May 2020

Valley of the Winds

VALLEY OF THE WINDS

SCOPING REPORT

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SCOPING REPORT
VALLEY OF THE WINDS

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ACKNOWLEDGEMENT

Aboriginal people have had a long and continuous association with the region for thousands of years. UPC/AC would like to acknowledge and pay respects to the traditional owners of the country which is encompassed by the proposal.

The name Coolah is derived from traditional language – meaning Valley of the Winds.

EXECUTIVE SUMMARY

Overview

This scoping report has been prepared to support a development application by UPC\AC Renewables Australia Pty Ltd (UPC\AC) to construct and operate the Valley of the Winds wind farm. The project would supply approximately 800 megawatts (MW) of electricity into the National Electricity Market (NEM).

The project would consist of approximately 175 wind turbines and supporting infrastructure including a high voltage transmission line which would run approximately 65 kilometres to the existing Bayswater to Mt Piper 500 kV transmission line. The wind farm would be located close to the township of Coolah, in the Warrumbungle Local Government Area (LGA).

The project meets the threshold for State Significant Development (SSD) under Clause 20 of Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011.* The project is also being referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) for potential impacts to matters of national environmental significance protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Project justification

The project would contribute to achieving Commonwealth and NSW Government objectives for providing secure and reliable energy supply and to achieving national commitments to reduce carbon emissions.

The Daft Integrated Service Plan 2020 provides a clear basis for promoting greater energy supplies through wind energy generation projects, particularly in identified Renewable Energy Zones (REZ). The project is within the NSW Central West Renewable Energy Zone (CW-REZ) identified in the NSW Electricity Strategy.

As part of the early phase project development UPC\AC considered alternative sites and turbine layouts. The ultimate decision to proceed with the project in its current layout was based on the following considerations:

- Topography that would provide favourable wind conditions
- Alignment with wider strategic plans for the wider region
- Suitable space available for the construction of the windfarm infrastructure
- Low dwelling density in the area
- Strong connection point into the NEM, via the Bayswater - Mt Piper 500 kV transmission line (lines 5A3 or 5A4).

Consultation and community engagement

A range of consultation activities have been undertaken in the scoping phase of the project with the focus on face-to-face discussions with targeted stakeholders. Consultation to date has provided valuable early input into the understanding of stakeholder needs and potential issues.

UPC\AC typically has an ‘owner-operator’ business model, which means its renewable energy projects are constructed and operated by UPC\AC for their full lifecycle, including decommissioning. This lifecycle ownership means a core UPC\AC project development principle is fostering a trusted relationship and providing a legacy with beneficial outcomes for the local community. Established relationships will continue with the community and stakeholders during the preparation of the environmental impact statement (EIS). The project team would continue to

gather feedback so that issues raised would be adequately addressed through the social impact assessment, which would be undertaken as part of the EIS.

Preliminary environmental assessment

An environmental and social risk assessment has been undertaken in accordance with the Scoping Worksheet provided in *Guideline 3 draft scoping an environmental impact statement* (DPE, 2017). This scoping exercise has identified several 'key issues' and 'other issues' that will be subject to detailed assessment in the EIS.

The following key issues were identified:

- Landscape character and visual amenity
- Biodiversity
- Traffic and transport
- Noise and vibration
- Aboriginal heritage
- Social and economic
- Hazard and risk
- Cumulative impacts.

Other issues identified include the following:

- Historic heritage
- Water and soils
- Land use and property
- Air quality
- Waste
- Greenhouse gas emissions and climate change.

The preliminary assessments undertaken for each of the key issues and other issues are presented in Chapter 7 of this report. All identified issues will be assessed in further detail as part of the preparation of the EIS in accordance with the SEARs to be issued for the project.

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GLOSSARY

Term / Abbreviation	Definition
AHIMS	Aboriginal Heritage Information Management System
Associated dwellings / associated properties	Dwellings or properties on which the wind turbines, or the transmission line, are located.
ATSIHP Act	Aboriginal and Torres Strait Islander Heritage Protection Act 1984
BAM	Biodiversity Assessment Methodology
BC Act	Biodiversity Conservation Act 2016
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
CLM Act	Contaminated Land Management Act 1997
Construction access tracks	Vehicle access tracks for construction and delivery of plant and equipment on private property.
CW-REZ	Central West Renewable Energy Zone
DAWE	Department of Agriculture, Water and the Environment
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMI	Electromagnetic Interference
ENA	Energy Networks Associations
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environmental Protection Licence
EP&A Act	Environmental Planning and Assessment Act 1979
FM Act	Fisheries Management Act 1994
GHG	Greenhouse gas
Girragulang Road	Cluster east of Black Stump Way and Girragulang Road, south of Coolah
Heritage Act	Heritage Act 1977
LALC	Local Aboriginal Land Council
Leadville	Cluster north of Golden Highway and east of Leadville township
LEP	Local Environmental Plan
LGA	Local Government Area
Micrositing	Refers to the process of determining the type of wind turbine and its exact position.
MNES	Matter of National Environmental Significance
Mt Hope	Cluster west of Black Stump Way, south west of Coolah
NEM	National Energy Market
NES	NSW Electricity Strategy
NHMRC	National Health and Medical Research Council
Non-associated dwellings / non-associated properties	Dwellings or properties that are potentially impacted by the proposed wind farm and on which wind turbines or transmission line are not located i.e. indirectly affected by the proposed development.

Term / Abbreviation	Definition
NPW Act	National Parks and Wildlife Act 1974
NRM	National Resource Management
NSW EPA	New South Wales Environmental Protection Authority
Operational access tracks	Vehicle access tracks for operations and maintenance on associated properties.
OSOM	Over size and over mass
PCTs	Plant community types
POEO Act	Protection of Environment Operations Act 1997
Project	Refers to the total area of the proposed Valley of the Winds wind farm, including the wind farm and the transmission line.
Proponent	UPC-AC Renewables (abbreviated to 'UPC\AC')
SEARs	Secretary's Environmental Assessment Requirements
Secondary substations	Substations within each of the three clusters which connect to a central substation in the Girragulang Road cluster via 132 kV, 220kV or 275kV aboveground transmission lines.
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TECs	Threatened ecological communities
Transport routes	Public roads that are to be used for delivery of plant and equipment (e.g. rotor blades)
TxL	Transmission Line
Wind farm site	The wind farm site boundary corresponds with the outer boundary of properties upon which the proposed Valley of the Winds wind farm is located. The wind farm site is made up of three separate wind turbine clusters, all connected electrically.

1. INTRODUCTION

1.1 Project overview

UPC\AC Renewables Australia Pty Ltd (UPC\AC) is proposing to construct and operate the Valley of the Winds wind farm (the project). The project would consist of approximately 175 wind turbines and supporting infrastructure, including a high voltage transmission line which would run approximately 65 kilometres to a connection point in the existing Bayswater to Mt Piper 500 kV transmission line. The project would supply approximately 800 megawatts (MW) of electricity into the National Electricity Market (NEM).

The wind farm would be located close to the township of Coolah, in the Warrumbungle Local Government Area (LGA), with the transmission line running generally south through the Warrumbungle, Mid-Western and Upper Hunter LGAs.

The wind farm site would be made up of three wind turbine clusters, connected via electrical reticulation to a central substation. A project overview map is provided in **Figure 1-1** presenting the wind farm site and indicative layout. A detailed description of the project is provided in **Chapter 4** of this report.

UPC\AC is seeking State Significant Development (SSD) consent under Clause 20 of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011. It would require approval from the Minister for Planning under the NSW Environmental Planning and Assessment Act 1979 (EP&A Act).

The project is also being referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) for potential impacts to matters of national environmental significance protected by the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Should DAWE determine that the project is a controlled action under Section 75 of the EPBC Act, the project will require assessment and approval under the EPBC Act. This is expected to be under the bilateral agreement between DAWE and DPIE.

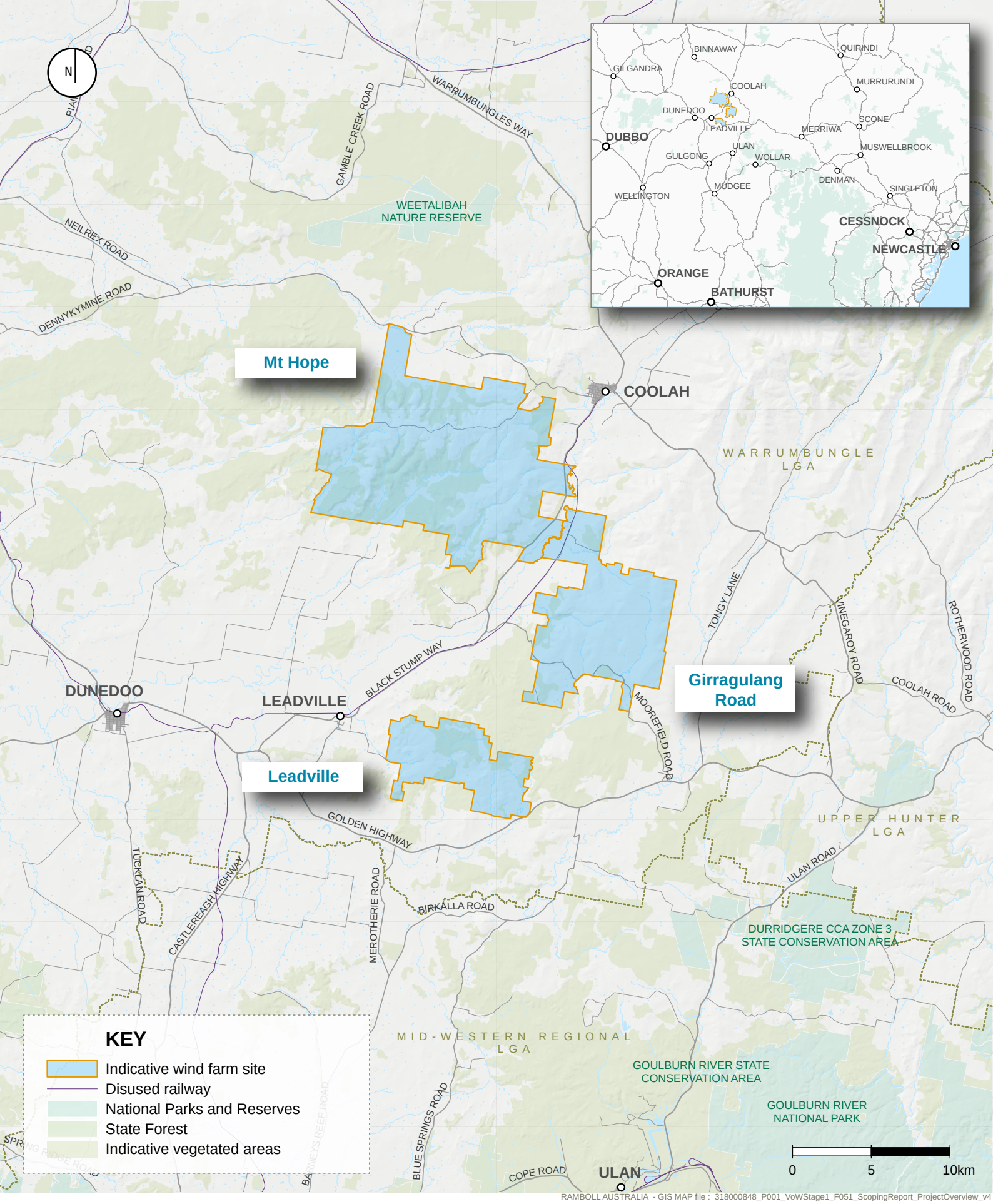

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Figure 1-1 | Project overview

1.2 The proponent

The proponent, UPC\AC Renewables Australia, is a joint venture between the UPC Renewables Group and AC Energy (i.e. UPC\AC).

UPC Renewables Group has been operating globally since the early 1990s with more than 4,500 megawatts of operating wind and solar projects with an estimated investment value of over AU$6 billion across North America, Europe, Asia and Africa. The company has operated in Australia since 2016, managing the delivery of numerous renewable energy projects. This includes the New England Solar Farm in NSW, Axedale Solar Farm in Victoria, Robbins Island and Jim's Plain Wind Farms in Tasmania, and Baroota Pumped Hydro and Bridle Track Solar Farm in South Australia.

AC Energy is the energy platform of Ayala, one of the largest business groups in the Philippines. AC Energy is one of the fastest growing energy companies with ~US$2 billion of invested and committed equity in renewable and thermal energy in the Philippines and around the region. From a strong local base, AC Energy is expanding rapidly around the region through strategic partnerships and greenfield initiatives.

The partnership between UPC Renewables and AC Energy was established in 2013 for the development, construction, and operations of renewable energy projects. UPC\AC typically has an 'owner-operator' business model, which means its renewable energy projects are constructed and operated by UPC\AC for their lifecycle, including decommissioning. This lifecycle ownership means a core UPC\AC project development principle is fostering a trusted relationship and providing a legacy with beneficial outcomes for the local community.

1.3 Document objective

This scoping report has been prepared to support a request for Secretary Environmental Assessment Requirements (SEARs) that would guide preparation of an EIS for lodgement to the Department of Planning, Infrastructure and Environment (DPIE) as part of a development application under Division 4.1 of Part 4 of the EP&A Act.

The purpose of this report is to provide the Minister for Planning and DPIE with adequate project context and details to allow them to provide project specific SEARs. This report has been prepared giving consideration of the 'NSW Wind Energy Framework' which comprises:

- *Wind Energy Guideline (Wind Guideline)* (DPE, 2016a)
- *Wind Energy: Visual Assessment Bulletin (Visual Bulletin)* (DPE, 2016b)
- *Wind Energy: Noise Assessment Bulletin (Noise Bulletin)* (DPE, 2016c)
- Standard Secretary's Environmental Assessment Requirements
- Wind Energy Framework Q&As
- *Guideline 3 – Draft Scoping an Environmental Impact Assessment* (DPE, 2017).

1.4 Project team

Ramboll Australia Pty Ltd (Ramboll) have prepared this scoping report on behalf of UPC\AC Renewables Australia. Where specialised skills were required to inform aspects of the scoping report, the following key specialists were engaged:

- EcoLogical Australia – Biodiversity assessment
- Green Bean Design – Landscape and visual assessment
- Elton Consulting – Community engagement and social impact assessment
- Marshall Day Acoustics – Noise assessment
- NSW Archaeology – Aboriginal cultural heritage assessment.

2. SITE AND REGIONAL CONTEXT

2.1 Regional context

The proposed wind farm site is south of the township of Coolah, in the Warrumbungle LGA in the Central West Local Land Services Region (Central West Region) of NSW. The site is approximately 280 kilometres inland from Newcastle and approximately 400 kilometres northwest of Sydney.

Details on the surrounding population centres are presented in Error! Reference source not found..

Table 2-1 Population centres in vicinity of the wind farm site[1]

Township	State suburb population	Urban population	Approximate. distance from wind farm site	Direction from project site
Coolah	1290	795	4 km	North east
Leadville	169	-	3 km	West
Dunedoo	1221	-	17 km	West
Gulgong	2521	1956	33 km	South
Mudgee	10,923	-	58 km	South
Dubbo	38,943	-	94 km	Southwest
Coonabarabran	3290	-	64 km	Northwest
Muswellbrook	12,075	-	109 km	Southeast

Major sources of employment in the broader region (including the Mid-Western and Upper Hunter LGAs) include agriculture, education, mining, equine, viticulture and retail, reflecting the predominately rural nature of the area. Natural and built features that characterise the regional context of the wind farm site include:

- Coolah Tops National Park - approximately 30 kilometres to the northeast
- Warrumbungle National Park - approximately 70 kilometres to the north / northwest
- Goulburn River National Park - approximately 20 kilometres southeast
- Other state conservation areas to the south of the site
- Coal mining is a major industry within the Mid-Western Regional Council LGA - Ulan Coal, Moolarben Coal Complex, and Wilpinjong Mine located south of the project
- Equine and viticulture industries are particularly strong in the Upper Hunter with viticulture also being a predominant industry within the Mid-Western LGA.

[1] Population statistics are sourced from ABS Census 2016

2.2 Local context

Land surrounding the wind farm site is characterised by rolling pastoral hills, open flat valleys and ridgelines with scattered vegetation. The hill slopes are generally gentle in gradient and predominantly cleared of vegetation, except for patches of denser remnant vegetation on steeper terrain, near rocky outcrops and between saddles.

The townships of Coolah and Leadville are the closest population centres to the proposed site. These townships are located on gently sloping to level land within valleys near creeks. Most built structures are of low to moderate scale. The main street of Coolah is the focus for local retail and community services in the local area.

Land uses within the locality include:

- Farming: predominantly grazing cattle and sheep, with small patches of cropping (cereal and fodder)
- Rural living: scattered rural dwellings and sheds present throughout the landscape, with a higher density of dwellings in the townships.

The predominant source of employment for both townships is commercial agriculture (sheep and cattle grazing). The impact of recent bushfires and long period of drought has severely impacted agricultural productivity and has generated significant economic stress for the local community.

The Warrumbungle LGA has a higher unemployment rate compared to the NSW average (ABS, 2016), which is a key indicator of economic stress in the local area. Anecdotally, younger people are moving from the local area to seek education and employment, which is reflected in a higher median age for Warrumbungle LGA compared to the NSW average.

Further detail on the socio-economic setting of the project is provided in **Section 7.3.6**. The locality and land use context in the region are shown in **Figure 2-1**.

2.3 The site

The project is split into three wind turbine clusters due to local topography, all connected electrically. The clusters are south of Coolah, north and east of Leadville, on private land currently used for cattle grazing. No cropping currently takes place within the wind farm site due its undulating topography and rocky subsurface. The transmission line may cross cropped land, subject to confirmation of the preferred option.

The topography of the wind farm site is variable with the ridgelines ranging between 626 metres Australian Height Datum (AHD) and 757 metres AHD. The highest point is located at Mt Hope, south west of Coolah, near Mt Hope Road.

Plates 1 to 5 illustrate the typical landscape and land use characteristics of the wind farm site.

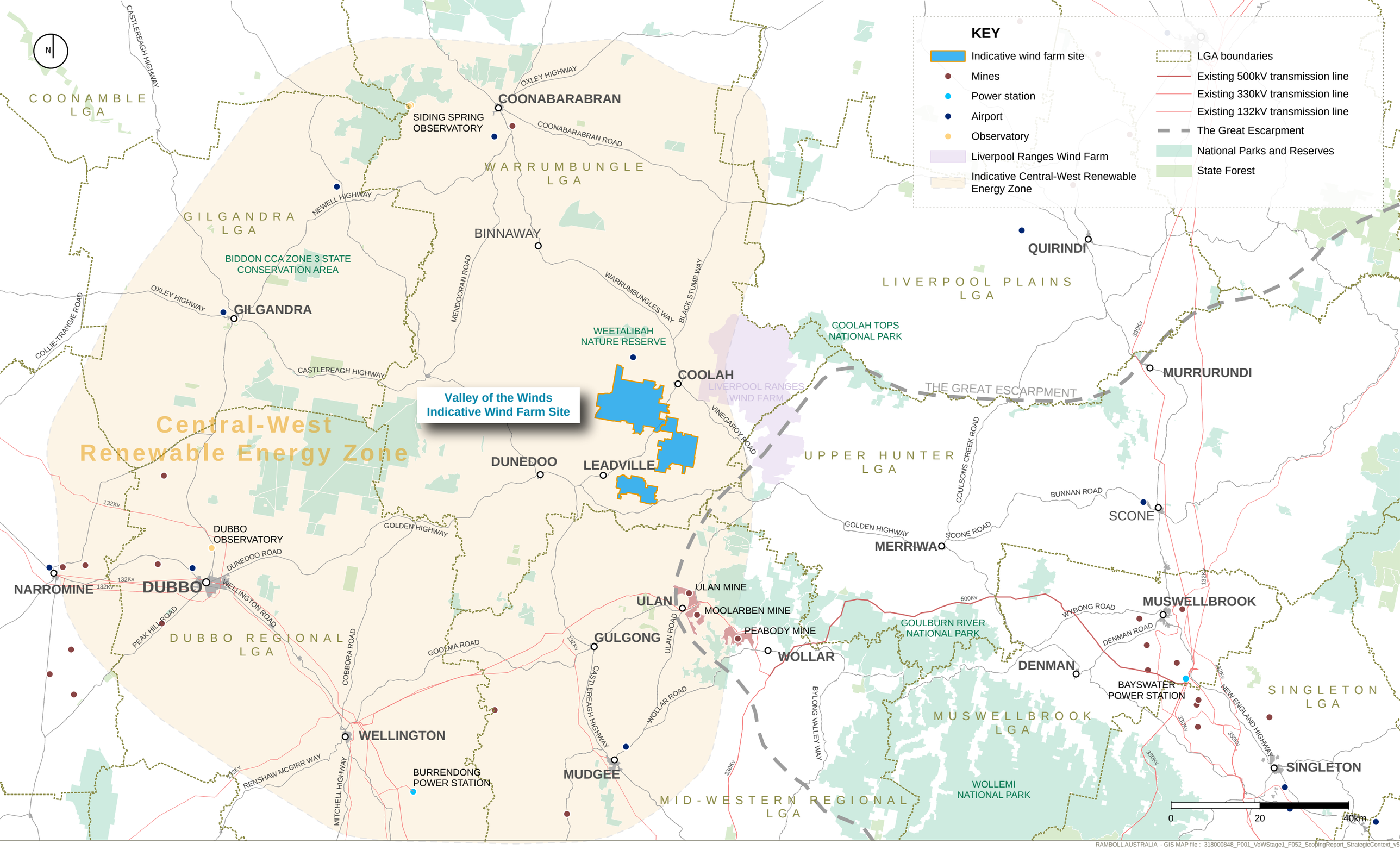

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Figure 2-1 | Strategic context

Plate 1 View of Coolah township from Girragulang Road cluster ridgeline

Plate 2 View of Girragulang Road cluster ridgeline (foreground)

Plate 3 View from valley towards Mount Hope

Plate 4 View of Mount Hope cluster ridgeline (foreground)

Plate 5 View of Leadville cluster ridgeline (foreground)

3. DEVELOPMENT JUSTIFICATION AND ALTERNATIVES

3.1 Strategic context

This section outlines how strategic planning both at the local level and at the State and Federal levels, supports the project.

3.1.1 Key policies

Several key policies support the development of the proposed wind farm, including:

- **NSW Renewable Energy Action Plan 2013**: Includes 24 actions under three goals that detail the Government's intention to work closely with NSW communities and the renewable energy industry to increase renewable energy generation in the state at the least cost to the consumer
- **National commitment to combat climate change and to move towards a sustainable low carbon future**: The Australian Government is a signatory to the Paris Agreement (ratified November 2016)
- **NSW Electricity Strategy 2019** (adopted November 2019): Provides detailed strategy for electricity supply to NSW
- **Draft Integrated System Plan 2020** (Draft ISP 2020) (exhibited December 2019 – February 2020): Will replace the Integrated System Plan 2018 (ISP 2018) and provides a "whole-of-system plan to maximise net market benefits and deliver low-cost, secure and reliable energy through a complex range of plausible energy futures". The Draft ISP 2020 provides updated data regarding the NEM and revised policy direction for *Australia's energy transition.* ISP 2018 was the first ISP.

3.1.2 Paris Agreement

The Paris Agreement, ratified 4 November 2016, was established under the United Nations Framework Convention on Climate Change, to combat climate change and to move towards a sustainable low carbon future. The key aim of the agreement is to ensure global temperature rise this century remains well below two degrees Celsius and to attempt to limit temperature increase to 1.5 degrees Celsius (United Nations Framework Convention on Climate Change – Paris Agreement, 12 December 2015).

As a signatory to the Agreement, the Australian Government has committed to reduce emissions to 26–28 per cent on 2005 levels by 2030. Consequently, in 2017 the Australian Government reviewed its climate change policies considering Australia's 2030 target and Paris Agreement commitments.

To contribute to achieving its commitments under the Paris Agreement, the Commonwealth Government has proposed to double Australia's renewable energy capacity by end of 2020, equating to over 23 per cent (33,000 GW) of Australia's electricity supply. Uptake of renewables is encouraged through the Large-scale Renewable Energy Target (under *Renewable Energy (Electricity) Act 2000*, as amended), which encourages investment in renewable power stations through several incentive schemes.

3.1.3 Draft Integrated System Plan 2020

The Draft 2020 Integrated System Plan for the National Electricity Market (exhibited December 2019 – February 2020) is *"an actionable roadmap for eastern Australia's power system that maximises market benefits through a transition period of complexity and potential uncertainty"*. It is a *"whole-of-system plan to maximise net market benefits and deliver low-cost, secure and reliable energy through a complex range of plausible energy futures"*.

The Draft ISP 2020 is currently under preparation and is expected to become a regulated requirement under the National Electricity Rules in mid-2020. The Australian Energy Market Operator (AEMO) is concurrently developing the ISP with the current draft of the ISP Rules being developed by the Energy Security Board.

The ISP has a 20-year planning horizon, which means the current ISP aims to guide the NEM through the energy transition. The Draft ISP forecasts the NEM will evolve from a generation mix dominated by coal-fired generation, to a generation mix dominated by renewable generation supported by energy storage, transmission, GPG, and DER. (Appendix to Draft 2020 ISP). Modelling has been carried out to inform the Draft ISP that demonstrates *"the least-cost and-regret transition of the NEM is from a centralised coal-fired generation system to a highly diverse portfolio dominated by DER and VRE, supported by dispatchable resources and enhanced grid and service capabilities to ensure the power system can reliably meet demand at all times"* (Draft ISP 2020).

