Jupiter Wind Farm

ENVIRONMENTAL IMPACT STATEMENT

October 2016

Volume 1



EPYC PTY LTD

ERM REFERENCE
0223522 RPT1 ENVIRONMENTAL IMPACT STATEMENT

CERTIFICATION OF ENVIRONMENTAL IMPACT STATEMENT FOR THE JUPITER WIND FARM prepared under Part 4 of the *Environmental Planning and Assessment Act 1979.*

This Environmental Impact Statement (EIS) was prepared by Environmental Resources Management Pty Ltd (ERM) supports an application by EPYC for the proposed Jupiter Wind Farm under Part 4 of the Environmental Assessment and Planning Act 1979.

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CERTIFICATION	We certify that we have prepared the contents of this EIS to the best of our knowledge. The EIS has been prepared in accordance with Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* and contains all available information that is relevant to the environmental assessment of the development. The EIS draws on the work undertaken by a number of technical specialists engaged as part of the Project Team with the information contained in the EIS neither false nor misleading.	
Signature:		
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Date:	26 October 2016	

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ABBREVIATIONS

Abbreviation	Description
AAAA	Aerial Agriculture Association of Australia
ABS	Australian Bureau of Statistics
ACMA	Australian Communications and Media Authority
AGL	Above Ground Level
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ALA	Aircraft Landing Area
ALARP	As Low As Reasonably Practicable
AM	Amplitude Modulation
ANZECC	Australian and New Zealand Environment Conservation Council
APZ	Asset Protection Zone
ASA	Airservices Australia
ASS	Acid Sulfate Soil
ATC	Air Traffic Control
BCA	Building Code of Australia
BFMC	Bushfire Management Committee
BGS	Below Ground Surface
BoM	Bureau of Meteorology
CAR	Civil Aviation Regulation
CASA	Civil Aviation Safety Authority
CB	Citizens' Band Radio
CCC	Community Consultative Committee
CEF	Community Enhancement Fund
CEMP	Construction Environmental Management Plan
CHA	Cultural Heritage Assessment
CLM Act	*Contaminated Land Management Act 1997*
CNMP	Construction Noise Management Plan
CO_2 –e	Carbon dioxide equivalent
CoRTN	United Kingdom (UK) – Calculation of Road Traffic Noise
Council	Palerang and Goulburn Mulwaree Councils
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTMP	Construction Traffic Management Plan
dB	decibel
DCP	Development Control Plan
DECC	Department of Environment and Climate Change
DGRs	Director General's Requirements
DNVGL	Derived Native Grassland – Technical specialist Company responsible for preparation of various technical assessment reports associated with this EIS
DoD	Commonwealth Department of Defence
DoEE	Commonwealth Department of Environment & Energy (formally Commonwealth Department of Environment (DOE))
DP&E	NSW Department of Planning and Environment
DP&I	NSW Department of Planning & Infrastructure
Draft Wind Farm Guidelines	The Department of Planning and Infrastructure's *Draft NSW Planning Guidelines: wind Farms, December 2011*
DTI	NSW Department of Trade and Investment
DUAP	Department of Urban Affairs and Planning
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EMI	Electromagnetic Interference

Abbreviation	Description
EMP	Environmental Management Plan
EMR	Electromagnetic Radiation
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPI	Environmental Planning Instrument
EPL	Environmental Protection Licence
ERA	Environmental Risk Assessment
ERM	Environmental Resources Management Australia Pty Ltd
ESD	Ecologically Sustainable Development
EVC	Ecological Vegetation Class
FDI	Fire Danger Index
FM	Frequency Modulation
FM Act	*Fisheries Management Act 1994*
FTE	Full time equivalent
GHG	Greenhouse Gas
GIS	Geographic Information System
GMDCP	*Goulburn Mulwaree Development Control Plan 2009*
GMLEP	*Goulburn Mulwaree Local Environment Plan 2009*
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GWh	Gigawatt hours
ha	hectares
Hz	Hertz
IEC	International Electro technical Commission
INP	NSW Environmental Noise Management – Industrial Noise Policy
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007*
ISO	International Standards Organisation
ISP	Internet Service Providers
km	kilometre
kV	Kilovolt
LEP	Local Environment Plan
LGA	local government area
LSALT	Lowest Safe Altitudes
LCVIA	Landscape Character and Visual Impact Assessment
LRET	Large-scale Renewable Energy Target
m	metres
Minister	NSW Minister for Planning and Environment
MNES	Matters of National Environmental Significance
MOS	Manual of Standards
Mt	Million tonnes
MW	Megawatt
NEM	National Electricity Market
NHMRC	National Health Medical Research Council
nm	Nautical Miles
NP&W Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
NSW WFG	DPI Planning Guidelines Appendix B NSW Wind Farm Noise Guidelines 2011
NW Act	*Noxious Weeds Act 1993*
OECD	Organisation for Economic Cooperation and Development
OEH	NSW Office of Environment and Heritage
OH&S	Occupational Health and Safety
OLS	Obstacle Limitation Surface

Abbreviation	Description
ONMP	Operational Noise Management Plan
PA	Project Area
PAC	NSW Planning and Assessment Commission
PAD	Potential Archaeological Deposit
PDCP 2015	*Palerang Development Control Plan 2015*
PANS-OPS	Procedures for Air Navigation Services – Operations Surfaces
PBP	Planning for Bushfire Protection
PCT	Plant Community types
PEA	Preliminary Environmental Assessment
PEA Act	*Protection of the Environment Administration Act 1991*
PLEP	*Palerang Local Environment Plan 2014*
PoEO Act	*Protection of the Environment Operation Act 1997*
PSR	Primary Surveillance Radar
RAP	Registered Aboriginal Party
RAV	Restricted Access Vehicles
RBL	Rating Background Level
REAP	Renewable Energy Action Plan
RECs	Renewable Energy Certificates
REF	Review of Environmental Factors
RET	Renewable Energy Target
RFS	NSW Rural Fire Service
RMS	Roads and Maritime Services (formerly the Roads and Transport Authority)
RNP	Road Noise Policy
Roads Act	*Roads Act 1993*
RSA	Rotor Swept Area
SA WFG	South Australia EPA Environment Noise Guidelines for Wind Farms
SA EPA	South Australian Environmental Protection Authority
SCADA	Supervisory control and data acquisition
SEARs	Secretary's Environmental Assessment and Requirements
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
SRES	Small-scale Renewable Energy Scheme
SSD	State Significant Development
SSR	Secondary Surveillance Radar
SWL	Standing Water Level
The Proponent	EPYC Pty Ltd, on behalf of Jupiter Wind Farm Pty Ltd
TSC Act	*Threatened Species Conservation Act 1995*
vpd	Vehicles per day
WFGGT	Wind Farm Greenhouse Gas Savings Tool
WHO	World Health Organisation
WM Act	*Water Management Act 2000*
WTG	Wind Turbine Generator
ZVI	Zone of Visual Influence

GLOSSARY OF TERMS

Term	Description
Braidwood Road	Used interchangeably with Goulburn Road and Goulburn-Braidwood Road throughout the EIS and supporting specialist assessment report, reflective of the change of name that occurs along this road between Goulburn and the Kings Highway in the vicinity of the PA.
Development Footprint	The Development Footprint is the area in which physical disturbance is proposed for the development of the Project, including the Permanent Development Footprint and Temporary Development Footprint.
Direct Employment	Direct employment includes the employees who are directly employed in developing, constructing and/or operating the wind farms and those directly employed in manufacturing wind farm plant and equipment and supporting these activities.
Endangered Ecological Community (EEC)	An ecological community listed as protected by the NSW *Threatened Species Conservation Act 1995*.
Goulburn Road	Used interchangeably with Braidwood Road and Goulburn-Braidwood Road throughout the EIS and supporting specialist assessment report, reflective of the change of name that occurs along this road between Goulburn and the Kings Highway in the vicinity of the PA.
native	Flora or fauna species that existed in NSW before European settlement.
negligible	Small and unimportant, such as to be not worth considering.
Obstacle Limitation Surface	These are a series of surfaces that set the height limits of objects around an aerodrome. Objects that project through the OLS become obstacles.
offset (biodiversity)	One or more appropriate actions put in place in an appropriate location to counterbalance a development's impact on biodiversity values.
PCT ID	An abbreviation meaning Plant Community Type Identification Number as according to the NSW Vegetation Information System.
perennial stream	Stream with a well-defined channel that flows continuously all year during a year of normal rainfall with the aquatic bed located below the water table for most of the year.
Permanent Development Footprint	This is the area of land that will be subject to permanent alteration as a result of installation and operation of Project infrastructure.
Plant Community Type (PCT)	From BBAM (2014): A NSW plant community type identified using the PCT classification system.
population	A group of animals or plants of the same species, potentially capable of interbreeding and sharing the same habitat in a particular area at a particular time.
Procedures for Air Navigation Services – Operations surfaces	This refers to the rules for designing aircraft instrument approach and departure procedures. The procedures are used to allow aircraft to land and take off when instrumental meteorological conditions impose instrument flight rules.
Project Area (PA)	The term Project Area (PA) refers to the area in which EPYC has applied to develop the Project. The PA encompasses the parcels of land associated with the Development Footprint, as shown in *Figure 1-2*.
Prudent Avoidance	The avoidance without undue inconvenience and monetary expense to avert the possible human health risks associated with exposure to new high voltage transmission lines.
regeneration	Where native vegetation is allowed to return naturally to an area generally by removing existing impacts such as grazing or slashing.
regrowth vegetation	Defined in the *Native Vegetation Act 2003* as any native vegetation that has regrown since 1 January 1990 (or 1 January 1983 Western Division). Excluding regrowth after illegal clearing or natural events such as bushfire, floods and drought.
remnant vegetation	Any native vegetation that is not regrowth.
riparian	Associated with drainage lines.

Term	Description
Temporary Development Footprint	This is the area of land which will be temporarily disturbed during construction of the Project, and rehabilitated following construction, in order to minimise permanent impacts to biodiversity. Mitigation measures in these areas are to include revegetation, spreading mulched or cleared vegetation and spreading native grass seed with local species in accordance with an approved Construction and Environmental Management Plan (CEMP).
the Project	In this report, the Project refers to the proposal by the proponent (EPYC) to construct and operate the Jupiter Wind Farm. The Project will involve the construction of up to 88 wind turbine generators.
the Project Team	The Project Team consists of EPYC (the Proponent), Environmental Resources Management Pty Ltd (ERM) and their in-house and external technical specialists.
Threatened Ecological Community (TEC)	An ecological community listed as protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
threatened flora	A species of plant listed as protected by the EPBC Act or the TSC Act
threatened species	A species listed as protected by the EPBC Act or the TSC Act
Total Economic Impact	The direct effect of the initial increase in demand and the associated flow-on effects throughout the economy. For example, the direct manufacture of WTGs requires the purchase of steel and other materials from suppliers, these suppliers would then need to restock to meet commitments to other customers creating a production induced flow-on effect in the economy.
Vegetation Information System	A resource held and administered by OEH that contains information on the vegetation types of NSW, mapping products and previous vegetation survey details.
vegetation type	A general term used to describe an association of flora species that are recognisable as a unit or grouping based on observed co-occurrence. Includes both native and non-native vegetation.
vegetation zone	From BBAM (2014): a relatively homogenous area of native vegetation on a development or BioBank site that is the same PCT and broad condition state.

EXECUTIVE SUMMARY

E1. Overview

EPYC Pty. Ltd. (EPYC) on behalf of Jupiter Wind Farm Pty. Ltd. (JWFPL) (the Proponent) is seeking approval for the construction and operation of the Jupiter Wind Farm (the Project) located within the Southern Tablelands Region of New South Wales (NSW). The Project Area (PA) covers an area of approximately 4,999 hectares (ha) spanning across the Goulburn Mulwaree and former Palerang Local Government Areas (LGAs), and is situated approximately 5 kilometres south east of Tarago and approximately 18 km east of Bungendore. The location of the Project is shown in *Figure E-1*.

The Project will involve the construction of up to 88 wind turbine generators (WTG) within two distinct precincts (northern and southern) with a maximum height of 173 m above ground level (AGL) and a total installed capacity of up to 350 Megawatts (MW). The Project will also involve construction of a series of internal access roads and 33 kV reticulation network connecting the WTGs, including a 33 kV transmission line connecting the southern precinct to the on-site substation site located in the northern precinct; an on-site electrical substation and 330 kV transmission line connection to the existing TransGrid 330 kV transmission line that passes through the PA; along with other associated buildings and ancillary structures and equipment, including temporary construction facilities.

The Project is State Significant Development (SSD) in accordance with clause 20, Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011* and will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Project is also designated development under Schedule 3 of the *Environmental Planning and Assessment Regulations 2000* as it is an 'electricity generating station' which is capable of supplying more than 30 megawatts of electrical power.

Further, the Project is also integrated development under the EP&A Act because it requires:

- an Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997* (POEO Act); and
- approval under section 138 of the *Roads Act 1993* (Roads Act) for the works proposed to be carried out in public roads.

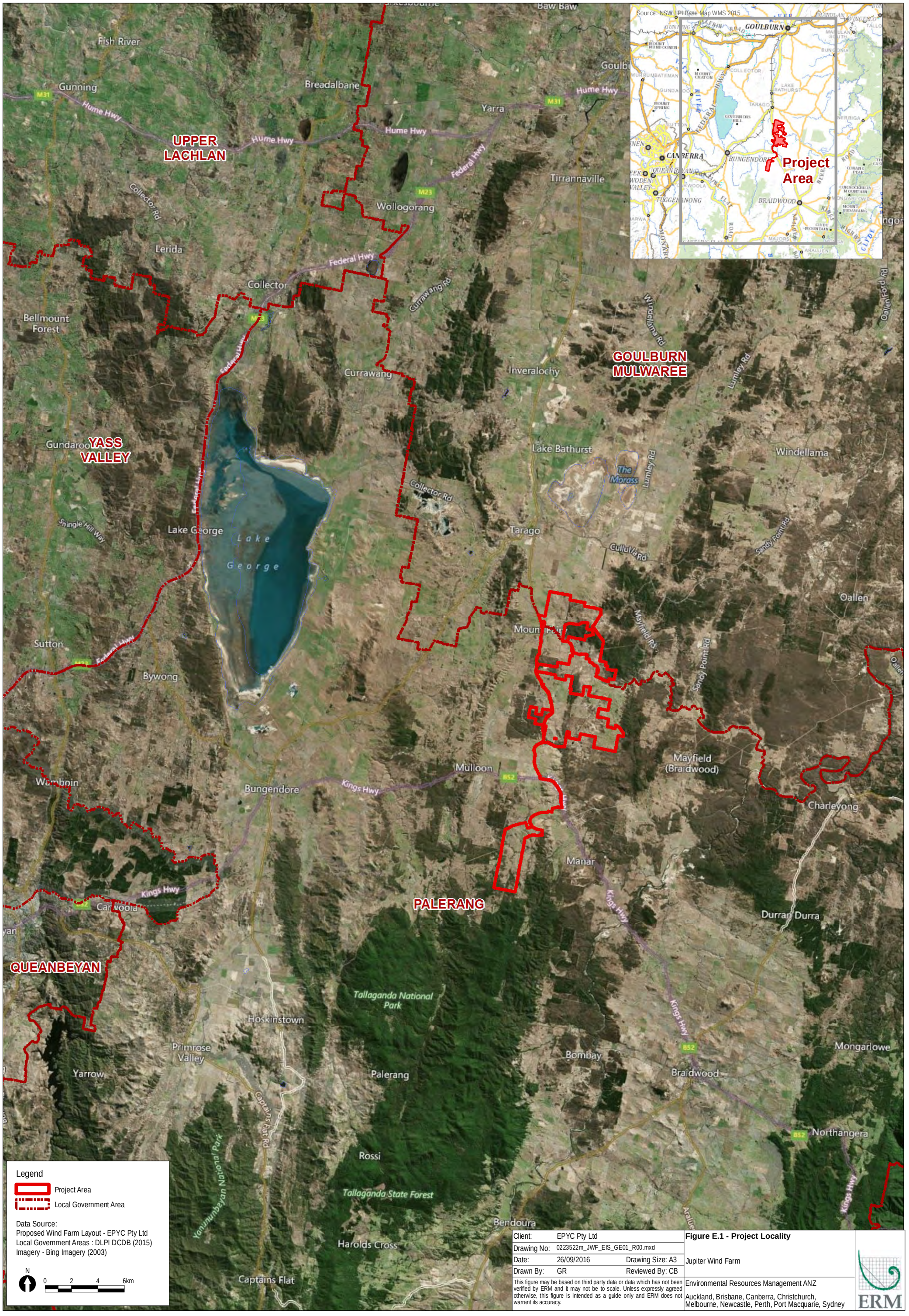
The Director General for DP&E initially issued environmental assessment requirements for the Proponent to consider and address in the EIS on 31 January 2014 (issued as Director General Requirements (DGRs)). On 10 September 2015, Supplementary Secretary Environmental Assessment Requirements (SEARs) were issued, and these were subsequently revised by DP&E and reissued on 2 March 2016. The revised SEARs (dated 2 March 2016) supersede the DGRs previously issued for the Project, and form the basis for preparation and assessment of the EIS for the Project.

The Project was referred to the Commonwealth Department of the Environment and Energy (DoEE) (formerly the Commonwealth Department of the Environment (DoE)) under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 13 July 2015, and determined to be a controlled action on 8 September 2015, with the controlling provisions that apply to the Project under the EPBC Act determined to be:

- listed threatened species and communities (sections 18 and 18A); and
- listed migratory species (sections 20 and 20A).

The Project requires approval under the EPBC Act and will be assessed for the purposes of the EPBC Act via DP&E under the terms of the bilateral agreement between the Commonwealth and NSW Governments.

