to open up 2.5GW of grid capacity of which this 1,400MW Project would provide a significant contribution.

As detailed in Section 2, the Project is in alignment with local, state and Australian government policies related to this transition, including:

- Australia's climate reduction plan (2021) and Nationally Determined Contribution (2022)
- Draft 2024 Integrated System Plan (ISP)
- NSW Climate Change Policy Framework (2016)
- NSW Net Zero Plan Stage 1: 2020 2030 (2020) and Implementation update (2022)
- NSW Electricity Strategy (2019)
- NSW Electricity Infrastructure Roadmap (2020)
- Riverina Murray Regional Plan 2041
- *Climate Change (Net Zero Future) Act 2023*

The Project has demonstrated it is permissible, in Section 4. As a State Significant Development, the Project has been assessed in accordance with Environmental *Planning and Assessment Act 1979* (EP&A Act). It is permissible in accordance with State Environmental Panning Policy (Transport and Infrastructure) 2021 (TISEPP). Mandatory matters have been considered including biodiversity, hazards and native title. Local provisions of the Wakool Local Environmental Plan 2013 and the Hay Local Environmental Plan 2011 have been considered and while local zoning provisions do not allow electricity generation within RU1 zoned land, this is overridden by the TISEPP.

8.4. Community views and benefits

8.4.1 Community input

The community around the Project area is rural with a strong focus on agriculture and a very low population density. The engagement activities undertaken throughout the EIS phase demonstrated that there is a low level of concern and high levels of support for the Project. The concerns expressed were primarily focused on the limited local housing supply, interactions with the Victoria to NSW Interconnector West transmission route, potential flora and fauna impacts, potential cultural heritage impacts and potential visual amenity. An overwhelming number of survey respondents – 72% - indicated support for the Project for the potential benefits that it could bring to the local area. Support in relation to the Project was based on community benefit sharing opportunities, diversification of land use and income streams and local employment opportunities.

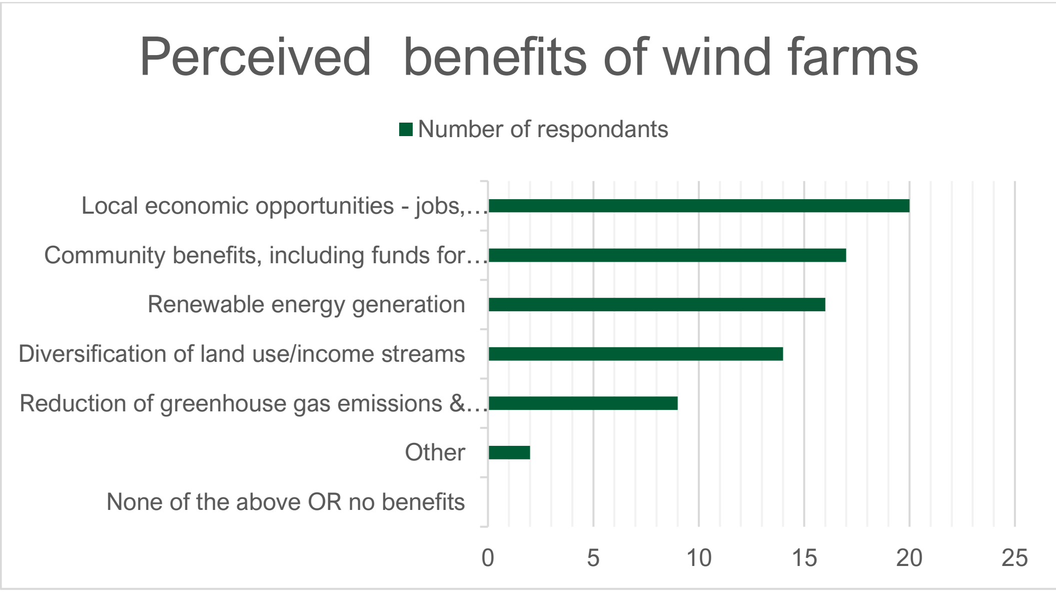


Figure 5.2 Perceived benefits of wind farms (generally), obtained from Baldon Wind Farm Project engagement activities

8.4.2 Public benefits

The Project will provide:

- An injection of 1,400 MW of renewable energy into the NEM, equating to approximately 3.4GWh of renewable electricity, displacing coal and gas fired generation
- Renewable energy to power equivalent to almost six hundred thousand homes (598,000 based on the average NSW home electricity usage of 5,745kWh)
- Reliable energy to the NEM with firmed storage through the installation of a 200MW/400MWh BESS onsite
- An investment of 2.9 billion dollars, most of which will be invested in NSW.

At the local level, the benefits are planned to include:

- Direct financial benefits to participating landowners

- Direct financial community benefits through agreed Community Benefit Schemes (CBS) with the Hay Shire Council and Murray River Shire Council (refer to Section 2.8)
- Investment in local suppliers of materials and labour during the construction period,
- Approximately 350-400 full-time equivalent jobs during the peak of the construction, and
- Approximately 35 permanent skilled jobs for the life of the Project.

Benefits will be maximised and social impacts managed under the framework provided by the:

1. Community and Stakeholder Engagement Strategy (CSES)
2. Industry and Aboriginal Participation Plan (IAPP)
3. Community Benefit Sharing Program (CBSP)

8.5. Scale and nature of impacts

The specialist assessments undertaken for the Project have helped to shape the Project's scale. Uncertainty has been addressed by building in conservatism and mechanisms to monitor and update assumptions. Mitigation strategies are strengthened by including locally appropriate provisions.

Key potential cumulative impacts centre on visual, noise, traffic, land use, biodiversity and socio-economic impacts; all are assessed as negligible adverse cumulative impact.

The key results are summarised in the table below.

Table 8-1 Key results and Project outcomes – Stage 1 and 2 combined

Impact	Results of assessment	Approach to uncertainty	Project outcomes
Biodiversity	The Project area is comprised of native vegetation in good condition hosting several threated flora and fauna. • No Terrestrial Threatened Ecological Communities would be impacted. • 15.6ha of Murray River Endangered Ecological Community would be impacted. • 805.54ha of native vegetation, dominated by PCT 164: *'Cotton Bush open shrubland of the semi-arid (warm) zone',* would be removed. • 27 hollow bearing trees, of the 109 identified, would be removed. This includes confirmed threatened species habitat including: • 321.01ha of Mossgiel Daisy *Brachyscome papillosa* habitat • 64.63ha of Chariot Wheels *Maireana cheelii* habitat • 39.21ha of Southern Bell Frog *Litoria raniformis* habitat[18]. • 2.5ha of Little Eagle *Hieraaetus morphnoides* habitat No high bird or bat collision risks during operation are anticipated however, ongoing monitoring is a commitment of the Project, targeting several moderate risk species.	Conservative assumptions regarding potential habitat and presence of species have been made. These decisions have been made in close consultation with BCS and local experts. Targeted surveys in September 2024 are considered highly likely to demonstrate several additional species currently assumed to occur will not be impacted.	While avoidance of impacts is not possible, the Project includes: • Further surveys to address key uncertainties • Design measures to minimise impacts of infrastructure placement • Mitigation to address local biodiversity threats, such as pest animals • Ongoing monitoring and adaptive risk management to manage collision risks • Biodiversity offset commitments including Stewardship agreements to enhance and protect local habitats in perpetuity.

[18] These are areas surrounding dams that can also be used as habitat by this species.

Impact	Results of assessment	Approach to uncertainty	Project outcomes
	One Serious and Irreversible Impact candidate species, the _Plains-wanderer Pedionomus torquatus_ is relevant but SAIIs are not anticipated for this species.		
Aboriginal cultural heritage	The field program recorded 206 new sites during the assessment of which 118 can be avoided. Isolated artefacts and artefact scatters were the most numerous sites recorded but many sites contained multiple features. The overall cultural and scientific (archaeological) value of the sites was deemed to be of high significance, most notably burial sites, mounds, hearths, and culturally modified trees. It is assumed that a similar density of artefact and hearth sites remain within the Project area and across the wider region. The overall impact on the archaeological record for the region is likely to be minimal.	While a thorough archaeological survey was conducted, it is likely that other artefacts are present within the Development Corridor. An unexpected finds protocol will be in place during works.	• Avoidance of 118 sites has been achieved by the significant changes made by the Project. • Further avoidance of sites is likely to be achieved by micro-siting the design of the final disturbance area, during the detailed design phase of the Project. • Mitigation will include a Cultural Heritage Management Plan to contain site-specific mitigation measures and a continued role for Registered Aboriginal Parties.

Impact	Results of assessment	Approach to uncertainty	Project outcomes
Landscape and visual	Specific local areas were assessed to have moderate scenic quality: Willows Picnic Area and Campground, Willows Visitor Access Trail, Abercrombie Creek, Billabong Creek Edward River and associated floodplains, Moulamein Lakeside Caravan Park. Wind turbines would dominate the visual catchment from two public viewpoints on the Sturt Highway, adjacent to the Project; VP06 and VP07 (St Pauls Rest Area). The preliminary assessment tool identified 14 non-associated dwellings within 8km of a wind turbine for further assessment; none were closer than 4km. Detailed assessment found R13 and R24 to have a moderate visual impact rating; all others were rated low to negligible.	Key modelling assumptions are stated explicitly so that the limitations of the assessment's conclusions area clear.	The Project commits to providing vegetation screening in consultation with the landholder for two non-associated dwellings, R13 and R24; specific areas where the screening would be effective have been identified. Landholders have been informed. Design measures including infrastructure colouring and lighting controls will assist to minimise visual amenity impacts generally.

Impact	Results of assessment	Approach to uncertainty	Project outcomes
Social and economic	The social impact assessment found the highest potential for adverse impacts to the community would be during construction. It would result from: • Increased traffic during construction and associated construction noise, and dust. • Pressure on the local labour force, local services and local accommodation. • Impacts on cultural heritage items within the disturbance area. The mitigated risk was assessed to be medium in all cases (with the possibility to reduce this to minor/minimal in most cases). High potential for positive impacts was identified through a suite of initiatives and economic stimulus to which the Project commits, such as the Community Consultative Committee, Industry Participation Plan, Stakeholder and Community Engagement Plan and the Community Benefit Sharing Framework, Workforce Management and Accommodation Strategy as well as the Strategic Projects Fund and Communities Fund. These benefits extend through local and regional businesses, local government and the broader community.	The survey sample sizes are small. Notwithstanding, the results have provided important information which has been used to inform a Project more able to be supported by the local community. The mitigation strategies identify higher priority residual risks and require further consultation to inform their detail.	The Project would be proactive in collaborating with local councils and other key regional economic development stakeholders to support local workforce development and maximise local economic benefits. Environmental management mitigation strategies address visual amenity, traffic, noise, and dust separately.

Impact	Results of assessment	Approach to uncertainty	Project outcomes
Traffic and transport	The Project would construct permanent turn treatments at the site access on Sturt Highway prior to the construction program. The site access on Sturt Highway is expected to operate within minimal queues and delays, and the mid-block sections (crossings) within the vicinity of the site are also expected to continue to operate with a good level of service. During construction approximately nine heavy vehicles per hour are estimated to be required and approximately 1,203 Over Size Over Mass (OSOM) vehicles overall would be required. The road network is able to readily accommodate the traffic generated by the Project during the construction, operation, and decommissioning periods. Specific mitigation measures have been included to address road safety risks and ensure that road asset impacts are borne by the Applicant.	Detailed planning commitments are made with respect to the traffic management and haulage route assessment. Key traffic assumptions are stated explicitly so that the limitations of the assessment's conclusions area clear.	Upgrades to local access network across the host sites. Commitments to detailed traffic safety planning as the Project progresses.

Impact	Results of assessment	Approach to uncertainty	Project outcomes
Hydrology	The land is very flat with limited drainage lines, also of low relief (not strongly incised). The Project area is not within areas mapped as Flood Prone Land under any LEPs. A risk based evaluation of potential impacts shows the highest risk activities are the design and construction of waterway crossings and tracks. These risks to the environment can be addressed through standard mitigation measures and environmental safeguards. Decommissioning risks would be similar and less than construction.	No prior flood studies or flood mapping are currently available for the Project area. Project-specific infrastructure flood modelling is proposed in tandem with detailed design, to address data gaps and mitigate flood risks.	Design and rehabilitation measures will adhere to best practice guidelines. A performance-based approach is proposed to ensure local hydrology, and the water quality and habitats that this parameter influences, will be protected. Management plans will include flood and emergency response preparedness protocols.
Noise and vibration	During construction, no non-associated dwellings are predicted to exceed the relevant noise management levels within or outside of standard construction hours, (45dbA and 35-40dbA respectively). Some blasting may be required at the wind turbine foundations and this has been considered separately. Noise from traffic during construction is below the criteria set by the NSW Road Noise Policy at all non-associated dwellings. Vibration impacts are not predicted to be detectable at any non-associated dwellings. During operation, no non-associated dwellings are predicted to exceed the relevant noise management levels (40dbA). The predicted noise at the nearest National Park is also well below the required 50dbA.	Equipment selections are not finalised, however, based on the predicted noise levels, the application of the maximum adjustment of 10 dB(A) for annoying characteristics would still not result in the nose criteria being exceeded at any non associated dwelling.	No noise construction or operational exceedances at any receivers are predicted for the Project. Revised noise modelling following the finalisation of selected equipment is a commitment of the Project.

Impact	Results of assessment	Approach to uncertainty	Project outcomes
Water, soils and land use	The Project area has specific soil and water use limitations and these have been considered and will assist to mitigate impacts on soil resources, water quality and quantity and the agricultural and broader catchment values that these foundations provide. Soil limitations have been verified by soil surveys. The Project's water requirement can be met by local sources. There is high confidence that disturbed areas can be returned to the existing moderate condition grasslands, suitable for grazing and providing broader catchment values in terms of biodiversity and water resources.	Soils and groundwater characteristics have been noted as variable across the large Project area and the surface water resources are highly ephemeral. This assessment has adopted standard mitigations strategies that have high confidence of success. The environmental management system will include monitoring and will be adaptive.	Best practice soil conservation measures are included in the Project's design and will inform rehabilitation practices in all areas disturbed by the Project. Should access to groundwater and surface water be required, the Applicant will apply for a Water Access License. Agriculture land use will be re-established over the operational footprint (unless otherwise agreed with the landowner and/or regulatory authorities) and the operational footprint will be returned to an agricultural productivity potential that is approximately equivalent of pre-Project status, at the end of the Project's life.
Other impacts considered	Historic heritage, hazards and risks including bushfire, air quality and waste were considered by desktop assessment and key risks have been found to be manageable.	Key uncertainties have been identified explicitly for all environmental issues assessed and strategies to address data gaps or assumptions are included within the identified mitigation measures for each issue, where required.	Management strategies centre on specific environmental management plans and site protocols, coordinating with local and government stakeholders where relevant and backed up by site monitoring and reporting requirements.

Impact	Results of assessment	Approach to uncertainty	Project outcomes
Cumulative	There are four nearby projects within 20km which may contribute to cumulative impacts. Relevant cumulative impacts include biodiversity, visual amenity, construction noise and traffic. Cumulative impacts during construction may occur if the proposed Wilan, Keri Keri or Tchelery wind farm construction activities are undertaken concurrently. Key adverse cumulative impacts in this case could include social (labour and skills shortages, pressure on social infrastructure, services and housing and accommodation), traffic, visual and biodiversity impacts. These can be addressed by the Baldon Wind Farm Project's mitigation strategies in each of these areas.	The Baldon Wind Farm Project would be located within the South West Renewable Energy Zone and as such cumulative impacts may result from the interaction of projects. These have been considered in terms of environmental effects as well as social impacts and the potential benefits as well as potential to exacerbate adverse impacts.	Opportunities to coordinate and maximise the benefits of the Project have also been identified and include the identification of strategic biodiversity offsets and positive economic impacts such as increased employment, additional procurement, and training opportunities, increased local and regional economic development and opportunities, increased generation of renewable energy and increased community investment.

8.6. Compliance and monitoring

The recommendations of the assessments outlined above have been captured in a consolidated set of mitigation commitments (Appendix C) and together with the Project description in Section 3, constitute the Project's commitment to developing a best practice wind farm.

Pending approval, environmental protection and management measures would be implemented via an environmental management framework, including construction, operational and decommissioning Environmental Management Plans. These plans would be prepared sequentially, prior to each stage of works.

Key plans identified in this EIS, and which would be prepared in consultation with relevant stakeholders, include:

Table 8-2 Specific management plans required for the Baldon Wind Farm Project

Management plan	Project phase
Biodiversity Management Plan	Construction and operation
Bird and Bat Adaptive Management Plan	Operation
Cultural Heritage Management Plan	During construction - ongoing
Rehabilitation and Decommissioning Management Plan	Decommissioning
Soil and Water Management Plan	Construction
Noise Management Plan	Construction
Community and Stakeholder Engagement Strategy update	Prior to construction
Industry Participation Plan	Prior to construction
Community Consultative Committee and Community Benefit Sharing Program.	Prior to construction
Workforce Management and Accommodation Strategy	Prior to construction
Traffic Management Plan	Construction
Bushfire Emergency Management and Operations Plan	All phases
Fire Management Plan	All phases
Emergency Response Plan	All phases
Fire Safety Plan.	All phases
Waste Management Plan	All phases

The management plans would each include performance indicators, timeframes, implementation and reporting responsibilities, communications protocols, a monitoring program, auditing and review arrangements, emergency responses, induction and training and complaint/dispute resolution procedures.

Adaptive management would be used to ensure that improvements are made in response to the outcomes being reported. The plans would incorporate all of the specific protocols and mitigation measures contained in this EIS and any additional applicable requirements from the DPHI's Conditions of Consent. They would be submitted to DPHI for endorsement prior to commencement of works.

In addition to the Project specific management plans, in line with other State Significant Development consents, it is expected that the DPHI would condition the following in relation to this Project:

- Detailed plans of the final layout, showing comparison to the approved layout, prior to commencing construction.
- Incident and non-compliance notification requirements.
- Independent environmental audits.

8.7. Ecologically sustainable development

Ecologically Sustainable Development (ESD) involves the effective integration of social, economic and environmental considerations in decision-making processes. In NSW, the concept has been incorporated into legislation including the EP&A Act, the EP&A Regulation and the *Protection of the Environment Administration Act 1991* (NSW).

The Project has considered and addressed the principles of Ecologically Sustainable Development (ESD), which involves the effective integration of social, economic and environmental considerations in decision-making processes. With reference to the Baldon Wind Farm Project:

- The precautionary principle has been adopted in the assessment of impact; all potential impacts have been considered and mitigated commensurate with risk. Where uncertainty exists, measures have been included to address the uncertainty. For example, a 'worst case' and 'upper limit' impact assessment has been undertaken to account for the uncertainty in the final impact footprint. Commitments to address data gaps are includes where required.
- Potential impacts have been assessed as likely to be localised and reversable and would not diminish the options regarding land and resource uses and nature conservation available to future generations. Importantly, the Project provides additional renewable energy that contributes to minimising the risk of climate change to current and future generations by reducing the carbon emissions produced in comparison to alternative fossil fuel electricity generation options. Opportunities to improve the soil health and address broader biodiversity threats have been identified.
- Impacts have been avoided where possible and specific mitigation strategies have been developed to ensure the site's values are projected for future generations. These primarily include important Aboriginal cultural heritage sites which will be managed in consultation with registered Aboriginal parties.
- The value of the environment is made clear in the Project's protection of cultural and natural values and their broader contribution to the catchment and catchment processes, such as maintaining local hydrology and surface water quality. The long-term impacts have been considered and the Project commitments ensure that natural resource use and pollution risks have been fully assessed and costs would be solely borne by the Applicant.

8.8. Ability to be approved

The Baldon Wind Farm Project would result in numerous benefits, local and regional. The Project addresses local, state and Commonwealth policies aimed to facilitate the required transition to renewable energy generation.

The Project meets relevant planning requirements and is consistent with the principles of Environmentally Sustainable Development (ESD), which have been incorporated in the design, and will be incorporated into construction, ongoing operations and decommissioning of the development.

The environmental values at this site are well understood. However, to address inevitable areas of uncertainty, conservative approaches have been adopted, including risk-based adaptive management mechanisms. The result is a Project that:

- Provides important contribution to the state's transition toward a sustainable energy future
- Responds well to its natural and cultural context, avoiding where possible, but including detailed design and management prescriptions to minimise impacts, particularly on biodiversity values, where avoidance is not possible.
- Includes a specific social impact management framework to mitigate negative social impacts and increase the likelihood of beneficial community outcomes
- Includes appropriate contributions to the local economy, through stimulus, Council contributions and benefit sharing initiatives.

It is considered justifiable and approvable.

Where to from here

During the public exhibition of this EIS, the community, local council and government agencies are invited to make informed submissions in relation to the Project. The consent authority would consider any formal submissions made during the exhibition period. The Applicant's response to all matters raised in submissions will also be exhibited as Department of Planning, Housing and Infrastructure (DPHI) commence preparation of their own assessment of the Project's impacts and its merits and make a recommendation regarding its ability to be approved.

Please take the opportunity to make a submission directly to the DPHI and to participate in the future engagement activities planned prior to the Project's determination.

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Appendix A Schedule of lands

Lots	DP	Landowner
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15	114086	Landowner 1
12, 14	114102	Landowner 1
1	115951	Landowner 1
2, 3	134029	Landowner 1
121, 122, 123, 124	134030	Landowner 1
130, 131, 132, 133, 134, 135, 136, 137, 138	134031	Landowner 1
125, 126	134032	Landowner 1
1	182223	Landowner 1
1, 3, 4	235869	Landowner 1
1, 2, 3	235870	Landowner 1
1, 2	527290	Landowner 1
1, 2	527291	Landowner 1
1, 2	527292	Landowner 1
1	664937	Landowner 1
1	665905	Landowner 1
1	665906	Landowner 1
1	665907	Landowner 1
2, 5, 10, 11, 12, 13, 14, 15, 16, 17, 18, 50, 51, 52, 53, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87	751175	Landowner 1
1, 2, 3, 4, 5, 6, 9, 10, 12, 13, 14, 18, 19	751190	Landowner 1
4, 5, 6, 7	751225	Landowner 1
13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 48, 49, 50, 51, 52, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109	756506	Landowner 1
44, 45, 46, 47, 72, 73, 74	756549	Landowner 1
19, 20, 21, 22, 23, 24	756555	Landowner 1
19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 38, 39,	756573	Landowner 1

Lots	DP	Landowner
40, 41, 42, 43, 48, 49,		
27, 28, 29	756595	Landowner 1
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 25, 26, 27, 28, 29, 30, 30, 31, 32, 33, 34, 35	756596	Landowner 1
1, 2, 12, 18, 19, 20, 22, 23, 24, 25, 26, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 65, 66, 68, 69, 70, 71, 72, 73, 88, 89, 90	756601	Landowner 1
23,30	756595	Landowner 2
36, 57, 58 ,59	756555	Landowner 2
1	1271318	Landowner 2

Appendix B SEARs table

The following cross reference table is provided to demonstrate the EIS has addressed the Project-specific Secretary's Environmental Assessment Requirements (SEARs) issued for the Project.

Issue summary	Addressed in this EIS
The environmental impact statement (EIS) must meet the minimum form and content requirements as prescribed by Part 8, Division 5 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) and must have regard to the State Significant Development Guidelines. In particular, the EIS must include:	
● A stand-alone executive summary.	Provided page ix
● A full description of the development, including: o details of construction, operation and decommissioning, including any proposed staging of the development or refurbishing of turbines over time; o all infrastructure and facilities, such as substations, transmission lines, battery energy storage system, construction compounds, concrete batching plants, internal access roads, and road upgrades (including any infrastructure that would be required for the development, but the subject of a separate approvals process); o plans for any buildings; o high-quality site plans and maps at an adequate scale with dimensions showing: ▪ the location and dimensions of all project components including coordinates in latitude / longitude and maximum AHD heights of the turbines; ▪ existing infrastructure, land use, and environmental features in the vicinity of the development, including nearby residences and approved residential developments or subdivisions within 5km of a proposed turbine, and any other existing, approved or proposed wind farms in the region; ▪ the Development corridor that has been assessed, including any allowance for micro-siting of turbines and identification of the key environmental constraints that have been considered in the design of the development; ▪ consolidated list and GIS data of coordinates of wind turbines, project infrastructure and relevant receivers and distances to potentially impacted	Descriptions and indicative designs provided in Section 4. Maps show required features. Coordinates of turbine layout provided as Appendix G.