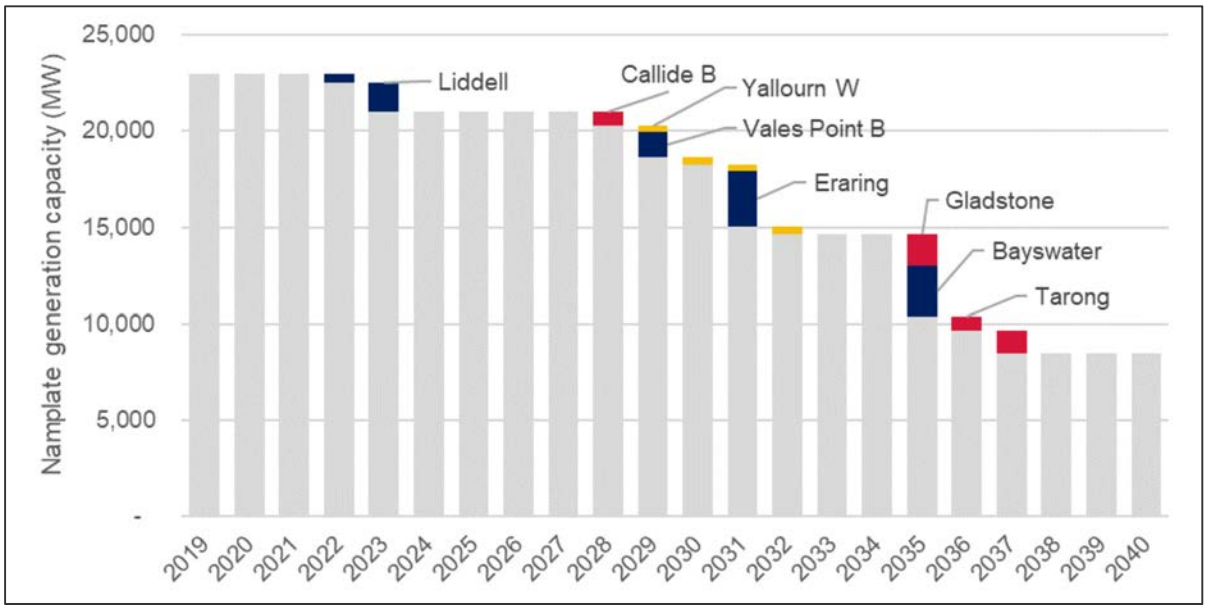
To achieve the transition, the Draft ISP modelled several scenarios to transition by 2040, which collectively demonstrate that *"over 30 GW of new grid-scale renewables"* is needed above what is already committed, with much of it built in Renewable Energy Zones (REZs).

The Draft ISP states that by 2040 the transmission grid will need to be augmented to balance resources and unlock new REZs, and that strategically placed interconnectors and REZs (combined with energy storage) will be the most cost-effective way to supply capacity and balance resources across the NEM.

The Draft ISP 2020 provides a clear basis for promoting greater energy supplies through wind energy generation projects, particularly in identified REZs. The project is within the NSW Central West Renewable Energy Zone (CW-REZ) identified in the NSW Electricity Strategy.

It is noted that the NSW Electricity Strategy was announced in 2019, just prior to completion of the Draft ISP 2020 and will be integrated into the Final 2020 ISP.

As shown in **Figure 3-1**, all five operating NSW coal-fired power stations are scheduled for retirement between 2022 and 2043, beginning with Liddell Power Station in April 2023, followed by Vales Point B in 2029, Eraring in 2031, Bayswater in 2035 and Mount Piper in 2043.



Source: AEMO, Integrated System Plan 2019-20 Assumptions Book as at 8 August 2019. Note: Operating life based on 50th year from full operation or announced retirement.

Figure 3-1 Schedule of coal-fired power stations retirement

3.1.4 NSW Electricity Strategy 2019

In November 2019, the NSW Government released the NSW Electricity Strategy (NES), which aims to address key challenges in providing "a reliable, affordable and sustainable electricity future that supports a growing economy". The strategy will support approximately $8 billion of private investment in the NSW electricity system over a 10-year period, and is expected to generate 1,200 jobs, mostly in regional NSW.

To achieve this aim, the NES proposes several measures to improve the efficiency and competitiveness of the NSW electricity market, including the delivery of three REZs. A REZ is an area that has been identified as energy rich for the development of new grid infrastructure to connect to multiple generators such as wind farms in the same location.

Several REZs have been identified for NSW, with the first coordinated REZ being the CW-REZ. The CW-REZ is centred near Dubbo and includes the proposed wind farm site. Energy agencies, together with local, state and federal governments have identified the Central West region as being appropriate for renewable electricity generation. This is not only due to the areas abundant wind and solar resource, but also with the intention of benefitting rural communities by providing jobs and economic development throughout the region. The project would be located within the CW-REZ, supplying approximately 800MW (0.8GW) to the NEM.

The NES aims to generate 3 gigawatts (GW) of variable renewable energy (VRE), such as wind and solar generation in the CW-REZ with associated transmission infrastructure by 2028. In NSW, there are 15 wind farms that have received planning approval or are progressing through the planning approval process, that would generate about 3,800 MW and an estimated value of approximately $4.7 billion (Source: NSW Electricity Strategy 2019).

3.2 Alternatives considered

UPC\AC has considered a range of alternatives to developing the proposed wind farm. These included investing in other renewable projects such as the New England Solar Farm, which has been granted planning approval by the Independent Planning Commission of NSW. However, the decision was made to progress with a renewable project around the Coolah area due to a number of factors including topography which would provide favourable conditions for wind energy, lack of other renewable energy developments in the region, and existing rural land uses and subsequent low density of surrounding dwellings.

Once the decision was made to proceed with a renewable energy project in the area surrounding Coolah, further consideration was given to the type of development that would best suit the environmental conditions, whilst having regard to the local community and other environmental constraints. Wind farms or hybrid developments were considered, which would typically comprise wind and solar, or wind and another renewable technology.

UPC\AC has carried out preliminary wind resource modelling, which shows the areas around Coolah as having a resource appropriate for wind generation with the optimal locations for turbines being along ridgelines (**Section 3.3)**.

According to the Clean Energy Council, wind power is currently the cheapest source of large-scale renewable energy in Australia. In 2018, Australia's wind farms produced 33.5 per cent of the country's clean energy and 7.1 per cent of the country's total electricity generation.

Wind energy investment is now more than $8 billion in Australia, helping to create about 5000 jobs. Wind power is an important energy source that will help Australia meet its national and international commitments to reduce its greenhouse gas emissions.

3.3 Site selection and justification

To date, the project has been developed over a period of one and a half years, within which significant site due diligence, preliminary investigations and discussions with landholders and key stakeholders (including DPIE) have been conducted.

As part of early project development UPC\AC carried out preliminary assessments of potential sites and turbine layouts. The evaluation of site options and layouts considered various factors including technical feasibility, as well as impacts on the local community environment. A summary of the key factors of consideration is presented in **Table 3-1 and Table 3-2**.

Table 3-1 Key factors for site consideration – technical feasibility

Key factors – technical feasibility	Comment
Quality of wind resource including average wind speeds and prevailing wind direction	• Preliminary wind resource modelling shows the area around Coolah has a resource appropriate for wind generation • The optimal location for turbines is along ridgelines • The local terrain lends itself to site optimising with the major ridgelines orientated perpendicular to the predominant wind direction.
Suitability of land topography for turbine microsites and associated infrastructure (electricity reticulation, substations and	• Gentle ridgelines provide for flexibility in design for micrositing of turbines, enabling siting that responds to environmental, heritage and visual constraints.

Key factors – technical feasibility	Comment
access for construction and operation of the wind farm)	• Good access is available over gentle terrain for both construction and operation. Further investigation is required to confirm requirements for public road upgrades • Suitable space is available for substations, electricity reticulation and associated infrastructure.
Landholder discussions and property constraints (dwellings, access and farm buildings), including prevalent local land uses such as farming practices and the ability to concurrently operate the wind farm with existing land use, and ultimately decommission back to current use	• All turbines are proposed to be located on freehold land • Unformed Crown roads, waterways and parcels of Crown land will be avoided where practical • Predominant land use is cattle and sheep grazing on associated properties. The land can be transitioned back to current use without significant impediment following the decommission of the wind farm at the end of its practical life • Indicative turbine layout enables continuation of current farming practices with little disruption.
Availability and capacity of connection to the NEM	• Proposed connection to a strong section of the NSW transmission network - 500kV • Three route options are being considered that would connect to the NEM at either the existing Wollar Substation or a new substation south-west of Merriwa. • Further assessment of potential environmental, community and property considerations, as well as technical feasibility, is required to define the preferred transmission line route. • The preferred transmission line would avoid National Parks and State Conservation Areas where possible.

Table 3-2 Key factors for site consideration – site constraints

Key factors – site constraints	Comment
Appropriate land use and adequate separation from dwellings and other sensitive land uses	• The local area has relatively low population density, with the townships nearest to the wind farm property being Coolah (population 795) and Leadville (population 169) • There are 12 non-associated dwellings within 2km of the indicative wind turbine locations, however the wind farm site is located on land zoned RU1 Rural Land and there are no residential zones nearby the project.
Landscape values, visual impact and potential for cumulative impacts	• Existing landscape features in the local area include wide open valleys with relatively uniform ridgelines • The approved Liverpool Range Wind Farm is in proximity to the project, with residents and the town of Coolah potentially having views of both wind farms during operation.
Traffic and transport (construction and operational access)	• Golden Highway has recently undergone an upgrade and provides good access to the wind farm site

Key factors – site constraints	Comment
	• Local roads may require upgrade or maintenance to gain access to the site for larger turbine components.
Community benefits	• In addition to providing an additional income stream for local farmers, local labour resources would be used during construction and operation where possible • The Coolah and Leadville area may experience economic benefit from increased spending during construction and operation of the wind farm.
Aboriginal and Non-Aboriginal heritage	• A search of the AHIMS database for the original layout (September 2018) showed that there are no registered Aboriginal sites within 350 metres of the indicative wind turbine location • There are several previously recorded Aboriginal sites in proximity to the transmission line options • There are four existing Native Title claimants in proximity to the wind farm site and transmission line options • There are no non-Aboriginal heritage items within 400 metres of the indicative wind turbine locations. There is one registered non-Aboriginal heritage item in proximity to the transmission line options (locally listed Wandoona Homestead).
Biodiversity	• The landscape has been significantly cleared of native vegetation, now largely consisting of introduced pastures for agricultural grazing purposes • A large majority of the Leadville and Girragulang Road clusters were severely burnt in a 2017 bushfire • Several Threatened Ecological Communities (TECs) were identified within the wind farm site, along with 55 threatened fauna and 36 threatened flora species that may be present, and associated habitat • Subject to further investigation there is opportunity to minimise impacts on sensitive areas through design development and micrositing.
Soils	• No unusual or significant soil constraints that would require extensive treatment other than standard soil and erosion management measures. • Soils within the project site are primarily mapped as Class 5, 6 or 7, which can be highly erodible. Other limitations include shallow soils, stoniness, rocky outcrops and scarring.
Hazard and risk	• Initial review of potential aviation impacts indicates no registered or certified aerodromes will have their obstacle limitation surface (OLS) impacted by the project • Several local airstrips are located within proximity to the site and the project may impact on lowest safe altitude for air routes in the area.

Key factors – site constraints	Comment
Cumulative impacts	• There are several surrounding developments that may have overlapping construction and operation periods including Liverpool Range Windfarm, Dunedoo Solar Farm, and some other renewable energy developments that may be developed under recently released strategic plans. There are also other non-renewable developments that may have overlapping impacts. • The project has the greatest potential for cumulative impacts in conjunction with the Liverpool Range Wind Farm given its proximity to the project, particularly impacts to landscape character and visual amenity, biodiversity and traffic.

In consideration of the key factors presented above, there have been ongoing refinements to the potential turbines sites and layouts throughout the early design and scoping stage of the project. An overlay of a previously considered layout and the current layout is presented in **Figure 3-2**.

As part of the ongoing refinement process, a preliminary desktop analysis of potential wind farm layouts was undertaken by Umwelt in 2018 (the Red Flags Review). The Red Flags Review assessed the potential planning, environmental, cultural heritage and hazard constraints arising from the proposed wind farm. Through this process, UPC\AC identified that two areas initially considered for project (one area north of Coolah and another to the east of the Girragulang Road cluster), had the potential to generate community angst through perceived cumulative impacts when considered alongside the proposed Liverpool Range Wind Farm. Although the wind resources in these northern areas would warrant consideration of micrositing locations, these no longer form part of the current project due to these perceived impacts. A number of turbines in other areas have also been relocated to minimise engineering, environmental and community constraints. The indicative layout proposed is now concentrated to the south and south west of Coolah.

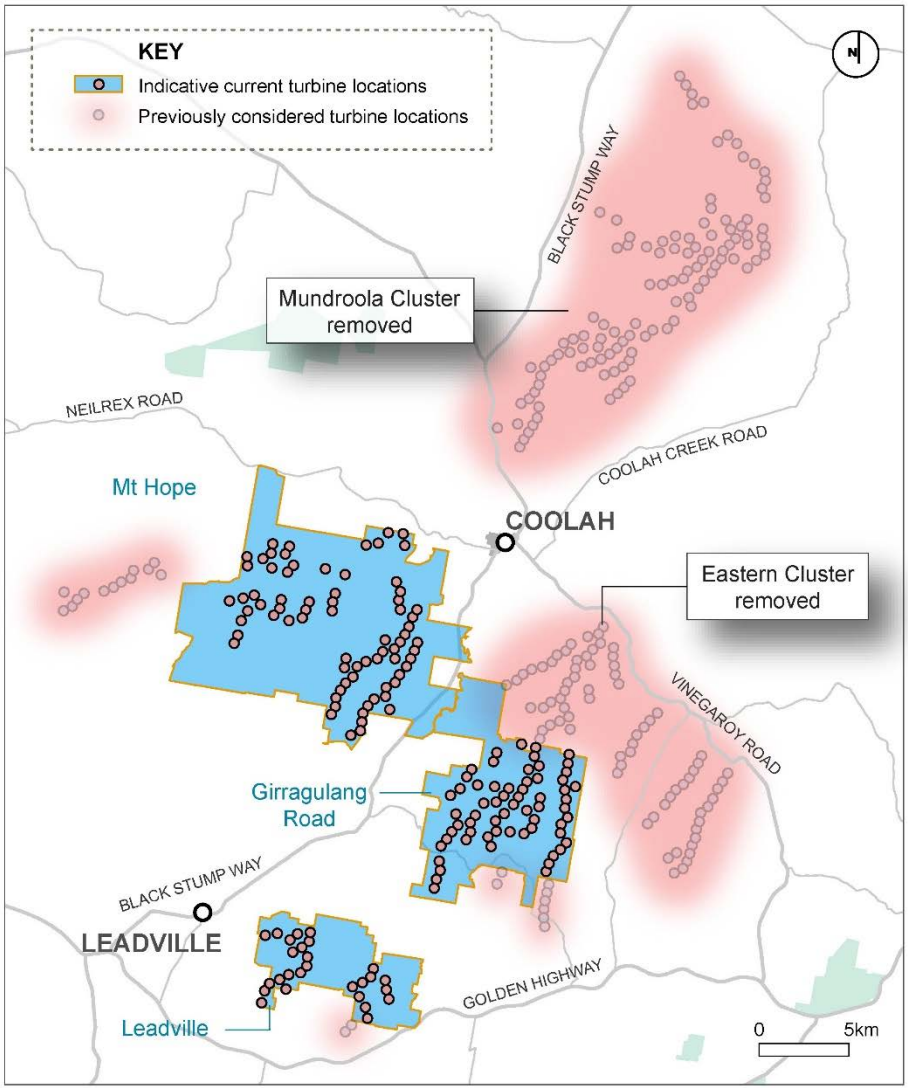


Figure 3-2 Previously considered project layout and current project layout

A summary of the number of turbines presented in the Red Flags Review compared to the current proposal along with the reasons for any changes, are presented in **Table 3-3**.

Table 3-3 Original site options and proposed clusters

Cluster	No. of wind turbines in layout in Red Flags Review	No. of wind turbines in current layout	Change	Reason for change
Mt Hope	91	75	-16	Turbines extending further west have been excluded to avoid areas of environmental significance and higher dwelling density
Girragulang Road	122	73	-49	Turbines extending further north west have been excluded due to the perceived cumulative impact

Cluster	No. of wind turbines in layout in Red Flags Review	No. of wind turbines in current layout	Change	Reason for change
				in conjunction with the approved Liverpool Ranges Wind Farm
Leadville	27	27	0	No change
Mundroola	92	0	-92	Cluster has been removed due to the perceived cumulative impact on the town of Coolah

The ultimate decision to proceed with the project in its current layout was based on the following considerations:

- Topography that would provide favourable wind conditions
- Alignment with wider strategic plans for the wider region
- Suitable space available for the construction of the windfarm infrastructure
- Low dwelling density in the area
- Strong connection point into the NEM, via the Bayswater - Mt Piper 500 kV transmission line.

4. PROJECT DESCRIPTION

4.1 Project overview

As discussed in **Chapter 0**, the project comprises a wind farm of approximately 175 wind turbines and a high voltage transmission line running approximately 65 kilometres which would supply approximately 800 megawatts MW of energy into the NEM.

The project would involve the construction, operation and decommissioning of three clusters of wind turbines, that would be connected electrically. These are:

- Mount Hope cluster
- Girragulang Road cluster
- Leadville cluster.

The wind farm would be connected via a series of underground cables (expected to be 33 kV) connecting the turbines to a substation within each cluster (i.e. 'secondary substations'). The secondary substations would then be connected to one central substation within the Girragulang Road cluster via 132kV, 220kV or 275kV transmission lines. The central substation would then transform the electricity to either 330 kV or 500 kV, transporting the electricity generated to the NEM via a single 330kV or 500kV transmission line. An illustration of the electrical reticulation is presented in **Figure 4-1**.

The Project would include the following key components:

- Approximately 175 wind turbines
  - Maximum tip height of 250 metres
  - Hardstand area at the base of each turbine
- Electrical infrastructure
  - Substations - one central substation and secondary substations as required within each cluster
  - Underground electrical reticulation connecting the turbines to secondary substations
  - Above ground transmission lines connecting the secondary substations to the central substation
  - Other electrical infrastructure as required including the potential of onsite battery storage
  - A high voltage transmission line connecting the central substation to the NEM
- Access track network
  - Access and egress points to each cluster from public roads
  - Operational access tracks and associated infrastructure on private property
- Other permanent on-site ancillary infrastructure
  - Permanent operation and maintenance facility
  - Meteorological masts
- Temporary construction ancillary facilities
  - Construction compounds
  - Laydown areas
  - Batching plants
  - Construction access tracks.

Depending on the quality of material available on site, the project may also include some on-site quarrying to source material that would typically be used for road base for access tracks and hardstand areas. Boreholes would also be required to determine the suitability and availability of the material on site for use and the depth of bedrock as part of design development. The size and location of these additional ancillary activities would be determined following further detailed site investigations. These activities would be identified and assessed in the EIS.

The current layout provides for a viable wind farm, with the three proposed clusters connected electrically. It is intended to be constructed in a single stage.

At the end of its practical life, the wind farm would be decommissioned, and the site returned to its pre-existing land use in consultation with the affected landholders.

Key components of the project are outlined in more detail in **Section 4.2** and an indicative layout of the project is provided in **Figure 4-2**.

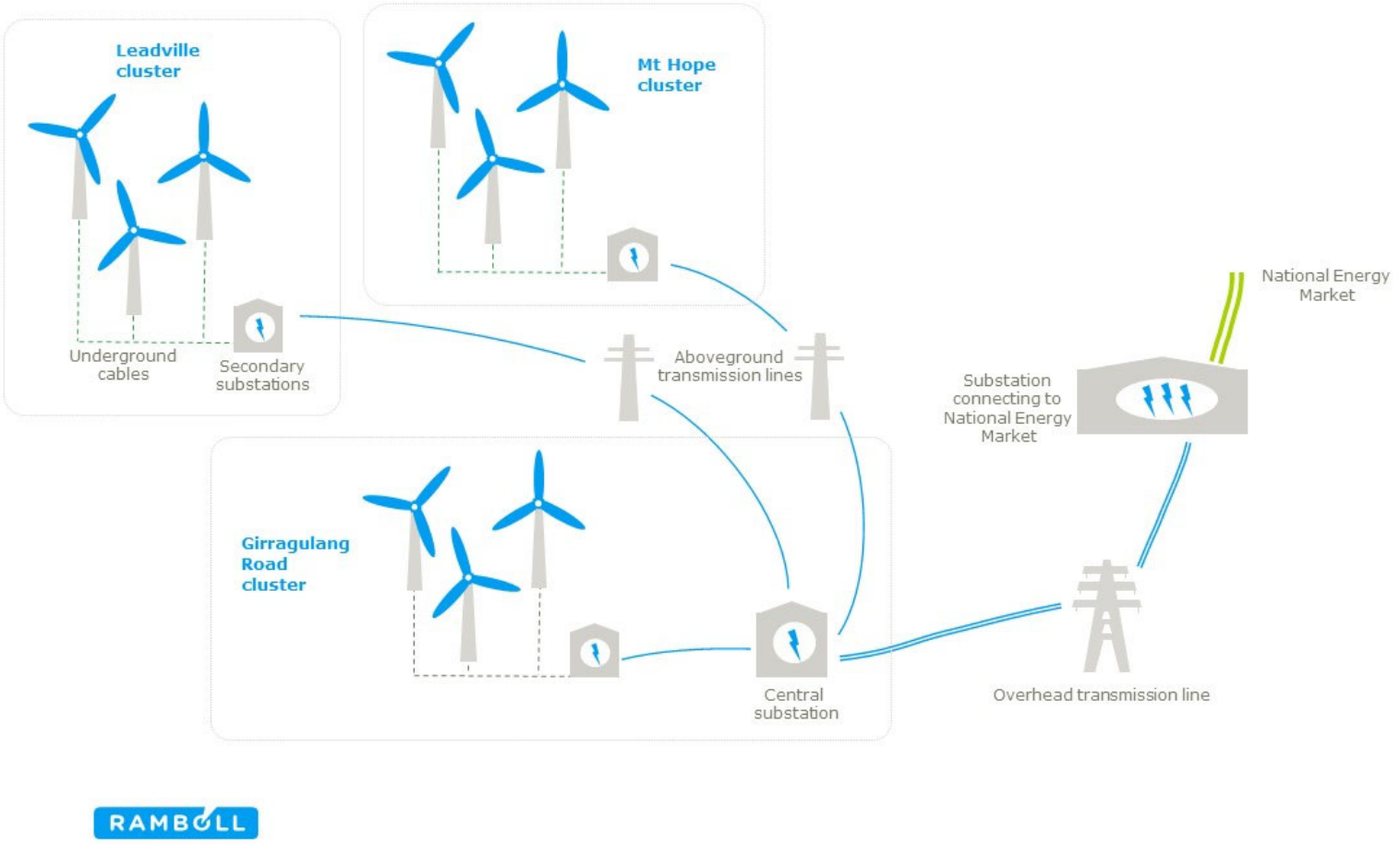
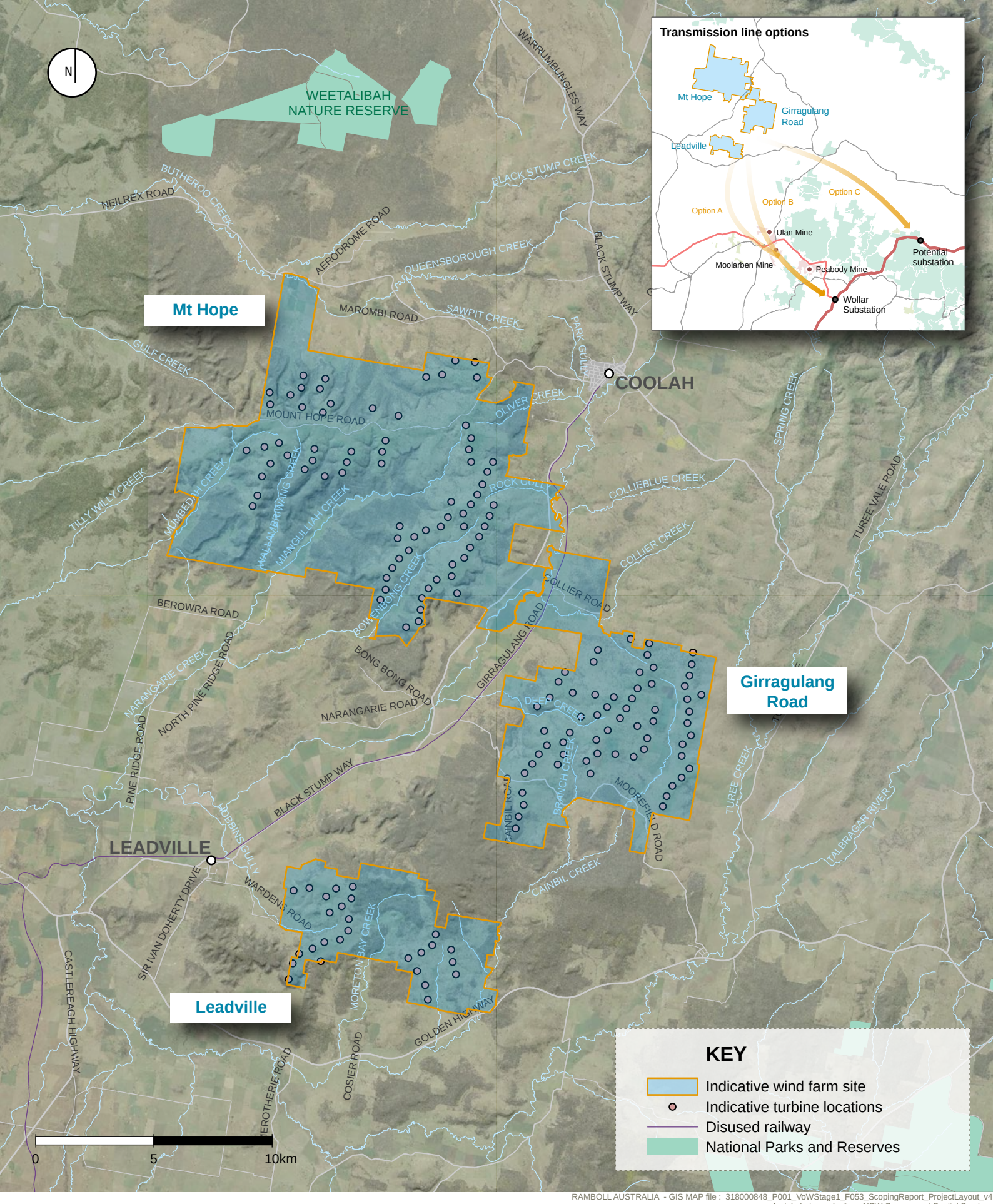


Figure 4-1 Electrical infrastructure arrangement



RAMBOLL AUSTRALIA - GIS MAP file : 318000848_P001_VoWStage1_F053_ScopingReport_ProjectLayout_v4
Aerial photography from NSW Government Spatial Services

Figure 4-2 | Project layout plan

4.2 Project components

The following sections outline the project's infrastructure components during construction and operation. For operation of the project, the key infrastructure components are:

- Wind turbines
- Electrical infrastructure
- Operations and maintenance facility
- Access track network
- Meteorological masts.