Environmental Resources Management Australia Pty Ltd (ERM) has been commissioned by EPYC to coordinate the technical environmental assessments and prepare this EIS to support the SSD Application for submission to DP&E for assessment.


Source: NSW LPI Base Map WMS 2015
Project Area
UPPER LACHLAN
YASS VALLEY
GOULBURN MULWAREE
PALERANG
QUEANBEYAN
Fish River
Gunning
Breadalbane
Yarra
Baw Baw
Hume Hwy
Federal Hwy
Tirrannaville
Wollogorang
Collector Rd
Lerida
Collector
Currawang Rd
Bellmount Forest
Currawang
Inveralochy
Windellama Rd
Lumley Rd
Oallen Rd
Gundaroo
Lake Bathurst
The Morass
Windellama
Shingle Hill Way
Lake George
Tarago
Cullulva Rd
Sandy Point Rd
Oallen
Sutton
Bywong
Mayfield Rd
Wamboin
Bungendore
Kings Hwy
Mulloon
Mayfield (Braidwood)
Charleyong
Manar
Durran Durra
Tallaganda National Park
Hoskinstown
Primrose Valley
Yarrow
Palerang
Bombay
Braidwood
Mongarlowe
Northangera
Rossi
Tallaganda State Forest
Yanununbeyan National Park
Captains Flat Rd
Bendoura
Harolds Cross
Captains Flat
Legend
Project Area
Local Government Area
Data Source:
Proposed Wind Farm Layout - EPYC Pty Ltd
Local Government Areas : DLPI DCDB (2015)
Imagery - Bing Imagery (2003)
N
0 2 4 6km
Client: EPYC Pty Ltd
Drawing No: 0223522m_JWF_EIS_GE01_R00.mxd
Date: 26/09/2016 Drawing Size: A3
Drawn By: GR Reviewed By: CB
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
Figure E.1 - Project Locality
Jupiter Wind Farm
Environmental Resources Management ANZ
Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney
ERM

The Proponent

JWFP is a 100% subsidiary of EPYC Pty. Ltd. that has been established to provide an independent identity for the Jupiter Wind Farm Project. EPYC Pty Ltd is an Australian/Spanish joint venture specialising in wind farm developments and is currently based in North Sydney. The company was established specifically to invest, develop, construct and operate large scale wind farms in Australia. Its shareholders, directors, engineers and managers, have extensive experience in the wind sector in Australia and abroad.

Project Benefits

The Project will make a substantial contribution to renewable energy generation in NSW and to the achievement of Federal and State policy objectives. In addition to delivering clean energy, the Project will deliver significant economic benefits at the local, regional and broader State level, particularly through the creation of construction employment opportunities and increased demand and support for local goods and services.

During construction, the Project (based on 350 MW capacity) is expected to create a total economic impact in the local and broader area in excess of $318 million through a combination of direct Project expenditure and flow-on effects through production and consumption induced demands for local goods and services. In addition, it is estimated the Project will generate of the order of $7 million per annum direct expenditure in the local / regional area, and of the order of $21 million per annum total economic impact through direct, production and consumption induced impacts across the local / regional area.

The Project will also diversify existing income streams for involved landholders, provide financial benefit to neighbouring landholders through the Benefit Sharing Programme, and contribute financially to the provision and enhancement of community facilities, projects and Council funded local infrastructure projects through the Community Enhancement Fund.

Need for the Project

Australia's per capita greenhouse has (GHG) emissions are the highest of any Organisation for Economic Cooperation and Development (OECD) country and are among the highest in the world. In 2012, per capita emissions (including emissions from land use, land use change and forestry) were 24 tonnes carbon dioxide equivalent (CO_2-e). Australia's per capita emissions are nearly twice the OECD average and more than four times the world average. NSW currently generates in the order of 142 million tonnes (Mt) of CO_2 emissions per year, with the stationary energy sector, which includes emissions from fuel consumption for electricity generation, accounting for approximately 49% of total GHG emissions across the State.

Australia is heavily dependent on fossil fuels for electricity generation. During 2013-2014 approximately 85% of Australia's electricity generated was derived from the use of fossil fuels, with coal use (both black and brown coal) accounting for over 61% of Australia's electricity generation. While Australia does have abundant fossil fuel resources, it is well understood that burning fossil fuels results in the emission of GHG.

The CSIRO (2011) has stated that:

"Greenhouse gas emissions from human activities are more than 90 per cent likely to have caused most of the global warming since the mid-20th century."

Meeting the current challenge of increasing GHG emissions and the growing energy demand will require an approach that includes improving energy efficiency and diversifying the energy mix through the investments in renewable energy. Despite abundant renewable energy resources, only approximately 15% of Australia's electricity was generated from renewable sources in 2013-14, of which approximately 4% was wind generated, indicating that further investment to increase the supply of energy from clean energy sources is warranted.

Coal and gas will continue to play an important role in Australia's energy future in the short-to-medium term. There is a need however, for a significant investment in clean energy technologies including wind energy, to assist in meeting the growing energy demand in a manner that does not contribute to increasing GHG emissions. Wind energy is currently the lowest cost form of renewable energy at a large-scale in Australia.

The key benefits of the Project are summarised in the following table.

Jupiter Wind Farm - Key Benefits	
Maximum number of wind turbines	88
Maximum rated capacity of each turbine	Up to 4.5 MW
Total installed capacity	Up to 350 MW
Average annual electricity generation	1,100GWh
Equivalent household consumption (NSW homes)	150,800
GHG emissions displaced per annum (CO_2e)	In excess of 900,000 tonnes

E2. Project Description

The Project will have an expected operational life of 25 to 30 years and total installed capacity of up to 350 MW. After this period, the Project may continue operations using the existing WTGs, be upgraded with new WTGs and continue operation, or alternatively will be decommissioned in accordance with the Preliminary Decommissioning and Rehabilitation Plan prepared as part of this EIS.

The Project consists of the following components:

- Up to 88 WTGs, each with:
  - a capacity of up to 4.5 MW;
  - three blades mounted on a tubular steel tower, with a maximum tip height of approximately 173 m; and
  - an adjacent pad mounted wind turbine transformer (or alternatively located within the steel tower), crane hardstand area, and related turbine lay down area.
  - The WTGs will be located across two distinct precincts. It is proposed that up to 75 WTGs will be located within the northern precinct and up to 13 WTGs will be located within the southern precinct.
- An electrical substation / switchyard located in the northern precinct, including transformers, switchgear, insulators and other ancillary equipment.
- A permanent operations and maintenance building, located adjacent to the substation.
- An internal private access road network connecting the WTGs and associated infrastructure within the Project Area to the public road network.
- 33 kV electrical reticulation and fibre optic cabling connecting the WTGs within each precinct (installed predominantly underground, with some sections aboveground where required by topographical or other constraints), and located generally along the same alignment as the internal private access road network.

- A 33 kV transmission line connecting the 33 kV electrical reticulation networks, extending from the southern precinct to the substation, installed predominantly underground, with some sections aboveground where required by topographical or other constraints, and to be located within the road reserve of Goulburn- Braidwood Road, the Kings Highway and the proposed access road into the southern precinct.
- A short 330 kV above ground transmission line connecting the on-site substation to the existing TransGrid 330 kV transmission line that passes through the PA.
- Minor upgrades to local roads and intersections, as required for the delivery, installation and maintenance of WTG components and other associated materials and structures.
- Up to four permanent meteorological monitoring masts.

Temporary construction facilities will also be required during construction of the Project. These include:

- Earthworks for access roads and WTG foundations.
- A temporary mobile concrete batching plant to supply concrete for WTG footings and substation construction works, and potentially rock crushing facilities for the generation of suitable aggregates for concrete batching or sized rock for access road and hardstand construction. Three representative locations and associated access roads for these facilities have been incorporated in the EIS, which would be utilised at various times as construction progresses across the PA.
- Cleared hardstand areas for construction equipment and storage (construction laydown areas).
- Temporary buildings and facilities for construction personnel / equipment, including site offices, car parking, and amenities for the construction work force, and lay down areas for the temporary storage of construction materials, plant, equipment and wind turbine components and temporary power supply for construction.
- External water supply for concrete batching and construction activities.
- The transport, storage and handling of fuels, oils and other hazardous substances for construction and operation of wind farm infrastructure.

The proposed layout of the Project including the WTGs, access roads and key supporting infrastructure is shown *Figure E-2*.

E3. Site Analysis

The PA covers approximately 4,999 ha. The Development Footprint incorporating permanent and temporary Project infrastructure will cover an area of approximately 86.3 ha, which constitutes approximately 1.7% of the PA.

The PA extends from approximately 5 km south east of the township of Tarago, to approximately 9 km south of the intersection of Goulburn-Braidwood Road and the Kings Highway. The nearest major township is Goulburn, located approximately 40 km to the north of the PA. The smaller township of Bungendore is located approximately 17.5 km west of the PA, with Braidwood located approximately 20 km to the south east. Lake Bathurst is located approximately 5.5 km north of the northern extent of the PA.

The PA and broader region consists of extensively cleared farm land and hill formations with the PA ranging in height from approximately 835 m Australian Height Datum (AHD) in the north western portion of the PA to 616 m AHD in the south east. The elevated gentle ridgelines occurring within the PA offer a favourable wind resource and are highly suitable for the placement of WTGs.

Farm land within the PA is predominantly used for commercial grazing with isolated lots used for personal cropping. The hill formations consist of both cleared and light density tree coverage (refer *Photograph E.1*). Remnant bushland and more heavily vegetated areas, including the Tallaganda National Park are located adjacent to the southern boundary of the PA. A number of other protected National Parks and Nature Reserves are also located within approximately 3-5 km from the PA.

Photograph E.1 Typical Landscape of the Project Area (ERM 2015)



The PA is located within the Sydney drinking water catchment, and is situated partly within the Shoalhaven River catchment area and partly within the headwaters of the Hawkesbury-Nepean catchment area upstream of the Mulwaree River. Several ephemeral creeks including Boro, Millendale, and Manar Creeks, and the perennial Reedy Creek, traverse the PA, all of which are tributaries of the Shoalhaven River. Other significant natural features include Lake Bathurst, which is located approximately 5.5 km north of the northern boundary of the PA, and Lake George, located approximately 15 km west of the PA.

There are no major developments within or immediately adjacent to the PA, however Capital Wind Farm and Woodlawn Wind Farm are located on the south eastern and northern sides of Lake George, approximately 13 km and 6 km from the boundary of the PA respectively.

BUNGENDORE ROAD
WILLANDRA LANE
BRAIDWOOD ROAD
LAKEVIEW ROAD
WILLOW GLEN ROAD
BORO
MOUNT FAIRY
MOUNT FAIRY ROAD
SANDHILLS ROAD
GOULBURN ROAD
BARNET DRIVE
BORO ROAD
DUCKFIELD ROAD
HAZELDELL ROAD
MULLOON
MULLOON ROAD
MANAR
MANAR ROAD
KINGS HIGHWAY
WATSONS ROAD
JONES ROAD
WARRI

Legend

- Project Area
- Project Area - Northern Precinct
- Project Area - Southern Precinct

Proposed Infrastructure

- Wind Turbine Generator
- Indicative Temporary Mobile Concrete Batching Plant Site
- Site Access Point
- Access Roads and 33kV Reticulation Network
- 33kV Transmission Line
- Substation / Operations Building Area

Existing Infrastructure

- Meteorological Monitoring Mast
- 330kV Transmission Line
- Major Road / Highway

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014) and ESRI World Imagery (2010)

N
0 1 2 3km

Client:	EPYC Pty Ltd		**Figure E.2 - Jupiter Wind Farm Layout**
Drawing No:	0223522m_JWF_EIS_GE02_R00.mxd		Jupiter Wind Farm
Date:	26/10/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: CB	
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.			Environmental Resources Management ANZ Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM

E4. Statutory Framework and Approvals Process

The Project is State Significant Development (SSD) in accordance with clause 20, Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011 and will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

An overview of the SSD Application process is outlined below.

- **Secretary's Environmental Assessment Requirements (SEARs) (formerly Director General Requirements (DGRs)) -** a preliminary environmental assessment (PEA) report was prepared and submitted to DP&I (now DP&E) in November 2013. DGRs were issued for the Project on 31 January 2014. Revised Secretary's Environmental Assessment Requirements (SEARs) were issued by DP&E on 2 March 2016, which supersede all previous requirements issued for the Project, and form the basis of the assessment criteria for the Project.
- **Preparation of the EIS** - the scope of the impact assessment was derived from the environmental scoping stage and risk assessment undertaken in the initial stages of the Project to identify potential impacts. Potential impacts identified during the environmental risk assessment, together with the SEARs, formed the overarching scope of the EIS.
- **Submission of the SSD Application and EIS to DP&E** - the EIS will be submitted to DP&E for its review and comment to determine its adequacy for public exhibition.
- **Public Exhibition of the EIS -** the EIS will be placed on public exhibition by DP&E for a period of up to 60 days. Submissions can be made via the DP&E Major Projects website: http://majorprojects.planning.nsw.gov.au/. During the exhibition period, submissions from Goulburn-Mulwaree and former Palerang Councils and relevant State agencies and other authorities will also be sought.
- **Response to Stakeholder Submissions** - if required, responses to the submissions received will be prepared by the Proponent and submitted to DP&E.
- **Approvals Stage and Determination** - DP&E will prepare an assessment report and consult further with the relevant Councils and State agencies and other authorities on draft conditions of consent. The assessment report and the draft conditions of consent will be made publicly available via the DP&E Major Projects website. The SSD application will then be determined by the Minister for Planning or their delegate (typically the Planning and Assessment Commission (PAC)).

E5. Community and Stakeholder Engagement

Community and stakeholder engagement is an integral part of any major development. EPYC is committed to effective and genuine engagement with key stakeholders and the local community to seek feedback and help inform the Project design and layout. Consultation with the community commenced in March 2012. A community and stakeholder engagement strategy has, and continues to be implemented, which has included processes and activities to identify all relevant stakeholders and facilitate ongoing engagement through the environmental assessment process.

Key engagement activities undertaken to date have included distribution of general and Project related information throughout the local community; ongoing dialog with involved landholders; establishment of a Project website and Proponent contact methods, distribution of newsletters; community information sessions; door-knocking and one-on-one meetings with nearby neighbours (up to 3km) regarding the Project generally and in response to specific issues of concern to individuals; establishment of a Community Consultative Committee (CCC); advertisement of important events in local media; targeted and specific discussions with non-involved owners of nearby dwellings regarding the proposed benefit sharing programme; and targeted and specific discussions with non-involved owners of nearby dwellings identified as having potential for significant visual impacts associated with the Project, to discuss potential impacts at their property and site specific mitigation options.

Community engagement will continue throughout the public exhibition period of the EIS, post approval, and during construction and operation of the Project.

Key agencies consulted as part of the environmental assessment process and preparation of the specialist assessments included (among others):

- NSW Department of Planning and Environment;
- Goulburn Mulwaree Council;
- Former Palerang Council;
- Commonwealth Department of the Environment and Energy;
- Sydney Catchment Authority;
- NSW Office of Environment and Heritage (OEH);
- NSW Department of Primary Industries (various departments);
- NSW Department of Industry (Resources & Energy) (formerly NSW Trade and Investment, Resources and Energy);
- NSW Roads and Maritime Services;
- Civil Aviation Safety Authority; and
- Local Aboriginal Land Councils and Aboriginal stakeholder groups.

E6. Biodiversity

A *Biodiversity Impact Assessment* was undertaken by ERM to address both biodiversity values in general, and those listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or the NSW *Threatened Species Conservation Act 1995* (TSC Act).

The land within the PA is primarily used for agricultural grazing and consists of both native and improved pasture with remnants of native woodlands. The PA comprises private farming properties, mostly used for sheep and cattle grazing. Pockets of agricultural cropping are also present within the PA however these are limited in extent.

The morphology of woodland vegetation suggests that the present distribution of woodland is a result of land clearing to increase the area of grasslands on which livestock can graze. It is likely that the areas covered by these fragments of woodland are on very poor soils, as retention of woodland fragments in an otherwise mostly cleared landscape may indicate that there was minimal agricultural benefit from their clearing and/or maintaining them as cleared areas.

A large amount of design effort was devoted to avoidance of ecological values by EPYC which was achieved through refining the Project layout during the ecological investigation period in an iterative approach. Project infrastructure has been sited to avoid disturbance to native vegetation where possible and of the approximate 86.3 ha of clearing required to accommodate the development footprint for Project infrastructure, approximately 49.1 ha is native vegetation and 37.2 ha is non-native vegetation.

The assessment concluded that the Project would not significantly impact on the majority of threatened matters. Two matters are assessed as having likely significant residual impacts, in accordance with the relevant guidelines, and based on application of the precautionary principle:

- the Glossy Black-cockatoo was considered as likely to be significantly impacted, as a result of the potential for exclusion from areas of high quality foraging habitat, if the species was to avoid areas habitats immediately surrounding WTGs; and

- removal of 1.63 ha of the EPBC Act-listed community White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland, which may be considered a significant impact in accordance with the Significant Impact Guidelines 1.1 (DoE 2013).

The assessment has incorporated preliminary calculations of required ecosystem and species credits. The BioBanking Assessment Methodology (BBAM) 2014 (OEH 2014) was used as a metric to quantify the biodiversity impacts using the indicative Development Footprint. The result of the preliminary calculation is that the Project will require 1,430 ecosystem credits and three species will require species credits: the fauna species Speckled Warbler (*Chthonicola sagittata*) and the Eastern Bentwing-bat (*Miniopterus schreibersii subsp. oceanensis*); and the flora species Hoary Sunray (*Leucochrysum albicans subsp. albicans var. tricolor*).