Issue summary	Addressed in this EIS
receivers; and ▪ details of the progressive rehabilitation of the site;	
• a list of any approvals that must be obtained before the development may commence; • the terms of any proposed voluntary planning agreement with the relevant local council;	VPA consultation to date summarised for each relevant Council in Table 5-5 Agency consultation summary
• an assessment of the likely impacts of the development on the environment, focusing on the specific issues identified below, including: o a description of the existing environment likely to be affected by the development using sufficient baseline data; o an assessment of the likely impacts of all stages of the development (which is commensurate with the level of impact), including any cumulative impacts of the site and existing or proposed developments in the region, in accordance with the Cumulative Impact Assessment Guideline (DPIE, 2021), taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice and including the NSW Wind Energy Guidelines for State Significant Wind Energy Development (2016); o a description of the measures that would be implemented to avoid, mitigate and/or offset the impacts of the development, including details of consultation with any affected non-associated landowners in relation to the development of mitigation measures and any negotiated agreements with these landowners), and draft management plans for specific issues as identified below; and	Sections 6 and 7.
o a description of the measures that would be implemented to monitor and report on the environmental performance of the development, including adaptive management strategies and contingency measures to address residual impact;	Framework environmental management system provided in Section 8.6.
• a consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS; and	Provided at the end of each impact chapter in Section 6&7 as well as a consolidated summary in Appendix C.
• a detailed evaluation of the merits of the project as a whole having regard to:	Section 8 and 8.7, specific to ESD.

Issue summary	Addressed in this EIS
o the requirements in Section 4.15 of the Environmental Planning and Assessment Act 1979 (EP&A Act), and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development;	
o the environmental, economic and social costs and benefits of the development, having regard to the predicted electricity demand in NSW and the National Electricity Market, NSW's Climate Change Policy Framework, NSW's Net Zero Plan Stage 1: 2020 - 2030 and the greenhouse gas savings of the development;	Section 2, Strategic context.
o feasible alternatives to the development (and its key components), including the consequences of not carrying out the development; and	Section 2.5
o the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses, including rural villages, rural dwellings, subdivisions, land of high scenic value, conservation areas (including National Parks, State Parks and Reserves), state forests, mineral and coal resources, triangulation stations, tourism facilities, existing or proposed wind farms, and the capacity of the existing electricity transmission network to accommodate the development;	Section 6.9 for Land use compatibility and Section 2, for Strategic context.
• a detailed consideration of the capability of the project to the security and reliability of the electricity system in the National Electricity Market (NEM), having regard to local system conditions and the Department's guidance on the matter; and	The Project's context within the NEM and contribution to energy security and reliability is set out in Section 2.1. The contribution provided by the Project is summarised in Section 2.7.
• a signed statement from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.	The Registered Environmental Assessment Practitioner (REAP) declaration is provided on page iv. The team of contributing authors is provided on the document verification page, overleaf from the cover page.

Issue summary	Addressed in this EIS
The EIS must also be accompanied by a report from a suitably qualified person providing: • a detailed calculation of the capital investment value (CIV) (as defined in the Dictionary of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived; • an estimate of jobs that will be created during the construction and operational phases of the proposed infrastructure; and • certification that the information provided is accurate at the date of preparation. • The development application must be accompanied by the consent of the owner/s of the land (as required in Section 23(1) of the Regulation).	EDC report supplied directly to DPHI. Landowner consents have been provided directly to DPHI.
Key Issues	
Landscape and Visual	
• including a detailed assessment of the visual impacts of all components of the project (including turbines, transmission lines, substations, battery energy storage system, and any other ancillary infrastructure in accordance with the NSW Wind Energy: Visual Assessment Bulletin (DPE, 2016), including detailed consideration of potential visual impacts on local residences (including approved developments, lodged development applications and dwelling entitlements), scenic or significant vistas and road corridors in the public domain.	Summarised in Section 6.3. Appended in full, Appendix F.3.
Noise and Vibration	
• an assessment of the wind turbine noise in accordance with the NSW Wind Energy: Noise Assessment Bulletin (EPA/DPE, 2016); • an assessment of the noise generated by ancillary infrastructure in accordance with the NSW Noise Policy for Industry (EPA, 2017); • assessment of the construction noise under the Interim Construction Noise Guideline (DECC, 2009) and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria); • assessment of the traffic noise under the NSW Road Noise Policy (DECCW, 2011); • an assessment of vibration under the Assessing Vibration: A Technical Guideline (DECC, 2006); and • assessment of the cumulative noise impacts (considering other developments in the area).	Summarised in Section 6.7. Appended in full, Appendix F.7. As no noise exceedances apply under the conservative assumption of low rural background noise, no cumulative noise impacts are considered relevant.

Issue summary	Addressed in this EIS
Biodiversity	
• an assessment of the biodiversity values and the likely biodiversity impacts of the project, including impacts associated with transport route road upgrades and indirect impacts on Yanga State Conservation Area and Gayini wetlands in accordance the Biodiversity Conservation Act 2016 (NSW), the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR), including a detailed description of the proposed regime for avoiding, minimising, managing and reporting on the biodiversity impacts (including on grasslands) of the development over time, and a strategy to offset any residual impacts of the development in accordance with the BC Act; • an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the Fisheries Management Act 1994, and a description of the measures to minimise and rehabilitate impacts, including impacts to Abercrombie Creek and the Aquatic Endangered Ecological Community of the Murray River; • an assessment of the impacts of the development on birds and bats, including blade strike, low air pressure zones at the blade tips (barotrauma), alteration to movement patterns, and cumulative impacts of other wind farms in the vicinity; and • if an offset is required, include details of the measures proposed to address the offset obligation.	Summarised in Section 6.3. Appended in full, Appendix F.3.
Heritage	
• an assessment of the impact to Aboriginal cultural heritage items (archaeological and cultural) in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), including results of archaeological test excavations (if required); • provide evidence of consultation with Aboriginal communities in determining and assessing impacts, developing options and selecting options and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010); and • an assessment of the impacts to historic heritage having regard to the NSW Heritage Manual.	Aboriginal cultural heritage summarised in Section 6.2. Appended in full, Appendix F.2. This includes details of consultation. Historic heritage in Section 7.1.

Issue summary	Addressed in this EIS
Transport	
• an assessment of the construction, operational and decommissioning traffic impacts of the development on the local and State road network; • provide details of the peak and average traffic volumes (including light, heavy and over-mass / over-dimensional vehicles) and transport and haulage routes during construction, operation and decommissioning, including traffic associated with sourcing raw materials (water, sand and gravel); • an assessment of the potential traffic impacts of the project on road network function including intersection performance, site access arrangements, site access and haulage routes, and road safety, including school bus routes and school zones; • an assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-mass / over-dimensional traffic haulage routes from port) during construction, operation and decommissioning; • an assessment of the likely transport impacts to the site access and haulage routes, site access point, any rail safety issues, any Crown Land (including existing Travelling Stock Route network) particularly in relation to the capacity and conditions of the roads and use of rail level crossings (and rail safety assessment if required), and impacts to rail underbridges and overbridges; • a cumulative impact assessment of traffic from nearby developments; and • provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road and / or rail authority.	Transport impacts summarised in Section 6.5. Appended in full, Appendix F.5.
Water and Soils	
• quantify water demand, identify water sources (surface and groundwater), including any licensing requirements, and determine whether an adequate and secure water supply is available for the development; • an assessment of the likely impacts of the development (including flooding) on surface water and groundwater resources traversing the site and surrounding watercourses (including their Strahler Stream Order), drainage channels, wetlands, riparian land, farm	Water supply requirements are addressed in Section 6.8. Surface and ground water risks use and protection; Section 6.8. Hydrology in Section 6.6 noting flooding has been

Issue summary	Addressed in this EIS
dams, groundwater dependent ecosystems and acid sulfate soils, related infrastructure, adjacent licensed water users and basic landholder rights, and measures proposed to monitor, reduce and mitigate these impacts; ● where the project involves works within 40 metres of the high bank of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the DPI Guidelines for Controlled Activities on Waterfront Land (2018) and (if necessary) Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (DPI 2003); and Policy & Guidelines for Fish Habitat Conservation & Management (DPI, 2013); ● a description of the measures to minimise surface and groundwater impacts, including how works on erodible soil types would be managed and any contingency requirements to address residual impacts in accordance with the Managing Urban Stormwater: Soils and Construction series of guidelines; ● an assessment of risks of dust generation and propose mitigation measures designed in accordance with the Approved Methods and Guidelines for the Modelling and Assessment of Air Pollutants in New South Wales (DECC, 2005).	considered in this EIS in the context of the risk posed (to the environment and project) and existing information. Infrastructure flood modelling is proposed in tandem with detailed design, to mitigate flood risks. Dust generation is considered in Section 7.4 and is supported by a technical appendix, G.1.
Land	
● a detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints; ● an assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: o consideration of agricultural land, travelling stock routes, flood prone land, Crown lands, mining, quarries, mineral or petroleum rights; o a soil survey to determine the soil characteristics and consider the o potential for erosion to occur; and o a cumulative impact assessment of nearby developments; ● an assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including: o consideration of the zoning provisions applying to the land, including subdivision (if required); o completion of a Land Use Conflict Risk Assessment in	Section 6.9 for Land use compatibility and LUCRA. Section 6.8 for soil and water resources. No flood prone land has been identified in the Project area. Infrastructure flood modelling is proposed in tandem with detailed design, to mitigate flood risks, refer to Section 6.6. Cumulative impacts, refer Section 7.5.

Issue summary	Addressed in this EIS
accordance with the Department of Industry's Land Use Conflict Risk Assessment Guide; and o assessment of impact on agricultural resources and agricultural production on the site and region.	
Hazard and Risks	
Aviation safety: ● assess the impact of the development under the National Airports Safeguarding Framework Guideline D: Managing Wind Turbine Risk to Aircraft; ● provide associated height and co-ordinates for each turbine assessed; ● assess potential impacts on aviation safety, including cumulative effects of wind farms in the vicinity, potential wake / turbulence issues, the need for aviation hazard lighting and marking, including of wind monitoring masts, considering, defined air traffic routes, aircraft operating heights, approach / departure procedures, radar interference, communication systems, navigation aids, and use of emergency helicopter access; ● identify aerodromes within 30km of the turbines and consider the impact to nearby aerodromes and aircraft landing areas; ● address impacts on obstacle limitation surfaces; and ● assess the impact of the turbines on the safe and efficient aerial application of agricultural fertilisers and pesticides in the vicinity of the turbines and transmission line; **Telecommunications:** ● identify possible effects on telecommunications systems, assess impacts and mitigation measures including undertaking a detailed assessment to examine the potential impacts as well as analysis and agreement on the implementation of suitable options to avoid potential disruptions to radio communication services, which may include the installation and maintenance of alternative sites; **Health** ● consider and document any health issues having regard to the latest advice of the National Health and Medical Research Council, and identify potential hazards and risks associated with electric and magnetic fields (EMF) and demonstrate the application of the principles of prudent avoidance, including an assessment against the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields; **Bushfire**	Section 7.2

Issue summary	Addressed in this EIS
• identify potential hazards and risks associated with bushfires / use of bushfire prone land, potential impacts on Yanga State Conservation Area including the risks that a wind farm would cause bush fire and any potential impacts on the aerial fighting of bushfires and demonstrate compliance with Planning for Bush Fire Protection 2019; and **Battery Storage:** • a preliminary risk screening completed in accordance with the State Environmental Planning Policy (Resilience and Hazards) 2021; • a Preliminary Hazard Analysis (PHA), prepared in accordance with the Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' and Multi-level Risk Assessment (DoP, 2011). The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation and compliance with Hazardous Industry Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning (DoP, 2011); **Blade Throw** • assess blade throw risks.	
Social Impact	
• including an assessment of the social impacts in accordance with the Social Impact Assessment Guideline (DPIE, 2021) and consideration of construction workforce accommodation.	Section 6.4 and Appendix F.4.
Economic	
• including any benefits of the economic impacts or benefits of the project for the region and the State as a whole, including consideration of any increase in demand for community infrastructure services, and details of how the construction workforce will be managed to minimise local impacts, including a consideration of the construction workforce accommodation.	Section 6.4 and Appendix F.4.
Waste	
• identify, quantify and classify the likely waste streams to be generated throughout all stages of the project, and describe the measures to be implemented to reduce waste generation, manage, reuse, recycle and safely dispose of this waste.	Section 7.3 supported by a technical appendix, G.2.
Plans and Documents	
• The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Part 3 of the	Section 3.

Issue summary	Addressed in this EIS
Regulation. Provide these as part of the EIS rather than as separate documents. In addition, the EIS must include high quality files of maps and figures of the subject site, proposal, and proposed road upgrades.	
Legislation, Policies and Guidelines	
The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, a list of some of the legislation, policies and guidelines that may be relevant to the assessment of the project can be found at: • https://www.planning.nsw.gov.au/Policy-and-Legislation/Planning-reforms/Rapid-Assessment-Framework/Improving-assessment-guidance • https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines ; and http://www.environment.gov.au/epbc/publications#assessments	Applicable guidelines for each environmental parameter are stated in Sections 6 & 7.
Engagement	
During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. The EIS must: • detail how engagement undertaken was consistent with the Undertaking Engagement Guide: Guidance for State Significant Projects (DPIE, 2021); and • describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided. In particular you must consult with: • the relevant local, State or Commonwealth Government authorities, service providers, community groups, affected landowners, exploration licence holders, quarry operators and mineral title holders; and • carry out detailed consultation with the following: o Murray River Council o Hay Shire Council o Edward River Council o NSW Aboriginal Land Council	Section 5.

Issue summary	Addressed in this EIS
o DPE's Biodiversity, Conservation and Science Directorate o NSW National Parks and Wildlife Service o Heritage NSW o Murray Local Land Services o DPE Water Group o WaterNSW o Environment Protection Authority o Crown Lands o Regional NSW – Mining, Exploration & Geoscience o Department of Primary Industries – Agriculture and Fisheries divisions o Transport for New South Wales o Transgrid o Department of Finance, Services and Innovation – Telco Authority o Fire & Rescue NSW o NSW Rural Fire Service o Commonwealth Department of Defence o Civil Aviation Safety Authority o Airservices Australia	
Expiry Date	
• If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, your SEARs will expire. If an extension to these SEARs will be required, please consult with the Planning Secretary 3 months prior to the expiry date.	An extension was granted on 3 July 2024.

Appendix C Consolidated mitigation measures

ID	Safeguards and mitigation measures	Project stage
Biodiversity		
B1	Detailed design will: • Ensure turbine locations will be microsited around Little Eagle (*Hieraaetus morphnoides*) nests to provide a minimum 100m buffer from turbines. • Consider dismantling nests to avoid long term collision risks where these occur within 100m of a wind turbine. • Ensure no dams will be removed to minimise impacts to Southern Bell Frog (*Litoria raniformis*)	Design / pre-construction
B2	An adaptive Biodiversity Management Plan (BMP) will be developed with input from BCD and DCCEEW prior to commencement of the action. Measures will include: Fauna management, including: • Staged clearing procedures for hollow bearing trees • Relocation of habitat features • Vehicle and parking protocols • Southern Bell Frog mitigation • Preclearing surveys and protocols for Plains-wanderer breeding sites, Bindweed (Convolvulus tedmoorei) and Austral Pillwort (Pilularia novae-hollandiae) Vegetation management, including: • Rehabilitation protocols with consideration to native revegetation requirements • Weed, pest animal and pathogen management • Staff training requirements with respect to understanding the sites sensitive environmental features	Pre-construction / construction

ID	Safeguards and mitigation measures	Project stage
B3	A Bird and Bat Adaptive Management Plan (BBAMP) will be developed in consultation with BCD. This will consider the full data set of the Project's bird and bat utilisation surveys as well as include a more comprehensive assessment of cumulative impacts, informed by quantitative information where available for relevant surrounding projects. Collision risk modelling may be appropriate where sufficient data is available, with triggers to ensure that mitigation is appropriate to the modelled risk.	Pre-construction
B4	The Project's offset obligation will be met in accordance with the NSW Biodiversity Offsets Scheme (BOS), and may include the following options: • Retiring credits under the Biodiversity Offsets Scheme based on the like-for-like rules, or • Making payments into the Biodiversity Conservation Fund using the offset payments calculator, or • Funding a biodiversity action that benefits the threaten entities impacted by the development.	Prior to construction
Aboriginal heritage		
AH1	All sites identified in the Project area must be managed in accordance with the site specific mitigation and management recommendations provided in the site table in Appendix D of the ACHA report.	During construction - ongoing
AH2	Cultural Heritage Management Plan (CHMP) will be prepared to address the potential for finding additional Aboriginal stone artefacts and objects during the construction of the Project and for the management of known sites within the Development corridor in accordance with the ACHA. The CHMP should include at a minimum the following items: • An unexpected finds procedure to manage any objects suspected to be Aboriginal in origin during the construction, maintenance, operation and decommissioning. The unexpected finds procedure must also include a procedure to manage suspected human remains. • Include requirements for heritage matters and an Aboriginal Cultural Awareness element to be included as part of the site inductions for all employees, contractors and utility staff working on site.	Prior to construction

ID	Safeguards and mitigation measures	Project stage
	• Include requirements for management of sites during construction including demarcation and signage, monitoring of initial ground disturbing activity in higher sensitivity areas and any ongoing auditing of site condition if necessary. • Include a methodology for surface collection, storage and relocation of collected material. Preparation of the CHMP should be undertaken in consultation with the registered Aboriginal parties.	
AH3	Specific micrositing recommendations and further assessment stipulated in the ACHA must be implemented during detailed design, not limited to: • Buffer zones to protect BWF – 24 and BWF – 195. • The gypsum extraction works area (a lower sensitivity area has been defined). • Installation of overhead cabling (specific locations have been identified in the ACHA).	Prior to construction
AH4	All works for the Baldon Wind Farm Project must stay within the area assessed in the ACHA or further assessment and consideration of impacts will be required. This may include additional Aboriginal consultation and survey and/or subsurface testing.	Prior to construction
Landscape and visual		
V1	The turbines will have a matte white finish and consist of three blades which is consistent with the current turbine models being considered.	Construction Operation
V2	Site specific planting for the purposes of visual screening is offered to landholders of receivers R13 and R24 (if the dwelling is planned to be occupied in the future). The following principles will be adhered to when implementing vegetation screening: • Planting is recommended post construction in consultation with the landowner. • Planting should remain in keeping with existing landscape character. • Species selection is to be typical of the area. • Planting layout should avoid screening views of the broader landscape.	Operation

ID	Safeguards and mitigation measures	Project stage
	• Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation.	
V3	The following night lighting design principles will be implemented: 1. Control the level of lighting: • Only use lighting for areas that require lighting i.e. paths, building entry points • Switch off lighting when not required • Consider the use of sensors to activate lighting and timers to switch off lighting 2. Lighting Design: • Use the lowest intensity required for the job • Use energy efficient bulbs and warm colours • Direct light downwards • Ensure lights are not directed at reflective surfaces • Use non-reflective dark coloured surfaces to reduce reflection of lighting • Keep lights close to the ground and / or directed downwards • Use light shield fittings to avoid light spill	Operation
V4	Access roads will be designed and constructed to reduced residual visual impacts by applying the following mitigations: • Where possible utilise or upgrade existing roads, trails or tracks to provide access to the proposed turbines to reduce the need for new roads • Allow for the provision for down sizing roads or restoring roads to existing condition following construction where possible • Any new roads must minimise cut and fill and avoid the loss of vegetation.	Construction
Social impacts		
SE1	The Community and Stakeholder Engagement Strategy will be adaptive and updated as needed to respond to emerging community and stakeholder concerns. It will be updated in accordance with the recommendations of the Social Impact Assessment and the EIS	Prior to

ID	Safeguards and mitigation measures	Project stage
	community and stakeholder engagement program. The CSES will: • Facilitate open, transparent, timely and accessible communication of Project information with the aim of minimising uncertainty and to addressing concerns. • Address concerns about potential environmental, amenity and safety impacts (e.g., traffic, noise, visual). • Continue regular engagement with Councils. • Develop accessible, adequate and responsive grievance and remedy mechanisms in the event of complaints. • Provide ongoing opportunities for the local community (particularly the Moulamein community) to be involved in decision-making processes relating to the Project, the Community Consultative Committee, and the Community Benefit Sharing Program. • Ensure representation of Traditional Owners and other key local Aboriginal stakeholders. • Communicate workforce accommodation plans • Engage with accommodation providers to avoid negatively impacting on tourism opportunities and vulnerable populations who are utilising temporary accommodation. • Communicate transport routes and local traffic management plans. • Collaborate with local councils and other key regional economic or social development stakeholders to support regional economic and social development initiatives. • Work with economic development stakeholders to showcase the Project and the industry within the region. Tell the positive story of the Project's success. • Ensure adequate linkage between environmental management plans stemming from the EIS and community concerns relating to these matters. • Engage with medical and emergency services about the scale, timing and workforce arrangements for the Project's construction phase.	construction
SE2	Establish a Community Consultative Committee (CCC) in accordance with NSW Department of Planning, Housing and Infrastructure guidelines for State significant projects, with the intention to: • Establish good working relationships and encourage the proponent, committee members and other relevant stakeholders to	Pre construction and construction

ID	Safeguards and mitigation measures	Project stage
	share information • Allow the proponent to seek feedback from community representatives, stakeholder groups and councils or respond to project-related matters • Give community representatives, stakeholder groups and councils a forum to ask for information or give feedback on a project. • Provide ongoing opportunities for the local community (particularly the Moulamein community) to be involved in the CCC. Ensure representation of Traditional Owners and other key local Aboriginal stakeholders.	
SE3	Develop an Industry and Aboriginal Participation Plan (IAPP) to achieve positive local employment and business outcomes for the Project. The IAPP will include the following components: • Local Jobs and Training Program • Local Procurement Policy and Local Business Participation Program • Aboriginal Participation Plan • Workforce Management and Accommodation Plan • See the SIA for more detail regarding specific measures that should be included within these plans.	Pre construction and construction
SE4	Development of a Community Benefits Sharing Program (CBSP) which would aim to provide meaningful contributions to social and economic outcomes within the local and regional areas. Goldwind intends to invest $1,100 per MW / annum over the life of the Project (indexed to CPI) commencing from the time the Project becomes operational. The CBSP would consider benefits at both the local and regional scales. The program will include funding through two key streams: Voluntary Planning Agreements: • Funding contributions to projects that meet strategic community need. • Managed as two distinct agreements/funds by a) Murray River Shire Council and b) Hay Shire Council.	Pre construction, construction and operation

ID	Safeguards and mitigation measures	Project stage
	Communities Fund: • Strategic community partnerships and/or projects • Community sponsorships • Education and employment initiatives (including Scholarship Program) • First Nations Initiatives, e.g., funding for local initiatives for community and/or employment purposes, education opportunities, support for cultural awareness in the local school network, cultural heritage protection support, support for activities relating to protection and understanding of cultural assets and values, especially those potentially relating to raising community understanding of Aboriginal cultural heritage values found at the site The communities Fund would be managed by Baldon Wind Farm in partnership with the community and key stakeholders. The First Nations component would be managed by an independent committee (yet to be determined) in partnership with the local Aboriginal community. The CBSP will also include consideration of a pre-construction sponsorship fund as well as the potential for in-kind contributions. Recommendations for community investment received during the Social Impact Assessment and the EIS community and stakeholder engagement program will be considered. See the full SIA at Appendix E4 for more detail.	
SE5	The developer would cooperate with other developers and wind farm operators in the region as necessary to address any cumulative social impacts (and potential cumulative benefits) that emerge, including participating in public forums organised by community groups, local Councils or government agencies, where relevant.	Construction and Operation
Traffic and transport		
T1	A Construction Traffic Management Plan (CTMP) will be prepared and implemented. The TMP should be prepared in consultation with TfNSW and relevant councils and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017.	Pre construction, construction and operation

ID	Safeguards and mitigation measures	Project stage
	The TMP would provide additional information regarding the traffic volumes, distribution and vehicle types broken down into: Hours and days of construction. Schedule for phasing/staging of the Project. The origin, destination and routes for: Employee and contractor light vehicles. Heavy vehicles. OSOM vehicles The TMP will include but not be limited to the following key safety initiatives: Designated transport routes, access and delivery schedules, Emergency access, Driver Code of Conduct, Implementation of the shuttle bus program, OSOM vehicle haulage and operating protocols, Heavy vehicle scheduling to avoid peak school bus times to limit the interaction of larger vehicles and vulnerable road users Key information relating to road safety to be provided to all staff, Consultation with neighbours and local authorities regarding heavy vehicle and OSOM deliveries, Regular dilapidation reports to be provided to ensure the road network is kept in a safe condition, Suitable signage on Sturt Highway and surrounding roads to advise road users of changed conditions, and On-site requirements including: – Parking – Loading, unloading and storage – Speed restrictions – Appropriate dust suppression measures – Maintenance program for access tracks to ensure safe access	

ID	Safeguards and mitigation measures	Project stage
T2	Provide turn treatments at the site access on Sturt Highway to accommodate construction traffic.	Prior to construction
T3	Implement road upgrades (and obtain relevant approvals) where required to facilitate OSOM transport vehicles successfully accessing the site from the Ports of Adelaide or Newcastle.	Pre/during construction (prior to movements)
T4	Three identified secondary access points would only be used in the event of emergency. The southern secondary access point on Baldon Road may be used by up to 10 light vehicles per day travelling to/from Moulamein. All other vehicles associated with the Project construction and/or decommissioning will enter and exit the Project area via the designated primary site access location off the Sturt Highway.	Construction
T5	Shuttle buses would be used to transport workers to and from the Project area from the existing accommodation camp in the nearby town of Balranald (if used).	Construction
T6	Where possible the movement of OSOM vehicles is timed to not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network.	Construction
Hydrology		
H1	A Spill and Contamination Response Plan would be developed as part of the overall Emergency Response Plan to prevent contaminants affecting adjacent surrounding environments. The plan would include measures to: • Manage the storage of any potential contaminants onsite. • Mitigate the effects of soil contamination by fuels or other chemicals (including emergency response and the EPA notification procedures and remediation.	All stages