These components are discussed in further detail in the following sections.

4.2.1 Wind turbines

The project would include approximately 175 turbines arranged in three clusters, all connected electrically. Key elements of the wind turbines and how many would be located within each of the clusters are presented in **Table 4-1**.

It is important to note that the turbines are still subject to detailed design, and the size and number of turbines defined and assessed in the EIS may differ from those presented below. However, a maximum tip height of 250 metres has been provided to indicate an upper limit for the EIS.

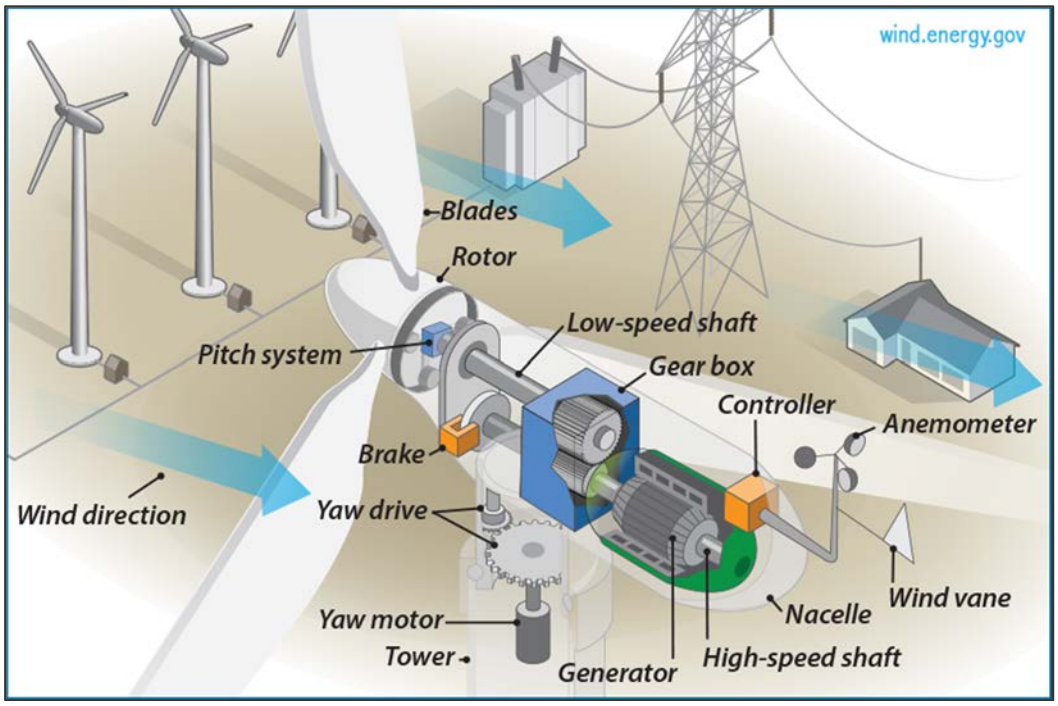
Table 4-1 Wind turbine overview

Total energy generation capacity	Approximately 800 MW		
Maximum tip height (above ground level)	250 metres		
Indicative number of wind turbines (approximate)	175		
Indicative Number of wind turbines (approximate)	**Mount Hope**	**Girragulang Road**	**Leadville**
	75	73	27

Each wind turbine would comprise the following key features, subject to design development and available turbine technology:

- Three blades which cause the rotor to spin
- Hub that connects the blades to the shaft
- Rotor (made up of the hub and blades)
- Nacelle, which is a cover that houses the generating components of the wind turbine, including the generator, gearbox, drive train, and brake assembly
- Tower
- Step-up transformer – this can be in a small structure at the base of each wind turbine tower, or inside the tower base.

The key features of the turbines are shown in **Figure 4-3**.



Source: US Department of Energy Office of Energy Efficiency & Renewable Energy (2018)

Figure 4-3 Typical turbine components

Electricity is generated by highly aerodynamic WTG blades being propelled by the natural power of the wind. The blades rotate a centrally geared drive shaft which feeds into an electrical generator within the turbine nacelle. This action produces electricity, which is transported via underground cables to an onsite substation.

The wind turbine footings are typically a mass concrete footing of approximately 3.5 metres in depth and 20 metres in diameter. Generally, the concrete footing is then covered with engineered fill to 1.5m deep, assisting in the stability of the wind turbine foundation. The specific footing requirements for the project will depend on the ground conditions in the local area and this will be investigated through the preparation of the EIS.

Preparation for construction of each turbine tower would include the development of a suitable foundation and laydown/hardstand area. This area would be required to be large enough to provide a level working space for the required construction machinery, a permanent foundation pad, and to lay down the individual turbine and tower components during construction. The total area required for each turbine site would be dependent on the turbine size, but it is expected that an area of approximately 100 metres by 100 metres would be required for each wind turbine location, with a number of configurations of this area possible. The laydown area would require a suitable surface fill to increase stability and be capable of being used by heavy vehicles and cranes. As the specific size of the hardstand will relate to the wind turbine used, and therefore will be refined as part of the preparation of the EIS.

A typical turbine elevation is shown in **Figure 4-4.**

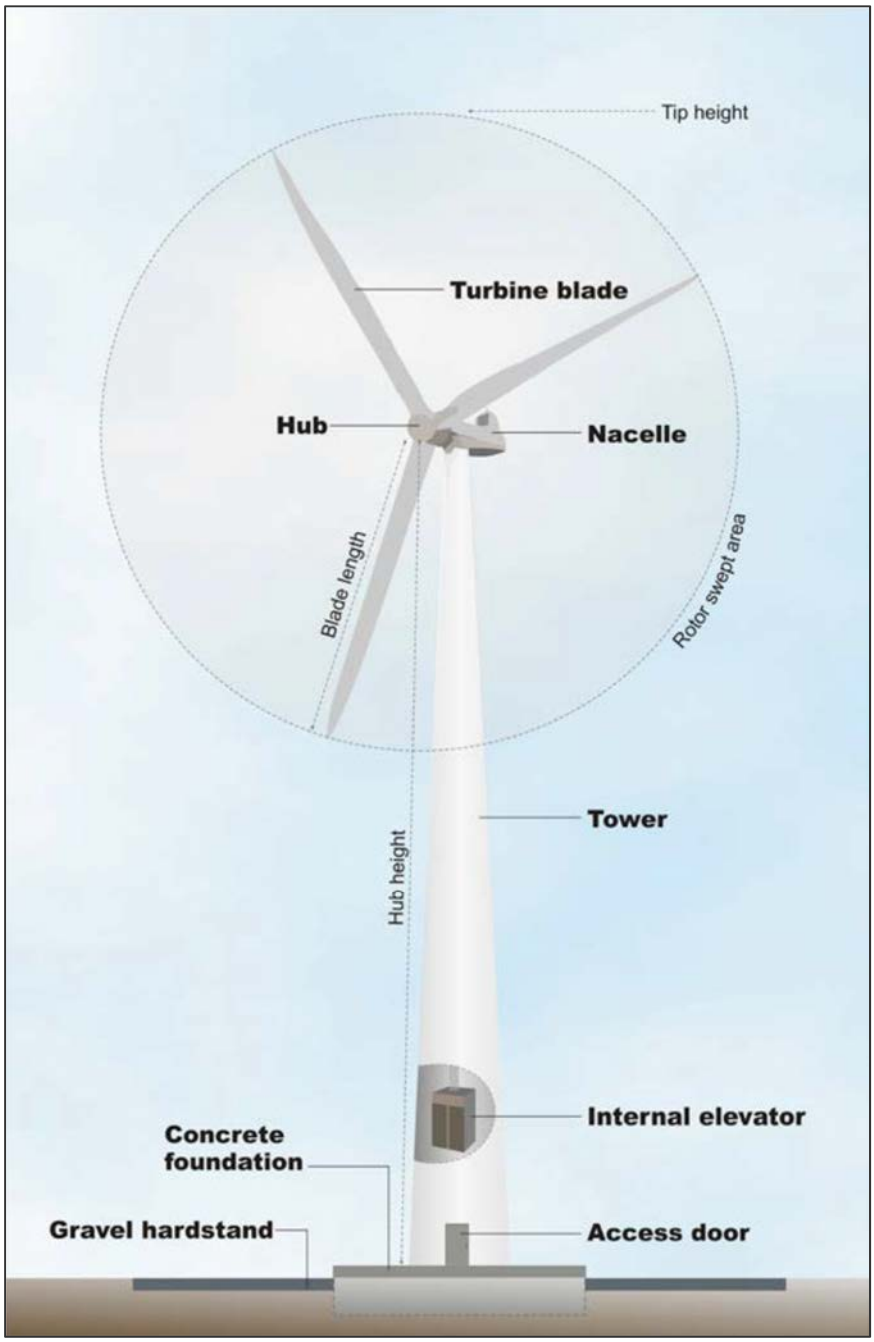


Figure 4-4 Typical turbine elevation

4.2.2 Electrical infrastructure

On site electrical reticulation

Permanent electrical reticulation that would be required within the wind farm site includes:

- Several electrical substations to transform the electricity generated by each turbine into a higher voltage, allowing it to be sent directly to the NEM. The substations required would include:
  - At least one secondary substation within each of the three clusters, converting electricity from 33 kV to either 132 kV, 220kV or 275kV

  - A larger ‘central’ substation connected to each of the secondary substations to convert the electricity from each of the clusters to either 330kV or 500 kV for distribution to the NEM.
- Electrical reticulation between wind turbines and substations, co-located with access tracks where possible, comprising:
  - 33 kV underground transmission cables connecting turbines to the secondary substation
  - 132 kV, 220kV or 275kV transmission lines connecting each secondary substation to the central substation.

Subject to design development, the project may include other electrical infrastructure such as battery storage. Further details of a storage system would be presented in the EIS.

Transmission infrastructure

A high voltage transmission line (330kV or 500kV) would be required to connect the wind farm to the Bayswater to Mt Piper transmission line (lines 5A3 or 5A4).

Three route options for the transmission line are being considered:

- Option A: A total length of approximately 70 kilometres to the existing Wollar substation, running to the existing 500 kV Wollar extension through the existing Peabody mining lease areas
- Option B: A total length of approximately 55 kilometres to the existing Wollar substation, running to the existing 500 kV Wollar extension through the Peabody mining lease areas
- Option C: A total length of approximately 65 kilometres to the Mt Piper to Bayswater 500kV transmission line. This option would require the construction of a new substation.

The transmission line route options are presented in **Figure 4-2**. These options will be subject to further assessment and refinement, leading to the preferred option being presented in the EIS. The refinement will consider each options viability using the avoid and minimise principle for environmental impacts, giving justification to the preferred option.

If Option C is found to be the most viable option, the new substation required for the connection the Mt Piper to Bayswater 500kV transmission line would contain a variety of electrical infrastructure, which would be stationed on concrete hardstands. The exact size of the substation has not been determined at this stage, but would require a hardstand area of approximately 200 x 300 m.

4.2.3 Permanent on-site ancillary infrastructure

Other permanent on-site ancillary infrastructure would be required on the wind farm site including an operation and maintenance facility, and meteorological masts.

An operation and maintenance facility (approximately two hectares in area) would be required throughout the projects operational life. This facility would generally comprise a control room (offices, monitoring equipment, stores and amenities), storage and maintenance facilities, laydown areas, and parking. The location and layout of this facility is subject to detailed design.

A minimum of two permanent meteorological mast would be required within each cluster. Meteorological masts comprise free standing towers up to 160 metres high that support equipment allowing for continuous monitoring of meteorological conditions. An example of a meteorological mast is presented in **Figure 4-5**.

Detailed design carried out throughout the preparation of the EIS will inform their locations.

Figure 4-5 Example of a meteorological mast

4.2.4 Access track network

The proposed windfarm would require an access track network connecting the turbines and associated infrastructure. The engineered gravel access tracks would be appropriately designed, constructed and maintained to allow access of all turbine componentry and electrical infrastructure through the site. This would include the construction of gates and fencing as required.

The design of the access network, access points from public roads, and construction methodology is subject to detailed design.

4.3 Property and easements

As discussed in **Section 4.1**, the proposed wind farm would be located close to the township of Coolah in the Warrumbungle LGA. The proposed wind farm site would comprise 22 private properties (20 landholders). A breakdown of properties within each cluster is presented in **Table 4-2**.

Table 4-2 Properties within each cluster

Cluster	No. of properties	Area (hectares)
Mt Hope	7	10,926
Girragulang Road	9	7005
Leadville	6	3248

UPC\AC have entered into access licence agreements with associated property owners (i.e. landholder agreements) allowing the option to lease the land for the construction, operation and decommissioning of the wind farm.

The high voltage transmission line would run generally south through the Warrumbungle, Mid-Western and Upper Hunter LGAs (refer to **Figure 4-2**). For both this line and those aboveground within the wind farm boundary, it is anticipated that lease arrangements would be agreed with property owners for the construction of the transmission line, in line with TransGrid's requirements.

During operation, an easement (or other agreement) would be required for the ongoing operation and maintenance of the transmission line. This agreement would include certain limitations for landholders relating to the use of the land within the easement, to ensure the safe operation of the infrastructure and minimise risks to safety. The number of properties requiring lease agreements and easements for the transmission line will be determined and assessed as the design develops and once the preferred route option is identified.

Upon cessation of any lease arrangement, easement, or other agreement, infrastructure would be decommissioned, and land would be returned to its pre-existing condition in consultation with the landholders and use would be returned to the landholder.

4.4 Construction

4.4.1 Overview

The project would typically be delivered in the following phases:

- Phase 1 – Detailed design and site investigations: Detailed design, including the design of electrical reticulation, geotechnical design, micrositing of turbines, etc. Initial investigations (e.g. geotechnical investigations) would also be undertaken during this phase to inform design
- Phase 2 – Site preparation: Pre-construction activities such as site preparation and vegetation clearing, utility adjustments, erection of site and workers compounds; and upgrades to public roads
- Phase 3 – Main construction works: Onsite civil works, wind turbine construction and electrical reticulation
- Phase 4 – Commissioning: Activities to be undertaken prior to operation such as testing of turbines and energising substations.

As discussed in **Section 4.1** the project is intended to be constructed in one stage, with individual turbines and clusters being commissioned sequentially throughout the construction phase, in line with AEMO requirements.

4.4.2 Temporary construction ancillary facilities

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

- Site compounds – inclusive of site offices, car parking and amenities
- Laydown areas – suitable for plant and equipment
- Concrete batching plants
- Onsite accommodation – if required
- Construction access tracks and associated infrastructure such as gates and fencing.

The locations of all temporary infrastructure will be determined following detailed site investigations which are scheduled to occur as part of the preparation of the EIS. Where possible,

areas that have been disturbed through the temporary construction activities would be repurposed for more permanent uses. This includes the construction access tracks where the majority would be used throughout the projects operational life.

Provision for workers' accommodation is also currently being considered and is subject to further options assessment as part of development of construction methodology and schedule. This will be documented in the EIS.

4.4.3 Transport routes

It is expected that many of the wind turbine components and other large components such as the electrical plant would be manufactured off-site and transported to site in sections.

It is acknowledged that transporting large components, such as turbine blades, by road is a very complex undertaking. Detailed consideration of the consequential effects will be included in the EIS. Dependant on the impact it may be necessary to upgrade portions of local roads to ensure the required oversized truck movements would not detrimentally impact the public road network. This includes any additional vegetation clearing that will be required due to the swept paths of the oversized trucks.

The preferred transport routes, as well as access points to each wind farm cluster will be identified and assessed in the EIS. However, it is expected that some components will be delivered by ship to Newcastle Port prior to transportation by road.

A possible regional route from Newcastle Port to the Golden Highway near the wind farm site would be approximately 280 kilometres, and may comprise the following roads:

- Bourke Street from Newcastle Port
- Hannel Street
- Industrial Drive
- Pacific Highway
- New England Highway
- Golden Highway.

From the Golden Highway, access to each turbine cluster would need to be via the local road network. Indicative local transport routes to each cluster may comprise:

- Mount Hope Cluster: Black Stump Way (Binnia Road, Coolah) from the Golden Highway, to Neilrex Road; and on to Mt Hope Road, providing up to 9-10 access points to the wind farm site from Mt Hope Road
- Girragulang Road Cluster: Black Stump Way from the Golden Highway, to Moorefield Road, providing potentially 2-4 points of access to the wind farm site from Moorfield Road
- Leadville Cluster:
  - The western portion may be accessed via Black Stump Way from the Golden Highway, to Garland Street (Leadville township) and on to Wardens Road
  - The eastern portion may be accessed from the Golden Highway at Uarbry (near Cainbil Creek) or overland from the western portion of the cluster.

Assessment of the entire impacted road network from port to site will be undertaken in preparation of the EIS. This will include a swept path assessment as well as an assessment of traffic volumes to accurately present the impact.

4.4.4 Construction program and workforce

The timing of construction would be dependent on project approval however, it is expected to commence in the first quarter of 2023 and would run for a period of approximately 24 to 42 months.

The project would likely require up to 400 workers during construction, subject to detailed design, construction methodology and scheduling. Opportunities will be available for local construction workers with a construction register being already available online which will assist in maximising the local work force onsite. Further details of which will be included in the EIS.

4.5 Operation and decommissioning

The proposed wind farm would likely operate 24 hours per day, seven days per week with the operations and maintenance team attending site typically 5 days a week during normal hours unless responding to an alarm or fault or major maintenance works. Ongoing monitoring and maintenance would be required, including maintenance of the turbines, associated infrastructure and internal access tracks. Approximately 50 full time employees would be required to operate and maintain the wind farm.

It is expected that the 330kV or 500kV transmission line would be owned, operated and maintained by the relevant Transmission Network Service Provider. Consultation with these agencies and other relevant stakeholders will continue as the project design is further developed, and throughout the planning approval process. Consultation is further discussed in **Chapter 5**.

At the end of its operational life, the proposed wind farm would be decommissioned and land that is impacted by the project would be returned to its pre-existing condition in consultation with the affected landholders.

5. PLANNING CONTEXT

5.1 Introduction

A review of the applicable legislation, policies and planning instruments to identify the most appropriate and likely approval pathway for the project has been undertaken.

This section includes a description of the relevant state, local and federal legislation and policies to the project and the relevant provisions that would affect the planning and assessment.

5.2 Planning approval pathway

The project meets the threshold for State significant development and is subject to assessment under Part 4 of the EP&A Act. The following subsections describe the relevant NSW legislation and environmental planning instruments (State environmental planning polices and local environmental plans) that are relevant in determining the planning approval pathway for the project.

5.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the principal environmental legislation for development planning and assessment in NSW. The EP&A Act is supported by the Environmental Planning and Assessment Regulation 2000 (the Regulation).

The project is consistent with the objects of the EP&A Act, which includes:

a) *to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,*
b) *to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*
c) *to promote the orderly and economic use and development of land,*
d) *to promote the delivery and maintenance of affordable housing,*
e) *to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*
f) *to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*
g) *to promote good design and amenity of the built environment,*
h) *to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,*
i) *to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*
j) *to provide increased opportunity for community participation in environmental planning and assessment.*

Part 4 of the EP&A Act relates to development assessment and consent; Part 4, Division 4.7 relates to the assessment of development deemed to be significant to the State (or SSD). Under Section 4.36(2) (previously Section 89C(2)) of the EP&A Act, a State environmental planning policy may declare any development, or any class or description of development, to be State significant development.

Under Division 4.2, Section 4.5 of the EP&A Act the consent authority for State significant development is the Independent Planning Commission (if the development is of a kind for which

the Commission is declared the consent authority by an environmental planning instrument) or the Minister (if the development is not of that kind).

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

Clause 4.41 of the EP&A Act clarifies that development consent for SSD includes authorisations under the following statutory provisions, meaning that separate planning approval processes do not apply:

- A permit under section 201, 205 or 219 of the Fisheries Management Act 1994
- An approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977
- An Aboriginal heritage impact permit under section 90 of the National Parks and Wildlife Act 1974
- A bushfire safety authority under section 100B of the Rural Fires Act 1997
- A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the Water Management Act 2000.

5.2.2 State Environmental Planning Policy (State and Regional Development) 2011

A State Environmental Planning Policy (SEPP) may declare any development, or any class or description of development, to be State Significant Development (SSD) for the purposes of the EP&A Act. *State Environmental Planning Policy (State and Regional Development) 2011* declares certain development to be SSD.

Clause 8 of the SRD SEPP states:

> *1) Development is declared to be State significant development for the purposes of the Act if:*
>
> *a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, an*
>
> *b) the development is specified in Schedule 1 and 2.*

Clause 20 of Schedule 1 of the SRD SEPP defines the following as SSD:

> *Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, waste, hydro, wave, solar or wind power) that:*
>
> *a) has a capital investment value of more than $30 million.*

The project is a development for the purpose of electricity generation with a capital investment value (CIV) of more than $30 million. The project is wind energy generation and has a CIV of $1bn and exceeds the threshold for SSD.

5.2.3 State Environmental Planning Policy (Infrastructure) 2007

Clause 34(1)(b) of *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) provides that development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. Under Clause 8(1) of the Infrastructure SEPP, the provisions of the SEPP prevail where there are inconsistencies with other environmental planning instruments, including local environmental plans.

The wind farm site is on land zoned RU1 – Primary Production under the Warrumbungle LEP and is permitted with consent. Subject to confirmation of the preferred alignment, the transmission line would be located on land in RU1 – Primary Production or RU3 – Forestry.

5.2.4 Warrumbungle Local Environmental Plan 2013

All the proposed wind turbines are located within the Warrumbungle local government area (LGA) and are subject to the Warrumbungle Local Environmental Plan 2013 (Warrumbungle LEP).

Aims of the Warrumbungle LEP include:

a) to encourage sustainable economic growth and development in Warrumbungle,
b) to encourage and provide opportunities for local employment growth and the retention of the population in Warrumbungle,
g) to provide for future tourist and visitor accommodation in a sustainable manner that is compatible with and will not compromise the natural resource and heritage values of the surrounding area.

The project is on land that is zoned RU1 –Primary Production under the Warrumbungle LEP, which is a prescribed rural zone under the Infrastructure SEPP (refer to Section 5.2.3). The objectives of this zone are:

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

The project is complementary to continued productive agricultural use of RU1 zoned land and represents economic use of land.

5.2.5 Mid-Western Local Environmental Plan 2012

Southern parts of transmission line corridor are located within the Mid-Western LGA and are subject to the Mid-Western Local Environmental Plan 2012 (Mid-Western LEP).

Aims of the Mid-Western LEP include:

a) to promote growth and provide for a range of living opportunities throughout Mid-Western Regional,
b) to encourage the proper management, development and conservation of resources within Mid-Western Regional by protecting, enhancing and conserving—
i. land of significance to agricultural production, and
ii. soil, water, minerals and other natural resources, and
iii. native plants and animals, and
iv. places and buildings of heritage significance, and

v. scenic values,

c) to foster a sustainable and vibrant economy that supports and celebrates the Mid-Western Regional's rural, natural and heritage attributes,

d) to promote development that minimises the impact of salinity on infrastructure, buildings and the landscape.

The transmission line corridor Options A and B traverse land zoned RU1 – Primary Production under the Mid-Western LEP, which is a prescribed rural zone under the Infrastructure SEPP (refer to Section 5.2.3). The objectives of this zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To maintain the visual amenity and landscape quality of Mid-Western Regional by preserving the area's open rural landscapes and environmental and cultural heritage values.
- To promote the unique rural character of Mid-Western Regional and facilitate a variety of tourist land uses.

The project is consistent with the objectives of the zone as it supports economic use of land, does not increase demand for public services and supports continued use of RU1 for the current productive agricultural uses.

5.2.6 Upper Hunter Local Environmental Plan 2013

The eastern section of transmission line corridor is located within the Upper Hunter LGA and are subject to the Upper Hunter Local Environmental Plan 2013 (Upper Hunter LEP 2013).

Aims of the Upper Hunter LEP include:

(b) to protect and conserve—

(i) soil stability by controlling development in accordance with land capability, and

(ii) remnant native vegetation, and

(iii) water resources, water quality and wetland areas, natural flow patterns and their catchments and buffer areas,

(c) to establish a pattern of broad development zones as a means of—

(i) separating incompatible uses, and

(ii) minimising the cost and environmental impact of a development, and

(iii) maximising efficiency in the provision of utility, transport, retail and other services,

(e) to promote ecologically sustainable urban and rural development and control the development of flood liable land,

The transmission line corridor Option C traverses land zoned as RU1 – Primary Production under the Upper Hunter LEP, which is a prescribed rural zone under the Infrastructure SEPP (refer to Section 5.2.3). The objectives of this zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To protect the agricultural value of rural land.
- To ensure that development does not unreasonably increase demand for public services or public facilities.

The project is consistent with the objectives of the zone as it supports economic use of land, does not increase demand for public services and supports continued use of RU1 for the current productive agricultural uses.

5.3 NSW legislation

5.3.1 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) establishes a framework for assessing and offsetting biodiversity impacts from proposed development. A biodiversity offsets scheme delivers a transparent, consistent, and scientifically based approach to biodiversity assessment and offsetting.

The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the wellbeing of the community, now and into the future, consistent with the principles of ecologically sustainable development, and in particular:

a) *To conserve biodiversity at bioregional and State scale*
b) *To maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations*
c) *To improve, share and use knowledge, including local and traditional Aboriginal ecological knowledge, about biodiversity conservation*
d) *To support biodiversity conservation in the context of a changing climate*
e) *To support collating and sharing data, and monitoring and reporting on the status of biodiversity and the effectiveness of conservation actions*
f) *To assess the extinction risk of species and ecological communities, and identify key threatening processes, through an independent and rigorous scientific process*
g) *To regulate human interactions with wildlife by applying a risk-based approach*
h) *To support conservation and threat abatement action to slow the rate of biodiversity loss and conserve threatened species and ecological communities in nature*
i) *To support and guide prioritised and strategic investment in biodiversity conservation*
j) *To encourage and enable landholders to enter into voluntary agreements over land for the conservation of biodiversity*
k) *To establish a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity*
l) *To establish a scientific method for assessing the likely impacts on biodiversity values of proposed development and land use change, for calculating measures to offset those impacts and for assessing improvements in biodiversity values*
m) *To establish market-based conservation mechanisms through which the biodiversity impacts of development and land use change can be offset at landscape and site scales*
n) *To support public consultation and participation in biodiversity conservation and decision-making about biodiversity conservation and,*
o) *To make expert advice and knowledge available to assist the Minister in the administration of this Act.*

The project will be assessed under the BC Act and an ecological assessment will be included in the EIS consistent with the requirements.