An offset package will be prepared when the Development Footprint is finalised. The offset will be determined in accordance with the *NSW Biodiversity Offsets Policy for Major Projects* which includes a range of options available to proponents. The analysis will include analysis of options to achieve the required offset, not limited to use of the BioBanking scheme.

The Project was referred to the Commonwealth Department of the Environment and Energy (DoEE) (formerly the Commonwealth Department of the Environment (DoE)) under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 13 July 2015, and determined to be a controlled action on 8 September 2015, with the controlling provisions that apply to the Project under the EPBC Act determined to be:

- listed threatened species and communities (sections 18 and 18A); and
- listed migratory species (sections 20 and 20A).

The Project requires approval under the EPBC Act and will be assessed for the purposes of the EPBC Act via DP&E under the terms of the bilateral agreement between the Commonwealth and NSW Governments.

E7. Noise and Vibration

To assess noise and vibration associated with the Project, two separate specialist assessments were completed as listed below:

- *Wind Farm Noise Impact Assessment* prepared by DNV GL (2016a) assessed potential impacts associated with WTG noise; and
- *Supplementary Acoustics Assessment* prepared by ERM (2016c) considered construction noise and vibration, road traffic noise during construction and operation, substation noise during operation, blasting overpressure and ground-borne vibration and corona and/or aeolian noise from the transmission line.

Existing background noise levels were quantified via measurement and are considered typical of a rural environment, with the majority of receptors experiencing existing levels at or below 30 dB(A) for wind speeds ≤5 m/s. Above 5 m/s, background noise levels typically increase significantly, which is to be expected at potential wind farm sites as extraneous emissions sources such as wind-blown vegetation increase in noise.

Predicted construction noise levels were above the ICNG noise affected management levels (standard hours) at the closest receptors in proximity to works, for the assessment scenarios considered. Predicted noise levels were above the highly noise affected management level at two receptors, both of which are involved landholders. Impacts could be generated if works outside the standard hours of construction are left unmanaged. The predicted values do not present the levels experienced by the broader community or for the duration of Project construction works. Construction noise impacts will only be temporary. Suitable mitigation measures to manage any adverse impacts on the surrounding community and environment have been provided. Construction noise levels will be reduced and impacts minimised with the successful implementation of these recommendations, as far as is practically achievable.

Predicted construction road traffic noise levels were at or below the criteria for the majority of receptors and assessment scenarios considered, however, night time impacts could be generated if left unmanaged. Suitable mitigation measures to manage any adverse impacts on the surrounding community and environment have been provided.

Predicted operational (wind farm, WTG) noise levels were above the compliance limits established to achieve the SEARs. The level by which the predicted noise exceeded the limits was limited to five non-involved landholders (with 6 dwellings), and the maximum level by which predicted values exceeded the limits was 3 dB(A). These non-compliant values were based on the conservative worst-case and unmitigated scenario (Scenario 1) and were predicted to occur at the receptors identified, for select wind speeds only. Two viable noise solutions (Scenario 2 and Scenario 3) were then established for the Project based on the unconstrained findings of Scenario 1. The mitigated scenarios (Scenario 2 and Scenario 3) achieve full noise compliance at all receptors for all conditions but are implementation of these scenarios is contingent on potential negotiated agreements with affected landholders and the detailed design of the Project that may achieve full compliance for the unmitigated Scenario 1.

Predicted operational (substation) levels indicate that compliance with the INP requirements can be achieved but this is contingent on suitable substation design incorporating the noise specification adopted for this impact assessment, or other measures to achieve compliance. Suitable mitigation measures to manage any adverse impacts on the surrounding community and environment have been provided.

Other noise and vibration factors were also considered by DNV GL (2016a) and ERM (2016c):

- The wind farm noise impact assessment considered special audible characteristics, including tonality, amplitude modulation, and low frequency noise and identified any risks with respect to tonal, low frequency or infrasound. The assessment concluded that any increase in noise associated with these features or additional adverse impacts was unlikely to occur with the implementation of the recommended mitigation; and

- The supplementary acoustic assessment considered activities with the potential to generate construction/operational vibration and operational road traffic noise levels that could impact the surrounding community and environment. It was concluded that impacts were unlikely to occur. Blasting overpressure and ground-borne vibration can be managed and mitigated during the design of any blast events such that impacts to the surrounding community and environment are therefore unlikely to occur. The potential for corona and/or aeolian noise from the transmission line was also considered and the potential for impacts to occur were determined unlikely. Any impacts associated with these factors were deemed negligible, if any at all.

E8. Landscape and Visual

A *Landscape Character and Visual Impact Assessment* was undertaken by Clouston Associates (2016) to assess the visual and landscape character impacts of the Project.

The assessment concluded that the Project has a relatively limited visual catchment due to:

- surrounding topography that encloses the Study Area, blocking many views of the WTGs from distances of over 5 km; and
- dense stands of tree planting, windbreaks and garden plantings (associated with individual properties) that block or filter views towards the Project.

Moderate/high and high visual impacts affect approximately 59 dwellings associated with the seven of the 12 selected private viewpoints. The relatively low density of residential viewer locations within the viewshed means that these moderate/high and high visual impacts are mostly limited to dwellings within 1-3 km of the WTGs. The highest impacts are associated with dwellings that are located on elevated ground with panoramic views over the surrounding rural landscape. The lack of tall built form within the Study Area increases the visual prominence of the WTGs. The extensive linear spread of WTGs over multiple sites increases the level of impact for some viewpoints as the WTGs take up a greater proportion of the field of view.

The potential visual impact of the Project from the specific private viewpoints could be mitigated by planting vegetation close to the view locations. Detailed consideration of potential mitigation measures (for all dwellings within 3 km of a WTG as per the SEARs) was undertaken, which determined that the impact ratings for individual dwellings were able to be reduced however, Moderate/High ratings were still recorded for 14 dwellings. Screening vegetation and other potential mitigation measures have been considered and will be evaluated further in consultation with affected landholders and/or the broader community during public exhibition of the EIS and continue through the detailed design phase of the Project.

Public viewpoints are mostly limited to the minor local road network and two main thoroughfares that traverse the Study Area. These view locations are dynamic with motorists travelling along the roads relatively quickly, reducing the duration of the view and hence the severity of the visual impact. The WTGs are, however, spread over a large geographical area, and views from the Kings Highway and Goulburn-Braidwood Road are likely to be relatively long lasting to motorists.

The Project is unlikely to have a major impact on the character of Tarago village, where views toward the WTGs from a number of residential view locations will be screened by adjoining dwellings/structures, tree cover and landform. Due to the large viewing distance, turbines are unlikely to dominate the view, although the number visible will lead to a noticeable change to the visual scene.

If constructed aboveground, the poles associated with the 33 kV transmission line are likely to have moderate visual amenity impacts on limited sections of Goulburn-Braidwood Road and the Kings Highway, especially when combined with cumulative views of the poles and WTGs together, contributing to the overall sense of new development.

Ancillary structures such as the access roads, temporary mobile concrete batching plant and substation are unlikely to result in any significant additional visual impact for surrounding residential or public view locations. These elements are of a relatively small nature with very few sensitive receptors in close proximity.

If required, night time obstacle lighting will have the potential to be visible from the surrounding area however the visual impact will be low and diminish when viewed from more distant view locations.

Landscape mitigation measures have been identified, and if necessary will be offered to reduce visual impact to residential dwellings surrounding the Project.

There is a recognised 'broad public interest in the establishment of viable renewable energy sources' which must be balanced against 'the geographically narrower' potential impacts of the Project (as was stated by Chief Justice Preston of the NSW Land and Environment Court in *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd* [2007] NSWLEC 59 (12 February 2007)). In that decision, Chief Justice Preston specifically noted that the public interest in "the adoption of alternative, more environmentally friendly, energy generation sources" outweighed the visual impacts of a wind farm "where there [was] no compelling reason why there should not be some turbines in [that] landscape." Whilst it is acknowledged that the Project will have an impact on visual amenity, this must be balanced against the public interest benefits which accrue from the development of renewable energy projects such as this Project.

E9. Cultural Heritage

An *Aboriginal and Historic Cultural Heritage Assessment* was undertaken by ERM (2016) to assess the potential impacts on items of cultural heritage significance.

Three previously recorded Aboriginal heritage sites are located within the PA, and an additional three Aboriginal objects and two areas of sensitivity were identified within the PA as part of the assessment. Two historic heritage sites were also identified within the PA as part of the assessment.

The Development Footprint largely avoids recorded Aboriginal heritage objects and areas of sensitivity, however may impact on two objects (JWF2 and JWF3) that have been identified along the 33 kV transmission line alignment between the southern and northern precincts (and are considered to be of low archaeological significance), and two areas identified as having moderate levels of potential to contain subsurface archaeological deposits (JWF PAD1 and JWF PAD2).

If impacts to these objects/areas cannot be avoided, they would be subject to further examination and collection/subsurface testing to be undertaken by a qualified archaeologist and registered Aboriginal stakeholders prior to commencement of Project works, and in accordance with the mitigation measures and processes outlined in the Aboriginal Cultural Heritage Management Plan (ACHMP) to be developed for the Project. If impacts to these objects/areas can be avoided through subsequent detailed design of Project infrastructure, these items would be protected through mitigation measures and processes to be incorporated in the ACHMP for the Project.

Impacts to Aboriginal heritage objects located outside of the development footprint will be avoided through clearly marking their locations on all relevant construction maps, and providing a heritage induction to site personnel; and

Management measures and contingency processes have been outlined in the CHA and are recommended for inclusion in the ACHMP to be developed for the Project to manage the unexpected discovery of previously unidentified heritage sites.

E10. Traffic and Transport

A *Transport Impact Assessment* was undertaken by GTA Consultants (2016) to assess the potential traffic impacts associated with the Project.

Based on the estimated traffic generation associated with the Project and the existing spare capacity in the road network surrounding the PA, no significant impacts on the capacity of the road network or road users are anticipated.

Subject to further consultation and obtaining relevant approvals and permits from RMS, the relevant Councils and private property owners, and undertaking the identified minor road upgrades, RAVs will utilise the Hume Highway from Port Kembla, exiting via the southern interchange at Goulburn, then via Hume Street, Clinton Street, Sloane Street and Goulburn-Braidwood Road.

It is anticipated that general construction vehicles will utilise Goulburn-Braidwood Road from Goulburn and the Kings Highway from Canberra.

The majority of vehicle movements associated with the operation and maintenance of the wind farm will be internal to the PA with minimal impacts on the surrounding road network

A Construction Traffic Management Plan (CTMP) will be prepared following Project approval. This will include detailed measures to address traffic generation, measures to minimise impacts to existing road users and to maintain and rectify haulage route roads and road infrastructure. The CTMP will address any requirements for specific work stage construction traffic management plans; and contain any additional matters identified and required by RMS and the relevant Councils.

E11. Water Supply, Water Quality and Hydrology

A *Water Supply, Water Quality and Hydrology Assessment* was undertaken by ERM (2016) to assess the potential water and soil related associated with the Project.

Overall constraints are relatively minor, with the erosion hazard rated as low over the majority of the PA, and therefore a standard suite of erosion and sediment control measures can be adopted in most areas.

Based on extrapolation of the available groundwater bore data within the PA, it is highly likely that water bearing zones occur at depths significantly greater than would be intercepted by any earthworks associated with Project's construction, which would be relatively shallow, the deepest being up to about 3 m for WTG footing construction.

Water supply options are available to meet the needs for construction of the Project and include use of a commercial water tanker to import water from a number of external sources (the preferred option), or extraction of surface water from existing dams, or new dams, or ground water from new or existing bores, where there is interest from landholders. Further consideration of water supply options is required to identify the most feasible and economic option. Water access licensing would need to be addressed depending on the identified options, and should be discussed with licensing officers at NSW DPI Water.

A detailed Soil and Water Management Plan will be prepared for the Project prior to commencement of construction, and through implementation of the recommended mitigation measures, the overall impact on soil and water resources is expected to be negligible.

E12. Socio-Economic

The Project is expected to deliver significant benefits to the local and broader region through employment opportunities and an increase in the demand for local goods and services, especially during the construction phase. The Project is anticipated to assist in the funding of local infrastructure and other projects throughout the operational life of the Project via the establishment of the Community Enhancement Fund. The structure and administration of these funds will be finalised prior to the commencement of operation. Consultation with Councils regarding the CEF is ongoing and will be finalised prior to commencement of construction of the Project.

Consultation with stakeholders during the preliminary design and environmental assessment phase of the Project have identified a number of issues of concern to the community, including potential visual and noise amenity impacts associated with the physical presence of the Project, road safety impacts and impacts on property values.

Construction and operational noise impacts have been assessed, and it has been demonstrated that fully compliant noise solutions are available for the Project, which will be further explored during detailed design of the Project and their implementation will avoid any adverse impacts on the surrounding community and environment.

The visual impacts to non-involved dwellings located in the vicinity of the PA are expected to range from negligible to high, generally with the level of impact decreasing with distance from the PA. The highest visual impacts are anticipated on properties that are located on elevated ground with panoramic views over the surrounding rural landscape. However, local vegetation and topography can significantly alter the visual impact experienced by individual properties, even those in close proximity to WTGs. The Project has a relatively limited visual catchment due to surrounding topography that encloses the PA, assisting in mostly blocking views of the WTG clusters from distances of over 5 km. Detailed consideration of potential mitigation measures for all dwellings within 3 km of a WTG determined that visual impact ratings for individual dwellings are able to be reduced through screening vegetation and other potential mitigation measures, which will be evaluated further in consultation with affected landholders and/or the broader community during public exhibition of the EIS and continue through the detailed design phase of the Project.

A review of available literature, including the recent Urbis (2016) investigation undertaken in support of release of the new draft Wind Energy Planning Framework by DP&E, did not find a correlation between declining property values in properties in proximity to wind farm developments, which has been supported by a statement made by the DP&E in the Secretary's Environmental Assessment Report for the proposed Yass Valley Wind Farm, which states that:

"The Department acknowledges that, in relation to impacts on land values, the NSW Valuer-General commissioned a report on the impacts of wind farms on land values in Australia. The report states as its principal finding, based on analysis of previous studies and its own investigations, that the majority of wind farms erected in Australia appear to have had no quantifiable effect on land values."

Further, in the NSW Planning Assessment Commission Determination Report for the Collector Wind Farm Project (December 2013), the Commission also acknowledged the results of the study "*which suggested that a property's underlying land use may affect the property's sensitivity to price impacts rather than impacts from development of adjoining land or intrusions on the landscape*" and that "*the study found that properties in rural / agricultural areas appeared to be the least likely to be affected by wind farm with no reductions in value for rural properties evident at of the wind farms investigated. The study also reported that residential properties in townships with distant views of a wind farm (more than 2-3 km away), also appeared to not have been negatively affected by a wind farm*."

Based on the findings of the available literature, it is not anticipated that the Project would have a significant negative impact on property values in the vicinity of the Project.

E13. Hazards and Risks

The EIS examined the potential hazards and risks associated with the Project, which included an assessment of aviation safety, electromagnetic interference, shadow flicker, blade throw, health impacts and bushfire risk. Key findings of these assessments are summarised below.

Aviation Safety

An *Aeronautical Impact Assessment* was undertaken by Aviation Projects Pty Ltd (2016) to assess the potential impact the Project may impose on the safe operation of aircraft within proximity to the PA. The assessment concluded that the Project is not expected to result in any significant risk to normal flying operations provided aircraft are operated in compliance with applicable regulatory and operational control requirements and with the application of good airmanship. Furthermore, the Project is not expected to impact on radar surveillance facilities in proximity to the PA. Whilst the Project may affect the fixed wing agricultural operations within the PA, it is expected that safe aerial application operations would be possible on properties neighbouring the PA subject to final WTG locations, and subject to a case by case assessment.

Electromagnetic Interference

An assessment of the potential electromagnetic interference issues was undertaken by DNV GL (2016). A total of 119 dwellings were identified within the potential interference zone for the Black Mountain terrestrial television broadcast tower; 111 dwellings within the potential interference zone for the Mt Gillamatong tower; and 93 dwellings within the potential interference zone for the Knights Hill tower. However, the area around the PA is able to receive a digital television signal from any of the three towers in Canberra, Braidwood or Illawarra, therefore it is possible that areas of poor coverage from one or two of the three towers might receive a reasonable level of signal from the third. For dwellings potentially affected by interference to television reception, an assessment of the potentially affected dwellings, and at the request of any landholders of other dwellings, will be undertaken to mitigate impacts considered to be caused by the Project.

Other communications services including radio broadcasting, mobile phones, internet and Citizens' Band radio are unlikely to be affected by the Project.

Shadow Flicker

A shadow flicker assessment was undertaken by DNV GL. Shadow flicker may occur under certain combinations of geographical position and time of day, when the sun passes behind the rotating blades of a WTG and casts a moving shadow over neighbouring areas. When viewed from a stationary position, the moving shadows appear as a flicker giving rise to the phenomenon of 'shadow flicker'.

The shadow flicker assessment determined that actual shadow flicker impacts in excess of the recommended limit of 10 hours per year are predicted within 50 m of 11 dwellings (nine involved, and two non-involved landholders). The exceedances at 50 m from the dwelling predicted at the non-involved landholders are small. According to the SEARs, the shadow flicker impact was assessed at the dwellings itself and it was predicted to be in excess of the recommended limit of 10 hours per year at only eight dwellings, all of which are involved landowners. .

EPYC has approached the landholders of the dwellings where the shadow flicker limits are predicted to be exceeded to discuss the matter, and consulted with the owners regarding shadow flicker impacts that may be experienced at their properties. Provisions have been made with these landholders regarding the predicted shadow flicker durations and mitigation options available to them (if required).

Blade Throw

A *Blade Throw Risk* assessment was undertaken by DNV GL to consider the rare phenomenon of a structural failure in a WTG blade during operation, resulting in the ejection of projectiles into the surrounding area. The assessment found that the risk of death, personal injury or damage to property from a blade throw event is extremely small and well within the risk levels typically deemed acceptable to society.