ID	Safeguards and mitigation measures	Project stage
	• Respond to the discovery of existing contaminants at the site (e.g., pesticide containers or asbestos), including stop work protocols and remediation and disposal requirements. • Requirement to notify the EPA for incidents that cause material harm to the environment (refer s147-153 of the POEO Act). • Ensure that machinery arrives on site in a clean, washed condition, free of fluid leaks. • Prevent contaminants affecting adjacent pastures, dams, water courses and native vegetation. • Monitor and maintain spill equipment. • Induct and train all site staff.	
H1	The surface treatment of roads should be designed giving regard to the velocity of floodwaters to minimise potential for scouring during flood events.	Pre-construction
H2	A detailed Hydrological and Hydraulic Assessment Report will be completed prior to construction in consultation with Council, BCD and DPHI, to verify that local hydrology would be maintained and that hydraulic impacts would be minimal. This work will inform the final civil design and works methods. Key considerations include: • Access roads would be constructed as close to natural ground levels as possible so as not to form an obstruction to floodwaters or change local hydrology. • Waterway vehicle crossings preferably bed level crossings, constructed flush with the bed of the watercourse on first and second order watercourses to minimise hydraulic impacts. • Buildings and structures (including wind turbines) located outside high flood hazard areas (H5 and above) where they may be vulnerable to structural damage and have significant impact on flood behaviour	Pre-construction
H3	To protect assets, the design of buildings, equipment foundations and footings for electrical componentry and wind turbine footings would be designed to take into account the 1% AEP flood level to minimise impacts from potential flooding including: • The turbines would be designed to withstand the forces of floodwater (including any potential debris loading) up to the 1% AEP flood event plus 500mm freeboard, giving regard to the depth and velocity of floodwaters.	Pre-construction

ID	Safeguards and mitigation measures	Project stage
	• All electrical infrastructure, including inverters and batteries, would be located above the 1% AEP flood level plus 500mm freeboard. • Where electrical cabling is required to be constructed below the 1% AEP flood level it would be capable of continuous submergence in water. • Fencing would be constructed in a manner which does not adversely affect the flow of floodwater. • The finished floor level of all buildings should be a minimum of 500mm above the 1% AEP flood level.	
H4	A Floodsafe Plan be prepared for the development to ensure the safety of employees during flood events in general accordance with the NSW SES "Business Floodsafe Toolkit and Plan".	Construction Operation
H5	Flood warning signs and flood level indicators placed on each approach to any watercourse crossings subject to inundation.	Pre-construction
H6	Waterway crossings (vehicular or service) would be designed in accordance with the following guidelines: • *Guidelines for Controlled Activities on Waterfront Land*; **Invalid source specified.** • Guidelines for Watercourse Crossings on Waterfront Land (DPI, 2018). • Guidelines for Laying pipes and Cables in Watercourses on Waterfront Land **Invalid source specified.** • *Why do fish need to cross the road? Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge, 2003). • *Policy and Guidelines for Fish Friendly Waterway Crossings* (NSW DPI, 2003).	Pre-construction Construction
H7	An Emergency Response Plan incorporating a Flood Response Plan would be prepared prior to construction covering all phases of the proposal. The plan would: • Detail who would be responsible for monitoring the flood threat and how this is to be done.	Construction Operation

ID	Safeguards and mitigation measures	Project stage
	• Detail specific response measures to ensure site safety and environmental protection. • Outline a process for removing any necessary equipment and materials offsite and out of flood risk areas (i.e. rotate array modules to provide maximum clearance of the predicted flood level). • Consider site access in the event that some tracks become flooded. • Consider appropriate vehicles used to transport staff to and from site, with 4WDs being the preferred vehicle. • Establish an evacuation point. • Define communication protocols with emergency services agencies.	
Noise		
N1	Develop and implement a construction noise management plan	Construction Decommissioning
N2	Establish and implement a complaints management system	Construction Operation Decommissioning
N3	Revised noise modelling following the finalisation of selected equipment.	Operation
N4	Implement an operational noise management plan inclusive of post construction testing at sensitive land uses, or representative locations to confirm the noise levels achieve the requirements predicted.	Operation
N5	If blasting is required, a blasting specialist would be engaged to achieve the project criterion of 115dB	Construction

ID	Safeguards and mitigation measures	Project stage
Water and soils		
SW1	A Soil and Water Management Plan (SWMP) including site specific progressive Erosion and Sediment Control Plan (ESCP) would be prepared, implemented and monitored during construction to minimise impacts to soil and surface water. They would be prepared in accordance with the 'Blue Book' Volume 1 Managing Urban Stormwater: Soils and Construction (Landcom 2004) and include the following specific provisions: • Stage works to minimise the extent of ground disturbance at any one time. Areas of disturbed soil would be rehabilitated promptly and progressively during construction. • Prior to the commencement of ground disturbing works, and progressively during construction, install erosion and sediment control measures in accordance with the progressive ESCP. • Regular inspections and maintenance of erosion and sediment controls, particularly following rainfall, including maintaining an inspection register. • Ensure that machinery leaves the site in a clean condition to avoid tracking sediment onto public roads. • During all excavation activities, separate subsoils and topsoils and ensure that they are replaced in their natural configuration to assist revegetation. • Stockpile topsoil appropriately to minimise weed infestation, maintain soil organic matter, and maintain soil structure and microbial activity. • Manage stockpiles in accordance with the Blue Book (Landcom 2004). • Manage works in consideration of heavy rainfall events. • Refuelling of plant and machinery to occur in a bunded area and not within 50 m of a waterbody or drainage line. • Plant and machinery to be appropriately maintained. • Procedure to manage spills and requirement to provide spill kits. • No concrete wash-out will occur within 50 m of a waterbody or drainage line. Concrete washout will occur in a sealed and	Construction

ID	Safeguards and mitigation measures	Project stage
	bunded area. • Unexpected Finds Procedure for contaminated soil. • Procedure for management of waste soil (spoil) including classification.	
SW2	Design and rehabilitation of works required within waterways will adhere to the following guidelines: • *Guidelines for Controlled Activities on Waterfront Land* (NRAR, 2018); • *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (DPI (Fisheries), 2003) • *Policy & Guidelines for Fish Habitat Conservation & Management* (DPI, 2013)	Construction
SW3	Should access to groundwater and surface water be required, the Applicant will apply for a Water Access License (WAL) and any other relevant approvals.	Construction / operation / decommissioning
SW4	Disturbance to soils will be limited during operation by restricting vehicle movements to formed access tracks and roads.	Operation
SW5	Following construction, all disturbed areas will be rehabilitated as agreed with the landowner. Consideration should be given to: • Grazing restrictions until vegetation is established • Seed bank protection and seed collection protocols for rehabilitation where appropriate. • Forward planning for seasonal windows and contingencies to address risks identified to sourcing required materials. Monitoring of rehabilitated areas until success criteria are achieved.	Construction
Land		
L1	Stock fences, farm dams, and access tracks to be retained as agreed with the land owner to accommodate continued grazing and farm operations within the Project area and (where possible) the Disturbance area.	Operation

ID	Safeguards and mitigation measures	Project stage
L2	• Agriculture land use will be re-established over the operational footprint (unless otherwise agreed with the landowner and/or regulatory authorities). • The operational footprint will be returned to an agricultural productivity potential that is approximately equivalent of pre-Project status.	Decommissioning
L3	A Decommissioning and Rehabilitation Management Plan will be prepared (approximately 18 months ahead of planned closure) that outlines the rehabilitation objectives and strategies to rehabilitate the wind farm site to pre-wind farm land and soil capability (or an appropriate standard in consultation with the landholder) during the decommissioning phase. The plan would include: • Reinstating soil growth medium of disturbed land at a safe and stable depth in order to mitigate long term effects on the land and soil capability of the Project Disturbance area (except in areas otherwise agreed by the landowner). • Soil capping material will be obtained from stripped and stockpiled topsoil from the construction phase of the Project. Soil capping material should be consistent with surrounding environment. • All remaining below ground infrastructure to be capped with minimum 0.5m of soil of suitable texture and preparation to mitigate long term wind erosion in order to restore pre-disturbance LSC classes. • The following re-spreading and seedbank preparation techniques are recommended to prevent excessive soil deterioration and dispersion over disturbed land . – Topsoil should be spread to a depth that reflects adjacent soil horizons, while also considering the surrounding landform. Soil stabiliser agents may need to be applied if adverse weather conditions and seasonal variation is not supportive of regrowth (e.g. drought conditions). – Where necessary soil should be treated with fertiliser and seeded in one consecutive operation, to reduce the potential for topsoil loss to wind and water erosion. Thorough seedbed preparation should be undertaken to ensure optimum establishment and growth of vegetation.	Decommissioning
Historic heritage		
NAH1	Surveys must be completed by an archaeologist to ground validate the standing location of all telegraph poles within the Disturbance Area.	Detailed design

ID	Safeguards and mitigation measures	Project stage
NAH2	No telegraph poles or the Dethridge wheel are to be impacted at any phase of the Project. Where appropriate, their locations should be noted in the field with flagging tape.	All phases
NAH3	Further historical significance assessment and site inspection will be undertaken if the final detailed design indicates proposed works impact any identified historic heritage items with heritage potential.	Detailed design
NAH4	In the event any heritage finds are identified, works must cease and the Unexpected Finds Procedure (refer to procedure in the ACHA) should be implemented	Construction Operation Decommissioning
Hazards - Aviation		
AV1	Notifications and reporting: • As constructed' details of wind turbine and met masts exceeding 100 m AGL must be reported to CASA as soon as practicable after forming the intention to construct or erect the proposed object or structure, in accordance with CASR Part 139.165(1)(2). • As constructed' details of wind turbine and met mast coordinates and elevation will be provided to Airservices Australia, using the following email address: vod@airservicesaustralia.com. • Any obstacles above 100 m AGL (including temporary construction equipment) will be reported to Airservices Australia NOTAM office until they are incorporated in published operational documents. With respect to crane operations during the construction of the Project, a notification to the NOTAM office may include, for example, the following details: o The planned operational timeframe and maximum height of the crane; and o Either the general area within which the crane will operate and/or the planned route with timelines that crane operations will follow.	Pre-construction, Construction

ID	Safeguards and mitigation measures	Project stage
	• Details of the wind farm will be provided to local and regional aircraft operators prior to construction in order for them to consider the potential impact of the wind farm on their operations. • To facilitate the flight planning of aerial application operators, details of the Project, including the 'as constructed' location and height information of wind turbines, WMTs and overhead transmission lines should be provided to landowners so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.	
AV2	The rotor blades, nacelle and the supporting towers of the wind turbines will be white. No additional marking measures or obstacle lighting are required for wind turbines.	Design
AV3	Met masts will be marked according to the requirements set out in MOS 139 Section 8.10 (as modified by the guidance in NASF Guideline D). Specifically: • marker balls or high visibility flags or high visibility sleeves should be placed on the outside guy wires • paint markings to be applied in alternating contrasting bands of colour to at least the top 1/3 of the mast • ensuring the guy wire ground attachment points have contrasting colours to the surrounding ground/vegetation.	Design
AV4	Overhead transmission lines and/or supporting poles that are located where they could affect aerial application operations will be identified in consultation with local aerial application operators and marked in accordance with CASR Part 139 MOS Chapter 8 Division 10 section 8.110 (7) and section 8.110 (8).	Pre-Construction Construction
AV5	Contact with local fire agencies will be ongoing to facilitate that during a fire emergency nearby the Project: • Access is available to the wind farm site by emergency services response for on-ground firefighting operations • Wind turbines are shut down immediately during emergency operations – where possible, blades should be stopped in the 'Y' or 'rabbit ear' position.	Pre-Construction Construction Operation
AV6	Triggers for review of the Aviation Impact Assessment are provided for consideration: • Prior to construction to ensure the regulatory framework has not changed.	Pre-Construction Construction

ID	Safeguards and mitigation measures	Project stage
	• Following any significant changes to the context in which the assessment was prepared, including the regulatory framework. • Following any near miss, incident or accident associated with operations considered in this risk assessment. • Where layout changes have been made.	Operation
Hazards – telecommunications		
TC1	Maintain open communication lines for all notified stakeholders throughout the development of the Project so that any signal concerns can be addressed and if required the costs of modifications to telecommunication infrastructure would be bourn by the Applicant.	All phases
TC2	The Project commits to the following agreements with the BOM: • Inform the BOM of any changes to the Project Design, including changes to the turbine locations or height • Give the BOM at least two weeks' notice of any planned shutdown of the Project • Collaborate with the BOM in the event of a severe weather conditions in the interests of community safety.	All phases
TC3	A review of fixed point to point links in the vicinity of turbines T115, T117 and T131, currently nearby but outside of current interference zones, should be undertaken during detailed design.	Pre construction
Hazards - EMF		
EMF1	All electrical equipment will be designed in accordance with relevant codes and industry best practice in Australia	Design
EMF2	The final detailed design of the Baldon WF will ensure cumulative EMF is within acceptable ICNIRP and WHO exposure limits where underground and overhead transmission is proposed.	Design
Hazards – blade throw		

ID	Safeguards and mitigation measures	Project stage
BT1	Turbines will meet current best practice Australian and international (IEC 61400-23) safety standards and will be equipped with sensors that can shut down turbines if an imbalance in the rotor blades is detected.	Design
BT2	Construction	
Hazards – battery		
BESS1	Review the required clearances between the BESS units and other structures to minimise fire propagation once UL 9540A unit level test for the GW-ESS-EBL01-0745-2H1 battery system has been completed.	Design Construction Operation
BESS2	Review the investigation reports on the Victorian Big Battery Fire (occurred on 31 July 2021) and implement relevant findings for the Project. The publicly available investigation reports include: • Energy Safe Victoria: Statement of Technical Findings on fire at the Victorian Big Battery. • Fisher Engineering and Energy Safety Response Group: Report of Technical Findings on Victorian Big Battery Fire.	Design Construction Operation
BESS3	Consult with Fire and Rescue NSW (FRNSW) to ensure that relevant aspects of fire protection measures have been included in the design. This may include: • Type of firefighting or control medium. • Demand, storage, and containment measures for the medium. The above aspects will form an input to the Fire Safety Study, which may be required as part of the development consent conditions, for review and approval by FRNSW.	Design Construction Operation
BESS4	Apply the controls listed in the PHA HAZID register.	Design Construction Operation

ID	Safeguards and mitigation measures	Project stage
Hazards – Bushfire		
BF1	The Project would apply relevant NSW RFS Planning for Bush Fire Protection 2019 guidance to the Project design, including: • Asset Protection Zones • Fuel hazard management • Site access specifications • Fire-fighting resources and preparedness	Design
BF2	Develop a Bush Fire Emergency Management and Operations Plan (BFEMOP) to include but not be limited to: • Detailed measures to prevent or mitigate fires igniting • Work that should not be carried out during total fire bans • Availability of fire-suppression equipment, access and water • Storage and maintenance dangerous or hazardous materials in accordance with AS1940-2004: The storage and handling of flammable and combustible liquids • Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate • Detail of automatic shutdown controls identified and implemented • A copy of the latest Yanga Precinct Fire Management Strategy • Appropriate bush fire emergency management planning. In developing the BFEMOP, NSW RFS and FRNSW would be consulted on the volume of water supplies, fire-fighting equipment maintained on-site, fire truck connectivity requirements, proposed APZ and access arrangements, communications, vegetation fuel levels and hazard reduction measures.	Construction Operation Decommissioning

ID	Safeguards and mitigation measures	Project stage
BF3	An APZ of minimum 10m would be maintained around all buildings, turbines and BESS. Average grass height within the APZ would be maintained at or below 5cm on average throughout the October to April fire season.	Operation
BF4	Following commissioning of the wind farm, the local NSW RFS and Fire and Rescue brigades would be invited to an information and orientation day covering access, infrastructure, firefighting resources on-site, fire control strategies and risks/hazards at the site.	Operation
Air quality		
A1	Air quality management measures will be included in the CEMP for the Project and would include but not be limited to: • Identification of high-risk construction activities with potential to generate dust, and control measures for the activities, specific to sensitive receivers; primarily at the site access / Sturt highway intersection. • A process for monitoring dust on-site and weather conditions, as well as procedures for altering management measures where required. • Protocols to notify relevant stakeholders regarding the nature and timing of works which may adversely impact them. • A protocol for responding to air quality-related complaints. • Watering and maintenance of haul routes in response to visual cues and vehicle speed restrictions entering, traveling within and leaving the site.	Construction
A2	Stockpiles: • Will be covered or otherwise stabilised • Located sufficiently distant from haul routes, particularly the Sturt Highway access, to manage visual impacts from dust.	Construction/ decommissioning
A3	Works will be designed and programmed to minimise the extent and duration of disturbance.	Pre-construction, Construction

ID	Safeguards and mitigation measures	Project stage
A4	Disturbed ground and exposed soils will be permanently stabilised and vegetated as soon as practicable following disturbance to minimise the potential for wind erosion.	Construction
A5	All plant and equipment used at the site will be maintained in accordance with the manufacturer's specifications.	All stages
A6	All plant and equipment accessing and utilising the public road network will be registered.	All stages
A7	Fires and material burning will not be undertaken.	All stages
Waste		
R1	A Waste Management Plan (WMP) would be developed to minimise waste, including: • Identification of opportunities to avoid, reuse and recycle materials, in accordance with the waste hierarchy. • Quantification and classification of all waste streams. • Provision for recycling management on-site. • Tracking of all waste leaving the site and disposal of waste at facilities permitted to accept the waste. • Haulage requirements (such as covered loads / hazardous wastes). • An objective to ensure that any use of local waste management facilities does not exhaust available capacity nor disadvantage the local community	Construction/ Operation/ Decommissioning
R2	Lithium-Ion Batteries would be kept, stored, managed and transported according to manufacturer's instructions and the ADG Code. Any spent batteries would be recycled at a EPA permitted and licensed recycler of Li-Ion batteries.	Construction/ Operation/ Decommissioning

ID	Safeguards and mitigation measures	Project stage
R3	Any septic system would be installed, operated and maintained according to the Hay Council and Murray River Council LGA’s regulations.	Construction/ Operation/ Decommissioning

Appendix D Statutory compliance table

D.1 Section 4.15 (1) of the EP&A Act

Matter	Section addressed
(a) the provisions of: (i) any environmental planning instrument, and (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and (iii) any development control plan, and (iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),	(i) Section 4 (ii) Section 4 (iii) Not applicable to SSD's under the provisions of the Planning Systems SEPP (iiia) Section 2.7 (iv) Appendix D.2
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	Section 6 and Section 7.
(c) the suitability of the site for the development,	Section 2.5 and Chapter 8
(d) any submissions made in accordance with this Act or the regulations,	Facilitated by public exhibition on the DPHI planning portal.
(e) the public interest.	Chapter 6.4

D.2 Division 5 Environmental Planning and Assessment Regulation 2021

Matter	Section addressed
Section 190 Form of an environmental impact statement	
(1) An environmental impact statement must contain the following information— (a) the name, address and professional qualifications of the person who prepared the statement, (b) the name and address of the responsible person, (c) the address of the land— (i) to which the development application relates, or (ii) on which the activity or infrastructure to which the statement relates will be carried out, (d) a description of the development, activity or infrastructure, (e) an assessment by the person who prepared the statement of the environmental impact of the development, activity or infrastructure, dealing with the matters referred to in this Division.	(a) Certification page (b) Certification page and Section 1.3 (c) Appendix A (d) Section 3 (e) Certification page
(2) The person preparing the statement must have regard to— (a) for State significant development—the State Significant Development Guidelines, or ~~(b) for State significant infrastructure—the State Significant Infrastructure Guidelines.~~	Certification page
(3) An environmental impact statement must also contain a declaration by a relevant person that— (a) the statement has been prepared in accordance with this Regulation, and (b) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure, and (c) the information contained in the statement is not false or misleading, and (d) for State significant development or State significant infrastructure—the statement contains the information	Certification page

Matter	Section addressed
required under the Registered Environmental Assessment Practitioner Guidelines.	
Section 191 Compliance with environmental assessment requirements	
The environmental impact statement must comply with the environmental assessment requirements notified under section 176 or the Act, section 5.16(4).	Appendix B
Section 192 Content of environmental impact statement	
(1) An environmental impact statement must contain the following— (a) a summary of the environmental impact statement, (b) a statement of the objectives of the development, activity or infrastructure, (c) an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, considering its objectives, including the consequences of not carrying out the development, activity or infrastructure, (d) an analysis of the development, activity or infrastructure, including— (i) a full description of the development, activity or infrastructure, and (ii) a general description of the environment likely to be affected by the development, activity or infrastructure and a detailed description of the aspects of the environment that are likely to be significantly affected, and (iii) the likely impact on the environment of the development, activity or infrastructure, and (iv) a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment, and (v) a list of the approvals that must be obtained under another Act or law before the development, activity or infrastructure may lawfully be carried out,	(a) Executive summary (b) Section 2 (c) Section 2.5 (d) (i) Section 3 (ii) Section 3, Section 6 and Section 7. (iii) Section 6 and Section 7 (iv) Section 6 and Section 7and Appendix C (v) Section 4 and Appendix D (e) Appendix C (f) Section 2 and Section 8

Matter	Section addressed
(e) a compilation, in a single section of the environmental impact statement, of the measures referred to in paragraph (d)(iv), (f) the reasons justifying the carrying out of the development, activity or infrastructure, considering biophysical, economic and social factors, including the principles of ecologically sustainable development set out in section 193.	

D.3 Statutory compliance list

Statute	Section addressed
Commonwealth statutes	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Section 1.8, Section 4, Section 6.1 and Appendix F.1
Native Title Act 1993	Section 4
NSW statutes	
Environmental _Planning and Assessment Act 1979_ (EP&A Act)	Section 1.8, Section 3.1, Section 4 and Appendix D.1
Environmental Planning and Assessment Regulation 2021	Section 1.8, Section 4 and Appendix D.2
Environment Protection and Biodiversity Conservation Regulations 2000	Section 4 and Appendix F.1

Statute	Section addressed
Roads Act 1993 (Roads Act)	Section 4
Protection of the Environment Operations Act 1997 (POEO Act)	Section 4
Crown Lands Management Act 2016 (CLM Act)	Section 4
Conveyancing Act 1919	Section 4
Fisheries Management Act 1994 (FM Act)	Section 4
Heritage Act 1977	Section 4
National Parks and Wildlife Act 1974 (NPW Act)	Section 4
Rural Fires Act 1997	Section 4
Water Management Act 2000 (WM Act)	Section 4
Biodiversity Conservation Act 2016	Section 4 and Section 6.1
NSW planning policies and local provisions	
State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP)	Chapter 4

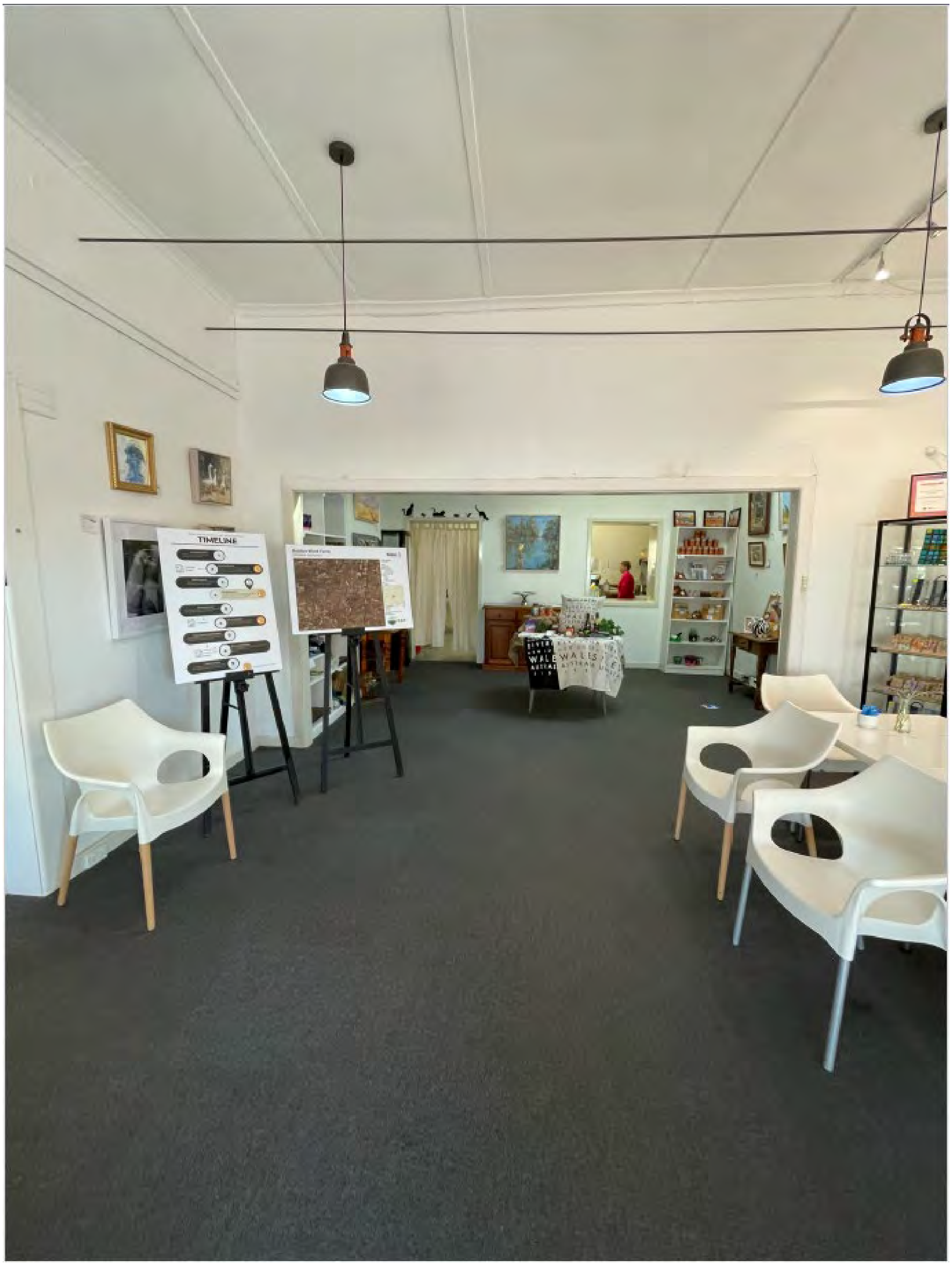
Statute	Section addressed
State Environmental Panning Policy (Transport and Infrastructure) 2021 (TISEPP),	Section 4, Section 6.5 and Appendix F.5
State Environmental Planning Policy (Resilience and Hazards) 2021	Section 4, Section 7.2.1 and Appendix F.8
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Section 4, Section 6.1 and Appendix F.1
State Environmental Planning Policy (Primary Production and Rural Development) 2021	Section 4, Section 6.9 and Appendix F.7
Wakool Local Environmental Plan 2013 (Wakool LEP)	Section 4
Hay Local Environmental Plan 2011 (Hay LEP)	Section 4

Appendix E Community and stakeholder engagement

Appendix E.1 Balranald Community Information Session 2023

Appendix E.2 Hay Community Information Session 2023

Appendix E.3 Moulamein Community Information Session 2023



Appendix E.4 Balranald Information Session 2024

Appendix E.5 Hay Information Session 2024

Appendix E.6 Moulamein Information Session 2024

Appendix E.7 Celebrate Moulamein Festival Information Stall 2023

Appendix E.8 NSW TAFE Baldon Pop Up

Appendix E.9 Public Notice August 2023

Baldon WIND FARM

Baldon Wind Farm

Information Pop-Up at Moulamein Bowls Tournament

Goldwind Australia is developing a planning application for a proposed wind farm 13km north of Moulamein, 55km east of Balranald, and 75km southwest of Hay.