5.3.2 Protection of the Environment Operations Act 1997

The *Protection of Environment Operations Act 1997* (POEO Act) aims to reduce pollution of the environment and governs the way discharge of pollutants is to be managed. Under Section 48 of the POEO Act, an environment protection licence (EPL) from the NSW Environmental Protection Authority (NSW EPA) is required for scheduled activities listed in Schedule 1.

An EPL is required for wind energy projects which are SSD or a designated development. The EPL is required to authorise the carrying out of scheduled activities, including ancillary activities, and may regulate forms of pollution (including water pollution) resulting from that work or those activities.

5.3.3 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) also provides for the conservation of environmental heritage items in NSW. It is used to regulate the impacts of development on the State's European and Aboriginal heritage assets. Administered by the NSW Heritage Office, the Heritage Act details the statutory requirements for protecting historic buildings and places and includes any place, building, work, relic, movable object or precinct, which may be of historic, scientific, cultural, social, archaeological, natural or aesthetic value.

The project will be assessed under the Heritage Act and a heritage assessment will be included in the EIS consistent with the requirements.

5.3.4 Other State legislation

Other NSW legislation and environmental planning instruments that may be relevant to the project are described in **Table 5-1.**

Table 5-1 Other NSW legislation

Legislation	Application
Rural Fires Act 1997	Aims to prevent, mitigate and supress bush and other fires whilst protecting people, property and infrastructure from damage whilst having regard to the principles of ecological sustainable development. Consultation is required to be undertaken with the Rural Fire Service (RFS) and local Fire Brigades to determine the features required to minimise the threat of fire to the project. Bushfires are a known hazard with most of the project located in Vegetation 1 and 2 category bushfire prone land. Bushfire risk would be considered in the context of the *Rural Fires Act 1997* at all levels of the development process, from project design through to decommissioning.
National Parks and Wildfire Act 1974	Governance, care, control and management of national parks, nature reserves, Aboriginal areas and historic sites are detailed under the *National Parks and Wildlife Act 1974* (NPW Act). The objectives of the NPW Act include the conservation of nature, objects, places or features such as habitats, biological diversity, landforms and places of Aboriginal, social or historical value. These objectives are achieved by applying principles of ecologically sustainable development. The project is situated between national parks, reserve and state conservation areas. Through the options development phase and refinement of the project, the project avoids designated NSW National

Legislation	Application
	Parks and Wildlife Service Estates. The environmental assessment would consider the interactions of the project on the amenity and function of the nearby NSW National Parks and Wildlife Services Estates.
Forestry Act 2012	This act sets out the establishment of the Forestry Corporation of New South Wales as a statutory State-owned corporation and land manager of forestry areas. The project potentially incorporates land zoned as RU3, managed by NSW Forestry Corporation. Consideration of the objectives of the *Forestry Act 2012* requires consideration and consultation with the NSW Forestry Corporation.
Fisheries Management Act 1994	The *Fisheries Management Act 1994* (FM Act) is in place to conserve fish stocks, habitats and threatened species, populations and communities, to preserve fishery resources for future generations. The FM Act requires consideration of proposed construction and operation of the project which may affect fish passage or cause adverse impact to threatened fish species.
Water Management Act 2000	The objectives of the *Water Management Act 2000* are to provide for the sustainable and integrated management of the State's water sources for the benefit of both present and future generations. Water access licenses may however be required. Water sources for construction and operations will be identified and quantified within the EIS and all required licences and approvals obtained prior to the commencement of relevant construction activities. Detailed investigations would be carried out as part of the EIS to determine whether proposed earthworks would impact on aquifers or groundwater.
Roads Act 1993	An approval is required under Section 138 of the *Roads Act 1993* to permit the erection of a structure or carry out a work in, on or over a public road. These will be obtained prior to the commencement of relevant works. Any road upgrades required for the project and impact assessment of the upgrades will be assessed and identified in the EIS.
Coal Mine Subsidence Compensation Act 1961	Depending on the preferred option, an approval under Section 15 of the *Coal Mine Subsidence Compensation Act 1961* may be required for a transmission line that traverses the declared mine subsidence districts near Ulan.
Crown Lands Act 1989	Under the *Crown Lands Act 1989*, consent from the Land Division, Department of Primary Industries (DPI) is required for the construction of the access roadway over Crown Land to provide permanent vehicular access to wind turbine infrastructure. All relevant tenure arrangements with Crown lands will be obtained prior to the commencement of relevant construction activities.
Noxious Weeds Act 1993	The *Noxious Weeds Act 1993* aims to prevent the establishment, reduce the risk of spread and minimise the extent of noxious weeds. The Act guides the management of declared noxious weeds in LGAs. Construction activities and transport of goods to the project may cause the importation and spread of noxious weeds which would need to be managed. Appropriate project management to minimise the risk of spreading noxious weeds should be considered and addressed in the Construction Environmental Management Plan (CEMP).

Legislation	Application
Contaminated Land Management Act 1997	The *Contaminated Land Management Act 1997* (CLM Act) establishes a process for investigating and where appropriate, remediating land that the NSW EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3. Furthermore, under Section 60 a person whose activities have contaminated land or a landowner whose land has been contaminated is required to notify the NSW EPA when they become aware of the contamination. The project does not contain land listed on the Contaminated Lands Register. Relevant processes would be recommended within the CEMP for the ongoing operation of the project which would require notification of pollution incidents to the NSW EPA.
Soil Conservation Act 1938	The *Soil Conservation Act 1938* allows for conservation of soil resources and erosion management. Notices can be issued under Section 15A to control erosion or degradation. The construction of the wind farm would be required to follow best practice methods and a CEMP will be in place to guide soil management during construction to minimise sedimentation of downstream waterways.
Dangerous Goods (Road and Rail Transport Act) 2008	The aim of the *Dangerous Goods (Road and Rail Transport Act) 2008* is to regulate the transport of dangerous goods by road and rail, in order to promote public safety and protect property and the environment. Dangerous goods transportation licences for vehicles and drivers (if more than 500 L or 500 kg of dangerous goods are required to be delivered to the site). Dangerous goods transportation during construction and operations will be identified and quantified within the EIS and all required licences and approvals obtained prior to the commencement of relevant construction activities.
Environmentally Hazardous Chemicals Act 1985	The *Environmentally Hazardous Chemicals Act 1985* regulates the use and storage of environmentally hazardous chemicals or declared chemical waste. It provides DPIE with assessment and control mechanisms for chemicals and chemical wastes. This Act would only apply if environmentally hazardous chemicals are used during wind farm construction and there is potential for a significant adverse impact on the environment.

5.4 Commonwealth legislation

5.4.1 Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a framework for protection of the Australian environment, including its biodiversity and its natural and culturally significant places.

Any action which could have a significant impact on a matter of national environmental significance (MNES) must be referred to the Minister for the Environment and Energy. The nine matters of national environmental significance protected under the EPBC Act are:

- World heritage properties
- National heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Commonwealth marine areas

- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- A water resource, in relation to coal seam gas development and large coal mining development.

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

Therefore, the MNES to be considered for this project are listed threatened species and ecological communities, and migratory species.

The Commonwealth Government and the NSW Government signed a bilateral agreement in November 2013 that accredits the NSW planning system to undertake a single environmental assessment process for projects in NSW that require consideration under the EPBC Act. Approval would still be required from DAWE, which would be based on the assessment by DPIE.

A Referral including supporting assessments of significance for each of the potential species, communities or migratory species would be lodged with DAWE to allow the Minister to determine whether the proposed action would need formal assessment and approval under the EPBC Act as a Controlled Action. If deemed a controlled action, UPC\AC would request that the project is assessed under a bilateral approval process under the bilateral agreement between DAWE and DPIE.

5.4.2 Native Title Act 1993

Native title recognises the traditional rights and interests to land and waters of Aboriginal and Torres Strait Islander people. Under the *Native Title Act 1993* (Native Title Act), native title claimants can make an application to the Federal Court to have their native title recognised by Australian law.

There are four known claims under the Native Title Act (*NC2011/006; NC2018/002; NC2016/005; NC2013/006)* in the areas covered by the wind farm and transmission line options. The status of the claims would be confirmed as part of the EIS.

Consultation with Aboriginal stakeholders is currently being undertaken regarding the known active claims and will continue throughout the project assessment, design and construction phases.

5.4.3 Other Commonwealth legislation

Other Commonwealth legislation and environmental planning instruments relevant to the project are described in **Table 5-2**.

Table 5-2 Other Commonwealth legislation

Legislation	Application
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	The aim of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act) is to preserve and protect from injury or desecration areas and objects in Australia and in Australian waters that are of significance to Aboriginals, in accordance with Aboriginal tradition. **Section** Error! Reference source not found.

Legislation	Application
	provides a discussion of relevant matters protected under the ATSIHP Act.
Civil Aviation Regulations 1988	Reporting of tall structures to the Royal Australian Air Force (RAAF) is required under the *Civil Aviation Regulations 1988*. A detailed assessment in accordance with the regulations would be undertaken as part of the EIS.
Heavy Vehicle National Law	Approvals would be required for the transport of wind turbines and associated infrastructure by over size and over mass (OSOM) vehicles. **Section 7.3.3** provides a discussion of the relevant approvals required under the Heavy Vehicle National Law.

5.5 Other plans and guidelines

Additional plans and guidelines which are relevant to the project are presented in the following sections.

5.5.1 NSW Wind Energy Framework

This Scoping Report has been prepared giving consideration of the NSW Wind Energy Framework which comprises:

- *Wind Energy Guideline (Wind Guideline)* (DPE, 2016a)
- *Wind Energy: Visual Assessment Bulletin (Visual Bulletin)* (DPE, 2016b)
- *Wind Energy: Noise Assessment Bulletin (Noise Bulletin)* (DPE, 2016c)
- Standard Secretary's Environmental Assessment Requirements
- Wind Energy Framework Q&As

The NSW Wind Energy Framework provides guidance to communities, industry and regulators on the planning framework for the assessment of large-scale wind energy proposals which are SSD. The Framework ensures impacts from wind energy proposals are transparently identified and assessed so that informed decisions are made with the benefit of community inputs.

This scoping report has also been prepared considering the *Guideline 3 - Draft Scoping an Environmental Impact Assessment* (DPE, 2017).

5.5.2 Local planning strategies

Consideration has been given to the local planning strategies which have been development by each LEP area within the project. A summary of the planning strategies has been provided in **Table 5-3**.

Table 5-3 Land Use Strategies

LGA	Strategy
Warrumbungle Shire Council Land Use Strategy (GHD, 2013)	Warrumbungle Shire Council strategic framework focuses on: • The value of agricultural land • Growth within towns and villages • Develop a strong, diverse and sustainable local economy • Providing quality infrastructure including roads. Specifically, a focus identified 'sustainable energy production forms in the new LEP such as wind, solar and geothermal' as an action towards economic growth.

LGA	Strategy
Upper Hunter Land Use Strategy 2017 (City Plan Strategy and Development, 2017)	The Upper Hunter Shire Council and community's vision has been identified as 'A quality rural lifestyle – in a vibrant, caring and sustainable community.' The Strategy focuses on five themes with includes: • Quality • Rural • Vibrant • Caring • Sustainable. As part of the Council's strategy, a focus has been identified to build on existing natural and industrial assets to generate economic growth and to diversify. Renewable energy production has been identified as a sector which the Council sees as well placed to attract new opportunities to the LGA.
Mid-Western Regional Comprehensive Land Use Strategy Part C – Strategy, Revision E (Parsons Brinckerhoff, 2017)	The purpose of the Mid-Western Regional Council is to identify environmental, social and economic opportunities and constraints and weigh these against land demand and supply pressures for the LGA. The Council's vision includes the following statement. *'to provide for sustainable growth and development, having regard to the regions unique heritage, environment and rural character, and to support enterprises and the regions diverse economic base.'* As part of the Council's strategy, it identified the Council should; *'encourage the consideration of the impacts of climate change when planning for new development.'*

6. CONSULTATION

6.1 Consultation objectives and early consultation

Early, meaningful and tailored consultation during the scoping report phase is important to provide the foundation for collaboration and consultation into the EIS phase. Early consultation builds relationships, demonstrates an ongoing commitment to providing clear information and provides genuine opportunities for input. A strategic and thoughtful approach to community consultation will also help landholders and communities understand wind energy developments, how this project may affect them; and how and when they can provide input throughout the assessment process.

The objectives driving community and stakeholder engagement for the project are focussed on three main areas:

1. Relationships – Building good relationships early in the development process with a view to growing and sustaining these through construction and operation
2. Transparency and timeliness – Providing clear and accurate information, in the right way, at the right time
3. Sharing, understanding and incorporating – Listening and working with stakeholders through every stage and adapting to the needs of the community as the project develops.

The preferred consultation method throughout the projects scoping phase has been face-to-face discussions with targeted stakeholders. The aim has been to introduce the potential project to individuals, seek feedback and provide further information as needed.

Since July 2018, UPC\AC has been building a local presence in the region through both one-on-one and group meetings with local landholders, neighbouring property owners, Warrumbungle Shire Council, Mid-Western Regional Council, Upper Hunter Shire Council, community groups and local service providers.

UPC\AC is committed to adopting a model of consulting early and often, with a view to minimising surprises the for the community and stakeholders. Ongoing interactions with the community and stakeholders will align with UPC\AC's engagement principles.

"UPC\AC understands that we have long-term responsibilities in the communities where our projects are located. UPC\AC works in collaboration with community leaders and other stakeholders to deliver renewable energy projects safely. Every project and community is unique, and our team engages with them to create projects that are investments in the people and infrastructure of the communities. We create custom-made community programs to meet local needs with the goal that our programs have a lasting positive impact."

As discussed in **Section 1.2**, the owner operator model means UPC\AC has long term motivations to be a valued member of the local community throughout its planning, construction, and operation phases. The long-term local presence means UPC\AC can foster long term relationships with both landholders and community members, and a long-lasting positive impact on the local community. Through regular and open communication, UPC\AC aims to establish strong relationships and understand how to best share socio-economic benefits with the community.

6.2 Stakeholder and community engagement strategy

UPC\AC engaged Elton Consulting to develop and assist to deliver a community and stakeholder engagement plan to meet the consultation objectives for the scoping phase. This plan informed

the consultation activities carried out as part of preparing this scoping report and forms the basis for ongoing consultation into the EIS phase.

The key community and landholder consultation stages align with the planning approvals process and as illustrated in **Figure 6-1**.

Figure 6-1 Consultation phases within the planning approval process

6.3 Consultation guidance

Stakeholder engagement for the project is guided by the requirements of relevant policies and guidelines including:

- *Wind Energy Guideline for State Significant Wind Energy Development* (DPE, 2016)
- *Guideline 6 - Community and Stakeholder Engagement* (DPE, 2017)
- *Community Consultative Committee Guidelines for State Significant Projects* (DPE, 2019).

6.4 Scoping study phase consultation

Consultation undertaken through the scoping phase of the project has involved the following:

- **Project website:** A public website has been established to provide project related information and regular community updates, https://valleyofthewinds.com.au/. This website will be maintained throughout the planning approvals process, during construction and into operation as a central public information source.

- **Project inbox:** A project inbox has been established to allow the project team to receive emails from members of the community seeking clarifications or further information
- **Community information session:** A community information session was held in Coolah on 27 February 2020, to allow landowners and the broader community to gather more information and talk to members of the project team face-to-face. The session also allowed the project team to discuss the potential impacts and seek initial feedback on the project. Feedback and requests for further information included general questions about the project and information on some of the potential key issues, including amenity, community benefit sharing opportunities, landscape values and community values.
- **Information packages**: As part of preparing for the community information session, written invitations and a project factsheet (project description and indicative layout plan) were sent to known stakeholders. A description of the stakeholder mapping process undertaken is provided in Chapter 4 of **Appendix 5** (Social Impact Scoping Report).
- **Meetings with key stakeholders**: meetings with key stakeholders, including local councils have been conducted to seek feedback on project and raise issues and opportunities to be addressed and/or discussed further as the project develops.

A summary of consultation activities undertaken to date is provided in **Table 6-1**.

Table 6-1 Consultation actives completed to date

Stakeholder	Method of Engagement
Associated landholders	Personal phone calls Face to face meetings Information package and community information session (27 February 2020)
Non-associated landholders	Information package and community information session (27 February 2020)
Broader community	Community information session (27 February 2020)
Identified local influencers and community groups	Information package and community information session (27 February 2020)
Department of Planning, Infrastructure and Environment	Project scoping meeting (5 December 2019)
Warrumbungle Shire Council	Council briefing (19 December 2019) Councillors briefing (3 February 2020) Community information session (27 February 2020)
Mid-Western Regional Council	Council briefing (4 February 2020)
Upper Hunter Shire Council	Council briefing (4 February 2020)
Other Government Agencies	Ongoing consultation within DPIE (Industry)
Local Aboriginal groups	Information package and community information session (27 February 2020)
Commonwealth Government	Pre-referral meeting held with DAWE 19 February 2020
TransGrid	Ongoing meetings since July 2018

Consultation undertaken during the scoping phase provided valuable early input into the understanding of stakeholder needs and potential issues. A summary of the outcomes of consultation undertaken to date is provided in **Table 6-2**.

Table 6-2 Summary of community feedback

Aspect	Comment	Where addressed in this report
Consultation	• Attendees at the community information session appreciated the opportunity to speak face to face with the project team and commented that the level of information provided was good. • The community recommended that improved community outcomes would be achieved through developing the project collaboratively.	**This chapter**
Socio-economic	Key comments relating to the potential socio-economic issues and opportunities for the project included: • Construction and operational job opportunities for the local community, including contractors and service providers • Training and skills development for locals such as youth training • Use of unused or underutilised property in Coolah town to house workers • Utilisation of existing local spaces for project administration and logistical needs • A community benefits program should be developed in coordination with existing community governance structures such as the Coolah District Community Development Committee • A desire to see the project mitigate some of the declining population of Coolah and surrounds and hopefully bring people to the area • Residents still feeling emotional effects of bushfires in 2017, with economic and social impact compounded by drought. • Members of the community expressed the need for a public meeting space in Coolah which can accommodate community events and activities • Benefit opportunities for adjacent landholders in compensation for the perceived devaluation of their land • Low supply of accommodation for construction workforce • Cumulative impacts if the construction program overlaps with the construction of the Liverpool Range Wind Farm • Questions raised about construction worker accommodation and the potential for and location of construction camps. Feedback was focussed on encouraging the use of local accommodation where	**Section 7.3.6**

Aspect	Comment	Where addressed in this report
	available and the desire to know where a possible construction camp might be located.	
Agriculture	• Impact of heavy vehicle movements on stock movements • Positive response to the wind farms allowing current agricultural and grazing practices to continue • Questions about whether the turbines would place restrictions on the use of land.	**Section 7.3.6** **Section 7.4.3**
Traffic and Transport	• Impact of project related vehicle movements on local road traffic, tourist traffic safety and cyclist safety. Questions were also raised about how the project would consider areas narrow roads and tight bends during transport of turbine components; and potential for damage to road surfaces. • It was noted that some roads in area are not in good condition, particularly after rain events.	**Section 7.3.3**
Landscape values	• Landscape and scenic values are not limited to certain locations, but relate broadly to wide views of the landscape, vegetation and valleys when viewed from public areas, dwellings and townships • The community values the trees along ridges and streams, but recent drought has meant some mature trees are visibly deteriorating • Most attendees noted that the potential visual impact would be acceptable based on flow-on benefits to the community, but some community members voiced concerns regarding the visual impacts • Coolah township is located on the lower east facing slope and the main views from the town are towards the east • Potential for some Aboriginal cultural sites, particularly King Togees Grave, Neilrex Road, Coolah.	**Section 7.3.1** **Section 7.3.5**
Biodiversity	• Potential impact on bird life and the countryside generally. It was suggested that the low energy generation associated with wind energy compared to coal does not warrant the potential impact on birdlife • Presence of numerous eagles in the area.	**Section 7.3.2**
Noise	• Question around the noise restrictions in NSW compared to other states. • Noise assessment process moving through the EIS phase • Relevance of background noise monitoring campaign	**Section 7.3.4**

6.5 Environmental Impact Assessment Phase Consultation

An approach to consultation is currently being developed to guide the consultation process through the preparation of the EIS. This would include UPC\AC's approach to achieving the outcomes identified in the scoping report and SEARs.

Consultation undertaken during EIS preparation will aim to:

- Continue to engage with key stakeholders to identify potential issues and opportunities
- Communicate the evolution of the EIS assessment process and project developments and or decisions
- Further develop cooperative landowner and community relationships
- Enable stakeholders to have input to the preparation of the EIS and project planning
- Consult proactively with stakeholders using clear and consistent key messages
- Facilitate the development and implementation of response and feedback strategies to address stakeholder concerns and use these to inform the preparation of the EIS.

Relationships have been established and would continue to be developed with the community and stakeholders during the preparation of the EIS. The project team would continue to gather feedback so that issues raised would be adequately addressed through the social impact assessment, which would be undertaken as part of the EIS. A summary of consultation methods and their purpose to be used as the project develops is provided in **Table 6-3**.

Table 6-3 Proposed Environmental Impact Statement phase consultation

Stakeholder	Purpose	Method
Government Agencies	• Regular project updates • Demonstrate methodology for compliance with SEARs • Receive comment on emerging issues throughout the EIS development phase	• Face-to-face briefings and meetings • Newsletters and fact sheets
Relevant Local, State and Federal MPs	• Regular project updates	• Face-to-face briefings • Newsletters and fact sheets
Associated landholders and non-associated neighbours	• Regular project updates and educate on windfarm developments • Regular updates on the regulatory approval pathway and opportunities for formal submissions to the project • Identify key environmental, social and amenity concerns • Identify connection to place and how the location is used by the community • Negotiate access arrangements and compensation	• Face-to-face briefings, interviews and phone calls • Newsletters and fact sheets • Community drop-in sessions • Website feedback forms and project information line.
Wider community	• Regular project updates and educate on windfarm developments	• Newsletters and fact sheets • Community drop-in sessions • Website feedback forms and project information line

Stakeholder	Purpose	Method
	• Regular updates on the regulatory approval pathway and opportunities for formal submissions to the project • Identify key environmental, social and amenity concerns • Identify connection to place and how the location is used by the community • Understand community cohesion	
Aboriginal community	• Regular project updates • Identify key environmental, social and amenity concerns • Identify connection to place • Build a picture of the cultural heritage values in the landscape	• Consultation in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010) • Newspaper notices • Face-to-face briefings • Newsletters and fact sheets • Open days and public displays • Website feedback forms and Project information line
Local service providers, business and industry associations	• Regular project updates • Identify key environmental, social and economic concerns • Gain an understanding of the local economy and resource availability	• Face-to-face briefings • Newsletters and fact sheets • Open days and public displays • Website feedback forms and Project information line
Commercial operators along the transmission line investigation corridor	• Regular project updates • Identify potential for land use conflicts • Understand potential cumulative impacts	• Face-to-face briefings • Newsletters and fact sheets • Open days and public displays • Website feedback forms and Project information line
Non-Government organisations and special interest groups	• Regular project updates • Identify key environmental, social, amenity and economic concerns	• Face-to-face briefings as required • Newsletters and fact sheets • Open days and public displays • Website feedback forms and Project information line

7. PRELIMINARY ENVIRONMENTAL ASSESSMENT

7.1 Introduction

A preliminary environmental assessment has been undertaken to assist in the identification of key environmental matters which would require detailed assessment during the EIS process. The purpose of this section is to identify potential environmental impacts specific to the context of the project.

The project boundary referred to in this report represents the physical extent of where the project may be located or where construction works would be undertaken. The project would be refined further in the EIS, however for this scoping stage the adoption of a conservative approximate area of impact informs the specialist assessments. This area differs for some specialist assessments due to the nature of potential impacts. For example, the potential socio-economic impacts may be broader than those for biodiversity. Therefore, appropriate impact footprint areas have been defined accordingly for each specialist area.

7.2 Scoping worksheet summary

An environmental and social risk assessment has been undertaken in accordance with the Scoping Worksheet provided in *Guideline 3 draft scoping an environmental impact statement* (DPE, 2017). The assessment was based on information collected at the project site, at nearby sites within the region and based on similar projects in other regions. The combinations of inputs regarding social and environmental matters identified an expected level of assessment and/or engagement required. The level of assessment is categorised into either:

- *Key Issue*- refers to the likelihood of there being a material impact on a matter, but detailed assessment is required to fully understand such impacts and identify project-specific mitigation. A separate specialist study describing the assessment method, data inputs, detailed impact assessment and mitigation will be required and will be summarised in the EIS.
- *Other Issue* - refers to the likelihood of there being a material impact on a matter, but that measures to manage the impact are well understood and routinely used on similar projects. The assessment of impacts for Other Issues will be reported in the EIS, without the need for a supporting specialist study in most cases.

The completed worksheet is provided in **Appendix 1**.

The key issues and other issues identified for the project, and where they are addressed in this chapter, are presented in **Table 7-1**.

Table 7-1 Summary of key issues and other issues

Discipline	Where assessed in this report
Key issues	
Landscape character and visual amenity	**Section 7.3.1**
Biodiversity	**Section 7.3.2**
Traffic and transport	**Section 7.3.3**
Noise and vibration	**Section 7.3.4**
Aboriginal heritage	**Section 7.3.5**
Social and economic impacts	**Section 7.3.6**
Hazard and risks	**Section 7.3.7**
Cumulative impacts	**Section 7.3.8**

Discipline	Where assessed in this report
Other issues	
Historic heritage	**7.4.1**
Water and soils	**Section 7.4.2**
Land use and property	**Section 7.4.3**
Air quality	**Section 7.4.4**
Waste	**7.4.5**
Greenhouse gas emissions and climate change	**7.4.6**

7.3 Key issues

7.3.1 Landscape character and visual amenity

Background

Preliminary assessment context

Typically, the height, scale and mechanical character of wind turbines generates an unavoidable level of visibility and contrast within the natural landscape in which they are situated. Such effects have the potential to alter the character of the landscape and impact on community values associated with views of that landscape.

The potential for visual impact is a product of various landscape characteristics, including:

- Topographic relief – the complexity of landforms in the landscape
- Vegetation cover – extent of potential vegetation screening
- Infrastructure and built form – presence of existing development and its influence on landscape character
- Cultural and landscape values – community values and cultural connections to landscape
- Percentage of visual absorption – degree to which new features (eg turbines) are absorbed in the landscape
- Horizontal visual effects – spread of the new features (eg turbines) in the landscape
- Vertical visual effects – height of the new features (eg turbines) in relation to existing vertical landscape elements
- Distance to visual effect – distance to viewpoints.