Health Impacts

Concerns regarding the potential effects that wind farm developments have on human health are generally associated with:

- audible noise;
- inaudible and low frequency noise;
- shadow flicker and blade glint; and
- electromagnetic emissions.

Based on a review of the available literature and drawing on the outcomes of the specialist noise, shadow flicker and EMI/EMF assessments, the Project is not expected to impact on the health of residents located in proximity to the Project. Furthermore, NSW Health in their submission during the public exhibition of the Draft Wind Farm Guidelines (DP&I 2011) stated that:

"NSW Health advises that there is currently no health evidence to support a generic 2 km separation distance from a proposed wind turbine. Mandatory enhanced assessment of potential impacts for neighbours within a 2 km radius of proposed wind turbines needs to be justified on non-Health grounds."

Bushfire Risk

An assessment of the potential bush fire risks was undertaken by ERM and determined that he risk of fire from wind farm developments is considered low given the on-board control systems designed to mitigate the risk of fire. There will be no WTGs or supporting infrastructure located within areas mapped as high or extreme bushfire hazard and with the implementation of the prescribed measures, the risk of bushfire can be effectively managed.

E14. Cumulative Impacts

The Draft Wind Farm Guidelines state that:

"Cumulative impacts may occur where other existing or future activities have impacts similar to the development proposed. It includes wind farms, but is not limited to wind farms, and could include other types of development. The area that needs to be considered will vary depending on the issue, and the spatial extent of the associated impact."

With reference to the above, cumulative impacts are an additional way in which a specific environmental aspect may be affected by a new wind farm project or another development. Cumulative impacts have two key characteristics:

- they occur over a geographical area; and
- they occur over time.

There is the potential for some impacts to intersect and potentially increase as a result of additional wind farm or other developments, including the Project.

Given the suitability of the Southern Tablelands region for wind energy projects, there are several operational, approved and proposed wind farms within the vicinity of the PA and broader region. Of these, the closest operational wind farms to the PA are Woodlawn, Capital and Cullerin Range, which are located approximately 6 km, 13 km and 43 km from the PA respectively.

The assessment of potential cumulative impacts concluded:

- Potential cumulative impacts associated with habitat loss, rotor strike and barotrauma to motile, flying species are considered to be minor, given the relatively small clearance footprint of wind farms in the regional context, relatively large distances between wind farms and lack of vegetation connectivity between wind farms.
- The Project is unlikely to contribute to any significant combined or sequential cumulative visual impacts resulting from associated views toward other wind farm developments in proximity to the PA. The Project may however, slightly increase the perceived density of wind farm development within this area of the Southern Tablelands.
- The surrounding road network has sufficient capacity to accommodate any potential cumulative traffic generation of the Project and any nearby future developments.

- Potential cumulative noise impacts during construction and operations (substation) are anticipated to be negligible.
- The Project is generally not expected to contribute to cumulative EMI impacts, however should impacts arise, mitigation measures have been identified to manage such impacts.
- The Project is not expected to contribute to cumulative impacts on aviation safety.
- The Project is anticipated to have a positive socio-economic benefit by providing opportunities for employment and facilitating economic growth of the region through direct and induced investment.

E15. Environmental Management

An Environmental Management Framework will be developed to guide proposed activities associated with the construction, operation and decommissioning and rehabilitation of the Project to ensure that appropriate measures and processes are in place to manage identified environmental risks and provide for ongoing continual improvement. The Framework will be elaborated in the Construction Environmental Management Plan (CEMP), Operational Environmental Management Plan (OEMP) and subsequent updates to the Preliminary Decommissioning and Rehabilitation Plan prepared for the Project.

As a result of the detailed specialist assessments undertaken, mitigation measures have been identified to reduce and manage potential environment impacts arising from the Project. The mitigation measures set out for each environmental aspect would form the basis of the CEMP and OEMP to ensure the Project minimises impacts to the environment and local community.

E16. Conclusion

The Jupiter Wind Farm Project involves the construction of up to 88 wind turbine generators (WTGs) with a total installed capacity of up to 350 MW, which is expected to generate in the order of 1,100 GWh of electricity annually over its operational life.

The Project has an estimated capital investment value of approximately $300 million, and will provide significant benefits at the local, regional and State levels, and nationally, by:

- generating of the order of 1,100 GWh of electricity annually over its operating life, sufficient to power the equivalent of 150,800 homes annually (based on average NSW household electricity consumption);
- providing a source of renewable energy to supplement NSW and National energy requirements and assist in reducing greenhouse gas (GHG) emissions;
- saving approximately 0.9 Mt of GHG emission in 2020, which is the equivalent of removing of the order of 274,000 passenger vehicles from NSW roads each year during the operational life of the Project;
- contributing to the additional generating capacity required to meet the growing energy demand in NSW, and improve security of supply through avoidance of reliance on electricity supply from other states and diversification of electricity generation sources and supply locations;
- contributing to the Federal and State governments' targets for renewable energy generation;
- provide significant direct investment in the local economy, consisting of an estimated $104 million during construction, and a further $7 million per annum during operation;
- providing direct fulltime employment opportunities for an estimated 336 people during construction, and an estimated 32 staff during its operational life;
- generating additional economic stimulus in the local area and broader region associated with indirect employment opportunities through the use of local contractors and suppliers during construction, and demand for local services, particularly during construction;

- creating additional income streams for the community, through:
  - payment to involved landholders hosting Project infrastructure
  - benefit sharing with neighbouring landholders; and
  - contributions to a Community Enhancement Fund for the provision and enhancement of community projects, facilities and Council funded local infrastructure projects.
- managing potential social and environmental impacts through the identification and implementation of mitigation and/or monitoring measures, and in consultation with potentially affected stakeholders;
- recycling and reusing materials where practically and economically feasible; and
- minimising all potential adverse environmental impacts and where practical and maximise all potential positive environmental effects.

Having regard to the above, the EIS and supporting specialist assessments have concluded that the Project is compatible with the existing agricultural land uses in the area, will provide a significant positive contribution to the local economy and broader community through employment and investment in the region, and can be appropriately managed to minimise adverse impacts on the surrounding community and environment.

There is a recognised 'broad public interest in the establishment of viable renewable energy sources' which must be balanced against 'the geographically narrower' potential impacts of the Project (as was stated by Chief Justice Preston of the NSW Land and Environment Court in Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd [2007] NSWLEC 59 (12 February 2007)). Whilst it is acknowledged that the Project will have an impact on visual amenity, this must be balanced against the public interest benefits which accrue from the development of renewable energy projects such as this Project.

1 INTRODUCTION

1.1 Project Overview

EPYC Pty. Ltd. (EPYC) on behalf of Jupiter Wind Farm Pty. Ltd. (JWFPL) (the Proponent) is seeking approval for the construction and operation of the Jupiter Wind Farm (the Project).

The Project is located within the Southern Tablelands Region of New South Wales (NSW). The Project Area (PA) covers an area of approximately 4,999 hectares (ha) spanning across the Goulburn Mulwaree Local Government Area (LGA) and the former Palerang Local Government Area LGA[1].

The PA is situated approximately 5 kilometres south east of Tarago and approximately 18 km east of Bungendore. The Project locality and PA are shown in *Figure 1.1* below.

The Project will involve the construction and operation of up to 88 wind turbine generators (WTG) and ancillary facilities with a total installed capacity of up to 350 Megawatts (MW) of renewable energy. The Project has been divided into two distinct precincts, known as the northern precinct and the southern precinct. The northern precinct will consist of up to 75 WTGs and the southern precinct will consist of up to 13 WTGs. Each WTG will have a maximum height of approximately 173 m above ground level.

The Project will also involve the construction and operation of a series of internal access roads; a 33 kV electrical reticulation network connecting the WTGs, including a 33 kV transmission line connecting the southern precinct to the on-site substation site; an on-site electrical substation and 330 kV transmission line connection to the existing TransGrid 330 kV transmission line that passes through the PA; along with other associated buildings (including substation control room and amenities) and ancillary structures and equipment, including temporary construction facilities.

A detailed description of the components of the Project is provided in *Chapter 3*.

The Project will have an estimated capital investment value of approximately $300 million.

1.2 The Proponent

JWFP is a 100% subsidiary of EPYC Pty. Ltd. that has been established to provide an independent identity for the Jupiter Wind Farm Project. EPYC Pty Ltd is an Australian/Spanish joint venture specialising in wind farm developments and is currently based in North Sydney.

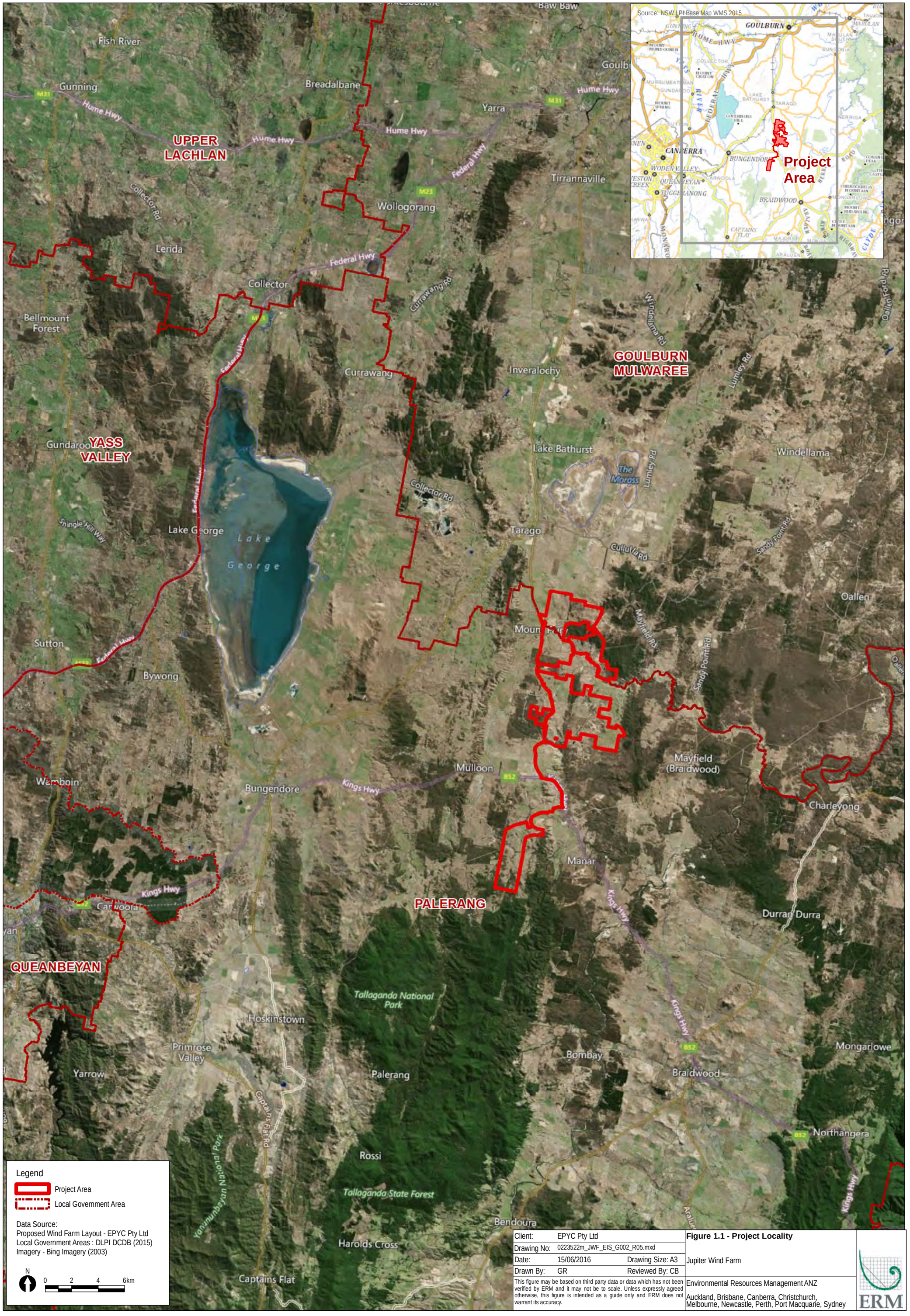
The company was established specifically to invest, develop, construct and operate large scale wind farms in Australia. Its shareholders, directors, engineers and managers, have significant experience in the wind sector in Australia and abroad.

Proponent contact details are outlined below in *Table 1.1*.

Table 1.1 ***Proponent Contact Details***

Proponent:	EPYC Pty. Ltd.
Primary Contact:	Ibrahim Eid (Project Manager)
Address:	Level 5, 44 Miller St, North Sydney, NSW, 2060
Phone:	(02) 9925 8405
Email:	info@epyc.com.au
Website:	www.epyc.com.au

[1] On 12 May 2016, the NSW Government announced the merger of the Palerang Regional Council and the adjacent Queanbeyan City Council to become the Queanbeyan-Palerang Regional Council. For the purposes of this assessment, reference has been made to the former Palerang LGA throughout. Further discussion of the local statutory context is provided in *Chapter 6*.



Client:	EPYC Pty Ltd		**Figure 1.1 - Project Locality**
Drawing No:	0223522m_JWF_EIS_G002_R05.mxd		
Date:	15/06/2016	Drawing Size: A3	Jupiter Wind Farm
Drawn By:	GR	Reviewed By: CB	

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM

1.3 The Application

The Project is State Significant Development (SSD) in accordance with clause 20, Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011 and will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

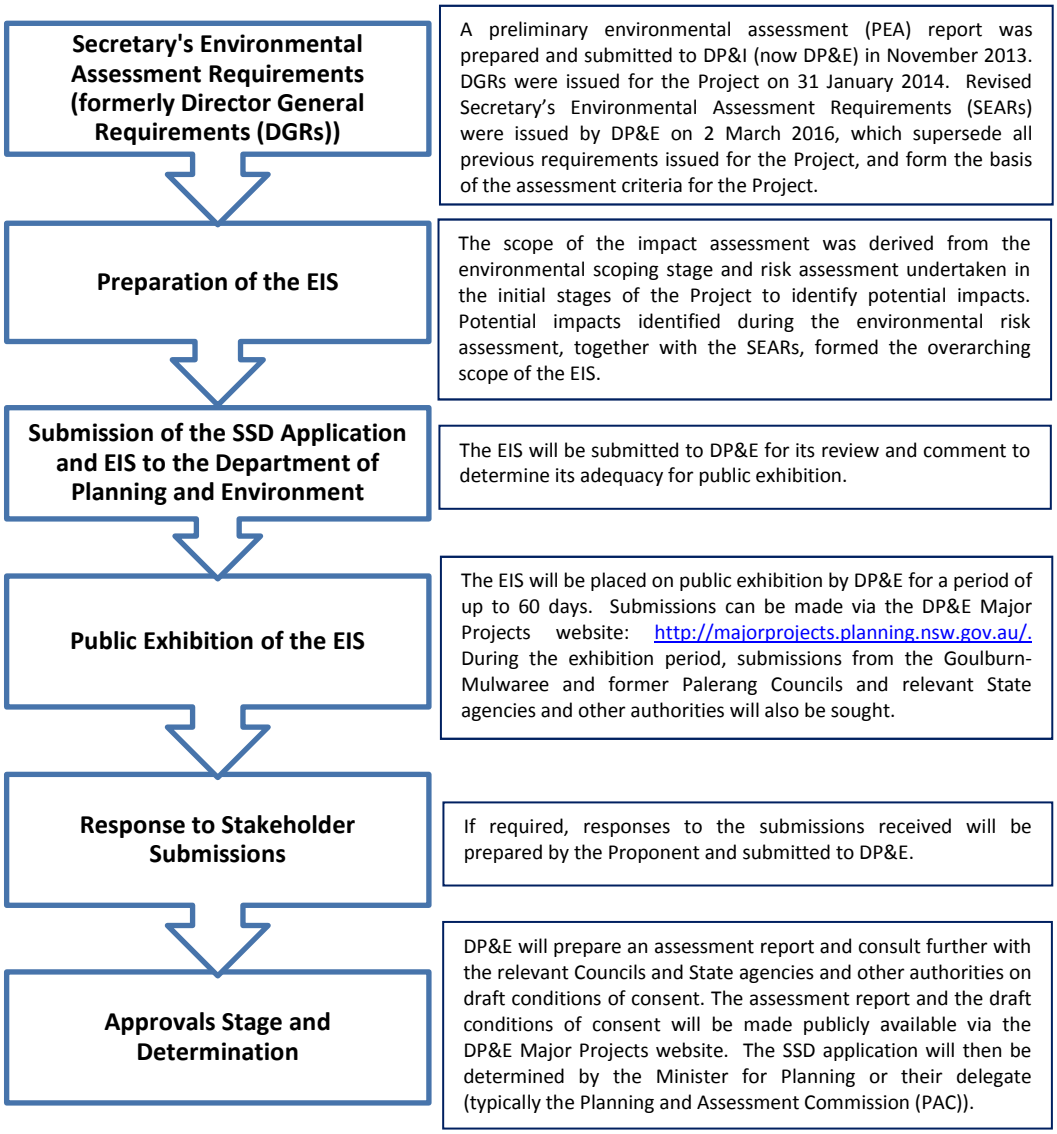
Environmental Resources Management Australia Pty Ltd (ERM) has been commissioned by EPYC to coordinate the relevant environmental assessments and prepare this Environmental Impact Statement (EIS) to support the SSD application. This EIS has been prepared in accordance with the EIS requirements outlined under Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* and the Secretary's Environmental Assessment Requirements issued for the Project on 2 March 2016 (SEARs).