Community members are invited to learn more about the project, meet the team, and provide their feedback by attending a pop-up information session.

The session will be hosted at:
Venue: Moulamein Bowling Club
Date: Saturday 26th August and Sunday 27th August
Time: 10:00am – 1:00pm

Please email info@baldonwindfarm.com for more information or visit the project website at https://baldonwindfarm.com/.

We also welcome feedback from interested community members via our online survey at https://www.surveymonkey.com/r/BaldonWindFarm.

Appendix E.10 Public Notice September 2023

Baldon Wind Farm

Baldon
WIND FARM

Community Information Drop-in Sessions

Goldwind Australia is developing a planning application for a proposed wind farm 13km north of Moulamein, 55km east of Balranald, and 75km southwest of Hay.

Community members are invited to learn more about the project, meet the team, and provide their feedback by attending an information drop-in session.

There will be three information sessions, hosted at:

Balranald Senior Citizens Centre - Tuesday 12 September
Address: 106 Market Street, Balranald NSW
Time: 8.00 am - 1.00 pm

Hay War Memorial Hall – Tuesday 12 September
Address: 204 Lachlan Street, Hay NSW
Time: 4.00 pm - 7.00 pm

Moulamein Art Gallery – Wednesday 13 September
Address: 33 Morago Street, Moulamein NSW
Time: 8.00 am - 1.00 pm

Please email info@baldonwindfarm.com or call 1800 050 209 for more information, or visit the project website at https://baldonwindfarm.com/. We also welcome feedback from interested community members via our online survey at https://www.surveymonkey.com/r/BaldonWindFarm.

Appendix E.11 Public Notice May 2024

BALDON WIND FARM
Community Information Pop-up Sessions

Baldon WIND FARM

Goldwind Australia is developing a planning application for a proposed wind farm 13km north of Moulamein, 55km east of Balranald, and 75km southwest of Hay.
The Baldon Wind Farm is getting ready to submit the Environmental Impact Statement. Community members are invited to meet the team, learn more about the project and the outcome of specialist assessments, and have any questions they may have answered.

There will be three pop-up sessions, hosted at:
Balranald Tourist Centre – Wednesday 8 May
Address: 83 Market Street, Balranald NSW
Time: 1 pm - 3.30 pm

Hay Black Sheep Cafe – Thursday 9 May
Address: 62 Lachlan Street, Hay NSW
Time: 8.00 am – 10.00 am

Moulamein Art Gallery – Thursday 9 May
Address: 33 Morago Street, Moulamein NSW
Time: 1.00 pm – 3.30 pm

Please email info@baldonwindfarm.com or call 1800 050 209 for more information or visit the project website by scanning the code.

Appendix E.12 Baldon Wind Farm Newsletter February 2023

Newsletter | February 2023

We are pleased to advise the community, that the Baldon Wind Farm has now moved into the Environmental Impact Statement (EIS) phase. This is following the NSW Dept of Planning and Environment (DPE) issuing the Secretary Environmental Assessment Requirements (SEARS) for the proposed Baldon Wind Farm in July 2022.

The EIS stage is the first step towards future planning applications, and, during this process, detailed site investigations and technical assessments will be carried out including biodiversity, Cultural Heritage, noise, traffic, transport and visual impact assessments. The indicative turbine layout and associated infrastructure will be designed based on results of site survey work.

Baldon Wind Farm

The proposed Baldon Wind Farm would be located 13km north of Moulamein, 55km east of Balranald, and 75km southwest of Hay. The project would sit within the Murray River and Hay Shire Council areas and is adjacent to the Edward River Council to the east.

The proposed site lies within the South-West Renewable Energy Zone (SWREZ) and would contribute significantly to the NSW Government's net-zero emissions by 2050 target sending clean, carbon-free renewable power into the NSW electricity grid.

The Baldon Wind Farm would include:

- Approximately 150-200 wind turbines exporting power to the national electricity market (NEM)
- Associated infrastructure such as roads, drainage, cabling and substations
- Battery energy storage systems (BESS)
- Associated construction facilities
- Accommodation camp for construction
- Operations and maintenance facilities

Figure 1.1- Proposal location

Goldwind Australia

Goldwind is a global leader in manufacturing and installing wind turbines and can be found on six of our seven continents. With 24 years' experience in developing wind turbines, Goldwind has installed over 44,000 wind turbines worldwide – totalling over 89 GW of generation.

Goldwind Australia was established in 2009 with offices located in both Sydney and Melbourne. Goldwind Australia has over 1.8 GW of wind and solar farm projects operating or in development across the country and is responsible for developing the Baldon Wind Farm.

How to learn more and provide feedback

It is important to us that the community has opportunities to provide feedback on the proposed project. There will be future opportunities throughout the year for near neighbours, Moulamein, Swan Hill, Balranald, and Hay residents along with the wider community members to come and chat with a member of the Project Team to learn more about the Proposal and have any questions answered.

You can also provide feedback by completing the online community feedback survey at https://www.surveymonkey.com/r/BaldonWindFarm which will inform the Social Impact Assessment within the EIA. For further information, please visit https://baldonwindfarm.com.

Project Benefits

The Baldon Wind Farm project has a capital investment value of more than $30 million and is therefore deemed a State Significant Development (SSD). It would bring significant investment to the local area during construction and would create jobs, diversify income and increase revenue in local service providers such as food, fuel, lodging and tourism operators in the local area.

Once the project is operational, benefits would continue with long-term jobs, ongoing operations and maintenance contracts and the establishment of community benefit schemes.

The Proposal would also significantly contribute towards the NSW Government's aim of reaching net-zero emissions by 2050. It will provide clean energy supply for the NSW energy grid, providing stable, sustainable energy for the future.

Local Benefit Sharing

Goldwind Australia is always looking for ways to invest in the community to help support local initiatives and improvements. We would love to hear your ideas on local priorities and how to share project benefits in the community.

Please share your ideas on how we can invest in your community by attending the community information drop-in session or by emailing info@baldonwindfarm.com.

Find out more

Your ongoing input is important to us. Should you have any questions about the project or what we can do to support the local community, please send an email to info@baldonwindfarm.com or complete the community feedback form available online at https://baldonwindfarm.com/

Frequently Asked Questions

Baldon WIND FARM

1. Baldon Wind Farm

The Proposal is within the Hay Plains area in the South-West Renewable Energy Zone (SWREZ). The wind farm would be located on freehold land used for sheep grazing in an area over 42,000 hectares in size. The site is located 15km north of Moulamein, 55km east of Balranald and 75km southwest of Hay in NSW. The proposed site sits within the Murray River and Hay Shire Council areas and is adjacent to the Edward River Council area to the east.

2. What is the project status?

The project is in the early stages of the Environmental Impact Assessment (EIA). The project is considered State Significant Development (SSD) under Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011. Consent is being sought under Part 4 of the Environmental Planning & Assessment Act 1979. The Department of Planning and Environment (DPE) has issued the Secretary's Environmental Assessment Requirements (SEARs), which has started the Environmental Impact Statement (EIS) stage.

The EIS stage involves detailed site investigations and technical assessments including biodiversity, Cultural Heritage, noise, traffic, transport, and visual impact assessments. The results of these technical assessments as well as community engagement outcomes will assist to refine the preliminary project infrastructure layout.

3. How many wind turbines would the proposed site have?

Investigations are underway and early assessments indicate that this project could host between 150 and 200 wind turbines and associated infrastructure. The initial Scoping Report has applied for approximately 162 wind turbines on the site. Investigations are ongoing to confirm the number of turbines to be included in the EIS.

4. How much electricity would a wind farm of this size generate and many homes in NSW would this power?

Given the number of turbines highlighted in early assessments, the site could produce over 1000MW of electricity. This is equivalent to powering over 700,000 homes in NSW.

5. What is wind energy and how is it created?

Wind energy generates electricity from the power of the wind. Wind power is the cheapest source of large-scale renewable energy and is clean and extremely reliable. When a wind turbine captures the power of the wind it generates electricity which is transferred to the onsite substation where it is connected to the national electricity grid. Once on the national electricity grid, the electricity travels through transmission lines that distribute the power to homes and businesses.

6. What is the land currently being used for? Is it used for Agricultural purposes?

The land is currently used for sheep grazing. There is an existing 220kV power line that runs through the centre of the site.

7. How long is the lifecycle of a wind farm?

Generally, a wind farm will operate for approximately 25-30 years.

8. What will happen to the turbines and the land at the wind farm's end of life?

Once the wind turbines have reached their end of usable life, the wind turbines would be decommissioned and removed (and recycled), or the wind farm may be refurbished. If the wind farm is to be decommissioned, the land would be rehabilitated and returned to its original use. The decommissioning process is an important part of the development application process, and decommissioning and rehabilitation objectives are required to be met as part of the Development Consent, outlined by the NSW Department of Planning and Environment.

9. Will the wind turbines scar the current natural landscape?

It is important to acknowledge that wind turbines do have a visual impact on the landscape. The EIA process assesses the potential impact and provides the planning authority information to make an informed decision on the application. However, we will work with the local community and surrounding landholders throughout the process to ensure the visual impact is minimised or mitigated were possible.

10. Are wind turbines noisy?

Like anything that moves – including farm machinery, vehicles and trucks – wind turbines do generate some sound. Noise varies on the position of the turbine, the shape of the site, where the listener may be situated and the direction the wind may be blowing.

A specialist noise consultant will carry out a formal noise assessment which will be included in the EIS. This will ensure that potential noise impacts to neighbouring properties meet the minimum noise requirements and that potential noise impacts are appropriately mitigated. Once the development is operational, noise levels on the wind turbines would be tested again to ensure compliance.

11. Will Cultural Heritage be preserved and protected?

Preserving and protecting Cultural Heritage is a priority for the project and we are committed to adhering to all legislation to achieve this.

An Aboriginal Cultural Heritage Assessment (ACHA), including field surveys, will be completed and form part of the EIS. This will include rigorous community engagement with Registered Aboriginal Parties and other community members throughout the community engagement process to ensure due diligence and to maintain strong relationships and respect with First Nations peoples and cultures.

12. Do wind turbines impact native flora and fauna?

We have engaged specialist consultants who are undertaking flora and fauna surveys to understand the ecological characteristics of the site. The project is committed to minimising impacts on native flora and fauna by designing the infrastructure to allow species to continue to thrive during the construction and operation phases. During these phases, management plans will be developed to ensure this compliance is maintained.

13. Do wind turbines affect livestock operations?

The site is currently being used for sheep grazing and this farming operation would continue throughout the project lifecycle. There is no evidence to say that wind turbines negatively impact livestock operations.

14. Is it possible that the wind turbines make it harder to fight a fire should one start on site?

There is no evidence to suggest that wind farms increase fire risks. Wind turbines are treated like any other piece of infrastructure that needs to be managed adequately. The wind farm roads would make it easier for emergency vehicles to access and drive around the site should a fire start.

15. How will Goldwind engage with the community and key stakeholders during the EIS phase?

Goldwind is committed to working with the community and other key stakeholders as part of the EIS process and as part of the wider project. Stakeholders will be given an opportunity to have their say at several engagements within the local region. The community will have both face-to-face and virtual opportunities to ask any questions, discuss concerns and community benefit sharing options with Goldwind.

Appendix E.13 Baldon Wind Farm Newsletter September 2023

Newsletter | September 2023

As notified in the February edition of our newsletter, the Environmental Impact Statement (EIS) is currently being compiled for submission.

We are progressing well with the detailed studies required to support the EIS and the project design. The studies we are currently undertaking include biodiversity, Cultural Heritage, noise, traffic, transport, and visual impact assessments.

Meteorological masts

A meteorological mast is a free-standing tower that contains instruments to measure wind speed and temperature. One meteorological mast was installed on the Baldon Wind Farm site in February of 2023, and two additional masts will be installed this month (September 2023). The masts will continue to monitor the wind speed in preparation for EIS lodgement.

Image 1.1 The meteorological mast that was installed in February of this year.

Biodiversity

Detailed ecology and heritage site surveys have been ongoing since February and will continue across the Spring months.

Image 1.2 Members of the project team have been visiting the site to conduct surveys

Local sponsorship opportunities

We are thrilled to be partnering with local community groups by providing ongoing sponsorship opportunities. We have been lucky enough to be involved in the Moulamein Festival, Moulamein Easter Fair, and the Moulamein Bowls Tournament so far this year - but are always looking for more opportunities to get involved in! If you wish to apply for sponsorship, please email info@baldonwindfarm.com.

Image 1.3 The project team at the Moulamein Festival in March of this year.

Baldon Wind Farm

The proposed Baldon Wind Farm would be located 13km north of Moulamein, 55km east of Balranald, and 75km southwest of Hay. The project would sit within the Murray River and Hay Shire Council areas and is adjacent to the Edward River Council to the east.

The proposed site lies within the South-West Renewable Energy Zone (SWREZ). It would contribute significantly to the NSW Government's net-zero emissions by 2050 target sending clean, carbon-free renewable power into the NSW electricity grid.

The Baldon Wind Farm would include:

- Approximately 180 wind turbines exporting power to the national electricity market (NEM)
- Associated infrastructure such as roads, drainage, cabling and substations
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Appendix E.14 Baldon Wind Farm Newsletter May 2024

Newsletter | May 2024

As notified in our previous newsletters, the Environmental Impact Statement (EIS) for Baldon Wind Farm is currently being compiled for submission.

The detailed studies that inform the EIS are coming to an end, with the preliminary Biodiversity, and Cultural Heritage surveys now finalised. The Landscape and Visual Impact Assessment, Soil, Agriculture and Social Impact studies are also coming close to completion.

The outcomes of these surveys, as well as feedback received from the community, has been incorporated into the design of the project.

NSW Department of Planning restructure

The Department of Planning, Housing and Infrastructure (DPHI) is now the consent authority that will be assessing the Baldon Wind Farm EIS. This is due to the NSW government restructuring in January 2024, which dismantled the Department of Planning and Environment (DPE) and created the DPHI and the Department of Environment and Heritage (DEH).

EIS submission and next steps

Once the EIS is submitted to DPHI, it will be placed on public exhibition for a minimum of 28 days. This allows community members and agencies (such as local Councils or other governmental agencies such as the Department of Transport) to comment on the proposed development.

Once the exhibition period has concluded, the submissions are compiled and delivered back to Goldwind. We will then prepare a Response to Submissions Report, which will address all items identified during the public exhibition submission period.

To be notified of when the EIS is available to read and when submissions are open, email us at info@baldonwindfarm.com.au.

Biodiversity surveys

After over 18 months of survey effort, detailed ecology site surveys are now sufficiently completed to submit the EIS. The outcomes of these surveys were fascinating and provided the Goldwind team with the information necessary to preserve areas of high biodiversity importance.

A number of threatened plant species were identified, including:

- *Maireana cheeli* (Chariot Wheels)
- *Brachyscome papillosa* (Mossgiel Daisy)
- *Lepidium monoplocoides* (Winged Peppercress)

The following animal species were also identified:

- Southern Bell Frog
- Plains Wanderer (bird)
- Blue Winged Parrot
- Pink Cockatoo
- Southern Whiteface (bird)
- White-fronted Chat (bird)
- And other bird and migratory species.

Maireana cheeli (Chariot Wheels). Image: NGH

Pink Cockatoo. Image: Ashraf Saleh

Southern Bell Frog. Image: NGH

Lepidium monoplocoides (Winged Peppercress) Image: NSW National Parks and Wildlife

Cultural Heritage surveys

With the expertise of the local Representative Aboriginal Parties (RAPs), over 200 cultural heritage sites were identified by foot while surveying the infrastructure assessment corridor.

The vast majority of sites have been protected and preserved by amending the location of the proposed wind farm infrastructure to avoid the sites.

Other management measures have been recommended by the RAPs to avoid or minimise potential impacts to identified local heritage sites.

Landscape and Visual Impact Assessment

The Landscape and Visual Impact Assessment (LVIA) is nearing completion, with the report ready for inclusion within the EIS. A lot of work goes into an LVIA, with many different assessment methods and techniques applied. The LVIA includes wireframes and photomontages, which visually depict what the wind farm would look like from different viewpoints (such as the Sturt Highway and from Moulamein).

As you would imagine with the size and scale of the project and the flat landscape of the plains, the wind farm will be visible from surrounding areas; however, it has been assessed within the LVIA as having an acceptable visual impact. The distance from local townships, the remote rural nature of the plains, and the low density of residents nearby has contributed to this assessment outcome.

Sunset at the site.
Image: NGH

Baldon Wind Farm

The proposed Baldon Wind Farm would be located 13km north of Moulamein, 55km east of Balranald, and 75km southwest of Hay. The project would sit within the Murray River and Hay Shire Council areas and is adjacent to the Edward River Council to the east.

The proposed site lies within the South-West Renewable Energy Zone (SWREZ). It would contribute significantly to the NSW Government's net-zero emissions by 2050 target sending clean, carbon-free renewable power into the NSW electricity grid.

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- Accommodation camp for construction
- Operations and maintenance facilities.

Goldwind Australia

Goldwind is a global leader in manufacturing and installing wind turbines and can be found on six of our seven continents. With over 24 years' experience in developing wind turbines, Goldwind has installed over 45,000 wind turbines worldwide – totalling over 100 GW of generation.

Goldwind Australia was established in 2009 with offices located in both Sydney and Melbourne. Goldwind Australia has over 1.8 GW of wind and solar farm projects operating or in development across the country and is responsible for developing the Baldon Wind Farm.

Learn more and provide feedback

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1. Baldon Wind Farm

The Proposal is within the Hay Plains area in the South-West Renewable Energy Zone (SWREZ). The wind farm would be located on freehold land used for sheep grazing in an area over 46,000 hectares in size. The site is located 13km north of Moulamein, 55km east of Balranald and 75km southwest of Hay in NSW. The proposed site sits within the Murray River and Hay Shire Council areas and is adjacent to the Edward River Council area to the east.

2. What is the project status?

The project is moving towards the final stages of the Environmental Impact Assessment (EIA). The Department of Planning and Environment (DPE) issued the Secretary's Environmental Assessment Requirements (SEARs) in July 2022, which triggered the Environmental Impact Statement (EIS) stage.

The EIS stage involves detailed site investigations and technical assessments including biodiversity, Cultural Heritage, noise, traffic, transport, and visual impact assessments. The results of these technical assessments as well as community engagement outcomes has assisted in refining the project infrastructure layout to date.

Once the EIS is submitted to the Department, it will be placed on public exhibition for 28 days. This allows community members and agencies (such as local Councils, Department of Transport or other governmental agencies) to comment on the proposed development.

Once the 28-day period is up, the submissions are compiled and delivered back to Goldwind. We will then prepare a Response to Submissions Report, which will address all items identified during the public exhibition submission period.

Following the review of the Submissions Report, the Department will decide to approve or refuse the application, or the application will be passed through to the Independent Planning Commission (IPC).

3. How many wind turbines would the proposed site have?

This project could host approximately 180 wind turbines, as well as the necessary associated infrastructure. The initial Scoping Report applied for approximately 162 wind turbines on the site, however, this was updated as additional land became available for the project.

4. How much electricity would a wind farm of this size generate and how many homes in NSW would this power?

Given the number of turbines highlighted in early assessments, the site could produce over 1000MW of electricity. This is equivalent to powering over 700,000 homes in NSW.

5. What is wind energy and how is it created?

Wind energy generates electricity from the power of the wind. Wind power is the cheapest source of large-scale renewable energy and is clean and extremely reliable. When a wind turbine captures the power of the wind it generates electricity which is transferred to the onsite substation where it is connected to the national electricity grid. Once on the national electricity grid, the electricity travels through transmission lines that distribute the power to homes and businesses. Some of the electricity may be stored in the battery system onsite and then be released when it is needed.

6. What is the land currently being used for? Is it used for Agricultural purposes?

The land is currently used for sheep grazing. There is an existing 220kV power line that runs through the centre of the site and the new Project Energy Connect 330kV line is being built next to the current line also.

7. How long is the lifecycle of a wind farm?

Generally, a wind farm will operate for approximately 25-30 years.

8. What will happen to the turbines and the land at the wind farm's end of life?

Once the wind turbines have reached their end of usable life, the wind turbines would be decommissioned and removed (and recycled), or the wind farm may be refurbished and repowered. If the wind farm is to be decommissioned, the land would be rehabilitated and returned to its original use. The decommissioning process is an important part of the development application process, and decommissioning and rehabilitation objectives are required to be met as part of the Development Consent, outlined by the NSW Department of Planning and Environment.

9. Will the wind turbines scar the current natural landscape?

It is important to acknowledge that wind turbines do have a visual impact on the landscape. The EIA process assesses the potential impact and provides the planning authority information to make an informed decision on the application. However, we will work with the local community and surrounding landholders throughout the process to ensure the visual impact is minimised or mitigated where possible.

10. Are wind turbines noisy?

Like anything that moves – including farm machinery, vehicles and trucks – wind turbines do generate some sound. Noise varies on the position of the turbine, the shape of the site, where the listener may be situated and the direction the wind may be blowing.

A specialist noise consultant will carry out a formal noise assessment which will be included in the EIS. This will ensure that potential noise impacts to neighbouring properties meet the minimum noise requirements and that potential noise impacts are appropriately mitigated. Once the development is operational, noise levels on the wind turbines would be tested again to ensure compliance.

11. Will Cultural Heritage be preserved and protected?

Preserving and protecting Cultural Heritage is a priority for the project and we are committed to adhering to all legislation to achieve this.

An Aboriginal Cultural Heritage Assessment (ACHA), including field surveys, has been prepared and will form part of the EIS. This will include rigorous community engagement with Registered Aboriginal Parties and other community members throughout the community engagement process to ensure due diligence and to maintain strong relationships and respect with First Nations peoples and cultures.

12. Do wind turbines impact native flora and fauna?

We have engaged specialist consultants who have undertaken flora and fauna surveys to understand the ecological characteristics of the site. The project is committed to minimising impacts on native flora and fauna by designing the infrastructure to allow species to continue to thrive during the construction and operation phases. During these phases, management plans will be developed to ensure this compliance is maintained.