In this context, multiple turbines and or wind farm projects within proximity of viewpoints (eg dwellings or public areas) may generate cumulative impacts on views and the perceived character of that landscape.

In order to establish a consistent approach to scoping the potential for landscape and visual impacts associated with wind farms, DPIE has prepared the Wind Energy – Visual Assessment Bulletin, December 2016 (the Visual Bulletin), which is designed to bring greater transparency, consistency and objectivity to visual impact assessments for wind energy development.

A preliminary landscape and visual assessment (preliminary LVA) has been prepared by Green Bean Design (GBD) and provided in **Appendix 2**. This Preliminary LVA has been prepared in order to meet the objectives of the Visual Bulletin.

The preliminary LVA considers the existing landscape and visual context of the area and identifies potential impacts of the proposed wind farm that require greater consideration in the EIS. This

section provides a description of the potential landscape and visual impacts based on the preliminary LVA prepared by GBD (**Appendix 2**).

This preliminary LVA has considered the most current turbine layout, assessing in line with dimensions stated in **Chapter** Error! Reference source not found., and the high-voltage transmission line connecting the project to the NEM. The assessment has not considered the location or extent of other typical ancillary infrastructure commonly associated with wind farm developments, including electrical infrastructure (substations), maintenance facilities and access tracks. Ancillary infrastructure items proposed as part of the project are subject to design development and siting considerations. The landscape and visual impacts of these elements would and assessed as part of preparing the EIS.

This preliminary LVA includes a high level description of the landscape characteristics and visual constraints along the potential transmission line routes (Options A, B and C), noting that a more detailed assessment of the landscape and visual impacts of transmission line options would be undertaken as part of the EIS once the preferred route is identified.

Landscape characteristics

A preliminary assessment of landscape characteristics in the area surrounding the wind farm site was carried out to inform the preliminary LVA as well as the early phase community consultation.

Landscape characteristics in the areas surrounding the wind farm site are grouped according to Scenic Quality Areas (SQA) as illustrated in **Figure 7-1** to **Figure 7-3**. The landscape characteristics are generally defined according to areas that express similar visual patterning with respect to line, colour, texture and scale, generating unique characteristics in land use, land cover and topography.

A preliminary landscape analysis identified nine SQA within and surrounding the project site, which are outlined below. Landscape character areas within which the proposed wind farm site is located are shown in bold:

- Cultivated agricultural land
- Creek line and irrigated land
- **Hills with dense timber**
- **Hills, rock outcrops and dense timber**
- Gullies and valleys
- Township-urban
- **Pastoral land**
- Hills with open timber
- Wind farm (approved not constructed).

The SQA were photographed and described for the purpose of communicating key findings at the community information session (Refer to **Chapter 6** for a description of community consultation). These figures demonstrate the approach to landscape analysis and processes involved in the determination of scenic quality.

Landscape characteristics that influence the Mount Hope cluster are typical of the ‘hills with closed (dense) timber’ and ‘closed valley with timber sides’ landscape areas. This means that ridgelines are generally viewed as partially vegetated from the valley floor, but the ridgelines themselves are largely cleared for pastoral grazing. The valleys between saddles are densely vegetated. The indicative turbine layout in the Mount Hope cluster aligns with these cleared areas to minimise impacts on timbered country and preserve screening vegetation where possible. Access to turbine

locations would be via the existing unsealed ridgeline road (Mount Hope Road), with lateral access roads formed to each turbine location within the wind farm site.

The landscape characteristics of Girragulang Road and Leadville clusters are typical of the Hills with closed timber and rock outcrops' landscape area. Ridgelines are the focus for the indicative turbine layout and are characterised by pastoral grazing land with scattered trees. Access tracks between turbine locations would likely traverse areas of pastoral land on hillsides and ridgelines.

The proposed 330kV or 500kV transmission line would potentially incorporate large scale steel lattice towers or single pole structures with the potential to result in a visual effect on sensitive view locations proximate to proposed easements and electrical infrastructure. Potentially sensitive view locations would include road corridors (including designated tourist routes) as well as dwellings, lookouts or designated landscape areas (including State Forests and National Parks).

The three route options under consideration exhibit a variety of landscape characteristics and varying degrees of absorption capability. In this context, absorption capability is the ability to accept modification without significant change to existing visual characteristics. Key landscape characteristics of the optional transmission line routes are:

- areas of open cultivated agricultural land within and beyond river flood plains (generally low absorption capability)
- gently undulating livestock pasture with scattered tree cover (generally low to moderate absorption capability)
- areas of dense woodland covering low hills and gullies (generally moderate to high absorption capability).

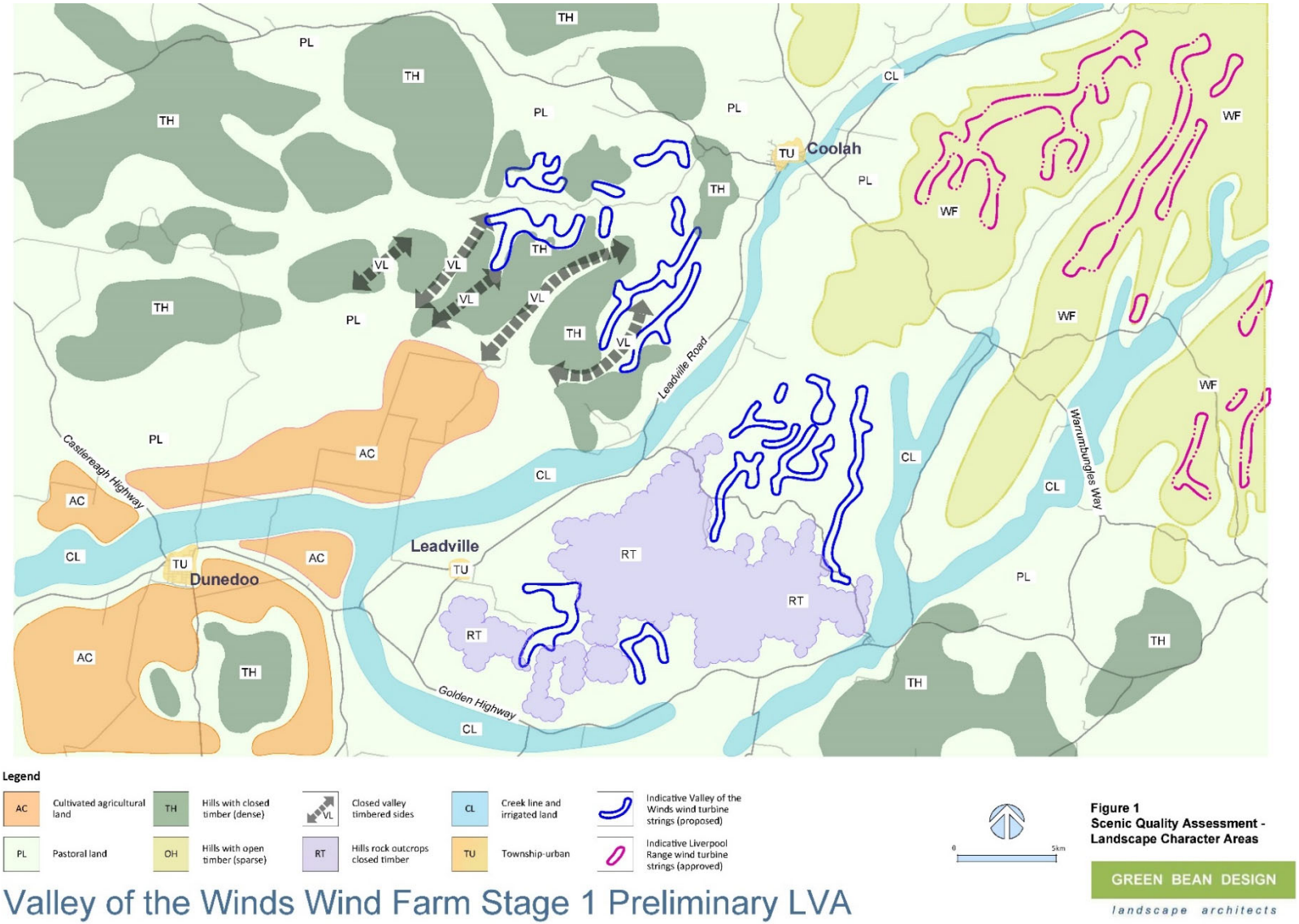


Figure 7-1 Scenic quality areas map

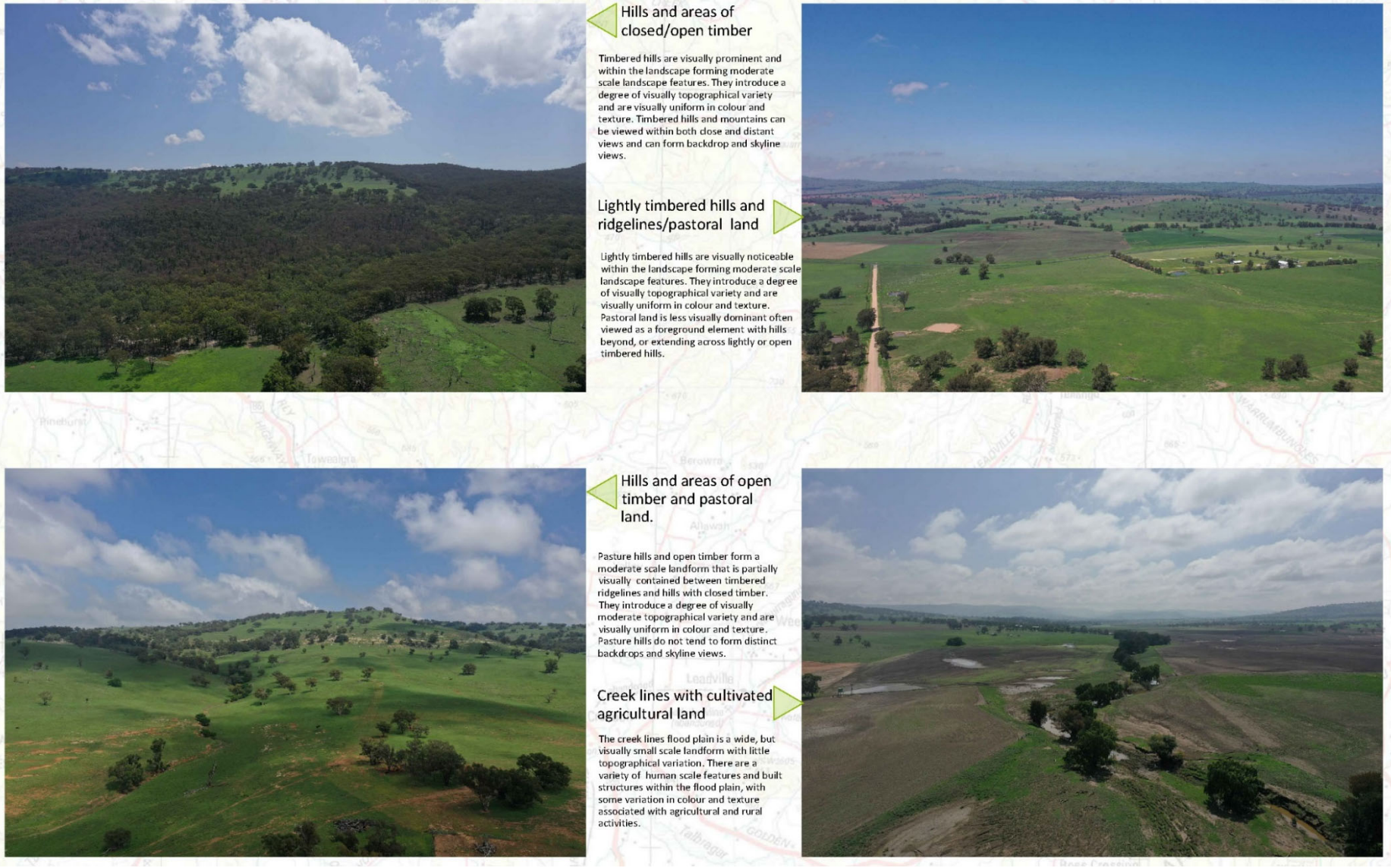


Figure 7-2 Scenic quality areas – Panel one

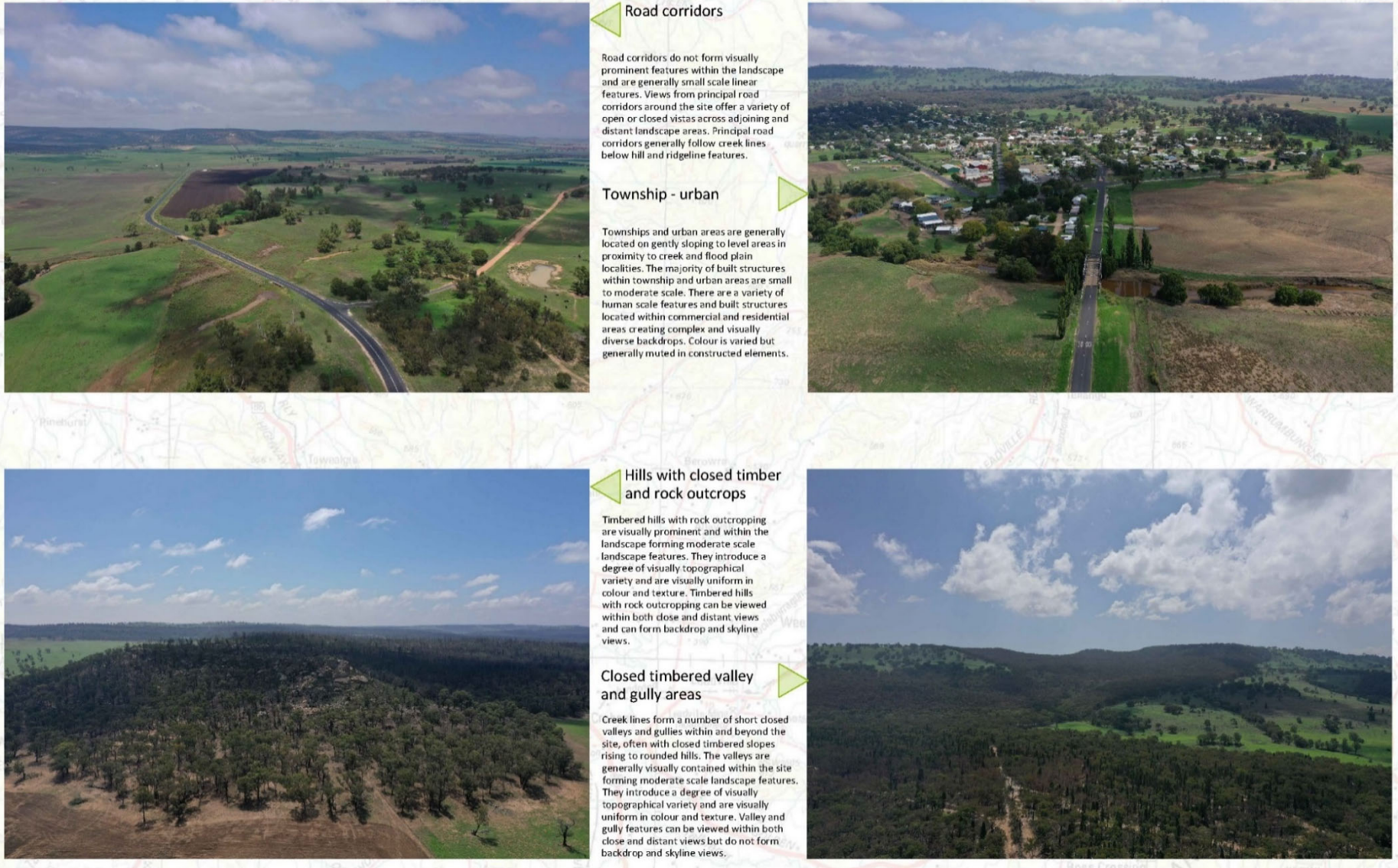


Figure 7-3 Scenic quality areas – Panel two

Feedback from community consultation

Notable observations or comments made during face to face meetings, information sessions and as provided in the feedback forms which are relevant to this assessment are summarised below.

People were interested to understand the proposed locations for wind turbines and commented positively regarding the clarity of information presented. To support community consultation, maps were prepared showing the indicative wind farm site area and identifying elevated ridges that had the potential to host wind turbines. This was done to allow for feedback to be incorporated into the design of the layout at the earliest stage.

Key comments and observations noted during community consultation include:

- Landscape and scenic values are not limited to certain locations, but related to wide views of the landscape, vegetation and valleys when viewed from public areas, dwellings and townships
- Generally the community values the trees along ridges and streams, but recent drought has meant some mature trees are visibly deteriorating
- Community values were expressed for rocky outcrops or large boulders visible within the landscape
- Most attendees describe the visual impact as acceptable based on flow-on benefits to the community, but some community members voiced concerns regarding the visual impacts
- It was noted that Coolah township is located on the lower east facing slope and the main views from the town are towards the east
- There may be potential for some Aboriginal cultural sites to be present that have localised landscape values. Community members raised King Togees Grave, Neilrex Road, Coolah as a local Aboriginal cultural site.

The Visual Bulletin notes that where a regional survey or study of landscape values has been undertaken, it must be considered. There are no known regional surveys or study of landscape values within or surrounding the wind farm site. In accordance with the requirements of the Visual Bulletin, this will be confirmed with DPIE prior to the commencement of the EIS detailed assessment work.

Potential landscape and visual impacts

Landscape character

Due to the prevalence of wide, open valleys with relatively uniform ridgelines, the proposed turbines would alter the landscape character of the local area. The degree to which the landscape is modified would be assessed in detail as part of the EIS, in accordance with the key features of the relevant SQA.

In terms of community landscape values, feedback during community consultation indicated that for most local residents, any changes to the landscape would be perceived as a positive change representing economic activity for the region. This feedback would be further examined as part of the EIS consultation program and additional feedback incorporated into the more detailed assessment of landscape and visual impacts.

Analysis of visual magnitude

The potential visual magnitude of the proposed wind turbines relative to dwellings or public viewpoints is established by mapping the dwellings, key public viewpoints and proposed turbines, at scale, based on the height of the proposed wind turbines (to the tip of the blade) and distance from dwellings or key public viewpoints. The line depicted in the graph at Figure 2 of the Visual

Bulletin (refer to **Figure 7-4**), provides an *'indication of where proponents should give detailed consideration to the visual impacts on dwellings or key public viewpoints from turbines located below the black line'.*

For the purpose of the preliminary LVA the proposed wind turbines have a tip height (from base of tower to tip of blade at vertical position) of approximately 250 metres. In accordance with the Visual Bulletin, the black line intersects at a distance of 3.4 kilometres from a tip height of 250 metres (refer to **Figure 7-4**).

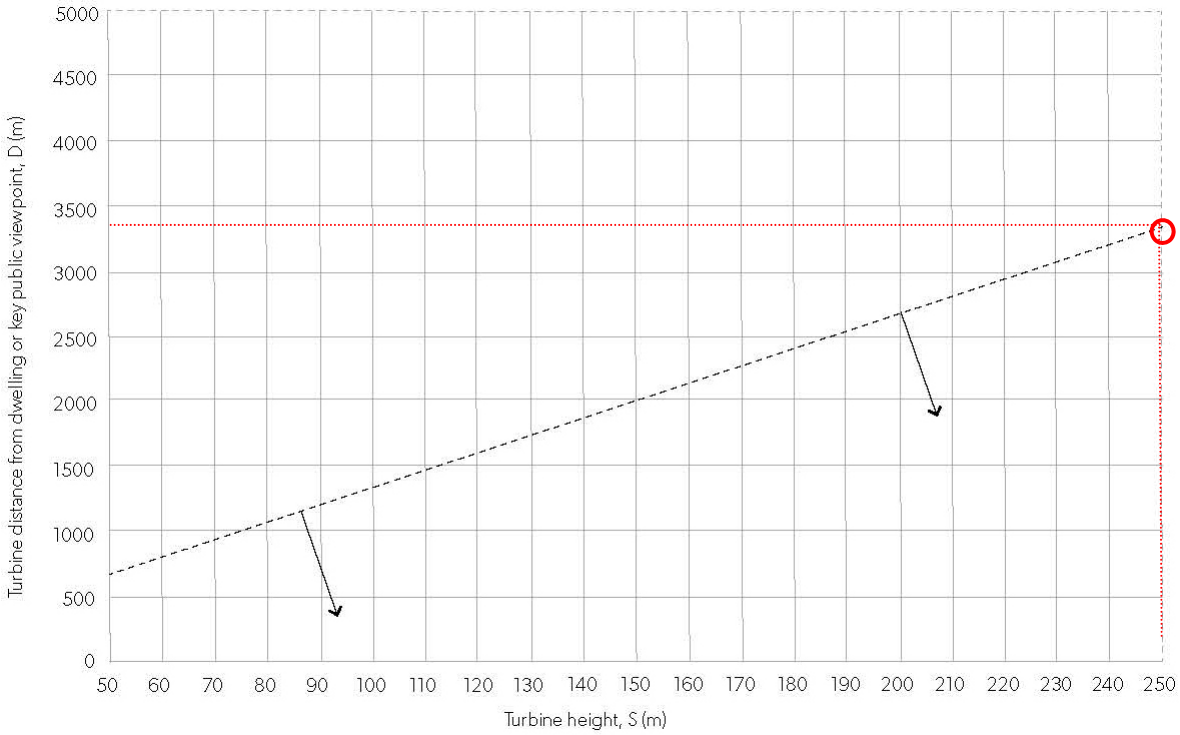


Figure 7-4 Application of the Visual Bulletin 'black line threshold'

Source: The Visual Bulletin (Figure 2 Preliminary Assessment Tool 1 indicating visual impacts for further consideration)

The Visual Bulletin states that proposed turbines below the black line threshold must be identified, along with the respective dwellings or key public viewpoints, as part of the request for SEARs. As the proposed turbines have a tip height of 250 metres, the Visual Bulletin requires that all dwellings within 3.4 kilometre of a turbine must be identified and analysed for potential visual impacts.

It is noted that **Figure 7-5** also identifies dwellings located up to 4.95 kilometres from the wind turbines, which coincides with the blue line threshold as indicated in the Visual Bulletin (illustrated at Figure 5, page 19 of the Visual Bulletin). Dwellings located between 3.4 kilometres and 4.95 kilometres have been identified and illustrated (**Figure 7-5**) to provide a greater degree of context regarding the location and number of dwellings surrounding the proposed wind farm.

The analysis of visual magnitude associated with the project is measured from these locations.

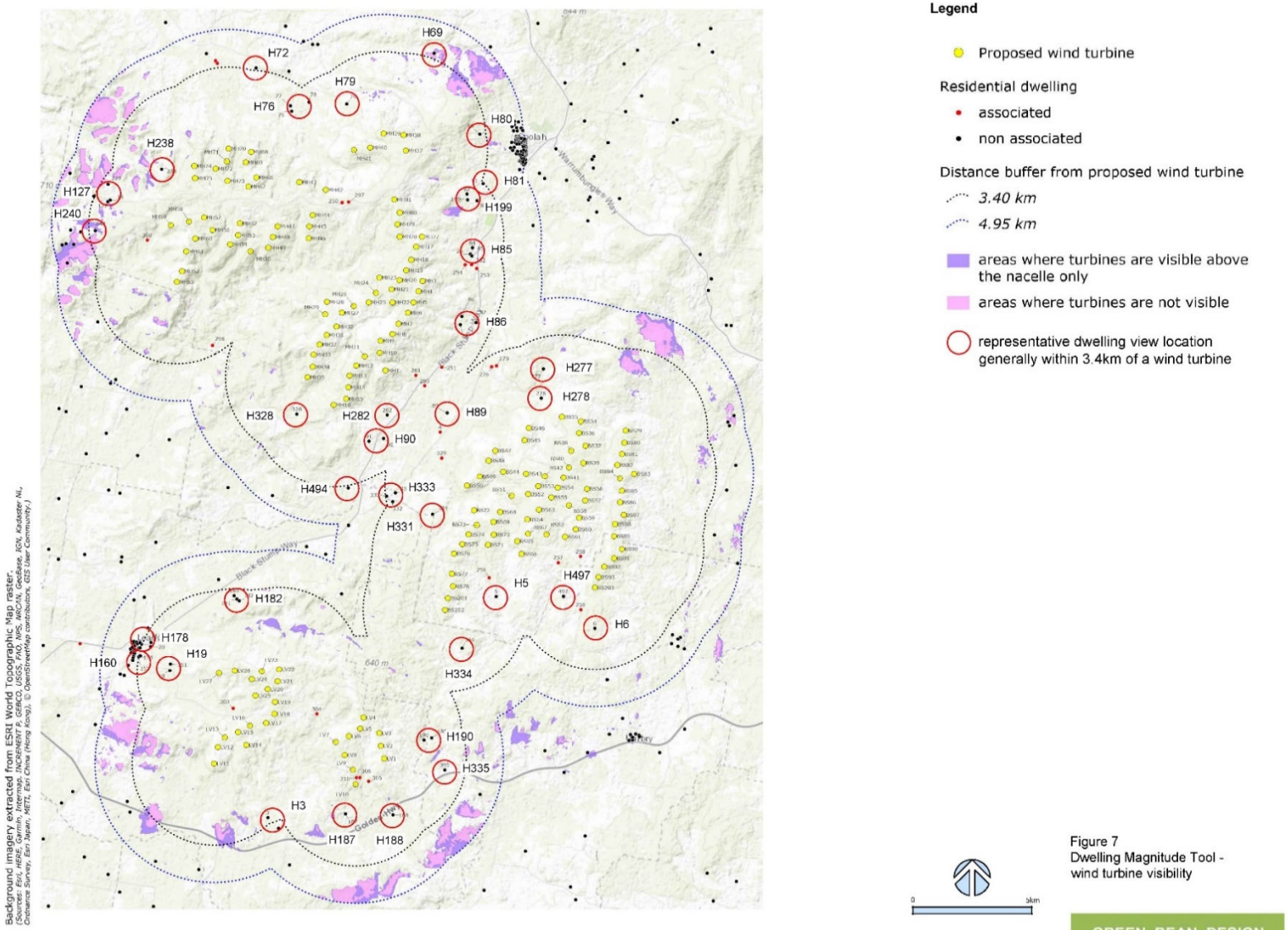


Figure 7
Dwelling Magnitude Tool - wind turbine visibility

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landscape architects

Valley of the Winds Wind Farm Stage 1 Preliminary LVA

Figure 7-5 Representative view points – Visual magnitude map

Identification of representative view locations

Representative view locations are identified where non-associated dwellings are in close proximity (ie within a 500 metre radius of each other) and likely to experience similar views of the wind turbines. These dwellings are grouped together for the purpose of preparing the multiple turbine tool diagrams. As shown in **Figure 7-5** the preliminary LVA has identified 34 individual representative view locations.