As required by the SEARs, this EIS also addresses the *Draft NSW Planning Guidelines for Wind Farms*, December 2011 (Draft Wind Farm Guidelines), released for public exhibition in December 2011 by the Department of Planning and Infrastructure (DP&I) (now Department of Planning and Environment (DP&E)).

1.3.1 Application Process

An overview of the SSD Application process is outlined in *Figure 1.2* below.

Figure 1.2 ***State Significant Development Application Process***



1.3.2 Environmental Assessment Team

The environmental assessment team consists of ERM's in-house technical experts and sub-consultants. *Table 1.2* provides a summary of the environmental assessment team and their contributions to the EIS and supporting technical assessments.

Table 1.2 Environmental Assessment Team

Company	Technical Component
ERM	• Ecology Impact Assessment • Supplementary Acoustic Assessment • Aboriginal and Historic Cultural Heritage Assessment • Water Supply, Water Quality and Hydrology Assessment • Bushfire Risk and Hazard Assessment • Preliminary Decommissioning and Rehabilitation Plan
GTA Consultants	• Traffic and Transport Assessment
DNV GL	• Wind Farm Noise and Vibration Assessment • Electromagnetic Fields and Electromagnetic Interference Assessment • Shadow Flicker Assessment • Blade Throw Assessment
Clouston Associates	• Landscape and Visual Assessment
Aviation Projects	• Aeronautical Impact Assessment

1.4 Structure and Content of the EIS

This EIS has been prepared to ensure that the Project is described adequately; addresses the DGRs, assesses the potential environmental impacts; and identifies proposed mitigation measures.

The EIS consists of five volumes, with the main environmental assessment contained in Volume 1 and the supporting specialist assessments and other documentation contained in Volumes 2 to 5. The overall structure of the EIS is outlined in *Table 1.3* and *Table 1.4*.

Table 1.3 *EIS Volume1 Structure*

Chapter Number	Volume 1: Environmental Assessment	
1	Introduction	Provides an overview of the Project, the Proponent and the SSD Planning Process.
2	Strategic Justification	Outlines the Project objectives and gives consideration to energy demand, greenhouse gas emissions, Government policies and Project suitability.
3	Project Description	Provides a detailed description of the proposed development including the key components for both the construction and operational phases of the Project.
4	Site Analysis	Identifies the existing conditions of the PA and surrounding area.
5	Project Alternatives	Discusses the alternatives to undertaking the Project including alternatives considered in relation to siting, design and operation.
6	Statutory Framework	Describes the relevant Commonwealth, State and local legislative frame work in relation to the Project.
7	Community and Stakeholder Engagement	Summarises the consultation activities undertaken with key external stakeholders (including government agencies, authorities and the local community).
8	Environmental Risk Assessment	Describes the approach and outcome of the environmental risk assessment and the impact assessment approach undertaken for the Project.
9	Biodiversity	Chapters 9-16 describe the physical, biological, cultural, social and economic environments within and in the vicinity of the PA, the potential risks and impacts of the Project upon the existing environment, and the mitigation and management measures that would be undertaken to minimise these risks and impacts.
10	Noise and Vibration	
11	Landscape and Visual	
12	Cultural Heritage	
13	Traffic and Transport	
14	Soil and Water	
15	Socioeconomic Issues	
16	Hazards and Risks	
17	Cumulative Impacts	Describes the potential cumulative impacts of the Project in combination with existing and other publicly proposed wind farms in the region.
18	Environmental Management	Provides an overview of the environmental management framework to be developed for the Project, including a summary of the mitigation measures outlined in the EIS to be implemented during the construction, operation and decommissioning of the Project.
19	Conclusion	Presents the conclusions of the EIS.

Table 1.4 *EIS Volumes 2, 3, 4 and 5 Structure*

Specialist Assessments		
Annex Ref.	**Annex Title**	**Volume**
A	Director General Requirements (DGRs) and supplementary Secretary's Environmental Assessment Requirements (SEARs)	Volume 2
B	Stakeholder Engagement Plan	
C	Consultation Material	
D	Biodiversity Assessment Report	Volume 3
E	Acoustics, Wind Farm Noise and Supplementary Noise Assessment Reports	Volume 4
F	Landscape and Visual Impact Assessment Report	
G	Cultural Heritage Assessment Report	
H	Transport Impact Assessment Report	Volume 5
I	Water Supply, Water Quality and Hydrology Report	
J	Aeronautical Impact Assessment Report	
K	Electromagnetic Interference (EMI) and Electromagnetic Field (EMF) Assessment Report	
L	Shadow Flicker and Blade Glint Report	
M	Blade Throw Risk Report	
N	Bushfire Risk and Hazard Assessment	
O	Preliminary Decommissioning and Rehabilitation Plan	

1.4.1 Secretary's Environmental Assessment Requirements

Revised SEARs were issued by DP&E on 2 March 2016, which supersede the DGRs previously issued for the Project, and form the basis of the assessment criteria for the Project.

A copy of the SEARs issued on 2 March 2016 are provided in *Annex A*. *Table 1.5* provides a summary of the SEARs and includes a reference to where each requirement has been addressed in the EIS and corresponding specialist assessments.

Table 1.5 Secretary's Environmental Assessment Requirements (2 March 2016)

Application Number	SSD 13_6277	Reference
General Requirements	*The Environmental Impact Statement (EIS) must meet the minimum form and content requirements of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 and include the following:*	*Chapter 3 – Project Description*
	1. the information required under clause 6, including but not limited to:	
	• *the description of the development, for both the wind farm and associated infrastructure, should include:*	
	• *construction, operation and decommissioning details;*	*Annex O – Preliminary Decommissioning and Rehabilitation Plan*
	• *a site plan at an adequate scale with dimensions, showing the development's location, orientation, site coverage, access roads and entrances to public roads;*	*Chapter 3 - Project Description and Associated Figures*
	• *the location and dimensions of all project components including the wind turbines (including map coordinates in latitude/longitude and maximum AHD heights) and the proposed external cladding materials, wind monitoring/ or met masts, underground/ overhead cabling between turbines, electrical substation and transmission line linking the wind farm to the grid, including identification of whether the transmission lines are aboveground or underground, temporary concrete batching plant(s), construction compounds, access roads/road upgrades (including internal access tracks), road crossings and obstacle lighting;*	*Chapter 3 – Project Description*
	• *supporting maps/plans clearly identifying existing environmental features (e.g. watercourses, vegetation), infrastructure and land use (including nearby residences and approved residential developments or subdivisions), the number of turbines within 2km of a dwelling or approved dwelling, and the location/siting of the development (including associated infrastructure) in the context of this existing environment;*	*Chapter 4 - Site Analysis and Associated Figures*
	• *a timeline identifying the development's proposed construction and operation components, their envisaged lifespan and arrangements for decommissioning. Include a Decommissioning and Rehabilitation Plan with proposed funding arrangements and confirming that the Proponent is responsible for decommissioning; and*	*Chapter 4 - Project Description; Annex O - Preliminary Decommissioning and Rehabilitation Plan*
	• *resourcing requirements (including, but not limited to, water supply and gravel).*	*Chapter 14 - Water Supply, Water Quality and Hydrology*
	2. the content listed in clause 7, including, but not limited to:	
	• *a summary of the EIS;*	*Executive Summary*
	• *a statement of the objectives of the development, including a description of the strategic need, justification, objectives and outcomes. This should include:*	*Chapter 2 – Strategic Justification*
	• *a strategic assessment of the need, scale, scope and location for the project in relation to predicted electricity demand, predicted transmission constraints and the strategic direction of the region and the State in relation to electricity supply, demand and electricity generation technologies, and its role within the:*	

Application Number	SSD 13_6277	Reference
	• *Commonwealth's Renewable Energy Target Scheme. The EIS must clearly demonstrate that the existing transmission infrastructure has sufficient capacity to accommodate the project;*	
	• *a justification for the development taking into consideration the objects of the Environmental Planning and Assessment Act 1979 (EP&A Act); and*	
	• *a clear demonstration of quantified and substantiated greenhouse gas benefits, taking into consideration sources of electricity that could realistically be replaced and the extent of their replacement, with reference to the Department of Environment, Climate Change and Water NSW wind farm greenhouse gas savings tool (www.environment.nsw.gov.au/climatechange/greenhousegassavingstool.htm);*	
	• *an analysis of feasible alternatives to the carrying out of the development, having regard to its objectives, including an assessment of the environmental costs and benefits of the development relative to alternatives and the consequences of not carrying out the development, the suitability of the chosen option and whether or not the development is in the public interest. This should include:*	*Chapter 5 – Project Alternatives*
	• *an analysis of the suitability of the project with respect to potential land use conflicts with existing and future surrounding land uses (including rural residential development, building entitlements and subdivision potential), land of significant scenic or visual value, land of high agricultural value, mineral resources (including mining leases/exploration licences, known mineral resources and any areas with high potential for the discovery of mineral resources within or in the vicinity of the site and demonstrate how impacts will be avoided or minimised), forestry, conservation areas and Crown land, taking into account local and strategic land use objectives and the potential for social and economic impacts on the local community. The analysis of site suitability shall consider any Environmentally Sensitive Area Mapping held by Goulburn Mulwaree Council and Palerang Council; and*	*Chapter 4 – Site Analysis*
	• *description of the alternatives considered (location and/or design) for all project components, and justification for the preferred project demonstrating its benefits on a local and strategic scale and how it achieves stated objectives and any measures to offset residual impacts (for example community enhancement programmes);*	*Chapter 5 – Project Alternatives; Chapter 2 – Strategic Justification; Chapter 15 - Socioeconomic Issues*
	• *an identification of how relevant planning, land use and development matters (including relevant strategic and statutory matters) have been considered in the impact assessment (direct, indirect and cumulative impacts) and/or in developing management/ mitigation measures, including section 79C of the EP&A Act, applicable State Environmental Planning Policies (SEPP), Local Environmental Plans, the nature and extent of any prohibitions that apply to the development including clear delineation between the different Local Environmental Plans (LEPs)/ Council areas and demonstration that the site is suitable for the proposed use in accordance with SEPP 55 – Remediation of Land and Goulburn Mulwaree Development Control Plan (DCP) particularly Clause 6.3;*	*Chapter 6 – Statutory Framework*
	• *consideration of impacts on community facilities within local towns including Bungendore and Braidwood, as a result of demands imposed by construction and operation stage workers; and*	*Chapter 7 – Community and Stakeholder Engagement; Chapter 15 - Socioeconomic Issues*

Application Number	SSD 13_6277	Reference
	• *detail how the principles of ecologically sustainable development will be incorporated in the design, construction and ongoing operation phases of the development.*	*Chapter 6 – Statutory Framework; Chapter 18 - Environmental Management*
	The EIS must consider the minimum form and content requirements of the Draft NSW Planning Guidelines: Wind Farms (as updated), including procedures for consulting with the community and stakeholders, and meeting assessment requirements.	*Chapter 6 – Statutory Framework*
	The EIS must demonstrate that the wind farm will be capable of meeting relevant Building Code of Australia (BCA) standards and other relevant codes / manufacturers' specifications for the construction of wind farms.	*Chapter 3 – Project Description*
	Notwithstanding the key issues specified below, the EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the development. Where relevant, the assessment of the key issues below, and any other significant issues identified in the risk assessment, must include:	*Chapter 8 - Environmental Assessment Approach; Chapters 9-18*
	• *adequate baseline data;*	
	• *consideration of potential cumulative impacts due to other development in the vicinity. Particular consideration should be given to other nearby existing and proposed wind farms, including Woodlawn, Capital I, Capital II, and Collector wind farms, and Capital Solar Farm and*	
	• *measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for managing any significant risks to the environment.*	
Key issues	*The EIS must address the following specific matters for both the wind farm and associated infrastructure:*	
	Landscape and Visual Impacts - the EIS must:	*Chapter 11 - Landscape and Visual; Annex F*
	• *provide a comprehensive assessment of the visual impacts of all components of the project (including turbines, transmission lines, sub-stations, and any other ancillary infrastructure) on landscape values, scenic vistas, rural townships, non-associated residences (including approved but not yet developed dwellings or subdivisions with residential rights), significant public viewing locations, and any cumulative impacts associated with surrounding proposed, approved or operational wind farms in the locality;*	
	• *identify a zone of visual influence for the wind farm (no less than 10 km);*	
	• *assess the impact of shadow "flicker", blade "glint", and night lighting from the wind farm; and*	
	• *utilise recognised tools (such as photomontages and wireframes) at representative locations to adequately assess the visual impacts of the project, particularly for non-associated residences within 3 km of a proposed turbine;*	

Application Number	SSD 13_6277	Reference
	• *provide detailed consideration of the feasibility and effectiveness of the proposed mitigation measures, including consultation with all landowners of non-associated residences within 3 km of a proposed turbine where significant visual impacts are predicted to identify potential approaches to mitigate any adverse impacts, including consideration of negotiated agreements;*	
	Noise and Vibration Impacts - the EIS must:	
	• *include a comprehensive noise assessment of all phases and components of the project taking into account cumulative impacts from surrounding approved or operational wind farms in the locality including: turbine operation, the operation of the electrical substation, corona and / or aeolian noise from the transmission line, construction noise (focusing on high noise-generating construction scenarios and works outside of standard construction hours), traffic noise during construction and operation, and vibration generating activities (including blasting) during construction and/ or operation. The assessment must identify noise / vibration sensitive locations (including approved but not yet developed dwellings), baseline conditions based on monitoring results, the levels and character of noise (e.g. tonality, impulsiveness, low frequency etc) generated by noise sources, noise/ vibration criteria, modelling assumptions and worst case and representative noise/ vibration impacts;*	
	• *in relation to wind turbine operation, determine the noise impacts under operating meteorological conditions (i.e. wind speeds from cut in to rated power), including impacts under meteorological conditions that exacerbate impacts (including varying atmospheric stability classes). The probability of such occurrences must be quantified;*	
	• *include monitoring to ensure that there is adequate wind speed/profile data and ambient background noise data that is representative for all sensitive receptors;*	*Chapter 10 - Noise and Vibration; Annex E*
	• *provide justification for the nominated average background noise level used in the assessment process, considering any significant difference between daytime and night time background noise levels at background noise levels higher than 30 dB(A);*	
	• *consider special audible characteristics, including tonality, amplitude modulation, and low frequency noise (apply penalties where relevant), and identify any risks with respect to tonal, low frequency or infrasound;*	
	• *clearly outline the noise mitigation, monitoring and management measures that would be applied to the project. This must include an assessment of the feasibility, effectiveness and reliability of proposed measures and any residual impacts after these measures have been incorporated;*	
	• *if any noise agreements with residents are proposed for areas where noise criteria cannot be met, provide sufficient information to enable a clear understanding of what has been agreed and what criteria have been used to frame any such agreements; and*	
	• *include a contingency strategy that provides for additional noise attenuation should higher noise levels than those predicted result following commissioning and/or should noise agreements with landowners not eventuate.*	

Application Number	SSD 13_6277	Reference
	• *The assessment must be undertaken consistent with the following guidelines:*	
	• *Wind Turbines: the South Australian Environment Protection Authority's Wind Farms _Environmental Noise Guidelines (2009) with a base criteria of 35 dB(A) or background plus 5 dB, whichever is greater;*	
	• *Low Frequency Noise: predictions are to be assessed by comparison to a level of 60 dB(C) at any relevant receiver or the proposed criteria in assessment of low frequency noise disturbance (UK Department for Environment, Food and Rural Affairs, 2005);*	
	• *Tonality: ISO 1996.2: 2007 Acoustics — Description, measurement and assessment of environmental noise – Determination of environmental noise levels;*	
	• *Substation: NSW Industrial Noise Policy (EPA, 2000);*	
	• *Site Establishment and Construction: Interim Construction Noise Guidelines*	
	(DECC, 2009);	
	• *Traffic Noise: NSW Road Noise Policy (DECCW 2011)*	
	• *Vibration: Assessing Vibration: A Technical Guideline (DECC, 2006).*	
	Biodiversity - the EIS must:	*Chapter 9 - Biodiversity; Annex D*
	• *include an ecological assessment considering terrestrial and aquatic ecosystems in local waterways (particularly tributaries of the Shoalhaven River incorporating the threatened fish species Macquarie Perch Macquaria australascia), including groundwater dependent ecosystems, consistent with Guidelines for Threatened Species Assessment (DEC, 2005); Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fisheries NSW), and taking account of Natural England Technical Information Note TIN051: Bats and Onshore Wind Turbines Interim Guidance (Natural England, 2012).*	
	• *provide justification for site selection of the proposed turbine locations taking into account the potential to use areas of lower habitat value within the site;*	

Application Number	SSD 13_6277	Reference
	• *identify threatened species, populations and communities listed under both State and Commonwealth legislation that have the potential to occur on site with particular reference to species identified by the Office of Environment and Heritage (OEH) letter received by the Department on 13 January 2014 particularly Eastern Bentwing bats with specific reference to the Mount Fairy bat staging cave and including the Endangered Ecological Communities (EECs) White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland Box Gum Woodland; Natural Temperate Grassland of the Southern Tablelands of New South Wales (NSW) and the Australian Capital Territory (ACT); White Box Yellow Box Blakely's Red Gum Woodland (Box Gum Woodland); Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion; Tablelands Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions; Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps Bioregions; and threatened flora species including the 19 identified in the DGR Request (particularly Buttercup Doubletail (Diuris aequalis)), threatened fauna species including the 43 identified in the DGR Request (particularly Glossy Black Cockatoo (Cathyptorhyncus) & the koala (Phascolarctos cinereus)), and the 23 migratory bird species that are identified in the DGR Request including those associated with nearby waterbodies such as Lake Bathurst, The Morass and Lake George;*	
	• *map existing vegetation by vegetation/ community type and include details on existing site conditions, including whether the vegetation comprises a highly modified or over-cleared landscape and the types and quality of habitat resources available. Vegetation mapping should consider any Environmentally Sensitive Area Mapping held by Goulburn Mulwaree Council and the former Palerang Council and any areas subject to an agreement with Upper Shoalhaven Catchment Management Authority;*	
	• *provide details of the survey methodology employed including survey effort and representativeness for each species targeted and clear justification for species that were discounted from requiring field surveys or further assessment;*	
	• *demonstrate a design philosophy of impact avoidance on ecological values, and in particular, ecological values of high significance;*	
	• *provide a worst case estimate of native vegetation to be cleared (in hectares), including quantifying impacts (in hectares) by vegetation type and threatened species habitat (as relevant);*	