13. Do wind turbines affect livestock operations?

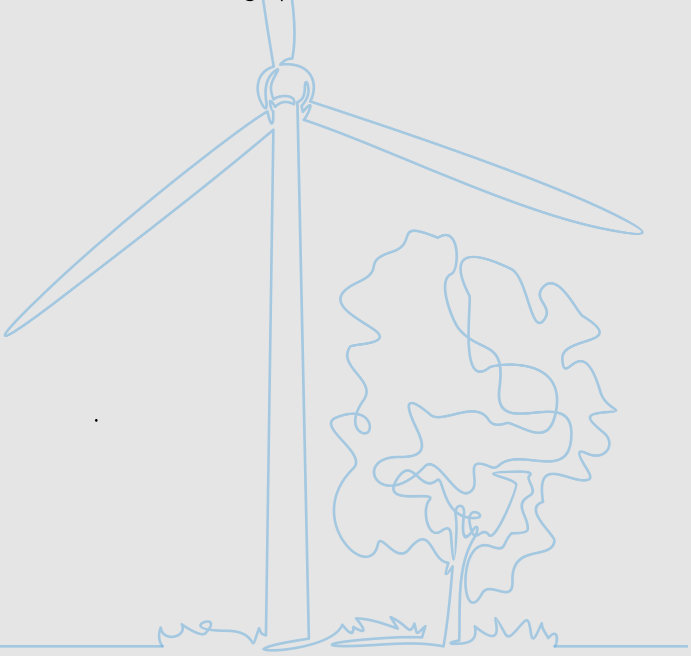
The site is currently being used for sheep grazing and this farming operation would continue throughout the project lifecycle. There is no evidence to say that wind turbines negatively impact livestock operations.

14. Is it possible that the wind turbines make it harder to fight a fire should one start on site?

There is no evidence to suggest that wind farms increase fire risks. Wind turbines are treated like any other piece of infrastructure that needs to be managed adequately. The wind farm roads would make it easier for emergency vehicles to access and drive around the site should a fire start.

15. How will Goldwind engage with the community and key stakeholders during the EIS phase?

Goldwind is committed to working with the community and other key stakeholders as part of the EIS process and beyond. Stakeholders will be given an opportunity to have their say at several engagements within the local region. The community will have both face-to-face and virtual opportunities to ask any questions, discuss concerns and community benefit sharing options with Goldwind.



Appendix E.15 Baldon Wind Farm EDM March 2023

Baldon WIND FARM

We are pleased to update the community that the Baldon Wind Farm is progressing the Environmental Impact Statement (EIS) phase. This is following the NSW Department of Planning and Environment (DPE) issuing the Secretary Environmental Assessment Requirements (SEARS) for the proposed Baldon Wind Farm in July 2022.

The EIS is one step in the process of seeking planning approval. The EIS stage involves detailed site investigations and technical assessments will be carried out including biodiversity, Cultural Heritage, noise, traffic, transport and visual impact assessments. The indicative turbine layout and associated infrastructure will be designed based on results of site survey work.

Figure 1.1- Proposal location

Baldon Wind Farm

The proposed Baldon Wind Farm would be located 13km north of Moulamein, 55km east of Balranald, and 75km southwest of Hay. The project would sit within the Murray River and Hay Shire Council areas and is adjacent to the Edward River Council to the east.

The proposed site lies within the South-West Renewable Energy Zone (SWREZ) and would contribute significantly to the NSW Government's net-zero emissions by 2050 target sending clean, carbon-free renewable power into the NSW electricity grid.

The Baldon Wind Farm would include:

- Approximately 150-200 wind turbines exporting power to the national electricity market (NEM)
- Associated infrastructure such as roads, drainage, cabling and substations
- Battery energy storage systems (BESS)
- Associated construction facilities
- Accommodation camp for construction (if required)
- Operations and maintenance facilities.

Goldwind Australia

Goldwind is a global leader in manufacturing and installing wind turbines and can be found on six of our seven continents. With 24 years' experience in developing wind turbines, Goldwind has installed over 44,000 wind turbines worldwide – totalling over 89 GW of generation.

Goldwind Australia was established in 2009 with offices located in both Sydney and Melbourne. Goldwind Australia has over 1.8 GW of wind and solar farm projects operating or in development across the country and is responsible for developing the Baldon Wind Farm.

Thank you to those who came and visited our stall at the Celebrate Moulamein Festival on Saturday the 18th of February. It was a fantastic event with much to see and do. We were fortunate enough to discuss the project with over 50 attendees and look forward to future engagement opportunities within the local community in 2023.

How to learn more and provide feedback

It is important to us that the community has opportunities to provide feedback on the proposed project. There will be future opportunities over the coming months for near neighbours, Moulamein, Swan Hill, Balranald, and Hay residents along with the wider community members to come and chat with a member of the Project Team to learn more about the Proposal and have any questions answered.

You can also provide feedback by completing the online community feedback survey which will inform the Social Impact Assessment (SIA) within the Environmental Impact Statement (EIS). For further information, please visit our website.

Community Feedback Survey

Project Benefits

The Baldon Wind Farm project has a capital investment value of more than $30 million and is therefore deemed a State Significant Development (SSD). It would bring significant investment to the local area during construction and would create jobs, diversify income and increase revenue in local service providers such as food, fuel, lodging and tourism operators in the local area.

Once the project is operational, benefits would continue with long-term jobs, ongoing operations and maintenance contracts and the establishment of community benefit schemes.

The Proposal would also significantly contribute towards the NSW Government's aim of reaching net- zero emissions by 2050. It will provide clean energy supply for the NSW energy grid, providing stable, sustainable energy for the future.

Local Benefit Sharing

Goldwind Australia is always looking for ways to invest in the community to help support local initiatives and improvements. We would love to hear your ideas on local priorities and how to share project benefits in the community. In 2023, Baldon Wind Farm has sponsored the Celebrate Moulamein Festival and the Moulamein Easter Fair.

Please share your ideas on how we can invest in your community by attending the community information drop-in session or by emailing

Find out more

Your ongoing input is important to us. Should you have any questions about the project or have ideas on what we can do to support the local community, please send an email to info@baldonwindfarm.com or complete the community feedback form available online here.

Medard Boutry
Development Manager/Environmental Advisor
Goldwind Australia

Appendix E.16 Baldon Wind Farm EDM September 2023

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Baldon WIND FARM

Community Information Drop-in Sessions

You are invited to learn more about Baldon Wind Farm, meet the team, and provide your feedback by attending an information drop-in session.

There will be three information sessions, hosted at:

Balranald Senior Citizens Centre – Tuesday 12 September
106 Market Street, Balranald NSW
8.00 am - 1.00 pm

Hay War Memorial Hall – Tuesday 12 September
204 Lachlan Street, Hay NSW
4.00 pm - 7.00 pm

Moulamein Art Gallery – Wednesday 13 September
33 Morago Street, Moulamein NSW
8.00 am - 1.00 pm

Should you have any questions about the project or have ideas on what we can do to support the local community, please send an email to info@baldonwindfarm.com, complete the community feedback form available here, or call our team on **1800 050 209**.

You can also provide feedback by completing the online community survey.

We hope to see you soon.

Medard Boutry
Development Manager
Goldwind Australia

Appendix E.17 Baldon Wind Farm EDM October September 2023

Baldon WIND FARM

Community Information Sessions

Thank you to those who attended our information sessions held in Balranald, Hay and Moulamein on Tuesday the 12th and Wednesday the 13th of September.

We were fortunate enough to meet many members of the community who provided beneficial insight to our project team.

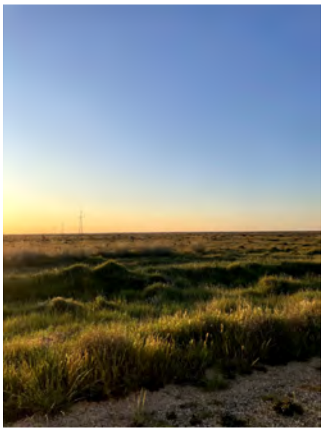
We thoroughly enjoyed our time spent in the area, and we look forward to future engagement opportunities.

Project updates

As mentioned in our last update, two additional meteorological mast were installed on the proposed site in September.

These structures are 130m tall and carry meteorological instruments, such as anemometers to measure wind speed and direction. There are now three meteorological masts on the site, which will help confirm the wind resources available. The met masts are complemented by the other wind monitoring devices, such as trailer-mounted SODAR units located on the site.

There has been extensive fieldwork completed across the project site throughout September and October, including ecological and heritage surveys. The results of these studies will further inform the project layout and will be inputs to the Environmental Impact Statement for the planning application.



Upcoming Engagement Opportunities

The Goldwind team are excited to be heading to the inaugural **Hay Education and Employment Expo** at NSW TAFE. The event will be attended by current and future local and regional businesses with employment and training opportunities showcased.

The Expo will be held from **5 pm to 8 pm on Thursday the 9th of November at 178/182 Lachlan St, Hay**. Come along to find out more!

Local benefit sharing

Goldwind Australia is always looking for ways to invest in the community to help support local initiatives and improvements. We would love to hear your ideas on local priorities and how to share project benefits in the community.

In 2023, Baldon Wind Farm has sponsored the Celebrate Moulamein Festival and the Moulamein Easter Fair, and is always looking for more opportunities to support the community.

Please share your ideas on how we can invest in your community by emailing info@baldonwindfarm.com.

Find out more

Your ongoing input is important to us. Should you have any questions about the project or have ideas on what we can do to support the local community, please email info@baldonwindfarm.com or complete the feedback form available online here.

You can also complete a community survey that will help to inform the social impact assessment (SIA) within the Environmental Impact Statement (EIS). Access this survey by clicking the button below.

Community Feedback Survey

We hope to see you at other information opportunities in the near future.

Kind regards,

Medard Boutry
Development Manager
Goldwind Australia

Our email address is:
engage@nghengage.com.au

Appendix E.18 Baldon Wind Farm Fact Sheet

Fact Sheet - May 2024

Proposal overview

Goldwind Australia is developing a planning application for the Baldon Wind Farm which will include a Battery Energy Storage System (BESS).

The proposed Baldon Wind Farm would include:

- Approximately 180 wind turbines exporting power to the national electricity market (NEM)
- Associated infrastructure such as roads, drainage, cabling and substations
- Battery energy storage systems (BESS)
- Temporary accommodation camp
- Operations and maintenance facilities

About the site

The proposed site is located 13km north of Moulamein, 55km east of Balranald and 75km southwest of Hay, NSW. The proposed site lies within the Murray River and Hay Shire Local Government Areas (LGAs) within the NSW South-West Renewable Energy Zone (REZ).

In July 2022, the Proposal moved into the Environmental Impact Statement (EIS) phase. As part of the EIS phase, we are seeking feedback from those who live and work in the area. The EIS is planned to be submitted and available for community review around mid-2024. Thank you to everyone who has provided feedback so far.

Key Benefits

Clean energy generation	The wind farm could generate the equivalent of the amount of electricity it takes to power over 700,000 NSW homes.
Clean energy storage	Provides reliable power for homes and businesses and brings stability to electricity network by releasing electricity when it is needed.
Income for the local area	The proposed wind farm would create jobs, diversify income and increase revenue to local services such as food, lodging and tourism.
Community Benefit Schemes (CBS)	Ongoing benefits for the local community would be available through CBS.

About the developer

Goldwind Australia are a leading wind power solutions provider in Australia and abroad, committed to sustainable development through balanced environmental projects across a wide suite of services.

Goldwind works alongside local communities to select and design projects that generate overall positive impacts on the community and environment.

Detailed studies to date

The detailed studies that inform the EIS are coming to an end. The preliminary biodiversity and cultural heritage surveys are now finalised, and a number of threatened flora, fauna and animal species, as well as over 200 cultural sites, were identified.

The information gathered by these surveys has allowed Goldwind to work to preserve areas of high biodiversity and cultural heritage value. The feedback received from the community has also been incorporated into the design of the project.

Questions and feedback

For more information on project updates, notices of upcoming community information sessions and to complete the Community Feedback Survey, visit https://baldonwindfarm.com or email info@baldonwindfarm.com. You can also reach the team by calling 1800 050 209.

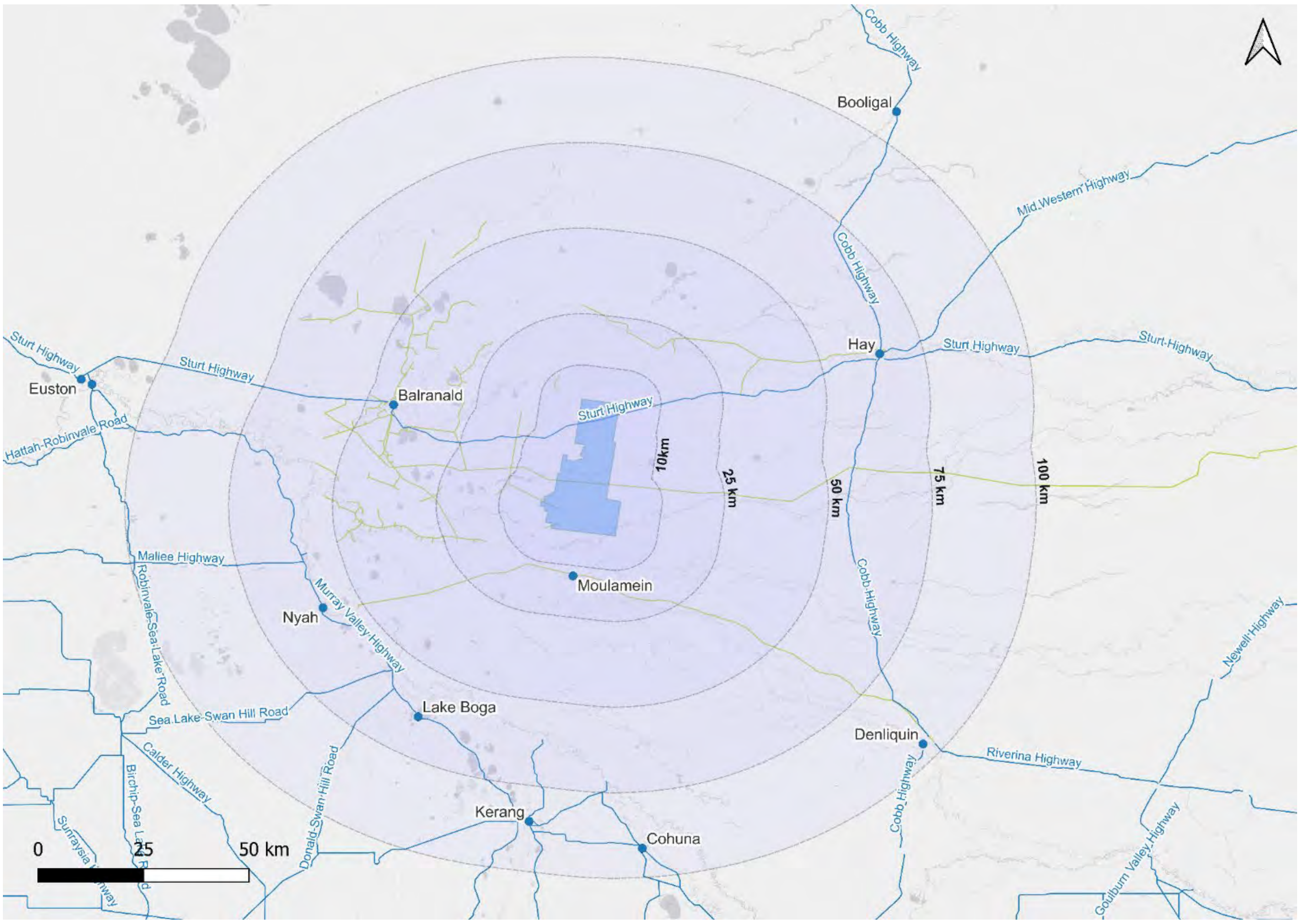


Figure 2.1 Site location

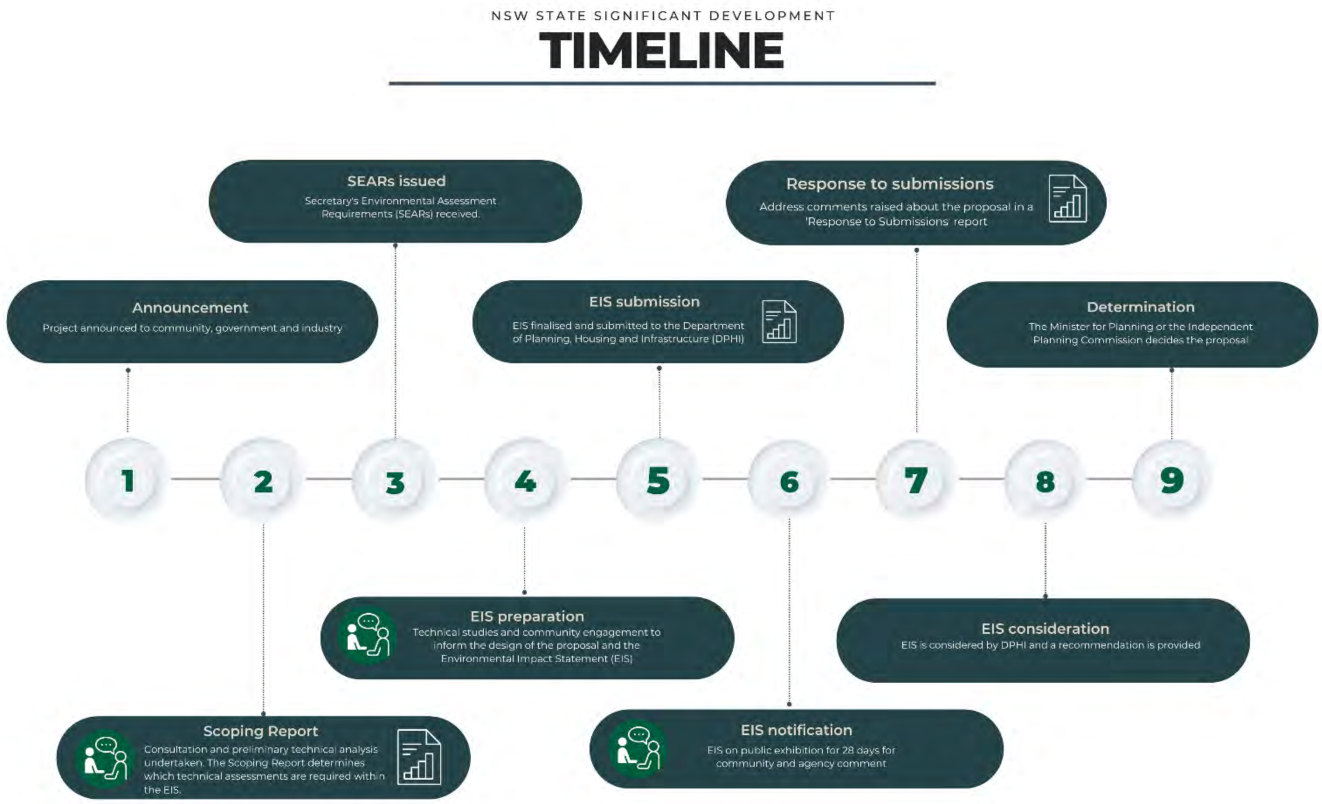


Figure 1.2 NSW SSD Timeline

Appendix E.19 Baldon Wind Farm FAQ

Baldon Wind Farm

The Proposal is within the Hay Plains area in the South-West Renewable Energy Zone (SWREZ). The wind farm would be located on freehold land used for sheep grazing in an area over 46,000 hectares in size. The site is located 13km north of Moulamein, 55km east of Balranald and 75km southwest of Hay in NSW. The proposed site sits within the Murray River and Hay Shire Council areas and is adjacent to the Edward River Council area to the east.

2. What is the project status?

The project is moving towards the final stages of the Environmental Impact Assessment (EIA). The Department of Planning and Environment (DPE) issued the Secretary's Environmental Assessment Requirements (SEARs) in July 2022, which triggered the Environmental Impact Statement (EIS) stage.

The EIS stage involves detailed site investigations and technical assessments including biodiversity, Cultural Heritage, noise, traffic, transport, and visual impact assessments. The results of these technical assessments as well as community engagement outcomes has assisted in refining the project infrastructure layout to date.

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Once the 28-day period is up, the submissions are compiled and delivered back to Goldwind. We will then prepare a Response to Submissions Report, which will address all items identified during the public exhibition submission period.

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3. How many wind turbines would the proposed site have?

This project could host approximately 180 wind turbines, as well as the necessary associated infrastructure. The initial Scoping Report applied for approximately 162 wind turbines on the site, however, this was updated as additional land became available for the project.

4. How much electricity would a wind farm of this size generate and how many homes in NSW would this power?

Given the number of turbines highlighted in early assessments, the site could produce over 1000MW of electricity. This is equivalent to powering over 700,000 homes in NSW.

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The land is currently used for sheep grazing. There is an existing 220kV power line that runs through the centre of the site and the new Project Energy Connect 330kV line is being built next to the current line also.

7. How long is the lifecycle of a wind farm?

Generally, a wind farm will operate for approximately 25-30 years.

8. What will happen to the turbines and the land at the wind farm's end of life?

Once the wind turbines have reached their end of usable life, the wind turbines would be decommissioned and removed (and recycled), or the wind farm may be refurbished and repowered. If the wind farm is to be decommissioned, the land would be rehabilitated and returned to its original use. The decommissioning process is an important part of the development application process, and decommissioning and rehabilitation objectives are required to be met as part of the Development Consent, outlined by the NSW Department of Planning and Environment.

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It is important to acknowledge that wind turbines do have a visual impact on the landscape. The EIA process assesses the potential impact and provides the planning authority information to make an informed decision on the application. However, we will work with the local community and surrounding landholders throughout the process to ensure the visual impact is minimised or mitigated where possible.

10. Are wind turbines noisy?

Like anything that moves – including farm machinery, vehicles and trucks – wind turbines do generate some sound. Noise varies on the position of the turbine, the shape of the site, where the listener may be situated and the direction the wind may be blowing.

A specialist noise consultant will carry out a formal noise assessment which will be included in the EIS. This will ensure that potential noise impacts to neighbouring properties meet the minimum noise requirements and that potential noise impacts are appropriately mitigated. Once the development is operational, noise levels on the wind turbines would be tested again to ensure compliance.

11. Will Cultural Heritage be preserved and protected?

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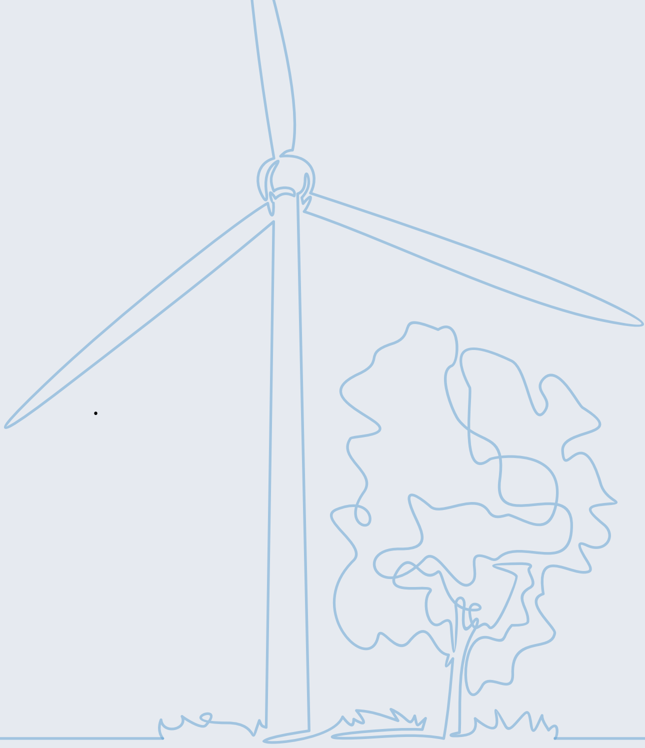
14. Is it possible that the wind turbines make it harder to fight a fire should one start on site?

There is no evidence to suggest that wind farms increase fire risks. Wind turbines are treated like any other piece of infrastructure that needs to be managed adequately. The wind farm roads would make it easier for emergency vehicles to access and drive around the site should a fire start.

15. How will Goldwind engage with the community and key stakeholders during the EIS phase?

Goldwind is committed to working with the community and other key stakeholders as part of the EIS process and beyond. Stakeholders will be given an opportunity to have their say at several engagements within the local region. The community will have both face-to-face and virtual opportunities to ask any questions, discuss concerns and community benefit sharing options with Goldwind.



Appendix E.20 Baldon Wind Farm Social Tile

Appendix F Technical reports

F.1 Biodiversity Development Assessment Report and Offset Strategy

The bird and bat collision risk assessment is included as appendices of the BDAR (Appendix J).

MNES Supplementary SEARs are addressed as an appendix of the BDAR (Appendix N).

The Offset Strategy is a standalone document included after the BDAR within this Appendix F.1.