A preliminary analysis of the study area did not identify any key public viewpoints (e.g. dedicated lookouts, public spaces, recreational areas etc.) and accordingly the preliminary analysis has focused on residential dwellings. A further detailed analysis of key public viewpoints surrounding the wind farm will be undertaken in the EIS phase.

Zone of visual influence

The zone of visual influence analysis identifies areas of the landscape, generally within eight kilometres of the indicative turbine locations, from which wind turbines will not be visible, or where only the blades are visible. The zone of visual influence is illustrated in **Figure 7-5**, which shows distinct pockets within the landscape from which the proposed turbines would not be visible. The extent of potential screening illustrated in **Figure 7-5** relates to screening by landform only and does not account for vegetation (tree cover) within the landscape or surrounding residential dwellings.

The zone of visual influence analysis demonstrates the key areas from which turbines would not be visible are:

- North of Coolah
- West of Mount Hope cluster
- North of Girragulang Road cluster
- Pockets of land to the south west, south and south east of Leadville cluster.

The Zone of Visual Influence reflects the open gradients of wide valleys around Coolah, the eastern portion of Mount Hope Cluster and of the Girragulang Road cluster. Whereas steeper and rockier landscape to the west of Mount Hope and around the Leadville generates more areas where the turbines are not visible or only partially visible.

Multiple turbine tool analysis

The multiple turbine tool analyses the horizontal views of nominated representative viewpoints, in order to identify the extent of views from that location that contain turbines. **Appendix 2** contains the multiple turbine tool diagrams for each representative viewpoint, reflecting the indicative turbine layout as shown in **Figure 4-2**.

The multiple turbine tool splits the 360° degree viewshed of each representative viewpoint into 60° sectors, then calculates the number of turbines that are visible in each sector (refer to **Figure 7-6** for an illustration of sectors). This is based on terrain only and does not account for potentially screening vegetation. The purpose of this is to identify representative viewpoints that may be subject to cumulative impacts associated with views of more than one turbine. This analysis identifies representative viewpoints that warrant focused investigation as part of the detailed design (siting refinement) and more detailed assessment as part of the EIS.

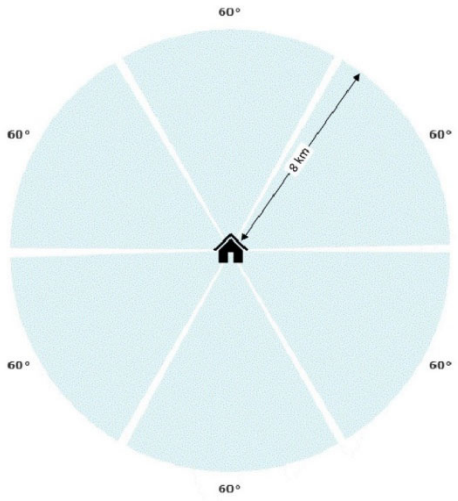


Figure 7-6 Multiple turbine tool – 60° sectors

Source: GBD, 2020 (Appendix 2)

In accordance with the Visual Bulletin, where a representative viewpoint has horizontal views of turbines within three or more 60° sectors, these must be identified along with the relative distance and submitted to the Department as part of the request for SEARs. **Table 7-2** provides a summary of the representative viewpoints and the number of 60° sectors within which turbines are visible.

Table 7-2 Multiple turbine tool summary

Representative viewpoint (corresponds to nominated residential dwelling ID)	**Distance (m) from representative dwelling to closest wind turbine** (turbine ID in brackets)	**Number of 60°sectors that have wind turbines visible within 8km**	**Number of visible wind turbines – For view locations that have turbines visible in three or more 60°sectors**
H3	3.14 (LV14)	2	
H5	1.84 (BS78)	4	58
H6	1.70 (BS203)	2	
H19	2.03 (LV27)	2	
H69	3.63 (MH38)	0	
H72	3.50 (MH68)	2	
H76	2.38 (MH68)	3	40
H79	2.73 (MH41)	3	31
H80	3.15 (MH37)	2	
H81	3.36 (MH77)	2	

Representative viewpoint (corresponds to nominated residential dwelling ID)	**Distance (m) from representative dwelling to closest wind turbine** (turbine ID in brackets)	**Number of 60°sectors that have wind turbines visible within 8km**	**Number of visible wind turbines – For view locations that have turbines visible in three or more 60°sectors**
H85	2.22 (MH77)	3	25
H86	2.07 (MH4)	4	30
H89	2.53 (BS47)	4	85
H90	2.27 (MH15)	4	69
H127	2.73 (MH59)	1	
H160	3.64 (LV27)	1	
H178	3.49 (LV27)	1	
H182	2.89 (LV28)	1	
H187	1.31 (LV10)	1	
H188	2.02 (LV2)	2	
H190	1.81 (LV2)	2	
H199	2.44 (MH77)	2	
H238	1.36 (MH74)	2	
H240	3.16 (MH59)	2	
H277	2.15 (BS35)	2	
H278	1.17 (BS35)	4	60
H282	1.84 (MH15)	4	59
H328	1.56 (MH16)	2	
H331	1.70 (BS74)	3	18
H333	3.36 (BS50)	4	37
H334	1.73 (BS202)	2	
H335	2.56 (LV1)	2	
H494	3.51 (MH16)	3	47
H497	1.36 (BS203)	3	64

Table 7-2 indicates the following key findings with respect to the 34 representative viewpoints:

- One (H69) location is predicted to have no views toward the wind turbines. As illustrated by the Zone of Visual Influence (**Figure 7-5**), this location is within an area from which the turbines are screened by steeper terrain.
- 20 representative viewpoints are predicted to have views toward wind turbines in either one or two of the 60° sectors. It is noted that some of these locations, although less than three sectors, may warrant more detailed assessment as part of the EIS, due to the proximity to indicative turbine locations.
- 13 are predicted to have views towards wind turbines within three or more of the 60° sectors out to approximately 8 kilometres from the representative viewpoint. In accordance with the Visual Bulletin, these view locations would be the focus of more detailed assessment, design development (review of turbine placement) and reasonable/feasible mitigation measures in order to reduce potential visual impacts.

Because the multiple turbine tool is based on terrain data only, many of the turbines predicted to be visible from these representative viewpoints may be obscured by existing vegetation and only be partially visible, including instances where only part of a blade is visible. Further, as discussed above, the tool identifies turbines that may appear as part of a distant view, which could be up to 8 kilometres away.

Accordingly, the findings of the multiple turbine tool analysis represent a conservative assessment to help identify where more detailed assessment is warranted. Along with a more detailed assessment, the EIS would include a process for ongoing consultation with affected residents and description of mitigation and management measures to reduce potential impacts.

Cumulative landscape visual impacts

There is a potential for cumulative impacts to landscape character and visual amenity as a result of the project in conjunction with surrounding projects, during both construction and operation. The project has the greatest potential for cumulative impacts associated with Liverpool Range Wind Farm given its proximity to the wind farm site. Impacts may be experienced particularly by residents and the town of Coolah, which is located in between the wind farm site and the Liverpool Range Wind Farm and may have views of both wind farms during operation. Receivers would likely also have temporary views of the construction activities including use of the local roads for delivery of equipment and large components (e.g. rotor blades).

Refer to **Section 7.3.8** for further detail regarding the assessment methodology to address cumulative impacts in the EIS.

Landscape and visual assessment methodology

The EIS would include detailed assessment of the landscape and visual impacts of the project, including the acceptability of impacts on landscape values and the amenity of landholders and communities, and the adequacy of the measures which are proposed to avoid, reduce or otherwise manage these impacts. The assessment would be in accordance with the tasks outlined in the Visual Bulletin, including:

- Visual Baseline Study as part of the EIS
- Community consultation to inform the visual baseline study and describe mitigation and management options in the EIS
- Establish Visual Influence Zones from viewpoints using inputs from the visual baseline study
- Evaluation of the project against the Visual Performance Objectives.

7.3.2 Biodiversity

A preliminary biodiversity assessment has been prepared by Eco Logical Australia (ELA) which considers the biodiversity values both within and surrounding the proposed wind farm. This study is provided in **Appendix 4** and a summary of the main findings presented below.
The methodology undertaken for the preliminary assessment included the following:

- Desktop assessment to identify the likely biodiversity values in the study area
- Field reconnaissance conducted across the study area from 18 to 20 November 2019 to validate the desktop assessment
- Likelihood assessments for all threatened species, populations, or ecological communities identified.

Key findings of the desktop assessment and field reconnaissance are discussed in the following sections.

Background

Plant communities

The desktop review identified the following most commonly mapped plant community types (PCTs) predicted to occur in the area of the wind farm:

- PCT511 Queensland Bluegrass - Redleg Grass - Rats Tail Grass - spear grass - panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion
- PCT484 Derived tall spear grass Plains Grass - grassland on mainly basalt hills of the Liverpool Plains, Liverpool Range and in the upper Hunter Valley (Merriwa district), south-eastern Brigalow Belt South Bioregion
- PCT434 White Box grass shrub hill woodland on clay to loam soils on volcanic and sedimentary hills in the southern Brigalow Belt South Bioregion.

The most commonly mapped PCTs in the area of the transmission options include:

- PCT483 Grey Box White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
- PCT484 Derived tall spear grass Plains Grass grassland on mainly basalt hills of the Liverpool Plains, Liverpool Range and in the upper Hunter Valley (Merriwa district), south-eastern Brigalow Belt South Bioregion
- PCT800 Derived grasslands of the Merriwa Plateau.

Threatened ecological communities
The desktop assessment identified 14 TECs listed under the BC Act within the locality, with the following occurring within either the proposed wind farm site or the transmission line options:

- Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions
- White Box Yellow Box Blakelys Red Gum Woodland.

The desktop assessment also identified seven TECs listed under the EPBC Act within the locality, however only the following TECs are likely to occur within the proposed wind farm site or the transmission line options:

- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

During the field reconnaissance, vegetation within the proposed wind farm site was observed to be severely degraded by the current drought conditions which reduces both diversity and cover of native plants. In addition, most turbine locations and infrastructure in the proposed wind farm would likely be located on grazing land which largely has little or no biodiversity value.

Vegetation within the Leadville area was found to be the most degraded due to ongoing agricultural practices and lack of rainfall in recent years, further exacerbated by a significant fire in 2017, which burnt a considerable portion of remnant vegetation between the Girragulang Road and Leadville areas. Due to below average rainfall since this fire, and the intensity of the fire, vegetation has not recovered and there is a pronounced absence of ground cover in the areas that have been burnt.

All remaining areas of the study area were subject to ongoing agricultural practices including sheep and cattle grazing, and ground cover enhancement through superphosphate and seeding of exotic pasture species.

The identified vegetation types, dominant species; and their relevant listings are presented in **Table 7-3**.

Table 7-3 Vegetation types identified during the field survey

Vegetation community	Dominant species	BC Act	EPBC Act	Wind Farm	Transmission Options
White Box Grey Box Woodland on basalt soils	*Eucalyptus albens x moluccana* *Eucalyptus melliodora* *Eucalyptus blakelyi*	Endangered Ecological Community	Critically Endangered Ecological Community	Present throughout	Present throughout
Tumbledown Red Gum – Rough-barked Apple Forest on sandstone outcrops	*Eucalyptus dealbata* *Angophora floribunda* *Eucalyptus punctata*	Not listed	Not listed	Occurs on slopes adjacent to turbine locations. Unlikely to be affected.	Scattered patches throughout landscape.
Rusty Fig – Rough-barked Apple forest on sheltered slopes and in gullies	*Ficus rubiginosa* *Angophora floribunda*	Not listed	Not listed	Occurs on slopes adjacent to turbine locations. Unlikely to be affected.	Not identified.
Ironbark-Stringybark	*Eucalyptus crebra*	Not listed	Not listed	Occurs on slopes	Dominant feature

Vegetation community	Dominant species	BC Act	EPBC Act	Wind Farm	Transmission Options
forest on sandstone	*Eucalyptus punctata* *Eucalyptus sparsifolia*			adjacent to turbine locations. Unlikely to be affected.	surrounding mining areas of Transmission Option A and Option B.
Inland Grey Box woodland on alluvial soils	*Eucalyptus microcarpa* *Eucalyptus melliodora*	Endangered Ecological Community	Endangered Ecological Community	None identified	Scattered patches throughout landscape
Fuzzy Box Woodland on basalt	*Eucalyptus conica* *Eucalyptus melliodora*	Endangered Ecological Community	Not listed	None identified	Scattered patches throughout landscape
Cleared land	Exotic pastures	Not listed	Not listed	Present throughout. Occurs between areas of native vegetation.	Present throughout. Occurs between areas of native vegetation.

*This Endangered Ecological Community is proposed to be up-listed as a Critically Endangered Ecological Community

Threatened flora and fauna and habitat

The desktop assessment identified 55 fauna species and 36 flora species listed under the BC Act within the locality, with most of the likely species comprising woodland birds that are ecosystem credits under the BAM, and not listed under the EPBC Act.

A total of 34 fauna species and 28 flora species identified are listed under the EPBC Act. The following species listed under the EPBC Act are considered likely to occur in the study area:

- Regent Honeyeater
- Fork-tailed Swift
- Swift Parrot
- Superb Parrot
- Large-eared Pied Bat
- Corben's Long-eared Bat
- Brush-tailed Rock-wallaby
- Koala.

The following flora species are likely to occur within the study area:

- *Acacia ausfeldii*
- *Androcalva rosea*
- *Cymbidium canaliculatum*.

Broadly, the following species-credit species may be identified during subsequent assessment for the EIS:

- Breeding habitat for Barking Owl, Masked Owl, and Powerful Owl
- Brush-tailed Rock Wallaby, Squirrel Glider, habitats in the southern areas of the Transmission Options
- Breeding habitat for Microchiropteran bats such as Large-eared Pied Bat
- Important habitat for Regent Honeyeater or Swift Parrot.

Further details regarding the distribution, habitats, and ecology of each threatened species are provided in Appendix A of **Appendix 4**.

Key fish habitat

The desktop assessment identified the following Key fish habitat:

- Purple-spotted Gudgeon
- Darling River Hardyhead
- Eel-tailed Catfish.

Potential biodiversity impacts

Based on a high-level observation of the frequency of each vegetation type encountered across the study area, it may be expected that 50 per cent of the native vegetation is a listed TEC under either the BC Act and/or EPBC Act. This would include woodland/forest and grassland. The preliminary assessment indicates that total impact to TEC's could be greater than 237 hectares, depending on the route options for the transmission line.

The desktop assessment identified that within the locality there are previous records of 55 fauna species and 36 flora species listed under the BC Act. Of these species, 32 BC Act and/or EPBC Act listed fauna species are considered likely to occur within the study area. All these species except for the Squirrel Glider, Brush-tailed Rock-wallaby, and Koala, are aerial avian or Microchiropteran bat species, that may be impacted by the construction and operation of the proposed wind farm. Two of these species, Regent Honeyeater and Swift parrot, as well as Koala are likely to be high level constraints to the development of the project and will require careful consideration during the project planning.

In addition, several Microchiropteran bats, including BC Act and EPBC Act listed Large-eared Pied Bat, are known to occur in the southern portion of Transmission options A and B. This species breeds in maternity caves, of which only three are known in NSW, one of these being close to the Ulan Coal Mine. Habitat present at the maternity cave is not dissimilar to some of the sandstone cliffs present close to the proposed wind farm site. This would need to be investigated further as part of the EIS.

The most likely flora species to be impacted as a result of the project is *Acacia ausfeldii* which is locally common in the Ulan region (Transmission Options A and B). Further detail regarding the distribution, habitats, and ecology of each threatened species is provided in Appendix A of **Appendix 4**.

The project also has the potential to generate cumulative impacts in conjunction with surrounding projects, primarily associated with the removal of TECs during construction, and bird and bat

strikes during operation. Refer to **Section 7.3.8** for further detail about other nearby projects and the assessment methodology to address cumulative impacts in the EIS.

Biodiversity assessment methodology

Biodiversity is considered a key issue for the SEARs and a detailed biodiversity assessment will be undertaken for the EIS. The assessment would be undertaken in accordance with the BAM. A referral to DAWE will also be required for potential impacts to MNEs, particularly the Critically Endangered Box Gum Woodland, which is prevalent in patches in the area.

The following matters will be considered/undertaken during the preparation of the EIS:

- Formal survey and assessment of threatened species in accordance with the Biodiversity Assessment Methodology (BAM) under the BC Act
- Formal survey of the preferred transmission line option and development corridor in accordance with NSW guidelines. This would include targeted surveys of identified (or likely) species credit species and mapping of habitat. Species credits carry their own offset obligation and are additional to assessment of native vegetation
- Careful consideration of Regent Honeyeater and Swift parrot, as well as the Koala.
- Investigation of the proposed wind farm's proximity to any breeding sites of the Large-eared Pied Bat under the BAM
- Separate assessment of ecosystem species listed under the EPBC Act
- Biodiversity offset strategy
- Assessment of all native vegetation regardless of TEC status.

7.3.3 Traffic and transport

A preliminary assessment has been undertaken and has found that potential impacts related to construction traffic and transportation of large wind farm components would be a key issue for assessment for the EIS. This includes a need to consider potential consequential effects of any oversized transport of components, such as localised road upgrades along the preferred transport route or vegetation removal required to provide appropriate swept paths for over-sized vehicles.

Background

The preferred transport routes, as well as access points to each wind farm cluster would be identified and assessed in the EIS. However, it is expected that some large components of the wind turbine infrastructure (e.g. blades, rotor and nacelle) are anticipated to be transported from their international manufacturing location to the Port of Newcastle via ship. These components would then be transported via over-size over-mass vehicles from the Port of Newcastle to the wind farm site, approximately 280 kilometres.

Other project components such as turbine towers, transmission line towers, electrical cabling and plant would be transported to site in sections/parts and constructed on site. Concrete and other materials would also likely utilise similar routes depending on the origin.

Potential transport routes between Newcastle Port to the proposed wind farm generally comprise a mix of high-volume State highways and low volume local roads, closer to the proposed wind farm site and through local towns. A potential route may include some of the following roads:

- Bourke Street, Newcastle
- Hannel Street
- Industrial Drive
- Pacific Highway
- New England Highway
- John Renshaw Drive

- Hunter Expressway
- Golden Highway (near Black Stump Way).

The transport route between Newcastle Port and Black Stump Way along the New England and Golden Highways is an approved RMS B-Double route.

From the Golden Highway, access to each turbine cluster would need to be via the local road network. Indicative local transport routes to each cluster may comprise:

- Mount Hope cluster: Black Stump Way (Binnia Road, Coolah) from the Golden Highway, to Neilrex Road; and on to Mt Hope Road, providing up to 9-10 access points to the wind farm site from Mt Hope Road
- Girragulang Road cluster: Black Stump Way from the Golden Highway, to Moorefield Road, providing potentially 2-4 points of access to the wind farm site from Moorfield Road
- Leadville cluster:
- The western portion may be accessed via Black Stump Way from the Golden Highway, to Garland Street (Leadville township) and on to Wardens Road
- The eastern portion may be accessed from the Golden Highway at Uarbry (near Cainbil Creek) or overland from the western portion of the cluster.

The nominated transport routes, vehicle types and scheduling of movements would be confirmed, subject to confirmation of technology supplier and origin. Access points from the public roads to each wind turbine cluster and the associated internal access tracks would be determined in consultation with Warrumbungle Shire Council and associated landholders, respectively.

Potential traffic and transport impacts

During construction, vehicle movements associated with the workforce and the transport of construction materials, equipment, wind turbine components, associated infrastructure and plant would be required. Vehicles likely to be utilised during construction may include:

- Four-wheel drive vehicles
- Light commercial vehicles
- B-Double trucks
- Specialist vehicles (non-standard off-road construction vehicles) and transport vehicles
- Over-size and/or over-mass vehicles.

Traffic associated with the project, specifically in the construction phase, has the potential to impact on the functioning of the local road network. Potential impacts during construction may include disruption of traffic, road safety and temporary disruption of property access along the route. Construction traffic could also potentially impact nearby residences along the affected roads from dust, vibration, noise and safety.

Larger vehicles would occupy most of the width of the carriageway at certain locations along the transport route, which would necessitate traffic control procedures to manage impacts on road users.

Consequential effects of any oversized transport of components, may include localised road upgrades along the preferred transport route or vegetation removal required to provide appropriate swept paths for over-sized vehicles and to mitigate potential impacts (eg property, road condition, road user safety, amenity, traffic disruption, drainage infrastructure, road furniture, adjoining land uses). Works to public roads would be determined and designed in consultation with the relevant authority.

Movement of over-size and over-mass vehicles has the potential to disrupt movement of stock, particularly where stock is unfenced or where stock is moved across public roads, such as some existing movements across the Golden Highway.

Where road upgrades or modifications are required, these works have the potential to generate localised impacts, including traffic disruption during construction, biodiversity, heritage, waterways and land use.

As the Liverpool Range Wind Farm proposes to utilise similar transport routes as the project, there is potential for cumulative impacts on regional and local roads. These impacts may be associated with both transport route upgrades/construction of new roads during construction, and an increase in the number of construction vehicle movements in association with vehicle movements from Liverpool Range Wind Farm (e.g. along Golden Highway), especially if both projects have overlapping construction periods. Likewise, there may be efficiencies realised through coordination of transport scheduling and mitigation measures between the two projects (e.g. road upgrades).

During operation of the proposed wind farm, light vehicles associated with the maintenance of the wind turbines would utilise the local road network and the same construction access routes. Heavy vehicles would also be required to attend site in the event of major maintenance and repairs.

Given there is the potential for direct and indirect traffic impacts associated with the construction and operation of the project, traffic and transport is considered a key issue for the EIS and a traffic and transport impact assessment would be undertaken.

Traffic and transport assessment methodology

A Traffic and Transport Impact Assessment Report and a Transport Logistics Assessment would be undertaken to investigate the potential impacts associated with the project. The traffic and transport assessment would include the following key elements:

- Assessment of the construction and operational traffic impacts of the project
- Provide projections of traffic volumes (both light and heavy vehicles) and transport routes during construction and operation, including traffic associated with sourcing raw materials (water, sand and gravel)
- Assessment of the potential traffic impacts of the project on road network function including intersection performance and site access arrangements and road safety, including school bus routes and pedestrian/cyclist safety
- Assessment of the capacity and condition of the existing road network to accommodate the type and volume of traffic generated by the project (including over size vehicles, cover mass vehicles and escorted deliveries) during construction and operation
- Provide details of measures to manage potential impacts including a schedule of required road upgrades, road maintenance contributions, and other traffic control measures, developed in consultation with the relevant road authority
- Identify and engage with other specialists regarding required upgrades or modifications to public roads, in order to identify and assess potential consequential impacts.

Consultation will also be undertaken with local councils regarding the works that may affect roads and traffic. This would include discussion of potential mitigation measures, ongoing engagement and information as well as potential scheduling.

7.3.4 Noise and vibration

A preliminary noise and vibration assessment has been undertaken by Marshall Day Acoustics Pty Ltd (Marshall Day) in accordance with the NSW Department of Planning and Environment Wind Energy: Noise Assessment Bulletin 2016 (the NSW Noise assessment Bulletin) and the South Australian EPA Wind farms environmental noise guidelines 2009 (the 2009 SA Guidelines). The assessment is provided in **Appendix 5** and summarised below.

Background

The land surrounding the proposed wind farm is characterised by rolling hills, open flat valleys and cleared ridgelines. The topography of the proposed site is variable with the highest ridgeline points ranging between 626 metres Australian Height Datum (AHD) and 757 metres AHD. The highest point is located at Mt Hope, south west of Coolah near Mt Hope Road.

The existing noise environment is relatively quiet and characteristic of the predominant surrounding land use, being agricultural grazing. Several sensitive noise receivers have been identified as both associated and non-associated receivers. The sensitive receivers are shown in **Figure 7-7**.

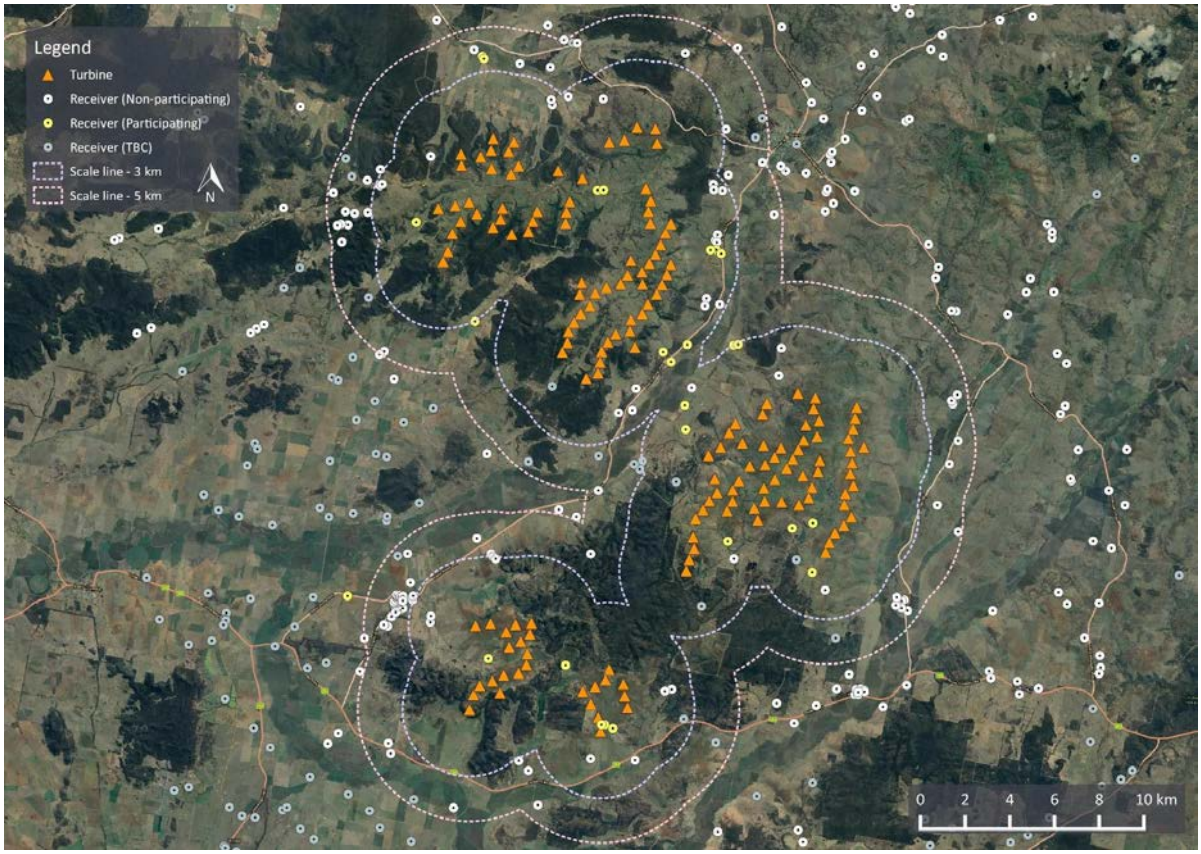


Figure 7-7 Noise sensitive receivers

For the project, a reference level of 45 dB L_{Aeq} has been applied as a base criterion for associated dwellings in order to provide context to the predicted noise levels for these locations. This is consistent with the 2009 SA Guideline which recommends a level of 45 dB for financial stakeholders. The base criterion of 35 dB has also been applied as defined in the NSW Noise Assessment Bulletin.