Application Number	SSD 13_6277	Reference
	• *assess the significance of impacts to native vegetation, listed threatened species, populations and communities and their habitats with consideration to local and region-based ecological implications, including edge effects, habitat connectivity and distribution of species. The assessment must consider impacts to in-stream and riparian ecology from works close to waterways and/ or waterway crossings. In addition, impact of the project on birds and bats from blade strikes, low air pressure zones at the blade tips (barotrauma), and alteration to movement patterns resulting from the turbines must be assessed, including demonstration of how the project has been sited to avoid and/ or minimise such impacts. This must include consideration of the Eastern Bentwing-Bat (Miniopterus schreibersii) Wee Jasper to coastal areas migration routes, and the Mount Fairy 'dispersal stopover' cave;*	
	• *consider effects, including the effects of multiple wind farms in the vicinity on bird/bat strike, movement patterns and loss of habitat;*	
	• *include details of how flora and fauna impacts would be managed during construction and operation including adaptive management, rehabilitation/ regeneration measures and maintenance protocols;*	
	• *demonstrate how the project (with the incorporation of all proposed measures to avoid, mitigate and/ or offset impacts) achieves a biodiversity outcome consistent with "maintain or improve" principles. Sufficient details must be provided of the specific areas and management proposed to offset the impacts of the project on biodiversity, and how the offset areas will be secured in perpetuity; and*	
	• *address the risk of weed spread, both noxious and environmental weeds, and identify mitigation measures.*	
	Heritage Impacts – the EIS must include an assessment of impacts on Aboriginal and historic heritage. The EIS must:	*Chapter 12 - Aboriginal and Historic Cultural Heritage; Annex G*
	• *include sufficient information to demonstrate the likely impacts of the project on Aboriginal heritage values/items (archaeological and cultural) and outline proposed mitigation measures (including consideration of the effectiveness and reliability of the measures) in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010). . The assessment must be undertaken by suitably qualified heritage consultants and demonstrate effective consultation with Aboriginal communities in determining and assessing impacts, developing options and selecting options and mitigation measures (including the final proposed measures) be undertaken and documented in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010); and*	
	• *provide sufficient information to demonstrate the likely impacts of the project on historic heritage values (including heritage vistas) and, where impacts to State or local historic heritage items are proposed, outline proposed mitigation and management measures (including consideration of the effectiveness and reliability of the measures) generally consistent with the guidelines in the NSW Heritage Manual. Where impacts to State or local historic heritage items are proposed, a statement of heritage significance must be included.*	

Application Number	SSD 13_6277	Reference
	Traffic and Transport – the EIS must assess the construction and operational traffic impacts of the development including:	*Chapter 13 - Traffic and Transport; Annex H*
	• *details of traffic volumes (both light and heavy vehicles) and transport routes during construction and operation;*	
	• *assess the potential traffic impacts of the project on road network function (including intersection level of service) and safety, and including impact on existing transport including school bus routes and freight operations as well as implications for other road users;*	
	• *assess the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-mass /over- dimensional traffic) during construction and operation, differentiating between various raw material deliveries and staff and contractors, including full details of any required upgrades to roads, bridges, site access provisions (for safe access to the public road network) or other road features;*	
	• *details of measures to mitigate and/or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control soil erosion and dust generated by traffic volumes;*	
	• *details of access roads within the site including how these would connect to the existing public road network (i.e. site access) and ongoing operational maintenance requirements for on-site roads;*	
	• *indicative details of the location of works in the road reserve;*	
	• *consideration of relevant RMS and Council traffic/road policies; and*	
	• *consideration of necessary road upgrade and / or maintenance contributions to the relevant Council to address impacts on the local road network.*	
	Hazard/Risks – the EIS must include an assessment of the following:	*Chapter 16 - Hazards and Risks; Annexures J-N*
	• *Aviation Safety: potential impacts on aviation safety, including cumulative effects of multiple wind farms in the vicinity, potential wake/turbulence issues, the need for aviation hazard lighting, considering nearby aerodromes and aircraft landing areas, defined air traffic routes, aircraft operating heights, approach/departure procedures, radar interference, communication systems, and navigation aids. The assessment shall be prepared in accordance with National Airports Safeguarding Framework Guideline D: Managing Wind Turbine Risk to Aircraft. Aerodromes within 30km of the turbines should be identified and impacts on obstacle limitation surfaces addressed. Assess the impact of the turbines on the safe and efficient aerial application of agricultural fertilisers and pesticides in the vicinity of the turbines and transmission line. An Aviation Impact Statement (AIS) prepared by an appropriately qualified person including the associated height and co-ordinates for each turbine;*	
	• *Telecommunications: identify possible effects on telecommunications systems, assess impacts and mitigation measures including undertaking a full engineering assessment to examine the potential impacts as well as analysis and agreement on the implementation of suitable options to avoid potential disruptions to radio communication services; which may include the installation and maintenance of alternative sites;*	

Application Number	SSD 13_6277	Reference
	• *Health: consider and document health issues, focusing on neighbours with dwellings within 1.5 km of proposed wind turbines. Identify potential hazards and risks associated with electric and magnetic fields and demonstrate the application of the principles of Prudent Avoidance;*	
	• *Bushfire Hazards: identify potential hazards and risks associated with bushfires/use of bushfire prone land, including the risks that a wind farm will cause bush fire and any potential impacts on the aerial fighting of bush fires incorporating options to switch off turbines during bushfire, and demonstrating compliance with Planning for Bush Fire Protection 2006; and*	
	• *Blade throw: assess blade throw risks.*	
	Water Supply, Water Quality and Hydrology – The EIS must:	
	• *identify water demands, and determine whether an adequate and secure water supply is available for the project;*	
	• *identify water sources (surface and groundwater), water disposal/discharge methods and water storage structures in the form of a water balance;*	
	• *include the statutory (licensing) context of the water supply sources;*	
	• *assess potential environmental impacts associated with the use of the identified water sources including impacts on groundwater and implications for existing licensed users/basic landholder rights;*	
	• *assess potential environmental impacts associated with any proposed discharges, and proposed monitoring methodology where required;*	
	• *assess the potential to intercept groundwater, including predicted dewatering volumes, zone of drawdown and associated impact, water quality and disposal methods;*	*Chapter 14 - Water Supply, Water Quality and Hydrology;* *Annex I*
	• *assess potential risks to surface and groundwater quality risks, demonstrating clear consideration of the principle of achieving neutral or beneficial effect on water quality in the drinking water catchment, consistent with the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011, including a framework for the avoidance, mitigation, management and monitoring of water quality impacts;*	
	• *where the project involves crossing or works within 40 metres of waterways, identify likely impacts to the waterways, how the waterways are proposed to be crossed and be designed in accordance with the NSW Office of Water Guidelines for Controlled Activities (2010);*	
	• *describe the measures to minimise hydrological, water quality, upland salinity, aquatic and riparian impacts, including monitoring and contingency requirements to address surface and groundwater impacts; and*	
	• *identify how works within steep gradient land or highly erosive soil types will be managed during construction and operation, including in relation to access roads.*	

Application Number	SSD 13_6277	Reference
Consultation	*During the preparation of the EIS, you must consult with relevant local, State and Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with:*	*Chapter 7 – Community and Stakeholder Engagement; Annex B – Stakeholder Engagement Strategy; Annex C – Consultation Material*
	• *Goulburn Mulwaree Council;*	
	• *former Palerang Council;*	
	• *Water NSW;*	
	• *Local Aboriginal Land Council;*	
	• *Office of Environment and Heritage*	
	• *Environment Protection Authority;*	
	• *NSW Trade and Investment Department (Resources & Energy);*	
	• *Department of Primary Industries (Catchments and Lands (Crown Lands), Fisheries NSW, Agriculture NSW, and DPI Water);*	
	• *NSW Roads and Maritime Services;*	
	• *NSW Rural Fire Service;*	
	• *Air Services Australia;*	
	• *Civil Aviation Safety Authority;*	
	• *Department of Defence;*	
	• *NSW Government Telco Authority and other registered communications licensees (including emergency services);*	
	• *Aerial Agricultural Association of Australia;*	
	• *Royal Flying Doctor Service;*	
	• *Operators of non-regulated aerodromes;*	
	• *NSW Farmers Association;*	
	• *relevant service providers;*	
	• *relevant minerals stakeholders (including exploration and mining title holders); and*	
	• *the public, including community groups and adjoining and affected landowners (including "associated" and "non associated" properties).*	
	A comprehensive, detailed and genuine community consultation and engagement process must be undertaken. This process must ensure that the community is both informed of the proposal and is actively engaged in issues of concern to them, and is given ample opportunity to provide its views on the proposal. Sufficient information must be provided to the community so that it has a good understanding of what is being proposed and of the impacts. There should be a particular focus on those non wind farm associated community members who live in proximity to the site, and in particular neighbours located within 3 km of a wind turbine.	

Application Number	SSD 13_6277	Reference
	The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	
	The EIS must:	
	• *demonstrate effective consultation with stakeholders, and that the level of consultation with each stakeholder is commensurate with their degree of interest/concern or likely impact;*	
	• *clearly describe the consultation process undertaken for each stakeholder/group including details of the dates of consultation and copies of any information disseminated as part of the consultation process (subject to confidentiality);*	
	• *describe the issues raised during consultation and how and where these have been addressed in the EIS; and*	
	• *provide details of the status of the community consultative committee required to be formed by the Applicant, consistent with the provisions of the Draft NSW Planning Guidelines: Wind Farms (as updated).*	
Further consultation after 2years	*If you do not lodge a development application and EIS for the development within 2 years of the issue date of these requirements, you must consult further with the Department in relation to the preparation of the EIS.*	

2 STRATEGIC JUSTIFICATION

2.1 Introduction

This Chapter outlines the key benefits and justification for the Project in the context of reducing Australia's greenhouse gas emissions, meeting future energy demands, supporting State and Commonwealth renewable energy targets, and contribution to economic development in the region.

2.1.1 Project Benefits

The Project would provide the following primary benefits:

- generate of the order of 1,100 GWh of electricity annually over its operating life, sufficient to power the equivalent of 150,800 homes annually (based on average NSW household electricity consumption);
- provide a source of renewable energy to supplement NSW and National energy requirements and assist in reducing greenhouse gas (GHG) emissions;
- save approximately 0.9 Mt of GHG emission in 2020, which is the equivalent of removing of the order of 274,000 passenger vehicles from NSW roads each year during the operational life of the Project;
- contribute to the additional generating capacity required to meet the growing energy demand in NSW, and improve security of supply through avoidance of reliance on electricity supply from other states and diversification of electricity generation sources and supply locations;
- contribute to the Federal and State governments' targets for renewable energy generation;
- provide significant direct investment in the local economy, consisting of an estimated $104 million total economic impact during construction, and a further $7 million per annum during operation;
- provide direct fulltime employment opportunities for an estimated 336 people during construction, and an estimated 32 staff during its operational life;
- generate additional economic stimulus in the local area and broader region associated with indirect employment opportunities through the use of local contractors and suppliers during construction, and demand for local services, particularly during construction;
- create additional income streams for the community, through:
  - payment to involved landholders hosting Project infrastructure
  - benefit sharing with neighbouring landholders; and
  - contributions to a Community Enhancement Fund for the provision and enhancement of community facilities and Council funded local infrastructure projects.
- manage potential social and environmental impacts through the identification and implementation of mitigation and/or monitoring measures, and in consultation with potentially affected stakeholders;
- recycle and reuse materials where practically and economically feasible; and
- minimise all potential adverse environmental impacts and where practical and maximise all potential positive environmental effects.

2.2 Electricity Demand

The Annual Electricity Statement of Opportunities (ESOO) released by the Australian Energy Market Operator Limited (AEMO) assesses the adequacy of existing and committed electricity supply to meet operational consumption in all National Electricity Market (NEM) regions and indicates when additional investment in generation or demand-side participation may be required to maintain electricity supply reliability.

The 2015 ESSO (AEMO 2015) outlined that, in the year since reporting of the 2014 results, which predicted surplus generation capacity by 2023-24, the market had responded by notifying its intent to withdraw a significant portion of the reported surplus by 2022, and maximum demand projections had increased. As a result, the report predicted that under the high and medium energy demand scenarios, additional investment in supply capacity would be required by 2021-22. The report also highlighted that the reported withdrawals in NSW exceeded the 2014 predicted surplus for the region, and this would result in an increased reliance on imports from other states.

The 2015 results also indicated that electricity demand would continue to rise and investment in new capacity would be required to meet forecast demand in the mid to longer term, particularly in NSW in order to be able to continue to meet increases in local demand and avoid reliance on supply from other states.

The 2016 report by AEMO (2016) acknowledges that the key change since 2015 is the reduced forecast for operational maximum demand from the grid. The 2016 report outlines that as intermittent generation continues to increase and thermal synchronous generation decreases; the total installed generation capacity alone becomes a less reliable indicator of supply adequacy. The report states that the availability of plant to supply energy when needed, and capability to provide ancillary services, are both key factors to consider when assessing opportunities related to secure operations and supply adequacy in the NEM (AEMO 2016).

The 2016 report outlines that under a neutral economic and consumer outlook, and in the absence of new generation, coal-fired generation withdrawals at the levels assumed (including a planned 2,000 MW withdrawal in March 2022) may lead to reliability standard breaches, particularly in NSW by 2025-26 and beyond, due to an increase in underlying maximum demand.

The 2016 report highlights that underlying demand is predicted to continue to increase, and this, along with further withdrawals of coal-fired generation, needs to me met through increased future generation capacity. It is acknowledged that additional intermittent generation alone may not materially improve reliability of the system, however investment in new, cost effective renewable sources, such as wind energy, is an important component in increasing electricity supply in response to increasing demand, whilst reducing GHG emissions. This may need to be coupled with other network and supply management improvements to ensure ongoing reliability of supply, particularly in the mid to longer term.

2.2.1 Electricity Generation from the Project

The Project will have an installed capacity of up to 350 MW, which is expected to generate of the order of 1,100 GWh of electricity annually over its operating life. The renewable electricity generated from the Project is enough to power the equivalent of 150,800 homes annually (based on the average NSW household electricity consumption of 7.3 MWh/year).

It is anticipated that the renewable energy produced from the Project would be fed directly into the electricity grid and sold on the NEM.

2.3 Greenhouse Gas Emissions

Australia's per capita GHG emissions are the highest of any Organisation for Economic Cooperation and Development (OECD) country and are among the highest in the world. In 2012, per capita emissions (including emissions from land use, land use change and forestry) were 24 tonnes carbon dioxide equivalent (CO_2-e) (OECD 2016). Australia's per capita emissions are nearly twice the OECD average and more than four times the world average (Garnaut 2011).

In 2013, NSW generated approximately 141.8 million tonnes (Mt) of CO_2-e, accounting for approximately 26% of Australia's total GHG emissions during that year. The stationary energy sector, which includes emissions from fuel consumption for production of electricity, accounted for approximately 49% of the total GHG emissions generated across the State (Commonwealth of Australia 2015).

Australia is heavily dependent on fossil fuels for electricity generation. In the reporting period 2013-14, approximately 85% of Australia's electricity generation was derived from the use of fossil fuels, with coal use (both black and brown coal) accounting for over 61% of Australia's electricity generation (Department of Industry and Science 2015). While Australia does have abundant fossil fuel resources, it is well understood that burning fossil fuels results in the emission of GHG.

The CSIRO (2011) has stated that:

"Greenhouse gas emissions from human activities are more than 90 per cent likely to have caused most of the global warming since the mid-20th century."

In the most recent reporting year of 2013, electricity and energy generation contributed around 51% of Australia's total GHG emissions (Commonwealth of Australia 2015). At 0.883 t CO2-e/MWh, the average emissions intensity of electricity generated in Australia is almost twice the world average (IEA 2011) and reflects our reliance on coal for electricity generation. Economic growth, population growth, and major resource development projects are expected to lead to a reversal of the recent trend of declining electricity use, with emissions from electricity generation projected to increase by 12% between 2013-14 and 2019-20; and by 32% between 2013-14 and 2034-35 (Commonwealth of Australia (Department of the Environment) 2015). Without key policies, such as the Renewable Energy Target (RET) scheme and measures to encourage energy efficiency, the rate of GHG emissions will likely continue to grow.

Meeting the current challenge of increasing GHG emissions and growing energy demand will require an approach that includes improving energy efficiency and diversifying the energy mix through investments in renewable energy. Despite abundant renewable energy resources, only approximately 15% of Australia's electricity was generated from renewable sources in 2013-14, of which approximately 4% was wind generated, indicating that further investment to increase the supply of energy from clean energy sources is warranted (Department of Industry and Science 2015). By 2030 wind energy is expected to account for 7% of total electricity generation in Australia (Commonwealth of Australia (Department of the Environment) 2015). Coal and gas will continue to play an important role in Australia's energy future in the short-to-medium term. There is a need however, for a significant investment in clean energy technologies including wind energy, to assist in meeting the growing energy demand in a manner that does not contribute to increasing GHG emissions.