F.2 Aboriginal Cultural Heritage Assessment Report

F.3 Landscape and Visual Impact Assessment

F.4 Social Impact Assessment

F.5 Traffic Impact Assessment

F.6 Noise and Vibration Impact Assessment

F.7 Soils, Land and Agricultural Impact Assessment

F.8 Preliminary Hazards Assessment

F.9 Aviation Impact Assessment

F.10 EMI & EMF Assessment

F.11 Blade Throw Assessment

Appendix G Technical Appendices

G.1 Air quality

1. Air Quality Technical Appendix

1.1. Legislative and policy setting

The Protection of the Environment Operations Act 1997 (POEO Act) sets the statutory framework for managing air quality in NSW, including establishing the licensing scheme for major industrial premises and offences and penalties for a range of air pollution issues. As a state significant wind farm seeking approval under Part 4 of the Environmental Planning and Assessment Act 1979, the Baldon Wind Farm would require a licence under this act.

1.2. Approach

The *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Approved Methods) (NSW Environment Protection Authority (EPA), 2016) lists the statutory methods for modelling and assessing emissions from stationary sources in the state of NSW. This document is referred to in Part 5: Air Impurities Emitted from Activities and Plant in the Protection of the Environment (Clean Air) Regulation 2021.

1.3. Existing environment

The Project is located in a low population density area between Balranald and Hay and comprises of two landholdings. The largest nearby population centres are Hay, Balranald and Deniliquin. While the sealed Sturt Highway dissects the north of the Project site, all local roads in the vicinity of the site are unsealed.

The Baldon Wind Farm project site is approximately 46,259 hectares. It is primarily utilised for low density grazing; 1 sheep per 2 ha is typical for the region. Irrigation infrastructure onsite has been made redundant. Regional land use and immediate near neighbours land use are consistent with the Project area and include livestock grazing, broad acre dryland cropping and in some instances irrigated cropping. There are no facilities within the Balranald Shire LGA that are required to report their emissions as part of the National Pollutant Inventory (NPI).

In this plains country between the Murray River to the south and Murrumbidgee River to the north, the soil exposure is seasonally high due to limited rainfall in the area (336mm per year on average). Extensive onsite land degradation was apparent in the 1990's including soil loss. Rehabilitation trials in about 1995 – 97 accompanied with lesser stocking rates have seen the soils stabilised and the native vegetation communities restored to good condition in most of the site. This historical information was sourced for host landholders, Local Land Services and current conditions are verified by the ecological surveys reported in Section 7.1 of the EIS.

Existing sources of air pollution within the area are limited. They are primarily comprised of dust from unsealed local roads and tracks and machinery exhaust emissions associated with transportation and agricultural activities. Bushfires and dust storms are a source of seasonal air pollution.

There are no air quality monitoring stations close to the area. Wagga Wagga and Albury stations do not represent the environmental conditions of the Project site. These two areas are populated centres with some industrial zones which emit pollutants to the air. The air quality at the Subject site is therefore assumed to be better than these two centres generally, because of lack of settlement and industries releasing air pollutants, subject to seasonal factors such as rainfall.

Sensitive receivers

There are 26 sensitive receivers (all dwellings) within a 10km buffer of the construction disturbance footprint that has been delineated for the Project. Five are considered 'project-associated' and as such, impacts for these dwellings do not require assessment. Refer to Table 1-1.

Table 1-1 Sensitive receivers within 10km of the construction disturbance footprint

Receiver	Status	Nearest Turbine	Distance to nearest wind turbine (m)	Direction from Project
Hells Gate RO4a	Non-associated	1	7,591	NNE
Hells Gate RO4b	Non-associated	1	7,544	NNW
Hells Gate RO5a	Non-associated	1	7,211	NNW
Hells Gate RO5b	Non-associated	1	7,092	NNW
Hells Gate RO5c	Non-associated	1	6,960	NNW
RO6a	Associated	4	3,139	N
RO6b	Associated	4	3,093	N
RO6c	Associated	4	3,073	N
RO7	Non-associated	6	6,938	NNE
R13	Non-associated	25	5,114	NE
R12	Non-associated	40	7,019	W
R14	Associated	56	955	-
R15a	Non-associated	57	3,657	E
R15b	Non-associated	57	3,767	E

Receiver	Status	Nearest Turbine	Distance to nearest wind turbine (m)	Direction from Project
R16	Non-associated	57	8,298	E
R19a	Non-associated	115	8,101	WSW
R19b	Non-associated	115	8,217	WSW
R19c	Non-associated	115	8,101	WSW
R20a	Non-associated	65	6,434	WSW
R20b	Non-associated	65	6,420	WSW
R21	Associated	115	855	-
R24	Non-associated	131	5,178	SSW
R28	Non-associated	168	6,534	SSW
R27	Non-associated	174	6,623	S
R25a	Non-associated	180	10,022	SE
R25b	Non-associated	180	10,004	SE

Figure 1-1 Sensitive receivers within 10km of the construction disturbance footprint

Climatic factors

Wind speed and direction

Wind speed and direction plays vital part on how air pollutants are distributed in the atmosphere. Wind speed data for past 12 months at the nearest Bureau of Meteorology monitoring station at Balranald (RSL) station shows the wind speed is highest during summer months (Bureau of Meteorology, 2023). This coincides with the hotter conditions and therefore lower soil moisture content, which may increase dust.

A monthly minimum, maximum and mean wind speed is plotted in Figure 1-2. The wind speed data shows that the area does not record high wind speeds. Wind direction is other factor which determines impact on potential receptors. The wind direction is also noted to be predominantly northern and western during winter months of April to October and predominantly in southern direction during summer months of November to March. In drought and low rainfall periods, with reduced ground cover and increased wind activity, dry soils will be exacerbated. Figure 1-3 and Figure 1-4 show the average annual dominant wind direction at 9am and 3pm respectively.

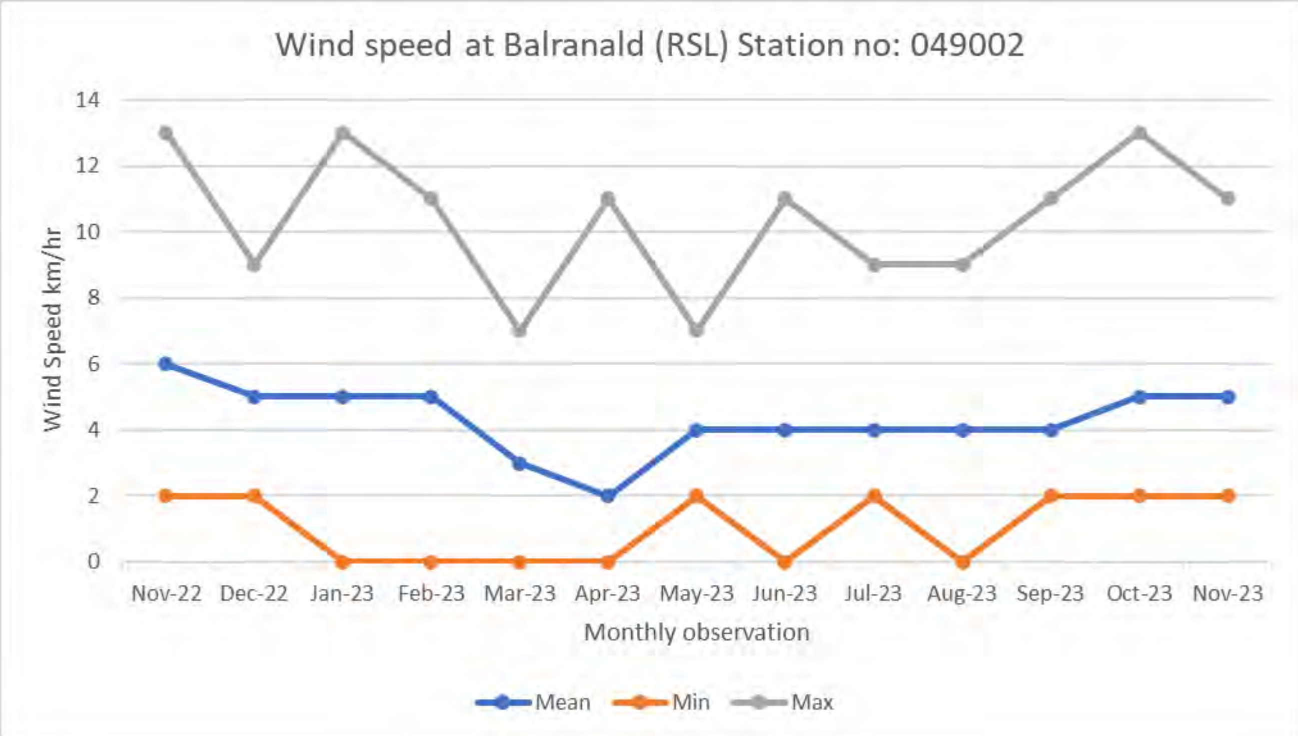


Figure 1-2 Monthly wind speed at Balranald (RSL) station number 049002

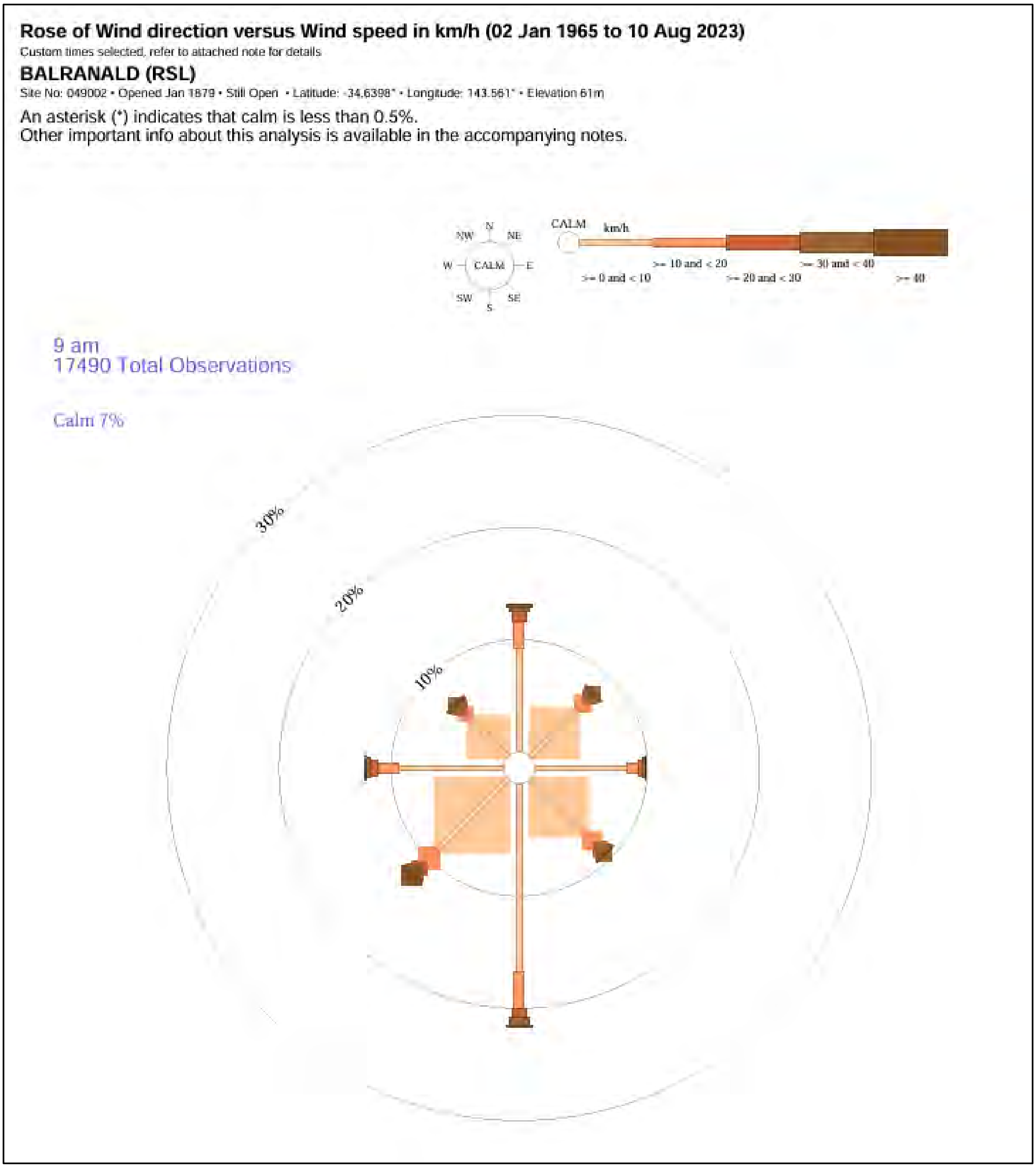


Figure 1-3 Predominant wind direction 9am and speed Balranald (RSL) station number 049002

BOM Years 1965 – 2032 (BOM , 2023)

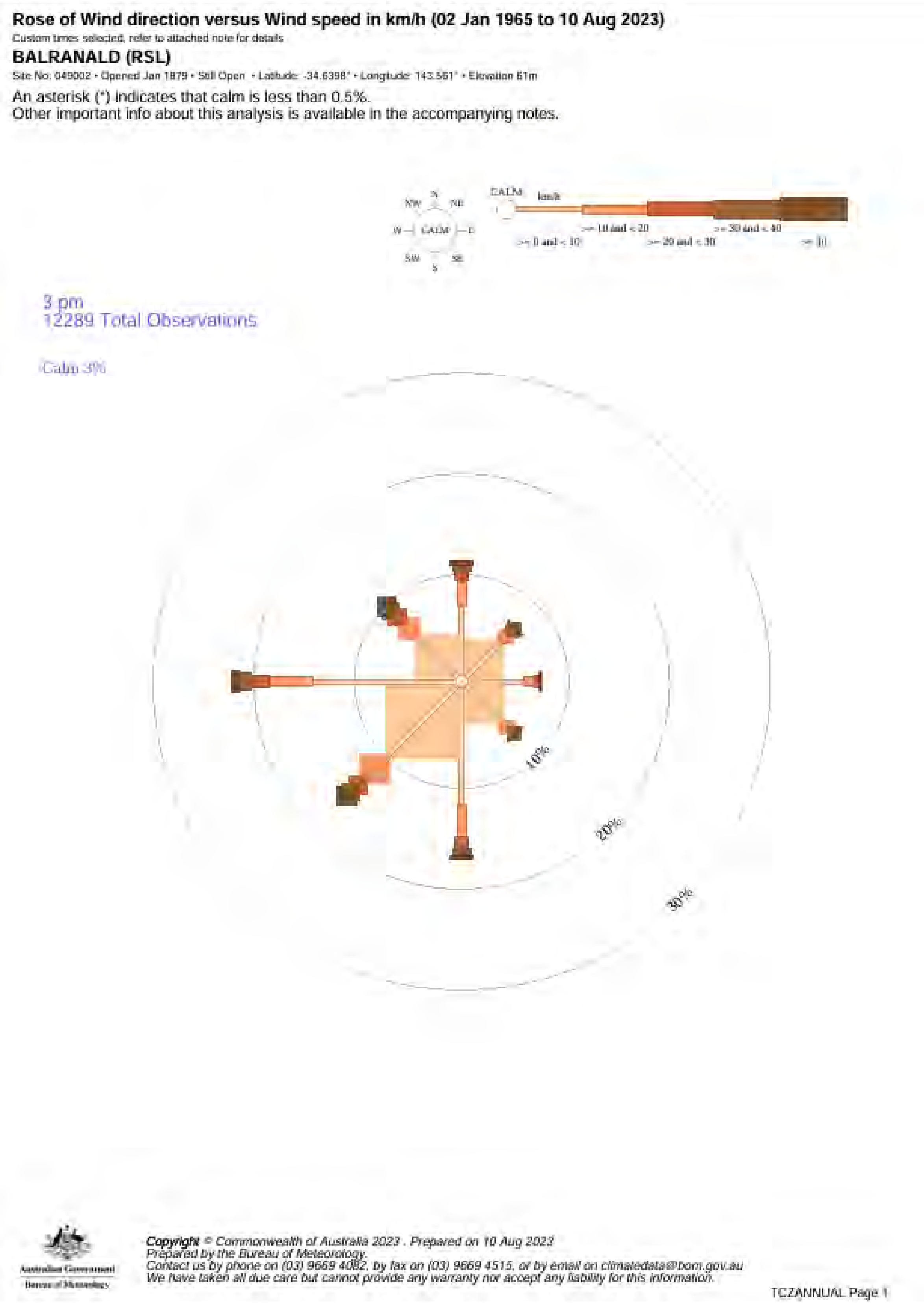


Figure 1-4 Predominant wind direction 3pm and speed Balranald (RSL) station number 049002

1.4. Air quality assessment

Approach

Air quality changes can occur when emissions from an industry or activity leads to the deterioration of the ambient air quality. Potential air quality issues have been identified from a review of the construction and operation of the Project. This identification process has considered the types of emissions to air and proximity of these emission sources to sensitive receptors.

Left unmanaged, dust emissions have the potential to negatively impact on air quality. Due to the scale of the Project, the significance and impacts of dust from the construction of the Project have been determined from qualitative assessment that considers (from the construction disturbance footprint):

- The proximity of construction activities to sensitive receivers
- The assessment criteria
- The existing environment
    - o Air quality conditions
    - o Prevailing winds
- The nature and scape of the activities.

Air quality is quantified by the concentrations of particulates in the ambient air. Air pollution occurs when there are exceedances (higher concentrations than usual) of one or more substances known to negatively impact on human health, generate a nuisance or cause adverse environmental effects.

Criteria

The EPA has published criteria for a range of air quality indicators, including particulate matter that are used for the assessment of specific projects. These criteria are detailed in the Approved Methods (EPA, 2022). Table 1-2 shows the relevant EPA assessment criteria which apply to existing and potential sensitive receptors. The Approved Methods (EPA, 2022) defines a sensitive receptor as " *a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area".*

Table 1-2 EPA air quality assessment criteria

Air quality indicator	Average period	Concentration
Particulate matter (PM10)	24-hour	50 µg/m3
	Annual	25 µg/m3
Particulate matter (PM2.5)	24-hour	25 µg/m3
	Annual	8 µg/m3
Particulate matter (TSP)	Annual	90 µg/m3

Air quality indicator	Average period	Concentration
Deposited dust	Annual (maximum increase)	2 g/m2/month
	Annual (maximum total)	4 g/m2/month

Particulate Matter (PM) 10 and 2.5 Concentration

Particulate matter (PM) is a term that describes extremely small solid particles and liquid droplets suspended in air (NSW Health, 2023). Particulate matter can be made up of a variety of components including nitrates, sulphates, organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mould spores). Particle pollution mainly comes from motor vehicles, wood burning heaters and industry. During bushfires or dust storms, particle pollution can reach extremely high concentrations (NSW Health, 2023).

The size of particles affects their potential to cause health problems PM10 (particles with a diameter of 10 micrometres or less) are small enough to pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. $PM_{2.5}$ (particles with a diameter of 2.5 micrometres or less) are so small they can get deep into the lungs and into the bloodstream. Exposure to PM2.5 over long periods (years) can cause adverse health effects.

PM10 and PM2.5 are regularly monitored in NSW. Most of the monitoring stations are located in city areas. The closest monitoring stations to our Project are Wagga Wagga North and Albury monitoring station. Monitoring results at these stations for the last two years are shown in Figure 1-5 Monthly average PM10 concentration in Albury and Wagga Wagga North monitoring stations and Figure 1-6 Monthly average PM2.5 concentration in Albury and Wagga Wagga North monitoring stations. These shows that the PM10 results are within the recommended levels of annual average of 25 $\mu g/m^3$ (EPA, 2022). PM2.5. While there are some monthly exceedances, the overall annual average is below recommended level of 8 $\mu g/m^3$ (refer Table 1-4).

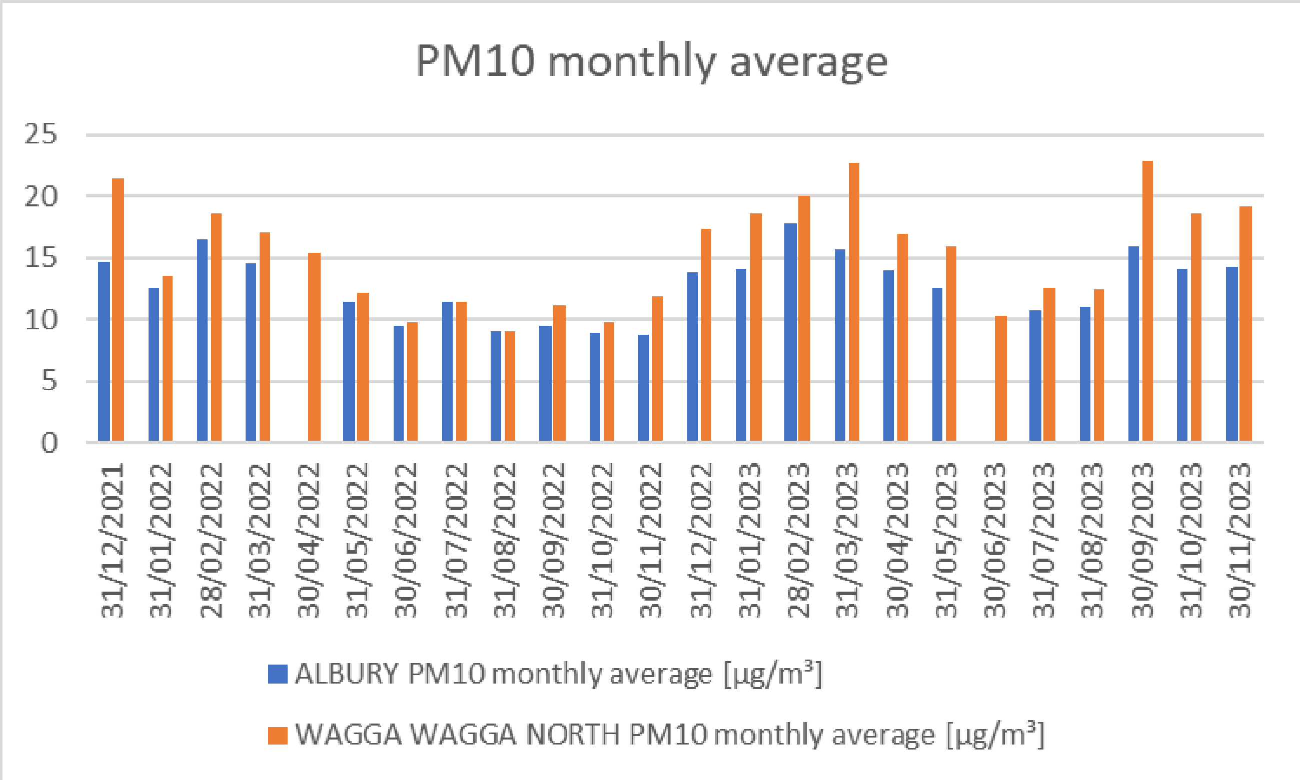


Figure 1-5 Monthly average PM10 concentration in Albury and Wagga Wagga North monitoring stations

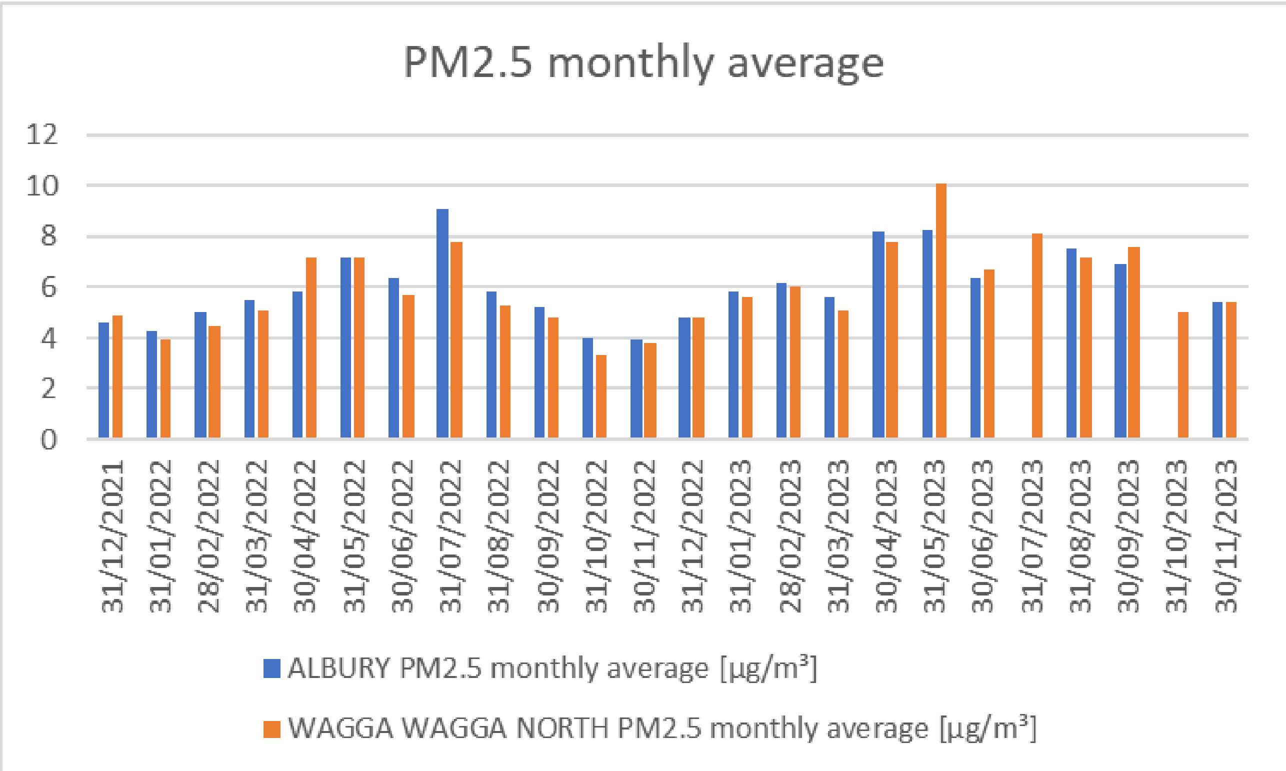


Figure 1-6 Monthly average PM2.5 concentration in Albury and Wagga Wagga North monitoring stations

Air quality in the Riverina is often influenced by drought conditions. The most recent of these was between 2019 and 2019. With lower than average rainfall and subsequent bushfire activity in 2020, there was significant deterioration of air quality. Following the 2020 bushfires, average to higher than average rainfall has occurred in the region and as such, an increase in vegetative cover, and a reduction of particulate matter in the ambient air leading to an improvement in air quality.