Potential noise and vibration impacts

Preliminary noise predictions have been calculated for the project which assessed the model inputs, prediction method and the predicted A-weighted noise levels associated with the turbines. Consideration for potential cumulative impact of the approved Liverpool Range Wind Farm have also been investigated.

The preliminary noise assessment assessed highest predicted noise levels at receivers. The results provided would be used to prepare the EIS. For the purposes of the scoping phase, the predictions have been undertaken based on a total of 164 turbines and have used conservative assumptions, such as maximum sound power level and worst-case noise propagation conditions. This provides a conservative preliminary assessment at this stage to inform the EIS. This will be updated as the proposed layout is refined to minimise potential impacts where possible.

The highest predicted noise levels for wind speed have been determined for associated and non-associated receivers, and other receivers. Results indicated that the highest noise levels (over 30 dB) would comply with the relevant base criterion aside from two non-participating receivers. These exceedances are presented in **Table 7-4**.

Table 7-4 Highest predicted noise level at receivers with predicted levels over 30 dB L_{Aeq}

Receiver	Easting (m)	Northing (m)	L_{Aeq}, (dB)	Distance to the nearest turbine ((m))
Non-participating receivers				
238	741,532	6,474,758	35.7	1,374
278	757,286	6,465,236	35.5	1,179

Note: Coordinates datum: MGA94 Zone 55

The potential impacts following the preliminary noise assessment include:

- Receivers may experience elevated noise levels. Two of the assessed non-associated receivers (238 and 278) exceeded the base criterion of 35 dB L_{Aeq} by up to 0.7 dB. For cumulative impacts, predicted cumulative noise levels from the project and the approved Liverpool Range Wind farm detailed most receivers were below the respective base criterion where cumulative noise was assessed, with only one receiver experiencing a minor exceedance of the criterion of 35.2 dB
- Wind speed and direction may influence and affect noise levels at receiver locations
- Vibration impacts associated with the construction of the project may occur.

Noise and vibration assessment methodology

Given there is the potential for direct and indirect impacts, the following key tasks would be undertaken as part of the next stage of the EIS which will be undertaken in accordance with the relevant guidelines and policies:

- Ongoing community engagement with associated and non-associated dwellings
- A relevant background noise survey which would quantify the existing ambient noise environment, including wind speed regression
- Refinement of the noise model input assumptions and investigation of noise optimised operation of the wind turbines
- Targeted baseline noise assessment and modelling at receiver sites to fully understand the environmental risks and impacts that may arise from the project and potentially any cumulative impacts from the approved Liverpool Range wind farm
- Predictive noise modelling of construction and operational activities
- Vibration impacts at sensitive receptors

- Identification of any reasonable mitigation and management measures where appropriate, to minimise project impacts.

7.3.5 Aboriginal heritage

A preliminary assessment of Aboriginal heritage has been prepared by Dr Julie Dibden of NSW Archaeology to inform this scoping report.

Background

There are two principal Aboriginal networks in the region, the Gamilaraay (often earlier referred to as the Kamilaroi) and the Wiradjuri peoples. O'Rourke (2009: 3-7) indicates that the people of the Gamilaraay language group occupied the inland Liverpool Plains and almost all the Upper Hunter Valley. The country of the Wiradjuri lays predominantly to the south, with the Wiradjuri language being spoken by groups who occupied the Warrumbungle Mountains and lands extending west to present-day Dubbo and Wellington.

These two overarching groups were in turn subdivided into numerous smaller local bands who were united by way of a common language. In broad reconstruction, the boundary between the Gamilaraay and Wiradjuri fell along an approximate line extending from Coolah to Coonabarabran. Accordingly, the proposed wind farm is located primarily within Wiradjuri country. The proposed wind farm site is located within the Gilgandra Local Aboriginal Land Council (LALC) area. The transmission line options are in the Mudgee LALC.

A preliminary search of the National Native Title Tribunal register of native title claims on the 17/1/2020 for the Warrumbungle Shire Council revealed two active claims in this LGA: Warrabinga-Wiradjuri#7 and Gomeroi People.

The proposed wind turbines are generally located on higher ground predominately along ridgelines flanked by steep slopes. The predominant land use is grazing and there is limited vegetation within the area other than pasture. The predominant land use surrounding the transmission line options also includes primary production, but other land uses include several national parks and nature reserves, environmental management areas, and areas of Coal mining.

There are no significant wetlands within or near the proposed wind farm site, but five rivers bisect the transmission line corridor options. These include Talbragar, Goulburn, Munmurra, Krui and Bow River. In addition, access roads may need to cross rivers and creeks and their associated landforms.

In the absence of major water courses, it is expected that the proposed wind farm site may not have been focal point in the broader landscape for Aboriginal habitation and land use. Accordingly, the wind farm site is unlikely to host an abundance of Aboriginal objects. Given the transmission options would potentially cross major water courses in a discrete and linear manner, impacts to associated archaeological sensitive landforms would be minimal.

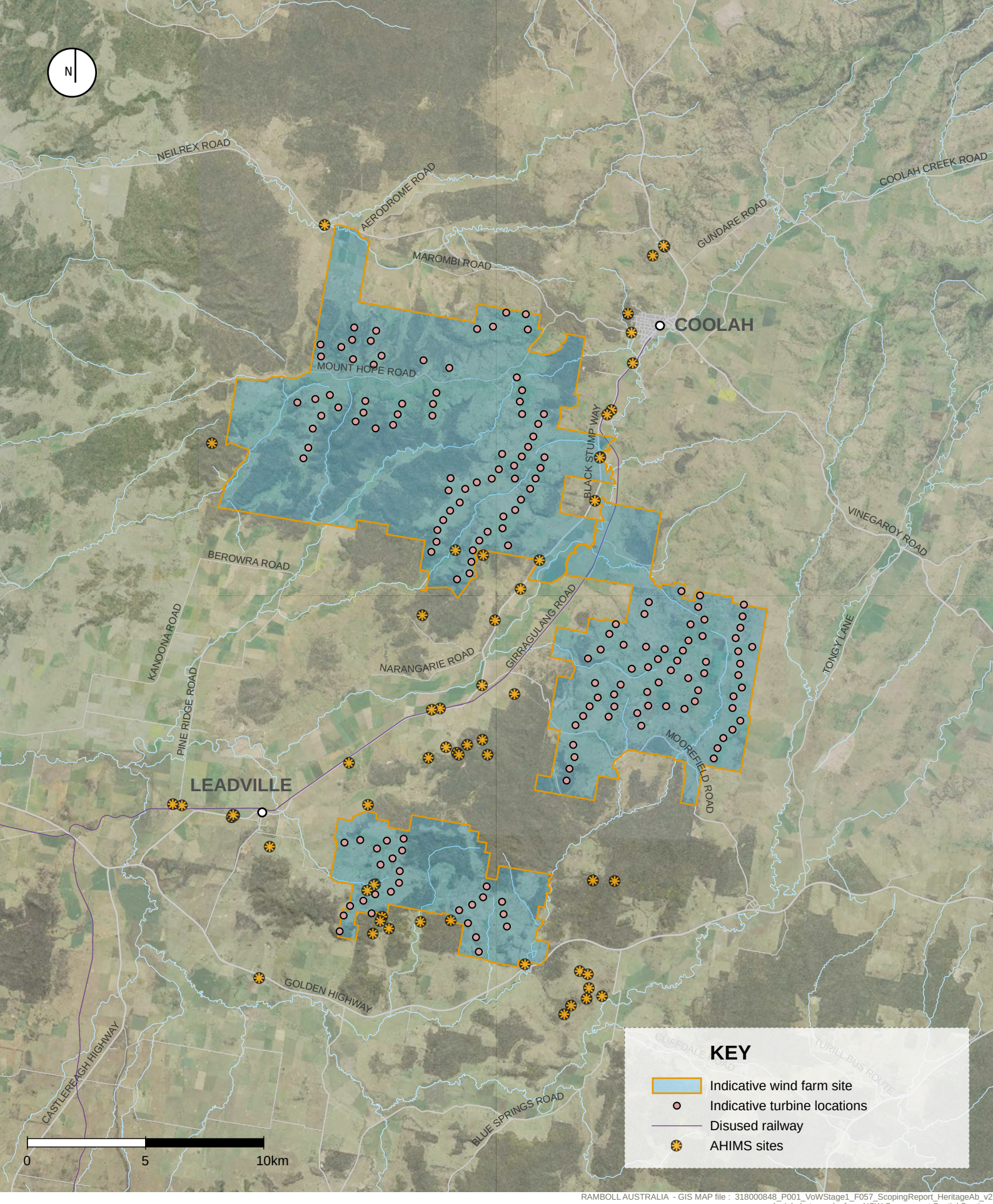
Based on the preliminary assessment, taking into consideration of the landscape context and a review of the NSW DPIE Aboriginal Heritage Information Management System (AHIMS) site search for the Study Area, the following Aboriginal objects are expected to be present:

- Stone artefacts in relatively low densities
- Grinding grooves in open rock platforms and rock shelters (which may host, for example, rock art, occupation deposit, human burials and grinding grooves)
- Rarer sites might include scarred or engraved trees and stone arrangements.

Searches of the AHIMS show up to 60 previously recorded AHIMS sites located within the search area, which includes all the proposed wind farm site. Of these 60 recorded sites, six are within the Mt Hope and Leadville turbine clusters. Numerous sites are located near to the transmission line options, which would be subject to further investigation as part of preparing the EIS and determining the preferred transmission line option. Findings of the preliminary Aboriginal heritage assessment are presented in **Figure 7-8**.

It is noted that the AHIMS register only includes sites which have been reported to NSW DPIE. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts. Accordingly, the search results cannot be considered an actual or exhaustive inventory of Aboriginal objects situated within the Study Area.

It is also noted that older site recordings made without GPS can be variable in terms of accuracy of location and that some previous recordings may be questionable in terms of site identification. For example, scarred trees can frequently be re-assessed and found to possess to natural scarring rather than humanly caused scarring.



RAMBOLL AUSTRALIA - GIS MAP file : 318000848_P001_VoWStage1_F057_ScopingReport_HeritageAb_v2
Aerial photography from NSW Government Spatial Services

Figure 7-8 | Aboriginal cultural heritage values

Potential Aboriginal heritage impacts

The project would result in ground disturbance and potentially some vegetation clearance. As such there is the potential that the construction, operation, maintenance and decommissioning of the project would cause impacts to any Aboriginal objects present within the areas of direct impact (and sometimes indirect impacts caused by accelerated erosion).

Potential risks include excavation and heavy machinery works during the works associated with clearance where required, access road upgrades and grading/levelling for wind turbine construction pads.

Aboriginal heritage assessment methodology

Aboriginal cultural heritage impact assessment undertaken as part of the EIS would include the following key tasks:

- Implement the Aboriginal consultation process to meet Stages 1 to 4 of the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)
- Review the OEH Aboriginal Heritage Information Management Systems database (and any other relevant registers) and obtain relevant site cards and reports
- Mapping of all identified registered Aboriginal heritage objects identified from these reviews
- Comprehensive survey within the subject site by suitably qualified archaeologists and representatives of Aboriginal stakeholders
- Preparation of a draft Aboriginal Cultural Heritage Assessment report which would include the following tasks:
  - Documentation of all Aboriginal consultation to meet the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)
  - Mapping of existing Aboriginal object sites identified during site register searches, any additional objects identified during the field survey to meet the requirements of the Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH, 2011) and the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)
  - Assessment of the significance of sites identified during the survey
  - Identification of potential impacts resulting from the project to any sites
  - Provision of practical and clear recommendations to reduce or mitigate any impacts within the relevant legislative context
  - Documentation of the findings within the assessment report in accordance with Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH, 2011) and the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010).

The draft assessment report would be issued to the Aboriginal stakeholders for review and comment before finalising for inclusion in the EIS.

7.3.6 Social and economic impacts

A preliminary assessment of social and economic impacts has been undertaken to identify further areas for investigation in the EIS. Elton Consulting has prepared a social impact scoping report, which is included in **Appendix 5**.

Background

The proposed wind farm would be located close to the township of Coolah, in the Warrumbungle LGA. The transmission line options run generally south through the Warrumbungle and the Mid-Western LGAs (Options A and B) or the Warrumbungle and Upper Hunter LGAs (Option C). The

total population and median age for key localities and LGAs compared to the NSW average at the 2016 census is presented in **Table 7-5**.

Table 7-5 Population and median age of Warrumbungle, Mid-Western and Upper Hunter LGAs and NSW

Location	Population	Median age	Unemployment rate (%)
Local Townships			
Coolah[1]	1290	46	5.3
Dunedoo[1]	1221	49	8.6
Leadville[1]	169	47	14
Coonabarabran[1]	3290	47	8.7
Local Government Area			
Warrumbungle LGA	9,384	49	7.9
Mid-Western LGA	24,076	42	6.5
Upper Hunter LGA	14,112	41	4.8
State			
New South Wales	7,480,231	39	6.3

1 State suburb ABS 2016 statistical area

The data in **Table 7-5** shows that key localities within the Warrumbungle LGA generally have a higher median age than Mid-Western LGA, Upper Hunter LGA and NSW average median age.

Unemployment rates show a similar trend with higher average unemployment than the state average across the Warrumbungle LGA, except for Coolah. The Upper Hunter LGA has a lower unemployment than the NSW average, likely due to the strong agricultural economy in Upper Hunter, which is characterised by a concentration of wineries and thoroughbred studs (refer to **Table 7-6**). Similarly, the Mid-Western LGA unemployment rate is lower than the Warrumbungle LGA and this is likely due to strong mining and viticulture industries present in Mid-Western LGA.

Median weekly household income within the Warrumbungle LGA is lower than that of the Mid-Western and Upper Hunter LGAs. Consistent with the unemployment rate, this is likely due to the presence of strong industries within the Mid-Western and Upper Hunter LGAs.

A summary of the percentage of the total workforce by industry of employment for each of the LGAs is provided in **Table 7-6**.

Table 7-6 Industry of employment statistics

Industry of Employment	Warrumbungle Shire LGA (%)	Mid-Western Regional Council (%)	Upper Hunter Shire Council (%)
Agriculture, Forestry and Fishing	28	9	19
Mining	1	15	12
Manufacturing	3	4	5
Electricity, Gas, Water and Waste Services	1	1	2
Construction	4	8	6
Wholesale Trade	2	2	2
Retail Trade	8	10	7

Industry of Employment	Warrumbungle Shire LGA (%)	Mid-Western Regional Council (%)	Upper Hunter Shire Council (%)
Accommodation and Food Services	6	8	6
Transport, Postal and Warehousing	4	3	3
Information Media and Telecommunications	1	1	0
Financial and Insurance Services	0	1	1
Rental, Hiring and Real Estate Services	0	1	1
Professional, Scientific and Technical Services	3	3	4
Administrative and Support Services	2	3	3
Public Administration and Safety	8	4	5
Education and Training	11	8	8
Health Care and Social Assistance	12	10	8
Arts and Recreation Services	1	1	2
Other Services	3	5	3
Inadequately described/Not stated	4	3	4

Agriculture, forestry and fishing is the largest industry of employment within the Warrumbungle LGA and the Upper Hunter Shire LGA employing 28% and 19% of the total workforce respectively. Mining is the largest industry of employment in Mid-Western Region LGA employing 15% of the total workforce.

Potential socio-economic impacts and opportunities

Potential social and economic impacts and opportunities that may be generated by the project are summarised in **Table 7-7**.

Table 7-7 Potential social impacts and opportunities

Potential impact		Social impact matter
Positive (opportunities)		
1	Large number of employment opportunities (both short and long-term) through the construction and operations targeting local communities to diversify industries and improve technical expertise, bringing about increased economic capital at the individual, household and community levels.	Economic
2	Vocational training and skills development through construction and operations targeting local communities can diversify skill sets bringing about increased human capital at the individual, household and community levels.	Economic
3	Vocational training schemes may build capacity of local tertiary training institutions through partnering and collaboration	Community
4	Business opportunities through the supply chain, natural resources (gravel and base course, concrete and water for dust control and concrete), goods and services provision and contractor opportunities through the construction and operations targeting local businesses and service	Economic

Potential impact		Social impact matter
	providers will stimulate the local economies, diversify industries, and increase financial flow in the local area, bringing about enhanced economic capital at the individual, household and community levels. Opportunities may include earthworks, trades, machinery and vehicle hire, fuel supply, road works labour hire, accommodation and property rentals, administration, hospitality, food and beverage industry, transport services, recreation, mixed businesses for groceries, laundromats, storage facilities, office space etc.	
5	Opportunities for community investment leading to improved and sustainable socio-economic outcomes in the local area through community benefit-sharing program. Opportunities are wide and varied, from sponsorship and grant assistance, to strategic community partnerships and co-ownership schemes. Programs should be developed collaboratively and based on locally identified values, needs, interests and priorities to realise success.	Community
6	Long-term improvements to and investment in infrastructure and services e.g. local road networks, electricity supply, education and health services, and their maintenance.	Access and Built Environment
7	Income generation and livelihood diversification for property owners hosting critical project infrastructure e.g. wind turbines or transmission lines, may improve household and community resilience through income diversity especially during times of drought and/or water scarcity.	Economic
8	Local Aboriginal targeted engagement in project's economic opportunities may advance socio-economic conditions and capabilities at individual, household and community levels.	Community
9	An increase in resourcing and supports to local councils may build capacity of administration and improve service provision over time.	Community
10	Opportunities for community and project to jointly set standards for renewables sector to act as a best case for others, bringing about community pride and social cohesion.	Community
Negative (impacts)		
11	Construction activities may cause amenity disruptions to nearby residents to the project site, host property owners and residents along major transportation routes, e.g. noise, dust, light pollution, heavy vehicles and traffic.	Amenity
12	An increase in truck traffic during the construction phase may impact the community's regular use of the local road network and may cause issues of public safety.	Access
13	Operational noise caused from wind turbines may cause ongoing disturbance to proximate residents.	Amenity
14	Visual disturbance likely to be a grievance expressed by neighbouring property owners, and from local residents or regular visitors to points of public interest, public viewpoints or places of community value of which the wind farm is highly visible, may cause growing dissatisfaction over time if no benefit of the project is experienced.	Amenity
15	Construction and operational activities are perceived to cause potential harm to local wildlife and biodiversity.	Biodiversity

Potential impact		Social impact matter
16	The incoming construction and operational workforce may have impact on the local housing supply, and on local infrastructure and services. The Coolah community would like to see the project workforce integrated within and across multiple townships, rather than focussing on only one town or the setting up of an accommodation facility. This will be increased if construction workers relocate with dependents.	Community
17	The incoming construction workforce may impact on community cohesion and alter the local demography in nearby towns. Community members want to ensure the humble way of life in the area is maintained.	Community
18	Project infrastructure may cause land use conflict if positioning of wind turbines, transmission lines and ancillary infrastructure is perceived to be competing directly with prime agricultural land.	Economic
19	The land required for construction of project infrastructure may impact upon Aboriginal cultural heritage sites or culturally significant places, which could cause flow-on effects on community cohesion and Aboriginal support for the project.	Heritage
20	Local income-generation from engagements with the project may lead to social disparities between community subgroups if certain community cohorts and demographics are excluded from employment and procurement planning.	Community
21	Public perception of other nearby wind farm project may bring about cumulative decreased support for the project if associations between the two compounds.	Built Environment

Source: Elton (2020)

The project may also generate cumulative impacts in conjunction with nearby projects, particularly Liverpool Range Wind Farm given its proximity to the wind farm site. These impacts are expected to be primarily generated during construction, with associated increased noise and dust, traffic, and reduced visual amenity resulting from both projects during construction.

Consideration of potential impacts would be investigated in more detail with input from specialist consultants as part of the EIS.

Socio-economic assessment methodology

An assessment of the potential social impacts of the project would be undertaken to address the above identified matters, as part of the EIS. The assessment will be undertaken in accordance with the International Association for Impact Assessment's (IAIA) *Social Impact Assessment: Guidance for assessing and managing the social impacts of projects,* published in 2015, the DPIE *Social impact guideline* (2017), as well as leading practice approaches to social impact management and community benefit planning for wind developments worldwide.

The key objectives and components of the socio-economic impact assessment would be to:

- Understand how and where the project would be undertaken in the context of socio-economic considerations
- Understand the socio-demographic baseline of communities potentially affected by the project
- Prepare a community vulnerability and resilience analysis
- Engage with stakeholders and local communities to identify community values, aspirations, opportunities, issues and concerns associated with the project

- Predict and analyse the potential impacts of the project including impacts on access to, and demand for, local services, workforce, infrastructure and housing, against existing baseline conditions
- Prepare a social and economic risk and opportunities analysis of the project
- Develop and recommend appropriate mitigation measures and enhancement strategies
- Identify means for the project to enable positive and localised social and economic outcomes through the its planning, development and extended operations
- Develop a monitoring and management framework as a mechanism to implement and measure recommended mitigation and enhancement strategies.

The socio-economic impact assessment will draw on the findings of several other technical specialist reports to draw conclusion on potential impacts on amenity, wider economic benefits and way-of-life. This would include noise and vibration; traffic and transport; landscape character and visual impact; hazard and risks.

The economic and social costs and benefits of the project would be assessed having regard to the predicted electricity demand, NSW Government's Electricity Strategy the Commonwealth's Renewable Energy Target Scheme, and the contribution to reducing carbon emissions generated by the project.

Preliminary consultation with regulators and the local community is currently being undertaken. Further details regarding the community engagement strategy is provided above in **Chapter 6.**

7.3.7 Hazard and risks

A preliminary assessment of hazards and risks associated with the project has been undertaken as identified in the standard SEARs and the NSW *Wind Guideline* (DPE, 2016a). This assessment includes a preliminary assessment of electromagnetic interference (EMI) and a high-level aviation risk review.

Background

Aviation

Several aviation facilities have been identified near the proposed wind farm site. Coolah Aerodrome is a registered Code 2 non-instrument aerodrome located approximately 6.3 kilometres (3.4 nautical miles) north of the nearest turbine in the Mt Hope cluster.

Mudgee Airport is the only certified aerodrome within 30 nautical miles of the wind farm site and was identified approximately 55 kilometres (29.8 nautical miles) south of the nearest turbine within the Leadville cluster. Mudgee Airport is owned and operated by Mid-Western Regional Council and has one sealed runway and one grass runway. The airfield elevation has an elevation of 471 metres AHD.

Several aircraft landing areas have also been identified within proximity of the wind farm site including:

- Cassilis Rotherw Aerodrome, an uncertified aerodrome located approximately 12.6 kilometres (6.8 nautical miles) south east of the nearest turbine in the Girragulang Road cluster
- Unknown ALA 1, an aerodrome located within the Mt Hope cluster
- Unknown ALA 2, an aerodrome located approximately 5.4 kilometres (2.96 nautical miles) north east of nearest turbine in the Mt Hope cluster
- Unknown ALA 3, an aerodrome located within the proposed Girragulang Road cluster approximately 2.3 kilometres (1.3 nautical miles) south west of wind turbine BS 11.

Bushfire

The proposed wind farm site is in a rural area primarily used for grazing, however there are also forested areas with evidence of previous fires. A significant fire occurred in 2017, burning a considerable portion of remnant vegetation between the Girragulang Road and Leadville clusters as discussed in **Section 7.3.2**. Sections of the transmission line options are close to forested areas, including national parks, state conservation areas and nature reserves (e.g. Minghom Gap Nature Reserve).

The Red Flags Review identified that the proposed wind farm site is in bushfire vegetation Category 1 and Category 2 areas, with Category 1 being the highest risk of bushfire and Category 2 being lower risk. The transmission line options also pass through bushfire vegetation Category 1 and Category 2 areas (NSW Government, 2020).

Health

The standard SEARs for wind farms require proponents to "consider and document any health issues having regard to the latest advice of the National Health and Medical Research Council, and identify potential hazards and risks associated with electric and magnetic fields and demonstrate the application of the principles of prudent avoidance."

Electromagnetic fields are present wherever electric current flows, including overhead and underground transmission lines and substations, as well as electrical appliances such as televisions, toasters and computers. The electric field component is associated with voltage, with a higher voltage resulting in a higher electric field. However, magnetic fields are generated by the flow of an electric current, with a higher current generating a greater magnetic field (WHO, https://www.who.int/peh-emf/about/en/, 2020).

In relation to health effects of wind farms, the Australian National Health and Medical Research Council (NHMRC) has concluded that the following:

> *"Examining whether wind farm emissions may affect human health is complex, due to the nature of the emissions and individual perceptions are highly variable. After careful consideration and deliberation of the body of evidence, NHMRC concludes there is currently no consistent evidence that wind farms cause adverse health effects in humans."*
> Source: NHMRC Statement: Evidence on wind farms and human health, Feb 2015

The NHMRC also states that further investigation is required, particularly for effects within 1500 m of a wind farm.

Telecommunications

The standard SEARs for wind farms require a consideration of impacts of the project on telecommunication systems. Mobile phones, television, commercial radio, land mobile radio and emergency radio are common examples of the systems that rely on radio and tele-communication. These systems generally use radio towers to help transmit and receive signals across a wide area.

Two communication towers were identified either within the wind farm site boundary, or within about two kilometres from the site boundary, comprising the CR-4 site communications tower, Woodvale, and the Telstra Customer communications tower, Coolah.