2.3.1 Greenhouse Gas Benefits of the Project

During its operational phase, the Project would generate 100% renewable electricity without producing any GHG emissions. Furthermore, the Project would be displacing electricity produced by fossil fuel sources such as coal and gas, thereby reducing the overall amount of GHG emissions produced by the stationary energy sector.

To estimate the potential GHG emissions savings that large scale wind farm developments would have in NSW, the NSW Department of Environment and Heritage (OEH) *Wind Farm Greenhouse Gas Savings Tool* (WFGGT) (OEH 2015) can be used as a method to calculate the expected GHG savings.

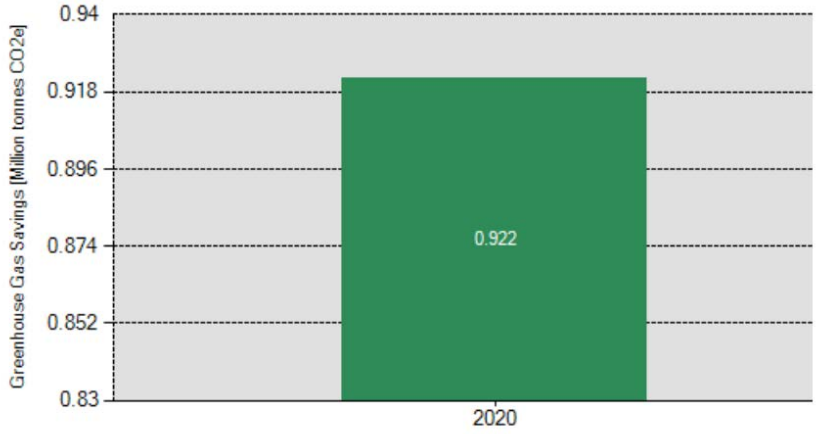
The WFGGT considers a range of variables describing prospective wind farms in NSW to model reductions in the amount of CO_2-e expected to result from the operation of a wind farm. This includes:

- the location of the wind farm;
- total electrical generation capacity; and
- commencement of operation of the wind farm.

According to the WFGGT, assuming an indicative operational capacity of 350 MW, the Project will save 0.9 Mt of GHG emission in 2020 (refer WFGGT model output below in Figure 2.1), which is enough electricity to power the equivalent of 150,800 homes annually (based on the average NSW household electricity consumption of 7.3 MWh/year). Based on the energy content factors and CO2-eq emission factors reported by DOEE (2016), it is estimated that this saving in GHG emissions resulting from the Project is the equivalent of removing of the order of 274,000 passenger vehicles from NSW roads each year during the operational life of the Project (based on ABS (2014) 2014 NSW vehicle fleet and fuel use statistics, not including any year on year traffic growth).

For the purposes of the WFGGT, it has been assumed that the Project will be operational in 2020 and is located in Precinct 4 of the NSW Renewable Energy Precincts (NSW/ACT Border Region).

Figure 2.1 *Greenhouse Gas Savings from the Jupiter Wind Farm*



2.3.2 Benefits of Wind Energy

There are many benefits to the development of wind energy technology as a renewable energy source. Unlike conventional energy sources, wind energy can produce electricity locally, thereby reducing transference distances and loss of energy in the process (Diesendorf 2007). Furthermore, wind energy is a clean energy source that does not involve the harmful side-effects associated with other energy sources, such as the risk of gas explosion (Diesendorf 2007).

Wind energy is the world's fastest growing source of renewable electricity around the globe (Diesendorf 2006). Wind energy can make a significant contribution to Australia's clean energy future as it is a mature, proven and cost-effective technology. Over the past six years, global wind power capacity has continued to grow at an average cumulative rate of 23% worldwide, which is the equivalent of almost double Australia's current residential electricity consumption. Installed wind power capacity in Australia has grown from 1.8% at the end of 2009, to 3.2% at the end of 2013 (Windicator 2014), and is expected to increase to approximately 7% by 2030 (Commonwealth of Australia (Department of the Environment) 2015). Wind energy is currently the lowest cost form of renewable energy at a large-scale in Australia (Clean Energy Council 2013).

Wind energy provides the following additional benefits:

- wind farms are compatible with the continued use of land for agricultural purposes;
- following decommissioning, wind farm sites are capable of being readily returned to their original state;
- results in carbon emissions savings as wind energy is produced replaces energy that is otherwise provided from non-renewable sources; and
- construction and development of the wind farm provides opportunity for a diversified construction skill base.

2.4 Policy Framework

2.4.1 Australian Renewable Energy Target

The Renewable Energy Target (RET) scheme outlines the Australian Government's commitment to reducing GHG emissions and expanding the use of renewable energy sources by 2020. The RET scheme "*will result in more than 23.5% of Australia's electricity being derived from renewable sources by 2020*" (Australian Government 2015) and to:

- "*encourage the additional generation of electricity from renewable sources;*
- *reduce emissions of greenhouse gases in the electricity sector; and*
- *ensure that renewable energy sources are ecologically sustainable.*" (Clean Energy Regulator 2014)

The RET policy creates a competitive market for new renewable energy projects as it places a legal obligation on electricity retailers to purchase Renewable Energy Certificates (RECs) from accredited renewable electricity generators.

The RET was divided into two parts in January 2011 - the 'Large-scale Renewable Energy Target' (LRET) and the 'Small-scale Renewable Energy Scheme (SRES). The LRET encourages large scale energy generation to be produced using technologies such as wind, hydro, biomass, solar and tidal energy, while the SRES targets small-scale technologies, such as solar water heaters and rooftop photo-voltaic systems.

Until recently, the annual target for the LRET increased annually up to 41,000 GWh by 2020. Based on these annual targets, it was estimated that the LRET would drive $14.5 billion of investment in large-scale renewable energy projects by 2020 (Roam Consulting 2014). In addition, more than 24,000 Australians were employed in the renewable energy sector in 2012 and the RET (based on the earlier target) was expected to generate an additional 18,400 jobs by 2020, consisting of 9,700 jobs in large-scale renewables like wind and bioenergy, and 8,700 jobs in household renewable energy, such as solar power and solar hot water (Roam Consulting 2014).

In February 2014, the Australian Government announced the review of the RET scheme by an Expert Panel. The purpose of the review was to "*examine the operation, costs and benefits of the RET, including the economic, environmental and social impacts, the extent to which the objectives of the scheme are being met and the interaction of the RET with other Commonwealth and state and territory policies*" (Australian Government 2014). Following the release of the Expert Panel's review, the Australian Government passed legislation in July 2015 to reduce the LRET from 41,000 GWh to 33,000 GWh by 2020.

Notwithstanding this reduction in the RET, wind power remains the most economical form of large-scale renewable energy and is expected to play a significant role in meeting the LRET. The Jupiter Wind Farm would have an indicative generation capacity of up to 350 MW and would contribute significantly to directly achieving to the current RET target of 33,000 GWh of large-scale renewable energy generation by 2020.

2.4.2 NSW Renewable Energy Target

The *NSW Renewable Energy Action Plan 2013* (REAP) (DTI 2013) was developed to support the achievement of the former national target of 20% renewable energy by 2020. The REAP positions NSW to increase the utilisation of energy from renewable sources at the least cost to customers and with maximum benefits to NSW. The REAP notes that wind energy is one of the most commercially viable and cost-effective renewable energy sources for large scale installation and a key driver in meeting the national target. Through the REAP, and also the recently released draft Wind Energy Assessment Policy (DP&E 2016), the NSW Government acknowledges that by international standards, NSW has excellent wind resources with many of the best locations being located in proximity to existing electricity grid infrastructure, and supports the development of a sustainable wind energy industry in NSW (DP&E 2016). The PA is located in an area with consistently high wind speed, as indicated by extensive wind speed modelling and other recent wind farm developments in the area, which supports the viability of the Project. In addition, existing electrical grid infrastructure passes through the PA, and is capable of receiving and transmitting energy produced from the Project.

2.4.3 The Project's Contribution

The Project supports the RET and REAP objectives by increasing the supply of energy generated by wind, which is considered a renewable technology leader in cost competiveness.

2.5 Other Project Benefits

2.5.1 Economic Benefits

The Clean Energy Council engaged SKM to develop a National and State based snapshot to model the anticipated economic benefit in terms of employment and economic stimulus based on the size of a wind farm development. This model is outlined in the report Wind Farm Investment, Employment and Carbon Abatement in Australia (SKM 2012).

The model was used to predict the economic impact the Project would have on the local region during both the construction and operation of the Project. The key attributes used in the model and the projected economic stimulus is outlined in *Table 2.1* below.

Table 2.1 Anticipated Economic Stimulus in the Local Region

Attribute	Figure
Total number of wind turbines	Maximum number 88
Rated capacity of each turbine	Up to 4.5 MW
Total installed capacity	Maximum installed capacity 350 MW
Economic Stimulus -Construction Phase	
Direct Economic Impact	Approximately $104 million
Total Economic Impact (including Direct, Total Production and Consumption Induced Impact)	Approximately $318 million
Direct Employment	Approximately 336
Economic Stimulus -Operation Phase	
Direct Economic Impact	Approximately $7 million per annum
Total Economic Impact (including Direct, Total Production and Consumption Induced Impact)	Approximately $21 million per annum
Direct Employment	Approximately 32 per annum

The anticipated financial contributions to the local and regional economy as outlined in *Table 2.1* are likely to occur through:

- use of local contractors and suppliers (where feasible and applicable) during construction;
- employment of local service and maintenance staff during construction and operation;
- use of local services (accommodation facilities, food outlets, restaurants, supermarkets etc) particularly during construction;
- lease payments to local landholders hosting Project related infrastructure; and
- establishment of a voluntary benefit sharing scheme for the neighbouring landholders for properties with a dwelling within 2 km of a proposed WTG (refer *Chapter 7* for further discussion).

In addition, the Proponent, in discussions with the relevant local councils, is exploring potential options to support the local community surrounding the PA through the establishment of a Community Enhancement Fund, by which the Proponent will provide direct contributions throughout the operational life of the Project. It is anticipated that funds will be spent to improve community assets such as recreational facilities, public open space and public amenities. Consultation with the relevant councils regarding the details of these agreements is ongoing and will be finalised prior to the commencement of construction of the Project.

2.5.2 Social Benefits

Social impacts associated with the Project are discussed in *Chapter 15*, however the key social benefits include:

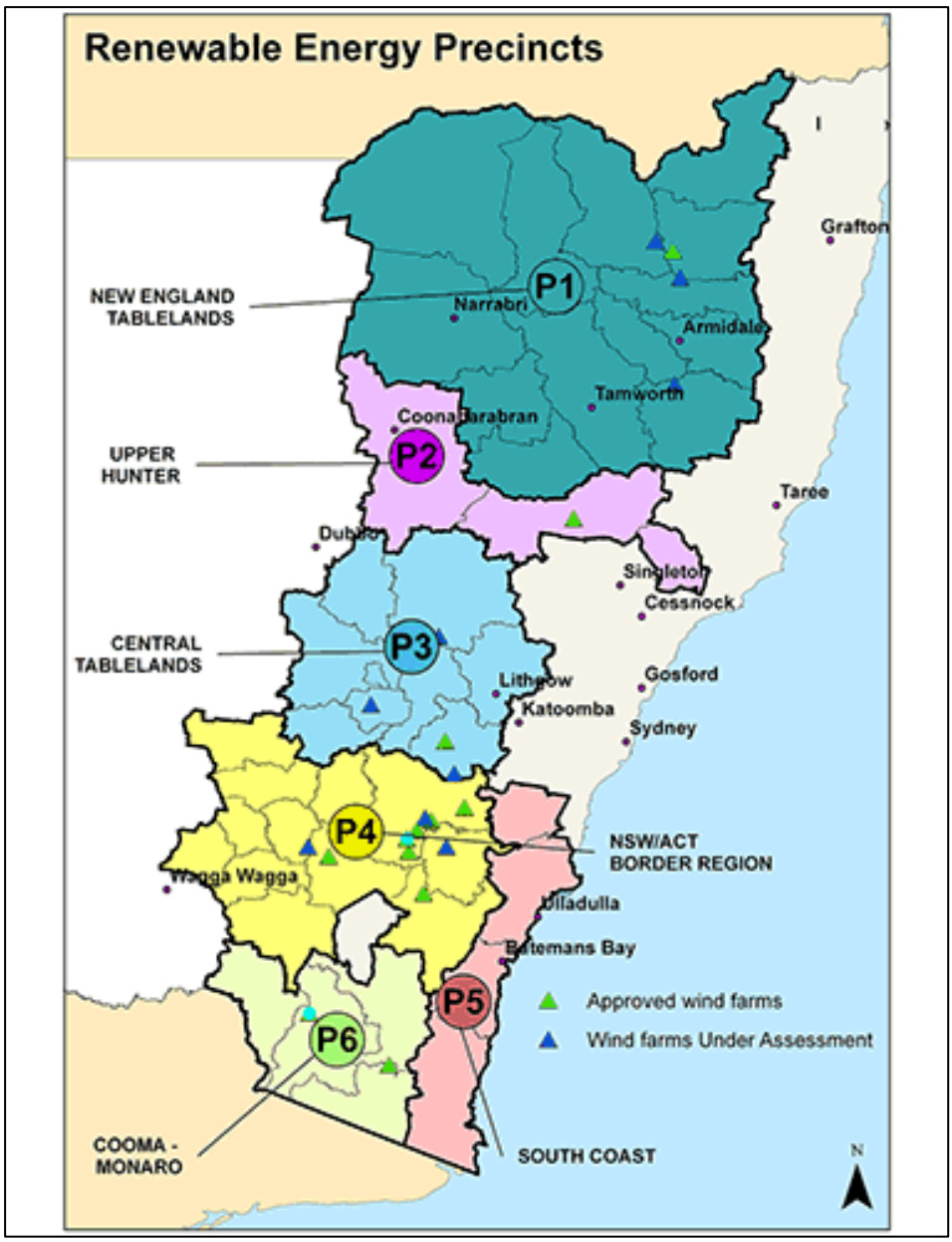
- supporting national and international efforts to reduce the potential impacts of climate change through reductions in GHG emissions;
- local employment opportunities and up-skilling of the local workforce;
- increased demand for local goods and services particularly during the construction phase;
- funding local infrastructure and other projects via the establishment of a community enhancement program in consultation with Council; and
- beneficial social outcomes arising from landholder payments and the voluntary benefit sharing payments for the neighbouring landholders as described above flowing through the local economy.

2.6 Suitability of the Project

2.6.1 Project Location

The Southern Tablelands of NSW is recognised for its strong wind resources. The area is located within one of the six designated 'Renewable Energy Precincts' established by the NSW Government, which include the New England Tablelands, Upper Hunter, Central Tablelands, NSW/ACT Border Region, South Coast and Cooma-Monaro (refer *Figure 2.2*). The PA is located within Precinct 4 – NSW/ACT Border Region.

Figure 2.2 NSW Renewable Energy Precincts (Source: OEH 2015b)



The wind resource has been assessed through the installation of three meteorological monitoring masts within each of the three precincts across the PA. Analysis of this data verifies that the PA has an excellent wind resource suitable for a wind farm development. Average wind speeds vary throughout the PA depending on topography affecting localised wind conditions.

2.6.2 Grid Connection

An existing 330 kV TransGrid transmission line traverses the northern precinct of the PA. Negotiations between the Proponent and TransGrid has confirmed that TransGrid is supportive of the Project and that the existing 330 kV transmission line has sufficient capacity to accommodate the electricity generated by the Project. The distance to nearby transmission networks is a factor that influences the commercial feasibility of wind farm projects, and being able to connect to the immediately adjacent TransGrid network within the northern precinct of the PA was a significant factor that informed selection of the Project's location.

2.6.3 Project Scale

The Project layout incorporates 88 WTGs with a total generating capacity of up to 350 MW. The scale of the Project takes into account the wind resource, topography, the capacity of the local electrical network, the objectives of Commonwealth and State renewable energy policy and targets, and consideration of key cultural, environmental and social values of the PA and broader region. As discussed in *Chapter 5*, preliminary investigation of Project alternatives considered installation of up to 100 WTGs, which has been reduced in number to 88 WTGs and the layout refined over time, as a number of constraints have been identified through the investigation, assessment and consultation process.

Constructing a wind farm of the scale of this Project in this location capitalises on the quality of the available wind resource and direct access to existing electricity grid infrastructure, and also carries benefits through economies of scale; whereby fixed costs associated with the construction of the Project are distributed across a large number of WTGs.

2.6.4 Site Access

The PA is well located adjacent to the existing road network, providing ready access to the site via new intersections off Goulburn-Braidwood Road and the Kings Highway. In addition, the preferred vehicle route for restricted access vehicles (RAVs) (oversized vehicles used to transport wind turbine components to the PA) was used for RAVs accessing the nearby Capital and Woodlawn wind farms, and therefore makes use of a number of modifications that have already been undertaken along the route to accommodate the vehicles associated with these developments.

The PA is also located in proximity to available resources and services required during the construction, operation and decommissioning of the Project.

2.6.5 Land Use

The majority of the PA consists of large and predominantly cleared agricultural lots that are used primarily for commercial grazing. The development footprint is relatively small, and the existing agricultural activities occurring within the PA can continue to coexist with the Project and the proposed infrastructure. In addition, introduction of a supporting income base assists in maintaining the agricultural capacity of the land, and the construction of improved access tracks may improve the agricultural efficiency for involved landholders.

During construction and commissioning, minor disruptions to agricultural activities may occur. Agricultural stock may need to be relocated from construction areas such as the WTG locations; however this will be temporary and can be managed through direct consultation with involved landholders, prior to the commencement of construction works.

The project has been assessed for consistency with the relevant local and regional land use planning is in *Chapter 6*. Detailed consideration of land use issues, including identification of potential land use conflicts with existing and potential future land uses within the PA and across the broader region, is provided in *Chapter 4*.