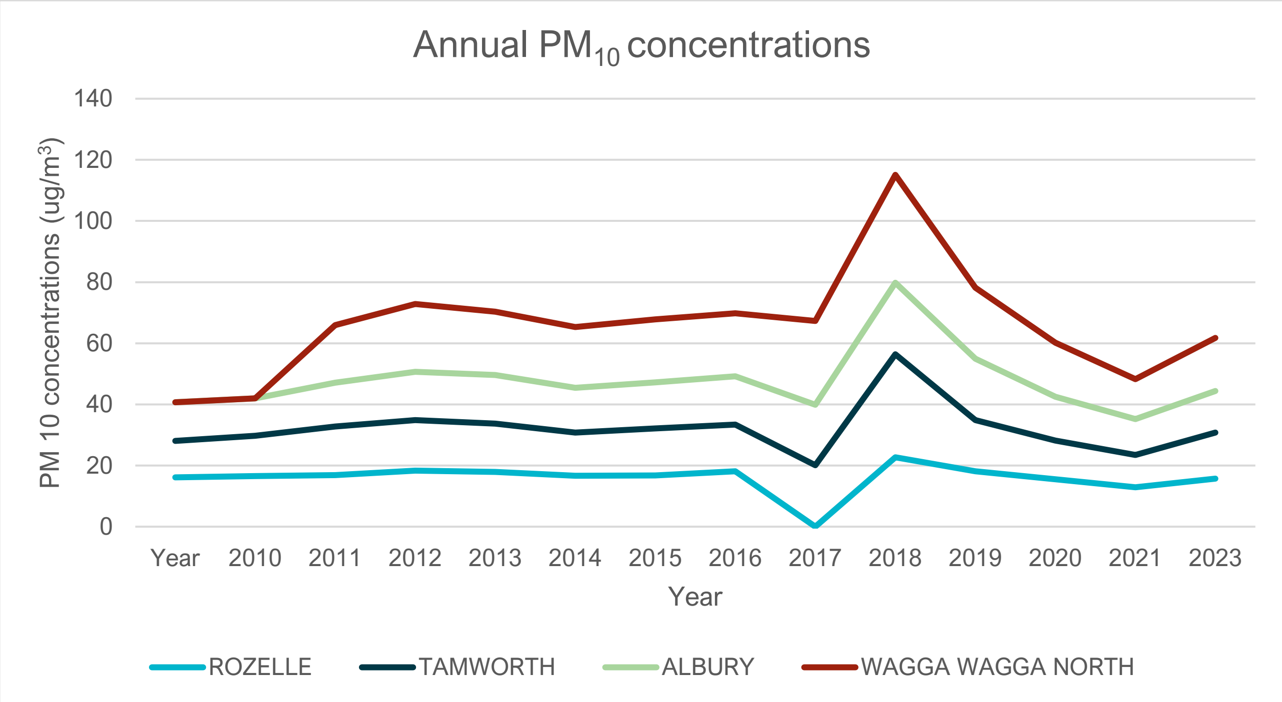


Figure 1-7 Annual PM10 concentrations at nominated NSW air quality monitoring sites.

All monitoring stations have similar trends which reflect environmental conditions during extreme events. Wagga Wagga is trending much higher than the other stations and would not be representative of the existing conditions of the Project site. Due to significant lack of historical collection of data at or near the site that would represent the conditions at or near the Project site, data from the Albury monitoring station is also used as part of this assessment.

The EPA concentration limits used for the assessment criterion is from Table 11 Impact assessment criteria (section 7) of the Assessment methods (EPA, 2022).

Particulate matter (PM10)

Table 1-3 presents the measured annual average PM10 concentrations recorded at Albury. All records are below the criterion set by the EPA of 25 µg/m^3 (refer Table 1-3). The increase in annual levels in 2019 and 2020 can be attributed to the widespread bushfires experienced by the majority of the eastern states during that time.

Table 1-3 Recorded PM10 concentrations recorded at Albury

Year	Annual average PM10 (µg/m^3)	EPA assessment criterion (µg/m^3)
2016	15.1	
2017	15.8	

Year	Annual average PM10 (µg/m^3)	EPA assessment criterion (µg/m^3)
2018	19.8	25
2019	23.4	
2020	20.1	
2021	14.3	
2022	11.7	
2023	13.6	

Particulate matter (as PM2.5)

Air quality criteria for PM2.5 are usually set to protect against adverse health impacts. Records for the monitoring station in Albury started in 2017 and is presented in Table 1-4.

Table 1-4 Measured PM2.5 concentrations recorded at Albury

Year	Annual average PM2.5 (µg/m^3)	EPA assessment criterion (µg/m^3)
2017	7.3	8
2018	7.3	
2019	10.1	
2020	11.1	
2021	7.3	
2022	5.6	
2023	6.5	

Particulate matter total suspended particulates (TSP)

Air quality criteria for TSP is set to protect against visual amenity impacts. No known active monitoring of TSP is conducted near the project site. The EPA sets the upper limit of this as 90 µg/m^3. It is expected that the Project site would record values lower than this.

Deposited dust

Air quality criteria for TSP is set to protect against visual amenity impacts. No known active monitoring of deposited dust is conducted near the projects. The EPA criteria for this is 2 g/m2/month (maximum increase in deposited dust level) and 4 g/m2/month (maximum total deposited dust level).

It is expected that air quality would be better, or lower at the Project site due to its remoteness to industry and population centres.

The review of existing air quality data and environment indicates that:

- The nearest quality air quality monitoring data was from the NSW Government monitoring station in Albury.
- Air quality is strongly correlated to climatic conditions.
- Concentrations of the key air quality indicators is expected to be lower near the Project than in the areas of high population density and associated industry hubs.

1.5. Cumulative impact on air quality

Although the individual pollution levels are below the trigger levels, the total cumulative impact from other large construction projects or during specific climatic events has potential to degrade air quality and increase hazards through reduced visibility. This combined effect is known as cumulative air quality impact.

There are currently several large-scale projects prosed for the South West Renewable Energy Zone; more projects than the grid has capacity to accommodate. It is difficult to ascertain which projects will be progressed however, this assessment has taken the ‘worst case’ scenario that all projects currently being planned may be approved with overlapping construction programs. Three of these projects are within 3km of the site and could possibly generate cumulative adverse air quality impacts.

Table 1-5 Development activities with a potential to cause cumulative air pollution

Project	Description of Project	Stage	Distance to Project	Assessment
Keri Keri Wind Farm	Development of a wind energy generation project with up to 170 wind turbines, with transmission connection, energy storage and associated infrastructure.	Prepare EIS	Adjacent to project (western side)	Depending on the timing of construction for both projects, the cumulative impact could be high if left unmitigated. Minimisation of dust will be required by both projects.

Project	Description of Project	Stage	Distance to Project	Assessment
Keri Keri Solar Farm	Development of a 400 MW solar farm and associated infrastructure.	Prepare EIS	Adjacent to project (western side)	Depending on the timing of construction for both projects, the cumulative impact could be high if left unmitigated. Minimisation of dust will be required by both projects.
Tchelery Wind Farm	Construction and operation of a wind farm with up to 120 wind turbines and associated infrastructure.	Prepare EIS	Within 3km east of the Project	Depending on the timing of construction for both projects, the cumulative impact could be high if left unmitigated.
Wilan Wind Farm	Development of a wind farm with up to 138 wind turbines, energy storage and associated infrastructure.	Prepare EIS	Within 10km to the west of the Project	Depending on the timing of construction for both projects, the cumulative impact could be high if left unmitigated.
The Plains Wind Farm	Development of a wind farm with up to 226 wind turbines and associated infrastructure	Prepare EIS	46km to the east of the Project	Depending on the timing of construction for both projects, the cumulative impact would be low due to the distance to the Project and prevailing wind conditions.
The Plains Solar Farm	Development of a 400 MW solar farm with energy storage and associated infrastructure.	Prepare EIS	53km to the east of the Project	Depending on the timing of construction for both projects, the cumulative impact would be low due to the distance to the Project and prevailing wind conditions
Junction Rivers Wind Farm (formerly known as Burrawong)	Development of a 750 MW wind farm, including 96 turbines (up to 300m), battery storage and ancillary infrastructure.	Prepare EIS	23km to the west of the Project.	Depending on the timing of construction for both projects, the cumulative impact would be low due to the distance to the Project and prevailing wind conditions.
Sunraysia Solar Farm	Development of a 200 MW solar farm and associated infrastructure.	Determined	44km to the west of the Project	Cumulative impact is unlikely due to being in operational phase

Project	Description of Project	Stage	Distance to Project	Assessment
Limondale Solar Farm	Development of a 250 MW solar farm and associated infrastructure.	Determined Operational	44km to the west of the Project	Cumulative impact is unlikely due to being in operational phase.

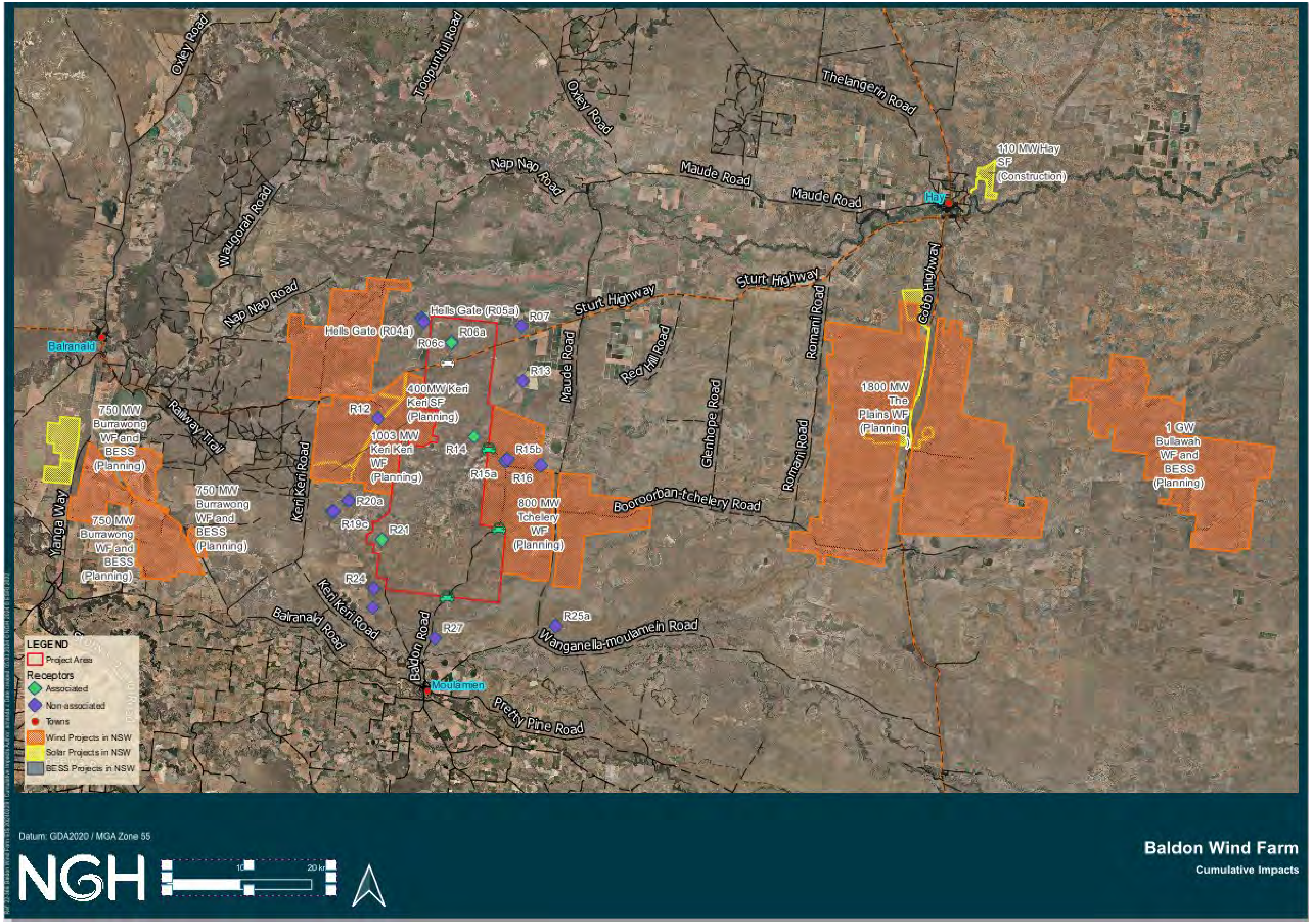


Figure 1-8 Nearby Major Projects

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G.2 Waste

1. Waste and recycling technical appendix

1.1. Legislative and policy setting

The Baldon Wind Farm SEARs require that the EIS:

> *Identify, quantify and classify the likely waste stream to be generated throughout all stages of the project, and describe the measures to be implemented to reduce waste generation, manage, reuse, recycle and safely dispose of this waste.*

The key instruments governing waste management and recycling in NSW include:

- NSW Protection of the Environment Operations Act 1997
- NSW Protection of the Environment Operations (Waste) Regulation 2005 (POEO Act).
- NSW Waste Avoidance and Resource Recovery Act 2001
- NSW Wate Avoidance and Resource Recovery Strategy 2014-2021
- NSW Waste and Sustainable Materials Strategy 2041, Stage 1: 2021:2027
- NSW Environmental Planning & Assessment Act 1979 (EP&A Act), specifically Ecologically Sustainable Development
- NSW Waste Classification Guidelines 2014
- NSW Water Management Act 2000
- Commonwealth Hazardous Waste Act 1989

The legal requirements for the management of waste are established under the NSW Protection of the Environment Operations Act 1997 and the Protection of the Environment Operations (Waste) Regulation 2005. Unlawful transportation and deposition of waste is an offence under section 143 of this act.

The NSW Waste Avoidance and Resource Recovery Act 2001 sets out the resource management hierarchy principles to encourage the most efficient use of resources and to reduce environmental harm. The objects of the Act are to encourage the most efficient use of resources to reduce environmental harm in accordance with the principles of ecologically sustainable development and to ensure that resource management options are considered against the hierarchy below.

The hierarchy requires resource management options be considered in the following order:

- Avoidance of unnecessary resource consumption
- Resource recovery (including reuse, reprocessing, recycling and energy recovery)
- Disposal, as a last option.

The NSW Waste Avoidance and Resource Recovery Strategy 2014-2021 provides a framework for achieving the statutory objectives. This strategy sets clear directions for a range of priority areas that align with NSW Government's waste reforms and aims to support investment in infrastructure to encourage innovation and improve recycling behaviour. The strategy includes developing new markets for recycled materials and reducing litter and illegal dumping. It sets the direction for other related programs, policies and plans that work to minimise the impact of waste on the environment and human health.

The NSW Waste and Sustainable Materials Strategy 2014 has a focus on meeting future infrastructure and service needs, reducing carbon emissions through better waste and materials management and protecting the environment and human health from waste pollution.

The Environmental Planning & Assessment Act 1979 (EP&A Act) identifies five principles in relation to Ecologically Sustainable Development:

1. Intergenerational equity
2. Protection of biodiversity and maintenance of essential ecological processes
3. Integration of economic, social and environmental factors
4. The precautionary principle
5. Adoption of policy instruments such as improved valuation, pricing and incentive mechanisms.

The is a strong link between these principles and the management of waste.

Commonwealth Hazardous Waste Act 1989 aims to regulates the export, import and transit of hazardous waste.

1.2. Existing environment

1.2.1. Site context

The Baldon Wind Farm project site is primarily utilised for low density grazing; 1 sheep per 2 ha is typical for the region. Irrigation infrastructure onsite has been made redundant. Extensive degradation was apparent in the 1990's. Rehabilitation trials in about 1995 – 97 accompanied with lesser stocking rates have seen the soils stabilised and native vegetation community restored to good condition in most of the site.

The current waste streams are minimal considering the size of the site; about 46,266 hectares in total. Wastes pertain to:

- Agricultural inputs: chemical and container disposal
- Machinery waste: batteries, tyres, fuels and lubricants
- Building waste: packaging, fencing, building materials.

1.2.2. Regional context

Regional capabilities are highly relevant for ensuring waste reuse and recycle options are fully explored. The region has low population density over large distances, which limits waste collection, separation, reuse and recovery options.

In such a large region, transport of resources and of waste is also highly relevant. Transport contributes proportionally higher resources costs (fuels) and wastes (vehicle emissions) as part delivering and servicing residents and commercial operations, including renewable energy projects, in the region. Sourcing local resources and disposal options and building local capabilities for separation, reuse and recycling become more important.

Specific facilities are located at:

- Murray River LGA:
    - Moama Waste Management Facility 91 Centre Road, Moama
    - Mathoura Waste Transfer Station 27 Clifton Street West,
    - Mathoura, Barham Waste Transfer Station 732 East Barham Road, Barham,

  - Koraleigh Landfill, 505 Koraleigh Rd, Koraleigh, Wakool Landfill, 6280 Wakool Rd, Wakool,
  - Moulamein Landfill 126 Tchelery Road, Moulamein

  Only domestic quantities of recycling materials are accepted at these sites.

- Hay LGA:
  - Hay Waste Disposal Thelangering Road
  - Access to the old landfill site is negotiable with council.

  Only domestic quantities of recycling materials are accepted at these sites.

- Edward River:
  - Deniliquin Landfill Depot Tip Road off Cobb Highway
  - Blighty Waste Disposal Depot
  - Conargo Transfer Station
  - Pretty Pine Transfer Station

  Construction, demolition and industrial waste are not accepted at Pretty Pine, Conargo or Blighty.

- Balranald LGA
  - Balranald Waste Management Facility (accepts DrumMuster containers)

Metal recycling is available at the Deniliquin Landfill Depot as well as in Wagga Wagga. Independent metal recycling contractors can support the collection and recycling of metal waste.

It is noted that Murray River, Edward River and Hay Shire are part of the Riverina and Murray Joint Organisation (RAMJO) Riverina Waste Group, providing for a collaborative approach across six council areas to reduce the amount of waste disposal at landfill sites and develop facilities which individual councils could not afford independently. The voluntary group works collaboratively to deliver projects, programs and education to assist the member councils with waste disposal and sustainability issues. Of note, RMJO is involved in the 'Sunset on Solar' project which aims to divert end of life solar panels from across southern NSW landfills for further processing. It is a proof of concept program which could in theory be extended to consider the wind industry.

Funding for improved waste treatment for the region was secured in 2022. Hay Shire Council will construct a $1.8 million materials recovery facility. It will allow Hay and surrounding councils to expand recycling capabilities, with 6,400 tonnes of waste being recovered annually. Plans are included for a new sorter, crusher, shredder and baler will recycle plastics, glass, paper, cardboard and tyres as well as construction and demolition waste. This development will support environmental sustainability and is a major stepping-stone towards sustainable waste practices in the region. It is also expected to boost employment, with the creation of additional local jobs.

1.2.3. Industry context

When compared to the major electricity generating methods employed in Australia, wind farms are favourable in terms of the potential to reuse and recycle component parts as well as their short energy payback time in comparison to the life span of the project.

- The wind turbines and transmission requirements contain high proportions of useful metals, able to be recycled.

- The payback time for wind turbines is found to be between 2.5 -10 months (Guezuraga et al (2012)) (IPCC, 2011).

While some of the larger components (batteries, wind turbine blades) have long life spans (10-30 years), there are currently limited commercially feasible end of life options. This is an emerging industry and the concentration of large-scale renewable energy infrastructure in the Renewable Energy Zones is expected to assist the development of these options in a way which benefits the regions. Of note:

- Batteries: Australia currently only recycles 2% of its lithium-ion battery waste, compared to 98% of lead acid batteries, however, the CSIRO is confident that lithium-ion batteries are highly recyclable would be used to manufacture new batteries in the future as the demand for these batteries increases (CSIRO, 2019).
- Blades: There are currently limited commercially feasible end of life options for turbine blades. The most common way is mechanically breaking down the blades into short fibres or powder for use in concrete batching or easier disposal to landfill. Emerging opportunities will see the use of resins that can be separated from the other components allowing the materials to be reused in other applications more easily. Blades can also be used largely intact as repurposed building structures, such as bus shelters.
- Approximately 85–94 per cent of a wind turbine (by mass) is recyclable and can be recycled in Australia – mostly steel, aluminium, copper and cast iron. This is well above the national average for commercial and industrial waste streams in 2018-19 (57 per cent) and the National Waste Policy Action Plan target (80 per cent average resource recovery rate across all industries by 2030) **Invalid source specified.**.
- An estimated 15,000 tonnes of blade composite waste will have been created in Australia by 2034 due to decommissioned wind farms, and up to 4000 tonnes in any given year **Invalid source specified.**.
- Resale of components for reuse on other projects will also be feasible for many components.

The composition of a typical turbine is shown below.

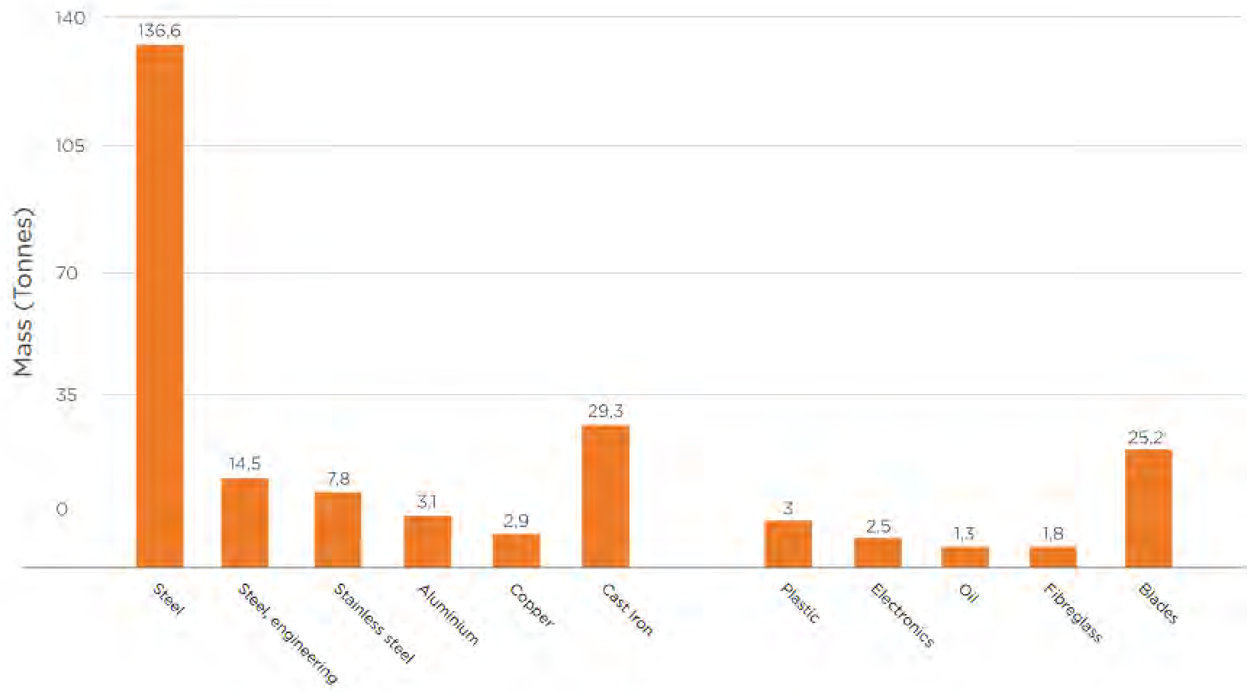

Figure 1-1 Vests V82 1.65 MW wind turbine composition by weight.

Other State Significant Developments have identified opportunities for reuse of construction waste within local communities:

- Mens sheds
- TAFEs, high schools and trade schools
- Day care centres
- Sporting grounds
- Local farmers
- Garden centres

This is an emerging opportunity for the Renewable Energy Zones to demonstrate coordinated reuse options within local communities. Community and business initiatives could see substantial benefits from Project waste streams that lead to:

- Timber and metal supplied to trade schools and local craft workshops
- Composted materials supplied to local gardeners and farms
- Biowastes treated to allow for use as an agricultural land treatment

1.2.4. Project context

Specific wastes expected as part of the Baldon Wind Farm are set out in detail in Table 1-1 with respect to the waste hierarchy options; avoid, reuse, recycle.