Potential hazards and risks

Aviation

The main findings of the high-level aviation risk review undertaken are as follows:

- No identified registered or certified aerodromes would have their obstacle limitation surfaces impacted by the project
- There would be no impact on the Coolah Aerodrome OLS, approach and take-off paths
- There would be no impact on any of the instrument procedures of Mudgee Airport if the turbine overall height remains less than approximately 423 metres above ground level in the Leadville cluster
- Air route and Grid lowest safe altitudes may be impacted by the project. Further assessment would be required once wind turbine heights and ground elevations are confirmed
- The turbines are not anticipated to infringe any protection areas associated with aviation facilities
- The turbines are located within Danger Area D538B which is provided for RAAF Base Williamtown military flying training. Consultation with Department of Defence wound therefore need to be undertaken.

Bushfires

There is a potential for bushfires to occur during construction and/or operation of the project. These fires could be caused by natural events such as lightning strikes, by human activity such as the use of spark generating equipment, or by malfunctioning infrastructure such as turbines. There is also a potential for fires to result from malfunctioning electrical infrastructure, including the substations and high voltage transmission line.

Conversely, as the proposed wind farm site and transmission line options are in bushfire vegetation Category 1 and Category 2 areas, combined with evidence of previous bushfires in the area, bushfires also pose a risk to the wind farm infrastructure.

Health

Although NHMRC has indicated that there is no consistent evidence of adverse health effects associated with the level of low-frequency electromagnetic radiation that is emitted from wind farms, UPC\AC would adopt an approach of 'prudent avoidance' in line with good industry practice, and guidance from Energy Networks Associations (ENA). The ENA EMF Management Handbook (2016) states:

- *"Prudent Avoidance does not mean that there is an established risk that needs to be avoided. It means that if there is uncertainty, then there are certain types of avoidance (no cost / very lowcost measures) that could be prudent"*
- *"Both Prudent Avoidance and the precautionary approach involve implementing no cost and very low-cost measures that reduce exposure while not unduly compromising other issues."*

Telecommunications

In the context of wind farm development and operation, electromagnetic interference (EMI) is the impact of a wind farm on surrounding communication services resulting in an unacceptable detrimental effect to the communication service. Radar services (civil and weather) can also be impacted by wind farms. The different impacts wind farms can have on communication services include:

- Near field impact: where an object that can conduct or absorb radio waves is placed within the near field zone around the antenna and thus can alter the behaviour of the antenna
- Obstruction impact: where a conductive object is placed in the path of an advancing radio wavefront and therefore can affect the signal detected at the receiver

- Reflection and scattering impacts: where an object reflective to radio waves is placed in the path of an advancing radio wavefront, and therefore can reflect the signal to the receiver and interfere with the desired signal
- Electromagnetic fields: where the operation of a turbine can create an electromagnetic emission that can, theoretically, interact with radio communications.

Interference with telecommunications services can result in the loss of communication signals and reduction in strength of broadcast signals (e.g. television or radio).

As mentioned above, 'near field' effects can occur if a turbine is near an antenna. While the exact 'near field' zone can be calculated and is dependent on the frequency of the signal as well as the gain and orientation of the antenna, the typical 'near field' zone for a point to point link is approximately 720 metres. Additionally, the Draft National Wind Farm Development Guidelines (Environment Protection and Heritage Council, 2010) recommends the following set-back distances when placing turbines on a site:

- One kilometre from any telecommunication site to avoid 'near field' effects
- Maximum 2nd Fresnel zone of a fixed point-to-point link to avoid 'reflection/scattering' of the radio signals
- Two kilometres from any radiocommunication site or receiver to avoid 'reflection/scattering' of the radio signals.

In order to assess the likely impact of the proposed development sites on nearby point to point links, WSP has assessed the 2nd Fresnel exclusion zones for each identified link.

Blade throw and blade glint

The standard SEARs for wind farms also require that blade throw risks are assessed. This would typically involve a failure in the turbine rotor which may result in the detachment of a turbine blade. However, previous studies undertaken indicate that the likelihood of blade throw is low, with the rate of turbine failure in the range of 1 in 1,000 to 1 in 10,000 (Larwood, 2005).

The risk of blade throw associated with the project is considered low, however will need to be assessed in detail as part of the EIS. Set back rates between turbines and the nearest dwellings would also be considered throughout the development of design.

The project may also generate blade glint as a result of the reflective white components of the turbines, which when in sunlight, can result in a direct reflection. However, most manufacturers treat turbines with non-reflective finishes to minimise risks of glint. The risk of blade glint generated by the project is therefore considered low.

Hazard and risks assessment methodology

Based on the potential from direct and indirect impacts, the EIS would include a qualitative assessment of hazards and risks using the following methodology:

- Identification of existing hazards across the project
- Identification of potential hazards resulting from the construction and operation of the project
- Identification of controls required to minimise the likelihood of hazardous events.

Preparation of a hazard and risk assessment would be undertaken in accordance with the relevant guidelines and consultation will be undertaken with affected property owners, stakeholders and local communities. Whether hazards or risks associated with the project can be suitably managed, advice from relevant government authorities will be implemented.

An aviation risk assessment would be undertaken by a suitably qualified aerodrome consultant confirm that the Project would not adversely affect the safety, operational integrity and efficiency of air services. Consultation would be undertaken with Airservices Australia, Department of Defence and the owners of affected ALAs, aircraft and aerial agriculture operators. The Civil Aviation Safety Authority may also determine, and subsequently advise whether night lighting is required on the wind turbines.

A Bushfire assessment would be undertaken in accordance with the NSW Rural Fire Services Planning for Bushfire Protection 2006. The hazard and risk assessment would also consider health issues having regard to the latest advice of the NHMRC as required by the standard SEARs for wind energy development.

A detailed EMI assessment would also be undertaken as the project develops, including other EMI impacts (such as point-to-multipoint, point-to-area, radar and broadcast services) in conjunction with a consultation process with the identified licensees.

7.3.8 Cumulative impacts

A high-level preliminary assessment has been undertaken to identify potential cumulative impacts that may be generated by the project associated with other surrounding developments.

The Wind Energy Guideline (Department of Planning and Environment, 2016) identifies cumulative assessment as an assessment issue that is particularly relevant to wind energy development. Specifically, the guideline requires the consideration of whether any proposed, approved or operating wind energy project in the vicinity is likely to increase the impacts of the project, especially impacts associated with landscape, noise, biodiversity and traffic impacts.

Background

Liverpool Range Wind Farm is located about six kilometres east of the project, with the nearest turbine being approximately 8.5 kilometres from the boundary of the nearest cluster for this project (Girragulang Road cluster). Liverpool Range Wind Farm was approved in March 2018 however has not commenced construction. The location of Liverpool Range Wind Farm in relation to the project is presented in **Figure 2-1**.

Other major projects close to the project include the Dunedoo Solar Farm, which is located approximately two kilometres north of Dunedoo (ib vogt, 2017), and approximately 17 kilometres west of the nearest cluster (Leadville cluster).

In addition, other renewable energy developments are likely to be undertaken in the wider area, as signalled by the recently released strategic plans for the area. As discussed in **Section 3.1**, the NSW Government released the NSW Electricity Strategy in November 2019 which proposed the delivery of three REZ's including one zone in Central-West NSW (i.e. the CW-REZ).

The CW-REZ is centred near Dubbo and includes the wind farm site. The CW-REZ is expected to unlock up to 3000 MW of new energy generation by the mid 2020's, providing up to 450 construction jobs in the region, and is anticipated to commence construction in 2022 (NSW Government, 2019). The EIS would consider the CW-REZ as context to the project, but only those projects that are either approved, planned or underway would be considered in the cumulative impact assessment.

There are also several proposed and operational developments in the wider area, including several renewable energy projects near Gulgong and Wollar, and modifications to existing mining operations at Ulan Mine and Moolarben Mine in proximity to the transmission line options A and B.

Potential cumulative impacts

The project may generate cumulative impacts in conjunction with surrounding projects during both construction and operation. The project has the greatest potential for cumulative impacts in conjunction with Liverpool Range Wind Farm given its proximity to the wind farm site.

Where the project is expected to result in more than a minimal impact alone, cumulative impacts associated with nearby projects have been identified for relevant disciplines in previous sections. These impacts may include:

- Landscape character and visual impacts – discussed in **Section 7.3.1**
- Biodiversity impacts – discussed in **Section 7.3.2**
- Traffic and transport impacts – discussed in **Section 7.3.3**
- General amenity impacts – discussed in **Section 7.3.6**.

Residences within and surrounding the Leadville cluster are less likely to experience cumulative impacts associated with Liverpool Range Wind Farm, as this cluster is located south west of the Mt Hope and Girragulang Road clusters and therefore further south west of the Liverpool Range Wind Farm.

There is also a potential for indirect and flow on impacts in conjunction with other developments in the wider area, particularly given the number of projects that may be undertaken as part of the delivery of the CW-REZ which has the potential to transform the region. However, local communities may also benefit from the project and other developments in the region through the generation of jobs during construction and ongoing operation, particularly under the CW-REZ, and contribution to local economies associated with the purchase of local goods and services.

Cumulative assessment methodology

Given the proximity of the project to the proposed Liverpool Range Wind Farm, and the presence of other planned projects in the wider region, a detailed cumulative impacts assessment will be undertaken as part of the preparation of the EIS. Cumulative impacts will be considered under two categories:

1. **Cumulative impacts resulting from two or more disciplines having an impact on the same receiver**: These impacts may result from a combination of two or more impacts on the same receiver alone, regardless of any other projects nearby. For example, several residents may be impacted by both an increase in noise and traffic congestion as a result of a nearby construction facility associated with the project. The project may therefore generate a cumulative impact on these receivers resulting from a combination of traffic and noise impacts generated by the project alone.
2. **Impacts resulting from a combination of impacts generated by the project and those generated by other developments in the local area**: These impacts may be associated with an impact generated by the project in conjunction with impacts generated separately by other projects in the local area. While impacts resulting from the project may be minor, they may result in more significant cumulative impacts on the same receivers when considered in conjunction with other projects.

As part of the cumulative impact assessment, surrounding developments will be identified that have the potential to result in a cumulative impact in conjunction with the project. This may include nearby projects that have overlapping construction and/or operational timeframes, or those that may indirectly affect the same receiver through activities that extend beyond the project boundary such as the use of the same construction transport routes. However, projects that are already operational at the time of EIS preparation will be considered to form part of the existing baseline and won't be considered in the assessment of cumulative impacts.

Potential cumulative impacts will be identified that may be generated by the project in conjunction with other identified nearby developments, and appropriate management measures will be proposed to minimise identified impacts.

7.4 Other environmental issues to be assessed

7.4.1 Historic heritage

A preliminary assessment of historic heritage in accordance with the *Heritage Act 1977* has been undertaken and the findings are summarised below.

Background

A search of available historic heritage inventories was undertaken within a five-kilometre radius of the project including:

- Register of the National Estate
- Commonwealth Heritage List
- National Heritage List
- NSW State Heritage Register
- NSW State Heritage Inventory
- Warrumbungle LEP
- Upper Hunter LEP
- Mid-Western LEP.

There were no World, Commonwealth, National or State Heritage Listed Items identified. Six Local Heritage Items were identified within the five-kilometre radius of the nearest turbine. A summary of the heritage items currently listed is provided in **Table 7-8** and are shown in **Figure 7-9.**

The closest listed heritage items to the wind farm site are the Coolah General Cemetery and the Leadville General Cemetery, which are locally listed heritage items under Schedule 5 of the Warrumbungle LEP 2013. These heritage items are in proximity to Mt Hope and Leadville, respectively. One listed heritage item is located within proximity to the transmission line corridor, a homestead, which is also a listed heritage item under Schedule 5 of the Mid-Western Regional LEP 2012.

Table 7-8 Listed historic heritage items

Item	Location	Proximity to Project	Instrument	Significance
Old Turee Homestead	Within Lot 3 DP850592 Tongy Road, Coolah	Located on 5km radius from Black Stump (Girragulang)	Schedule 5 of the Warrumbungle LEP Listing ID I14	Local
Turee Vale Creek Cemetery	Within Lot 3 DP850592 Tongy Road, Coolah	Located on 5km radius from Black Stump (Girragulang)	Schedule 5 of the Warrumbungle LEP Listing ID I15	Local

Item	Location	Proximity to Project	Instrument	Significance
Coolah General Cemetery	Lot 7029 DP1061328 Lot 1 DP668541 Lot 1 DP1150781	Located within 5km radius from Mt Hope	Schedule 5 of the Warrumbungle LEP Listing ID I7	Local
Leadville General Cemetery	Lot 7011 DP96957	Located within 5km radius from Leadville	Schedule 5 of the Warrumbungle LEP Listing ID I28	Local
Leadville Mines site	Lot 157 DP44930	Located within 5km radius from Leadville	Schedule 5 of the Warrumbungle LEP Listing ID I29	Local
Wandoona Homestead	Lot 1 DP755455	Located within 5 km radius of Transmission line investigation corridor	Schedule 5 Mid-Western Regional LEP Listing ID996	Local

Potential historic heritage impacts

Historical heritage sites and objects in New South Wales are regulated under the *Heritage Act 1977*. All historical heritage items are afforded protection from harm under the *Heritage Act 1977*, which defines harm as:

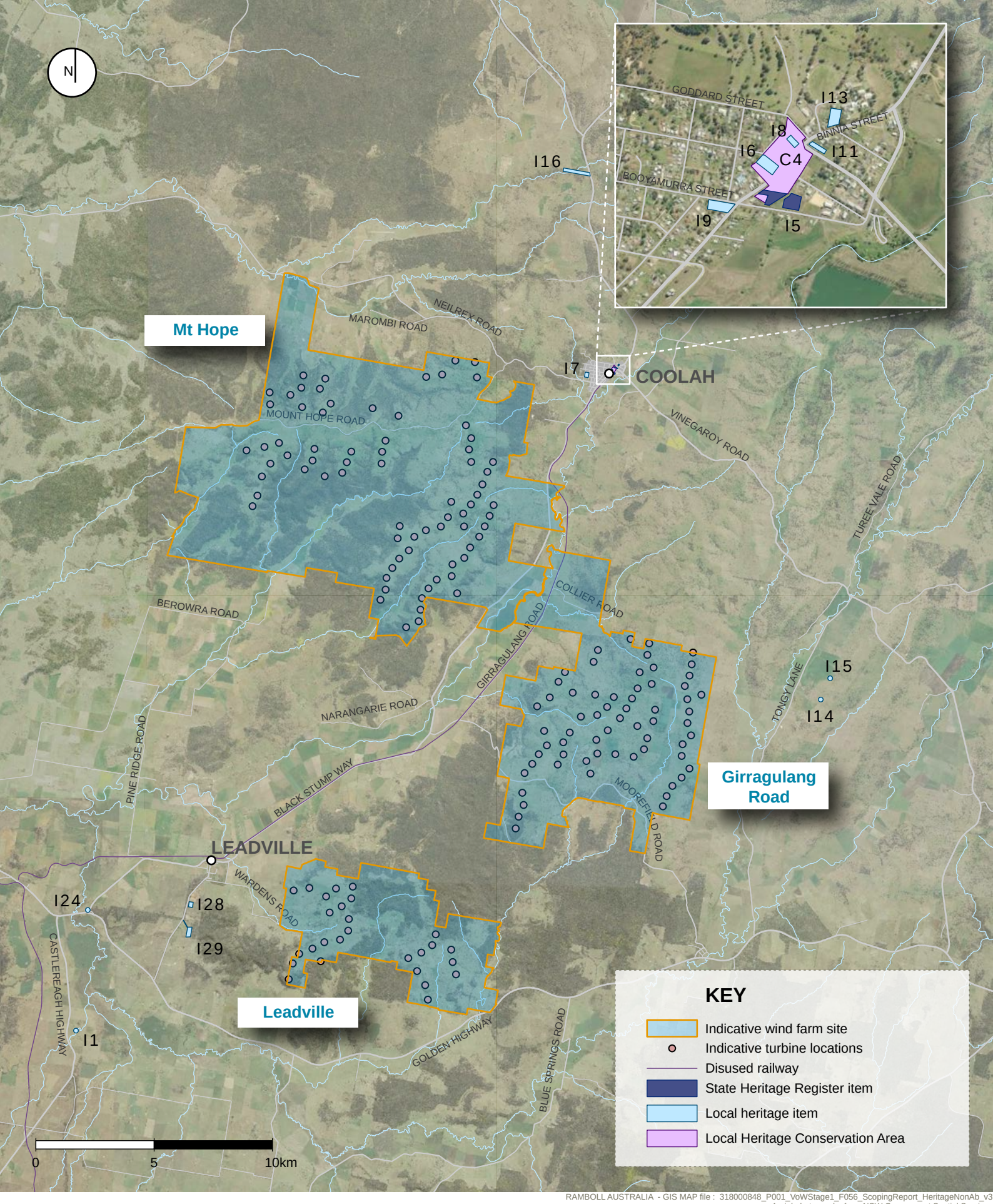
- In relation to a building or work – demolish
- In relation to a relic or moveable object – damage, despoil, move, or alter
- In relation to a place or precinct – damage, despoil, or develop the land that comprises the place or is within the precinct or damage or destroy any tree or other vegetation on, or remove any tree or other vegetation from, the place or precinct.

Given there are no direct impacts anticipated to listed heritage items but there is potential for indirect impacts, assessment of the potential indirect impacts should be undertaken. Consideration of potential dust and vibration impacts on items near to the haulage route should be investigated in more detail as part of the EIS. There is potential for previously unreported heritage items to be located within the project including unrecorded family cemeteries which will need to be considered.

Historic heritage assessment methodology

Given the potential for indirect impacts to listed items and potential previously unreported items in or near the project, the following key tasks would be undertaken as part of a Historic Heritage Impact Assessment to assess the potential impacts on historic heritage associated with the project:

- Review the NSW State Heritage Inventory, the relevant LEPs and the Australian Heritage Database to determine if there is any additional information on places of heritage significance in or near to the project
- Mapping of all identified registered historic heritage objects identified from these reviews
- A site assessment would be undertaken with the aim of assessing the potential impact of the proposal upon any identified heritage vales and assessing if there are any items that may be of heritage value.



RAMBOLL AUSTRALIA - GIS MAP file : 318000848_P001_VoWStage1_F056_ScopingReport_HeritageNonAb_v3
Aerial photography from NSW Government Spatial Services

Figure 7-9 | Listed Non-Aboriginal Heritage Items

7.4.2 Water and soils

Water

The project is in the Macquarie-Bogan catchment area. There are no significant wetlands within or near the project however, five rivers bisect the transmission line corridor, including Talbragar, Goulburn, Munmurra, Krui and Bow River. In addition, access roads may need to cross rivers and creeks. The wind turbines are generally located on higher ground predominately along ridgelines with limited potential for flooding.

Potential impacts to drainage and hydrology from the project include pollution of waters by accidental and uncontrolled spills and excavation works, impacts from sedimentation and erosional transport to water courses as well as total water usage for the project.

The EIS will assess potential impacts from mobilisation of sediment and pollutants generated and recommend appropriate management measures in accordance with the hierarchy of avoidance, minimise and manage. This will include identification of any project impacts within 40-metres of the high bank of “waterfront land” which would trigger the need for the relevant assessment.

As part of the EIS, sources of water required for construction and operation of the project will be identified and quantified and detail whether any licences under the *Water Management Act* are required. A relevant assessment on the impacts to groundwater will also be included.

Soils

The construction, operation, maintenance and decommissioning of the project has the potential to impact the current soil and landform. Potential risks include excavation and heavy machinery works, access road upgrades and grading/level which can impact erosion and weathering processes, ground stability as well as the introduction and/or spreading of weed species.

Consideration of the impacts to soils and the potential for erosion and sedimentation issues would be included in the EIS. More detailed assessment of soils will be required once the final position of infrastructure has been determined. The soil assessment will focus on soil disturbance during construction including erosion from excavation work given the potentially-erosion prone nature of the slopes of the site and rehabilitation where required.

7.4.3 Land use and property

As discussed in **Section 4.1**, the proposed wind farm site is located close to the township of Coolah in the Warrumbungle LGA. The wind farm site comprises 122 private properties (20 landholders.

Several properties are also located in proximity to each of the transmission line options, however the number of properties affected by the transmission line would be subject to design refinement and selection of the preferred transmission line option.

The proposed wind farm site is located within an area zoned as RU1 Primary Production and is predominantly used for cattle and sheep grazing. Other land uses in the local area include scattered rural dwellings with higher densities of dwellings located in closer proximity to townships outside the wind farm site.

Several villages (land use zone RU5) are also located near the proposed wind farm site, including Leadville, which is about three kilometres west of the Leadville cluster. The township of Coolah is approximately 4kilometres north east of the Mt Hope cluster.

Coolah is predominantly characterised by general and large lot residential land use (land use zones R1 and R5), public and private recreational areas (land use zones RE1 and RE2), a local town centre (land use zone B2), and general industrial areas (IN1).

The predominant land use in the areas surrounding the transmission line options is also primary production, however the options also pass through several other land uses, particularly transmission line Option A and Option B. These land uses predominantly include several national parks and nature reserves (e.g. Minghom Gap Nature Reserve), environmental management areas (land use zones E1 and E3), and areas of Coal mining, particularly Ulan Coal, Moolarben Coal Complex, and Wilpinjong Mine. In addition, the transmission line options traverse several public roads. Future land uses in the surrounding CW-REZ is likely to change over time, with an increase in renewable energy developments.

Most of the impacts to land use are anticipated to occur during construction, associated with the operation of machinery earthworks, occupation of the site and use of internal access tracks, and construction of infrastructure, along with associated amenity impacts such as noise and dust.

During operation of the windfarm, the project is likely to have limited impacts on property and land used for grazing, aside from the area occupied by the turbines and ancillary infrastructure, and vehicular use of access tracks for ongoing maintenance. Similarly, most of the existing land uses in proximity to the preferred transmission line option would be primarily impacted during construction.

The project is not anticipated to require property acquisition. UPC\AC would enter into temporary lease arrangements with associated landholders to allow for the construction and ongoing operation of the wind farm. As discussed in **Section 4.3**, temporary lease arrangements would also be required for the construction of the transmission line, with an easement (or other agreement) to be established for ongoing operation of the transmission line.

A detailed assessment of potential land use and property impacts will be undertaken as the project design progresses and in preparation of the EIS, with a key consideration of avoidance and minimisation of impacts on land use through design refinement. Further consultation will be undertaken with the community and other stakeholders including the owners and operators of coal mines in proximity to the transmission line options, and the Environment, Energy and Science Group of DPIE given the proximity of the project to a number of national parks, conservation areas and nature reserves. Consultation is discussed in more detail in **Chapter 5**.

7.4.4 Air quality

Air quality within and surrounding the project area is generally expected to be good and typical of that found in a rural setting in NSW. Existing sources of air pollution in such a location is expected to comprise dust from agricultural practices. During colder months, there may be a minimal increase in air contaminants due to smoke emissions from the operation of solid fuel heating.

The construction of the project is not anticipated to have a significant impact on air quality and would mostly be related to dust during dry periods and vegetation removal. Impacts to air quality during operation are likely to be negligible with adoption of standard mitigation measures.

As part of the preparation of the EIS, further air quality assessment would be carried out in conjunction with design development and construction methodologies. The assessment would also identify mitigation and management measures to minimise impacts on the environment during construction and operation of the project.

7.4.5 Waste

Waste generated from the project is predicated to be minimal overall, with the main waste generation phases being during construction and decommissioning stages of the project. During the operational stage, there will be very limited waste generated. Waste minimisation and avoidance measures would be adopted to avoid and minimise waste from the construction site, reuse and recycle waste where possible and dispose appropriately of waste not able to be reused or recycled. The potential waste streams and measures to manage these wastes would be provided with the EIS.

7.4.6 Greenhouse gas emissions and climate change

Based on a review of the CSIRO Climate Change in Australia Projections for Australia's National Resource Management (NRM) regions, the project sits within the Central Slopes cluster where key climate projections include:

- Average temperatures will continue to increase in all seasons
- More hot days and warm spells and fewer frosts
- Increased intensity of extreme rainfall events
- A harsher fire-weather climate in the future.

In operation, wind farms contribute to reducing greenhouse gas (GHG) emissions through clean energy generation. During manufacture and construction, some GHG emissions would be generated, but it is estimated that the GHG emissions would be recovered from the savings in a period of approximately seven months, depending on the technology and its origin (Source: https://www.offshorewindadvisory.com/faqs-ghg-payback/).

Potential impacts as a result of climate change may affect the construction and operation of the project, such as extreme rainfall events, extreme heat causing higher bushfire risk and more extreme storms. Further assessment of potential GHG and climate change impacts will be carried out as part of the EIS.

Assessment will include identification of feasible and reasonable management measure that may be implemented to reduce GHG emissions during construction and operation. The review of standard construction environment management plans would ensure that impacts from emissions generated during excavation, road works, transport of machinery would be adequately covered by avoidance, minimizing and managing.

8. CONCLUSION

The project would contribute to achieving Commonwealth and NSW Government objectives for providing secure and reliable energy supply and to achieving national commitments to reduce carbon emissions. The project is also located within the CW-REZ identified in the NSW Electricity Strategy.

A key consideration during project development has been to minimise environmental and community impacts. As part of the early phase project development UPC\AC considered alternative sites and turbine layouts and several areas were removed from the project due to potential and perceived impacts on local communities. Detailed investigations will be carried out to identify the preferred route for the transmission line in conjunction with the DPIE to co-ordinate with future transmission and electricity infrastructure upgrades.

The ultimate decision to proceed with the project in its current layout was based on the following considerations:

- Topography that would provide favourable wind conditions
- Alignment with wider strategic plans for the wider region
- Suitable space available for the construction of the windfarm infrastructure
- Low dwelling density in the area
- Strong connection point into the NEM, via the Bayswater - Mt Piper 500 kV transmission line.

Key issues have been identified in this scoping report, requiring a detailed assessment to fully understand the impacts and identify project-specific mitigation. Key issues include:

- Landscape character and visual amenity
- Biodiversity
- Traffic and transport
- Noise and vibration
- Aboriginal heritage
- Social and economic
- Hazard and risk
- Cumulative impacts.

Other issues identified include the following:

- Historic heritage
- Water and soils
- Land use and property
- Air quality
- Waste
- Greenhouse gas emissions and climate change.

Key issues and other issues will be assessed in further detail as part of the preparation of the EIS in accordance with the SEARs to be issued for the project.

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