Table 1-1 Potential sources of waste and their management options

Components	Stage	Quantification	Waste hierarchy options		
			Reduce/Avoid	Reuse	Recycle
Fuels and lubricants	All Stages	Greatest during decommissioning; nacelles from all turbines will have to be emptied prior to disassembly.	☑ Smoky emission vehicle protocols. ☑ Fuels and lubricants to be kept in appropriate containment areas.	✘ N/A	✘ N/A
Fertilisers and herbicides: Plastic containers Packaging Chemical waste	All Stages	Low all stages but greatest during construction and post construction rehabilitation activities.	☑ Fertilisers, herbicides kept in appropriately bunded and locked shed	✘ N/A	☑ Empty containers triple rinsed and disposed of at accredited drumMUSTER site.
Landscaping products. Vegetation recovered from site.	Construction and decommissioning	Low all stages but greatest during construction and post construction rehabilitation activities.	☑ Minimise disturbance areas	☑ Mulch stored away from infrastructure.	☑ 90% composted for reuse in landscaping onsite or in local initiatives
Excavated soils	Construction	Greatest during construction for turbine footings. Other activities will better achieve cut and fill balance.	☑ Minimise disturbance areas, ensure cut and fill balance.	☑ Soil to be retained and reused onsite.	✘ N/A
Packaging (timber): pallets, timber cable drums	Construction Operation	Greatest during construction.	✘ N/A	☑ Offer to local TAFE, High School and Art community, local contractors	☑ Recycled at appropriate facility
Packaging (plastics)	Construction, Operation	Greatest during construction when highest volume of staff onsite.	☑ Avoid non-recyclable/non-biodegradable options	✘ N/A	☑ Sort and recycle at appropriate facility
Packaging (cardboard, paper)	All stages	Greatest during construction when highest volume of staff onsite.	✘ N/A	✘ N/A	☑ Recycled at appropriate facility
Excess building materials: metal, timber	Construction	Low all stages but greatest during construction and post construction rehabilitation activities	☑ Avoid plastics	☑ Offer to local TAFE and high schools, local contractors	☑ Metal, cabling, plastic to be sorted and recycled at appropriately licensed facilities
Putrescible waste: Construction worker consumables Food waste, single use bottles (glass, plastic), food packaging	All stages	Greatest during construction when highest volume of staff onsite.	☑ Avoid plastic	✘ N/A	☑ Sort on site (glass, plastic, green) 90% recycle
Excess construction materials: Concrete aggregates Timber products Masonry products	Construction	Greatest during construction.	☑ Reduce water consumption by installing water saving appliances	☑ Offer to local TAFE and high schools	☑ Recyclable material to be sorted and disposed at appropriate facilities

Components	Stage	Quantification	Waste hierarchy options		
			Reduce/Avoid	Reuse	Recycle
Concrete wash					
Infrastructure: Buildings	Decommissioning	Greatest during construction when highest volume of staff onsite.	✘ N/A	☑ Modular ancillary buildings transported and reused post construction	✘ N/A
Lithium-Ion batteries	Operation (component failure) Decommissioning	Greatest during decommissioning; when the battery is disassembled and removed. Components may also require disposal during operation as they reach the end of their life span.	✘ N/A	✘ N/A	☑ Recycled at approved recycling facility
Electrical cables Recovered electrical cables at decommissioning	All stages	Greatest during decommissioning.	✘ N/A	✘ N/A	☑ Recycled at licensed and approved metal recycling facility
Wastewater (grey water)	All stages	Greatest during construction when highest volume of staff onsite.	☑ Minimise water use, install water saving appliances.	☑ Re-use onsite using approved technology	✘ N/A
Bio waste (septic) / black water	All stages	Greatest during construction when highest volume of staff onsite.	☑ Install water saving appliances. Install bio-septic tank or worm farm waste composting septic (or similar) tank to reduce volume of biohazard black water.	☑ Utilise local composting facilities to incorporate into their activities for end use to be on farm (associated land) soil improvement.	☑ Managed and maintained by appropriately licensed contractor
Turbine Components Blades Towers Nacelle Footings	Operation (component failure) Decommissioning	Greatest during decommissioning; when the turbines are disassembled and removed. Components may also require disposal during operation as they reach the end of their life span.	☑ Use newest technology with recoverable resin and components.	☑ Second hand turbine market or stripped and components sold separately (domestic and international).	☑ Sort and recycle metal components. Recycle blades using most up to date and available technology.

1.2.5. Waste management risks

Considering the quantities and the distribution of waste streams over the life of the project, and the potential for recycling / reuse / disposal, the following key issues have been identified:

- Construction waste – a high volume of waste will be generated in comparison to existing local recycling / reuse / disposal *capacity,* over the approximately 36 months (with peak periods expected from months 9 -24) construction phase.
- Decommissioning waste – a high volume of waste will be generated in comparison to current recycling / reuse *technologies,* at the end of the Project's life.

These are discussed below. During operation, the solid waste streams would be associated with maintenance activities and presence of employees. Some materials, such as fuels and lubricants, and metals may require replacement over the operational life of the wind farm. These materials would be reused or recycled wherever possible. The operational waste streams generated by the wind farm are considered to be low and impacts to regional waste disposal facilities would be minor.

Construction waste

Solid waste is one of the major pollutants caused by construction. Several construction activities would produce solid wastes, such as earth works, construction of buildings, turbine erection and rehabilitation activities. Most waste generated during the construction phase would be classified as building and demolition waste within the class general solid waste (non-putrescible). Ancillary facilities in the site compound would also produce liquid wastes and sanitary (clinical waste), classified in accordance with the POEO Act.

A detailed waste management strategy will be required to be prepared in accordance with definitions in the POEO Act and associated waste classification guidelines. Key strategies which can begin to be implemented now, ahead of procurement, is setting out the commitment to environmental best practice, seeking:

- Careful procurement procedures to reduce over ordering and waste
- Up front identification of local substitution options.

All waste would be transported and disposed of in accordance with the Waste Classification Guidelines (NSW EPA, 2014) and the POEO Act.

The impact from waste generation, on regional waste facilities is assessed to be moderate without the implementation of any recycling or re-use measures. However, with the implementation of a Waste Management Plan and identification of recycling waste facilities in the LGA, the impacts from construction waste disposal on regional landfills, the biological environment and social environment is assessed to be low.t

It will be important for the Project to work with Hay Shire Council, Wakool Shire Council/ Murray River Council and commercial services to ensure that local facilities are not overwhelmed by disposal requirements and to maximise reuse and recycle opportunities.

Decommissioning waste

During decommissioning, all above ground infrastructure and materials would be removed from the site and recycled or otherwise disposed of at approved facilities.

- Ancillary buildings would be transportable and reused elsewhere.
- Buildings and major electrical equipment would be removed for resale or reuse, or for recycling as scrap.

- All underground cabling (and buried infrastructure) to a maximum depth of 1000 mm would be removed.
- Concrete footings could be removed entirely, or to a specific depth to enable vegetation to be reestablished, or they may be retained in agreement with the host land holder.

The majority of infrastructure would be constructed using highly recyclable materials. However, the key project components, wind turbines and batteries, currently have limited facilities able to accept them.

Wind turbines

Much of a wind turbine (up to 90%) can be recycled, this includes all steel components, batteries and magnets reducing the impacts on resources. The least recyclable part of the wind turbine is the blades which are composed of a fibreglass reinforced polymer which at this stage there is no well-established best practice. There are some promising developments in Europe and USA where complete recycling processes of the blades are progressing. Recycling of the blades can be achieved through thermos recycling or mechanical grinding. There are very few studies that have a Life Cycle Assessment that have excluded landfill or incineration.

Batteries

Li-ion batteries are classified as hazardous waste under the Commonwealth *Hazardous Waste Act 1989*, and Dangerous Goods under the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code). The code has a special provisions and packaging instructions for Li-ion batteries transported for disposal or recycling. The average life of the Li-ion PV batteries is assumed to be 10 years (Randell Environmental Consultancy, 2016) and therefore batteries may require replacement 2-3 times during the life of the wind farm.

Australia currently only recycles 2% of its lithium-ion battery waste, compared to 98% of lead acid batteries, however, the CSIRO is confident that lithium-ion batteries are highly recyclable would be used to manufacture new batteries in the future as the demand for these batteries increases (CSIRO, 2019). AEMO (2015) predict strong growth in the consumption of Li-ion batteries for both electric vehicles and large scale energy projects over the next 20 years. This growth would begin to significantly affect the waste stream from 2025 (Randell Environmental Consultancy, 2016).

Presently, there is one B-Cycle accredited, EPA- permitted and licensed recycler of mixed batteries including Li-ion batteries in Australia that are collecting, sorting and processing entirely onshore. The number of recycling plants with these accreditations is expected to grow with demand. B-Cycle is a government backed scheme which is run by the Battery Stewardship Council and authorised by the ACCC to promote the safe use and disposal of batteries including Lithium-Ion Batteries.

The Li-ion PV batteries would be disposed in accordance with the hazardous waste policies active at the time of decommissioning; recycling and reuse would be considered as a first option.

Resource management risks

While increasing scarcity of resources and environmental impacts are emerging from the use of non-renewable resources, the supply of the materials required for the Project's construction are not currently limited or restricted. In the volumes required, the Project is unlikely to place significant pressure on the availability of local or regional resources. In consideration of local context, water and gravel requirements have been considered in more detail.

Water

The Project's water requirements are focused on the construction phase. During Construction water would be required for track construction, dust management and concrete batching. Potable water would be required for the O&M and ancillary buildings for staff and to service septic tanks. Highest water demand would be during peak construction.

Currently, all existing bores on the property are stock and domestic bores, monitoring and water supply. Under this license, water can only be taken for supporting livestock and domestic household watering needs only. Water cannot be taken for any other purposes. A general Water Access License would be required for taking water for any other purpose and temporary ground water transfer will be required to meet the needs of the Project for the duration of construction.

Gravel

The tracks and turbine footings will require large volumes, estimated to be 760,000 tonnes, of gravel. Currently, a suitable source of gravel would need to be located. Ideally, this would be situated in licensed gravel quarries close to the Project to reduce transportation impacts and costs. Alternatives to strengthen tracks are being considered to reduce gravel requirements.

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Appendix H Turbine locations and heights

Project turbine coordinates and heights

WTG NO.	X GDA2020M	Y GDA2020M	Z AHD	WTG	AMSL M	AMSL FT
1	231146.7	6156908	73.26	300	373.26	1224.6
2	232389.2	6157342	75.85	300	375.85	1233.1
3	233575.1	6157610	73.59	300	373.59	1225.7
4	234857.9	6158199	74.14	300	374.14	1227.5
5	236118.2	6158633	73.27	300	373.27	1224.6
6	237316.6	6159015	71.54	300	371.54	1219.0
7	230721.8	6155182	71.61	300	371.61	1219.2
8	232078.6	6155595	73.21	300	373.21	1224.5
9	233284.7	6155905	73.71	300	373.71	1226.1
10	234639.3	6156544	74.47	300	374.47	1228.6
11	235867.3	6156959	73.78	300	373.78	1226.3
12	237128	6157404	72.60	300	372.60	1222.4
13	238376.7	6157837	70.75	300	370.75	1216.4
14	231255.5	6153800	69.68	300	369.68	1212.8
15	232390.9	6153916	71.90	300	371.90	1220.1
16	233730.2	6154723	72.09	300	372.09	1220.8
17	234976.1	6155151	69.77	300	369.77	1213.2
18	236302.2	6155598	71.96	300	371.96	1220.4
19	237628.2	6156045	74.00	300	374.00	1227.0
20	231637	6152115	70.35	300	370.35	1215.1
21	232927.5	6152949	72.81	300	372.81	1223.1
22	234368.9	6153379	72.98	300	372.98	1223.7
23	235610.6	6153822	72.79	300	372.79	1223.1
24	236834.7	6154248	73.02	300	373.02	1223.8
25	238052.9	6154554	74.92	300	374.92	1230.1
26	232173.6	6151153	69.34	300	369.34	1211.7

WTG NO.	X GDA2020M	Y GDA2020M	Z AHD	WTG	AMSL M	AMSL FT
27	233442	6151640	73.24	300	373.24	1224.5
28	235344.6	6152190	73.72	300	373.72	1226.1
29	236568.6	6152492	73.66	300	373.66	1225.9
30	237828.1	6152971	73.45	300	373.45	1225.2
31	231601.5	6149388	70.42	300	370.42	1215.3
32	233209	6149828	71.05	300	371.05	1217.3
33	234493	6150423	72.63	300	372.63	1222.6
34	236000.9	6150700	73.17	300	373.17	1224.3
35	236985.5	6150425	72.00	300	372.00	1220.5
36	238056.3	6150353	75.17	300	375.17	1230.9
37	232078.9	6148344	72.92	300	372.92	1223.5
38	233366.6	6148605	75.42	300	375.42	1231.7
39	234803.5	6149190	72.62	300	372.62	1222.5
40	226651.1	6144309	69.48	300	369.48	1212.2
41	228004.7	6145168	71.03	300	371.03	1217.3
42	229627.9	6145762	70.07	300	370.07	1214.1
43	230824.5	6146270	69.40	300	369.40	1212.0
44	232194.4	6146902	70.89	300	370.89	1216.8
45	233783.5	6147461	73.27	300	373.27	1224.6
46	235030.4	6147845	71.11	300	371.11	1217.5
47	236850.4	6148835	74.13	300	374.13	1227.5
48	237924.6	6148747	71.69	300	371.69	1219.5
49	227195	6143371	70.25	300	370.25	1214.7
50	228614.9	6143277	69.84	300	369.84	1213.4
51	230053.7	6144600	70.10	300	370.10	1214.2
52	231538.8	6145122	69.10	300	369.10	1211.0
53	232812.8	6145688	71.86	300	371.86	1220.0

WTG NO.	X GDA2020M	Y GDA2020M	Z AHD	WTG	AMSL M	AMSL FT
54	234057.1	6146053	71.11	300	371.11	1217.6
55	235323.7	6146399	71.04	300	371.04	1217.3
56	236839.5	6147019	73.73	300	373.73	1226.2
57	237827.1	6146764	72.54	300	372.54	1222.2
58	230439.5	6143491	70.05	300	370.05	1214.1
59	231597	6143598	71.95	300	371.95	1220.3
60	232876.2	6144131	72.81	300	372.81	1223.1
61	235491.4	6144820	72.47	300	372.47	1222.0
62	236582.9	6144745	70.08	300	370.08	1214.2
63	226151.9	6141664	68.75	300	368.75	1209.8
64	227344	6141970	69.86	300	369.86	1213.5
65	225414.2	6139897	70.52	300	370.52	1215.6
66	226559.9	6140258	70.99	300	370.99	1217.2
67	228029.5	6141195	70.81	300	370.81	1216.6
68	229330.6	6141895	71.33	300	371.33	1218.3
69	230412.9	6141828	70.13	300	370.13	1214.3
70	231663.6	6142125	69.60	300	369.60	1212.6
71	233257.1	6142945	70.08	300	370.08	1214.2
72	234262.9	6142655	70.34	300	370.34	1215.0
73	235566.8	6143020	67.97	300	367.97	1207.3
74	236952.6	6142633	71.55	300	371.55	1219.0
75	227128	6139452	69.87	300	369.87	1213.5
76	228316.3	6139999	71.65	300	371.65	1219.3
77	229221.6	6139735	71.49	300	371.49	1218.8
78	230372.7	6140137	70.73	300	370.73	1216.3
79	232251.2	6141217	69.75	300	369.75	1213.1
80	233234.7	6140926	68.00	300	368.00	1207.4

WTG NO.	X GDA2020M	Y GDA2020M	Z AHD	WTG	AMSL M	AMSL FT
81	234568.4	6141239	70.42	300	370.42	1215.3
82	236564	6141089	72.42	300	372.42	1221.8
83	225620.1	6138685	71.14	300	371.14	1217.7
84	227320.6	6138233	71.76	300	371.76	1219.7
85	228298.5	6138141	69.70	300	369.70	1212.9
86	229460	6138557	69.20	300	369.20	1211.3
87	230598.9	6138936	70.65	300	370.65	1216.0
88	231661.1	6139549	68.74	300	368.74	1209.8
89	233484.2	6139670	69.78	300	369.78	1213.2
90	234539.1	6139742	71.88	300	371.88	1220.1
91	235438.1	6139478	71.74	300	371.74	1219.6
92	236433.1	6139358	72.16	300	372.16	1221.0
93	226140.7	6137792	68.16	300	368.16	1207.9
94	225962.4	6136204	66.55	300	366.55	1202.6
95	227172	6136727	68.34	300	368.34	1208.5
96	228619.9	6136934	69.89	300	369.89	1213.5
97	229772.3	6137320	71.96	300	371.96	1220.3
98	230970.2	6137880	71.83	300	371.83	1219.9
99	232219.6	6138513	71.32	300	371.32	1218.2
100	233073.8	6138064	72.33	300	372.33	1221.5
101	234269.4	6138195	71.40	300	371.40	1218.5
102	235282.3	6137968	69.48	300	369.48	1212.2
103	237008.4	6138543	71.42	300	371.42	1218.6
104	224673	6134951	68.02	300	368.02	1207.4
105	226056.9	6134777	68.85	300	368.85	1210.2
106	227300	6135441	71.48	300	371.48	1218.8
107	228307.7	6135347	70.90	300	370.90	1216.9

WTG NO.	***X GDA2020M***	***Y GDA2020M***	***Z AHD***	***WTG***	***AMSL M***	***AMSL FT***
108	229475.8	6135784	69.36	300	369.36	1211.8
109	230649.7	6136291	72.03	300	372.03	1220.6
110	231862.3	6136920	72.59	300	372.59	1222.4
111	233712	6136553	72.16	300	372.16	1221.0
112	234623	6136290	72.25	300	372.25	1221.3
113	235869.7	6137141	72.25	300	372.25	1221.3
114	236852.6	6136997	72.12	300	372.12	1220.9
115	223523.3	6132735	69.04	300	369.04	1210.8
116	224745.6	6133493	69.31	300	369.31	1211.7
117	225800.4	6133263	71.83	300	371.83	1219.9
118	227079.6	6133916	70.25	300	370.25	1214.7
119	228593.5	6134088	72.72	300	372.72	1222.8
120	229849.3	6134520	70.48	300	370.48	1215.5
121	231089.5	6135261	71.85	300	371.85	1220.0
122	232153.4	6135147	72.68	300	372.68	1222.7
123	233331.8	6134963	71.31	300	371.31	1218.2
124	234191.8	6134656	72.27	300	372.27	1221.4
125	235409.2	6135526	72.83	300	372.83	1223.2
126	236400.3	6135343	73.12	300	373.12	1224.1
127	237123.3	6134803	73.51	300	373.51	1225.4
128	237998.3	6134473	74.52	300	374.52	1228.7
129	238981.8	6134397	73.34	300	373.34	1224.9
130	239801.7	6133854	74.47	300	374.47	1228.6
131	224249.4	6131710	69.02	300	369.02	1210.7
132	226141.8	6131979	70.40	300	370.40	1215.2
133	227406.8	6132554	70.05	300	370.05	1214.1
134	228437.7	6132398	69.43	300	369.43	1212.0

WTG NO.	X GDA2020M	Y GDA2020M	Z AHD	WTG	AMSL M	AMSL FT
135	229672.4	6132818	70.58	300	370.58	1215.8
136	230978.9	6133651	71.39	300	371.39	1218.5
137	231647.2	6132863	71.53	300	371.53	1218.9
138	232486.8	6132340	72.83	300	372.83	1223.2
139	233754	6132831	73.99	300	373.99	1227.0
140	235007.3	6133883	72.70	300	372.70	1222.8
141	235668.7	6133068	73.69	300	373.69	1226.0
142	236916.3	6132931	72.86	300	372.86	1223.3
143	237959.2	6132776	74.08	300	374.08	1227.3
144	238744.3	6132158	73.77	300	373.77	1226.3
145	239843.4	6132164	72.99	300	372.99	1223.7
146	226481.4	6130766	71.40	300	371.40	1218.5
147	227529.7	6130624	70.50	300	370.50	1215.5
148	228803.3	6131038	71.85	300	371.85	1220.0
149	230103.9	6131721	71.67	300	371.67	1219.4
150	234377.3	6131944	71.56	300	371.56	1219.0
151	235548.2	6131466	73.62	300	373.62	1225.8
152	236533.6	6131192	72.90	300	372.90	1223.4
153	237349.5	6130627	73.13	300	373.13	1224.2
154	238395.1	6130443	73.02	300	373.02	1223.8
155	239275.4	6129999	73.79	300	373.79	1226.4
156	230349.6	6130438	72.56	300	372.56	1222.3
157	231524.4	6130606	72.09	300	372.09	1220.8
158	229034	6129318	71.51	300	371.51	1218.9
159	230406.6	6128964	72.18	300	372.18	1221.1
160	231836	6129348	72.28	300	372.28	1221.4
161	233039	6129596	72.11	300	372.11	1220.8

WTG NO.	*X GDA2020M*	*Y GDA2020M*	*Z AHD*	*WTG*	*AMSL M*	*AMSL FT*
162	234287.4	6130050	73.06	300	373.06	1224.0
163	235079.3	6129454	72.33	300	372.33	1221.5
164	236039.8	6129197	73.36	300	373.36	1224.9
165	236974.8	6128652	71.09	300	371.09	1217.5
166	238033.3	6128600	71.55	300	371.55	1219.0
167	238650.7	6127722	73.36	300	373.36	1224.9
168	227715.5	6127979	69.40	300	369.40	1211.9
169	228521.6	6127274	73.44	300	373.44	1225.2
170	229664.2	6127249	70.76	300	370.76	1216.4
171	230841.1	6127621	71.70	300	371.70	1219.5
172	232015.8	6127861	72.42	300	372.42	1221.8
173	233250.5	6128245	72.59	300	372.59	1222.4
174	232303.5	6126483	70.58	300	370.58	1215.8
175	234017.7	6127609	70.40	300	370.40	1215.2
176	235048.3	6127472	73.30	300	373.30	1224.7
177	235845.7	6126880	71.11	300	371.11	1217.5
178	236966.5	6126934	74.97	300	374.97	1230.2
179	237583.8	6126050	73.28	300	373.28	1224.7
180	238848.5	6126391	72.26	300	372.26	1221.3

Met mast coordinate and heights

Type	WMT_ID	X_GDA2020M MGA55	Y_GDA2020M MGA55	STATUS	Terrain Elevation m AMSL	WMT Height m AGL	WMT Top Elevation m AMSL	WMT Top Elevation ft AMSL
Permanent	Mast 1	236318.00	6130502.00	Installed	73.00	130.00	203.00	666.01
Temporary	Mast 3	233166.00	6139707.00	Installed	70.00	130.00	200.00	656.17
Permanent	Mast 4	233748.00	6149653.00	Installed	72.00	130.00	202.00	662.73
Temporary	PMM_13	238486.00	6157439.00	Proposed	71.00	130.00	201.00	659.45
Temporary	PMM_179/180	238244.00	6126054.00	Proposed	72.00	130.00	202.00	662.73
Temporary	PMM_65/83	225335.31	6139304.70	Proposed	70.00	130.00	200.00	656.17
Permanent	PMM_7	230634.00	6154798.00	Proposed	72.00	130.00	202.00	662.73
Temporary	PMM_92/103	236845.00	6139022.00	Proposed	72.00	130.00	202.00	662.73
Temporary	TMM_103	237008.44	6138543.10	Proposed	71.42	130.00	201.42	660.81
Permanent	TMM_13	238376.69	6157837.38	Proposed	70.75	130.00	200.75	658.63
Temporary	TMM_179	237583.82	6126049.57	Proposed	73.28	130.00	203.28	666.92

Type	WMT_ID	X_GDA2020M MGA55	Y_GDA2020M MGA55	STATUS	Terrain Elevation m AMSL	WMT Height m AGL	WMT Top Elevation m AMSL	WMT Top Elevation ft AMSL
Temporary	TMM_180	238848.46	6126391.20	Proposed	72.26	130.00	202.26	663.60
Temporary	TMM_65	225379.22	6139955.79	Proposed	70.52	130.00	200.52	657.88
Permanent	TMM_7	230721.79	6155182.47	Proposed	71.61	130.00	201.61	661.43
Temporary	TMM_83	225620.13	6138684.72	Proposed	71.14	130.00	201.14	659.92
Temporary	TMM_92	236433.06	6139358.22	Proposed	72.16	130.00	202.16	663.24

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SUNSHINE COAST

Building 1, 30 Chancellor Village Boulevard
Sippy Downs   QLD   4556

T: 13 54 93

SYDNEY REGION

Unit 17, 21 Mary Street
Surry Hills NSW 2010

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TOWNSVILLE

Level 4, 67-75 Denham Street
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WAGGA WAGGA - RIVERINA & WESTERN NSW

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T. (02) 6971 9696

WODONGA

Unit 2, 83 Hume Street
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T. (02) 6067 2533