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3 PROJECT DESCRIPTION

3.1 Introduction

This chapter presents a detailed description of the works associated with the construction, operation, maintenance and decommissioning phases of the Project and provides a detailed overview of the proposed Project layout and infrastructure components.

An analysis of the PA is discussed in detail in in *Chapter 4*.

3.2 Project Overview

The Project involves the construction, operation and decommissioning of a wind farm with up to 88 wind turbines generators (WTGs), together with associated and ancillary infrastructure.

The Project has been revised and refined over time in response to design requirements, and in consideration of environmental constraints and the outcomes of community consultation (refer *Chapter 5* for further discussion of alternatives considered during the assessment phase).

The Project consists of the following key components:

- Up to 88 WTGs, each with:
  - a capacity of up to 4.5 MW;
  - three blades mounted on a tubular steel tower, with a maximum tip height of approximately 173 m; and
  - an adjacent pad mounted wind turbine transformer (or alternatively located within the steel tower), crane hardstand area, and related turbine lay down area.
  - The WTGs will be located across two distinct precincts. It is proposed that up to 75 WTGs will be located within the northern precinct and up to 13 WTGs will be located within the southern precinct.
- An electrical substation / switchyard located in the northern precinct, including transformers, switchgear, insulators and other ancillary equipment.
- A permanent operations and maintenance building, located adjacent to the substation.
- An internal private access road network connecting the WTGs and associated infrastructure within the Project Area to the public road network.
- 33 kV electrical reticulation and fibre optic cabling connecting the WTGs within each precinct (installed predominantly underground, with some sections aboveground where required by topographical or other constraints), and located generally along the same alignment as the internal private access road network.
- A 33 kV transmission line connecting the 33 kV electrical reticulation networks, extending from the southern precinct to the substation, installed predominantly underground, with some sections aboveground where required by topographical or other constraints, and to be located within the road reserve of Goulburn- Braidwood Road, the Kings Highway and the proposed access road into the southern precinct.
- A short 330 kV above ground transmission line connecting the on-site substation to the existing TransGrid 330 kV transmission line that passes through the PA.
- Minor upgrades to local roads and intersections, as required for the delivery, installation and maintenance of WTG components and other associated materials and structures.
- Up to four permanent meteorological monitoring masts.

Temporary construction facilities will also be required during construction of the Project. These include:

- Earthworks for access roads and WTG foundations.
- A temporary mobile concrete batching plant to supply concrete for WTG footings and substation construction works, and potentially rock crushing facilities for the generation of suitable aggregates for concrete batching or sized rock for access road and hardstand construction. Three representative locations and associated access roads for these facilities have been incorporated in the EIS, which would be utilised at various times as construction progresses across the PA.
- Cleared hardstand areas for construction equipment and storage (construction laydown areas).
- Temporary buildings and facilities for construction personnel / equipment, including site offices, car parking, and amenities for the construction work force, and lay down areas for the temporary storage of construction materials, plant, equipment and wind turbine components and temporary power supply for construction.
- External water supply for concrete batching and construction activities.
- The transport, storage and handling of fuels, oils and other hazardous substances for construction and operation of wind farm infrastructure.

The Project will also require the subdivision of land for the substation / switchyard and any deemed subdivision arising from the grant of leases for any other project infrastructure components.

The key Project components are discussed in further detail below.

The proposed layout of the Project, including the WTGs, access roads and key supporting infrastructure is shown in *Figure 3.1* to *Figure 3.3*. The proposed layout is indicative and subject to detailed design, during which the final location of individual infrastructure components may be refined. Such detailed design would be undertaken in accordance with any micrositing allowance and other relevant conditions of the Project Approval issued by DP&E.

Construction of the Project may be staged in response to market drivers and specific construction work packages. If construction is to be undertaken in stages, notification of such will be provided to DP&E prior to the commencement of construction, and details of each proposed stage, including any associated strategies, plans or programs, would be progressively submitted to DP&E in accordance with any relevant conditions of the Project Approval issued by DP&E.

BUNGENDORE ROAD
WILLANDRA LANE
BRAIDWOOD ROAD
LAKEVIEW ROAD
WILLOW GLEN ROAD
BORO
MOUNT FAIRY
MOUNT FAIRY ROAD
SANDHILLS ROAD
GOULBURN ROAD
BARNET DRIVE
BORO ROAD
DUCKFIELD ROAD
HAZELDELL ROAD
MULLOON
MULLOON ROAD
MANAR
MANAR ROAD
KINGS HIGHWAY
WATSONS ROAD
JONES ROAD
WARRI

Legend

- Project Area
- Project Area - Northern Precinct
- Project Area - Southern Precinct

Proposed Infrastructure

- Wind Turbine Generator
- Indicative Temporary Mobile Concrete Batching Plant Site
- Site Access Point
- Access Roads and 33kV Reticulation Network
- 33kV Transmission Line
- Substation / Operations Building Area

Existing Infrastructure

- Meteorological Monitoring Mast
- 330kV Transmission Line
- Major Road / Highway

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014) and ESRI World Imagery (2010)

N
0 1 2 3km

Client:	EPYC Pty Ltd		**Figure 3.1 - Jupiter Wind Farm Layout**
Drawing No:	0223522m_JWF_EIS_G003_R11.mxd		Jupiter Wind Farm
Date:	11/10/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: CB	

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

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ERM

Legend

- Project Area
- Proposed Infrastructure
  - Wind Turbine Generator
  - Indicative Temporary Mobile Concrete Batching Plant Site
  - Access Roads and 33kV Reticulation Network
  - 33kV Transmission Line
  - Substation / Operations Building Area
- Existing Infrastructure
  - Meteorological Monitoring Mast
  - 330kV Transmission Line
  - Major Road / Highway

Northern Precinct

BORO

BRAIDWOOD ROAD

MOUNT FAIRY ROAD

HAZELDELL ROAD

BORO ROAD

BARNET DRIVE

GOULBURN ROAD

DUCKFIELD ROAD

Concrete Batching Plant 3

Concrete Batching Plant 2

WT02

WT03

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014)
Inset : DLPI Base Map WMS 2015

N

0 500 1,000m

Client:	EPYC Pty Ltd	
Drawing No:	0223522m_JWF_EIS_G004_R09.mxd	
Date:	15/06/2016	Drawing Size: A3
Drawn By:	GR	Reviewed By: CB

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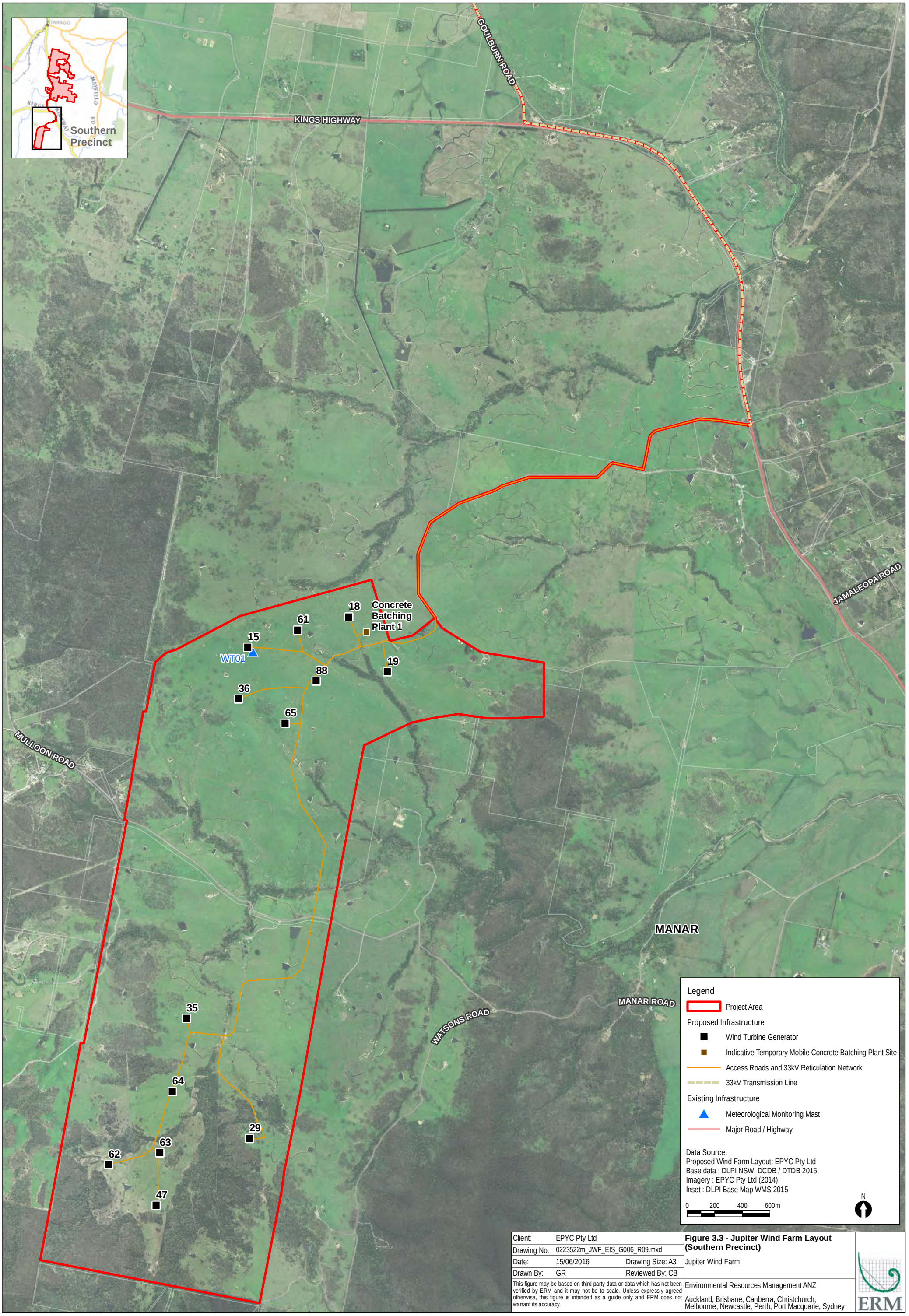
Figure 3.2 - Jupiter Wind Farm Layout (Northern Precinct)

Jupiter Wind Farm

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ERM



Client:	EPYC Pty Ltd		**Figure 3.3 - Jupiter Wind Farm Layout (Southern Precinct)**
Drawing No:	0223522m_JWF_EIS_G006_R09.mxd		Jupiter Wind Farm
Date:	15/06/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: CB	

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ERM

3.3 Project Components and Layout

The proposed layout of Project infrastructure was determined in consideration of:

- maximising exposure to the wind resource through suitable positioning of WTGs on-site including on elevated locations along gently sloping ridgelines;
- minimising associated environmental impacts, and in response to environmental constraints/sensitive areas identified through specialist assessments discussed in the later sections of this EIS (including, but not limited to ecological, heritage, visual and noise related issues);
- obtaining lease agreements with involved landholders hosting Project infrastructure; and
- outcomes of community consultation.

The proposed Project layout is illustrated in *Figure* 3.2 to *3.3*, with each of the individual components discussed in detail below.

3.3.1 Wind Turbine Generators

The Project will involve the construction and operation of up to 88 WTGs within the PA, to be installed in two precincts; with up to 75 WTGs within the northern precinct, and up to 13 WTGs within the southern precinct.

The central coordinates and approximate elevations of the current WTGs layout within each precinct are provided in *Tables 3.1* and *3.2*.

Table 3.1 ***WTG Coordinates (Northern Precinct)***

WTG No.	Easting (m)*	Northing (m)*	Elevation (m AHD)
1	744406	6109438	724
2	744346	6102432	724
3	747323	6100126	699
4	745727	6106483	680
5	743945	6109545	713
6	746442	6106428	690
7	744212	6109049	718
8	745556	6102445	684
9	744118	6101506	703
10	744847	6101969	708
11	744355	6102014	712
12	744134	6108304	701
13	744765	6108412	708
14	748237	6100284	683
16	743099	6109744	713
17	743236	6099443	677
20	745805	6102824	691
21	744416	6109825	732
22	743337	6108799	701
23	743494	6109695	740
24	744430	6102811	720

WTG No.	Easting (m)*	Northing (m)*	Elevation (m AHD)
25	743240	6110426	736
26	747802	6099561	673
27	744071	6107931	697
28	745255	6102680	702
30	748085	6099883	667
31	744857	6101587	697
32	746701	6105940	680
33	743359	6110062	738
34	743780	6109027	724
37	744772	6100957	694
38	745332	6101919	694
39	748502	6099956	671
40	744282	6101002	729
41	744510	6108708	714
42	744240	6110170	727
43	745649	6108613	690
44	743477	6106380	725
45	747883	6098802	681
46	746955	6100823	701
48	744924	6108865	695
49	743832	6109942	708
50	743529	6109312	710
51	745152	6108446	699
52	746223	6108273	671
53	744009	6107522	680
54	747035	6102064	663
55	745786	6101474	677
56	747726	6100214	675
57	747190	6100490	726
58	746645	6101051	679
59	745180	6102300	692
60	743855	6099811	686
66	744347	6100627	702
67	743999	6101878	701
68	744364	6103396	713
69	745147	6101171	688
70	745874	6101867	673
71	745340	6101530	684
72	746284	6102215	670
73	743389	6107071	683
74	743994	6108684	709
75	744014	6106122	700
76	746242	6108688	680
77	743615	6110341	706
78	745515	6109026	682
79	743151	6109226	705
80	743755	6108268	692

WTG No.	Easting (m)*	Northing (m)*	Elevation (m AHD)
81	744871	6109301	697
82	746574	6102462	666
83	746635	6102051	657
84	746268	6101014	670
85	746390	6100471	688
86	747039	6099715	686
87	743632	6106026	709
*Coordinate System is GDA94 MGA55			

Table 3.2 *WTG Coordinates (Southern Precinct)*

WTG No.	Easting (m)*	Northing (m)*	Elevation (m AHD)
15	740388	6092679	767
18	741121	6092899	744
19	741400	6092501	734
29	740402	6089116	750
35	739943	6089987	724
36	740321	6092305	749
47	739725	6088632	744
61	740751	6092804	744
62	739380	6088927	738
63	739751	6089012	732
64	739842	6089457	721
65	740659	6092128	727
88	740884	6092435	736
*Coordinate System is GDA94 MGA55			

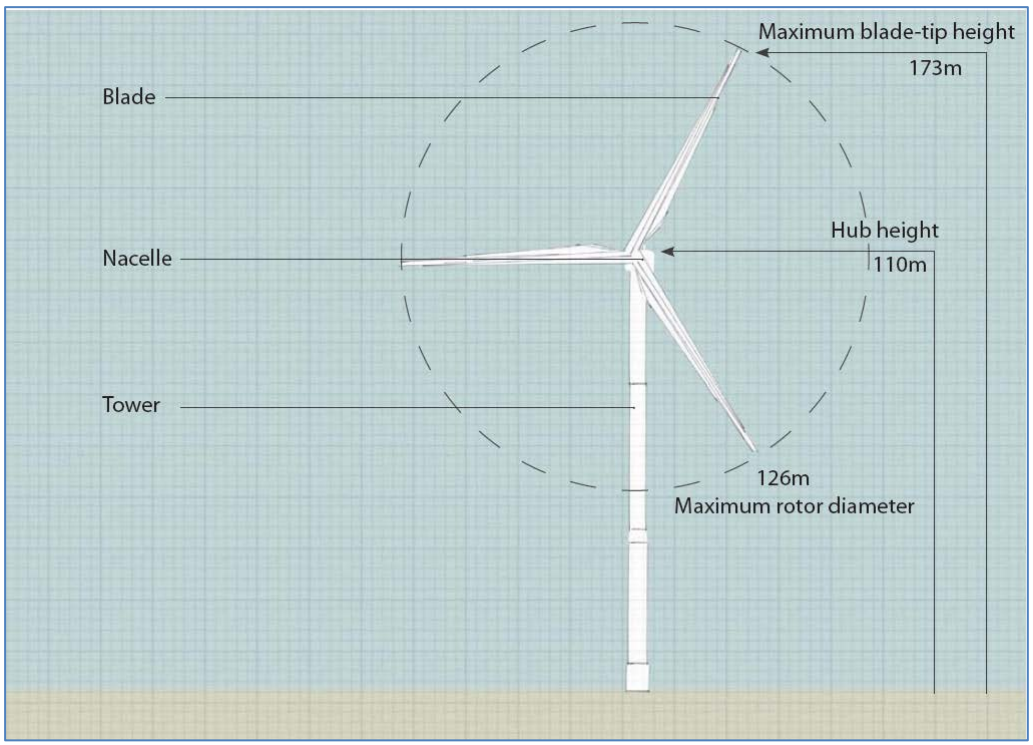
The WTG model to be used for the Project is yet to be determined, with a range of WTG models currently under consideration. The Project and selected WTG model will be designed to be compliant with the relevant Building Code of Australia (BCA) standards and other relevant international standards, including *IEC 61400-1 Wind turbines – Part 1: Design requirements*; *IEC 61400-23 Wind turbine generator systems – Part 23: Full-scale structural testing of rotor blades*; and *IEC 62305-1/3/4 Protection against lightning*.

The selected model will have a maximum generation capacity of up to 4.5 MW; however the dimensions of the WTG components including blade length, and hub and blade tip heights will vary depending on the model selected. In order to provide flexibility in selecting the WTG model, the WTG dimensions adopted for assessment as part of this EIS are the largest of the model options being considered for the Project, including a WTG with rotor diameter of up to approximately 126 m and blade length of up to approximately 62 m, giving an overall maximum tip height of approximately 173 m.

Each WTG consists of a tower, nacelle, hub and rotor. These elements will all be painted a similar colour, within a white to light grey colour palette. The painted surface will be non-reflective. The process of installing the WTGs is outlined in *Section 3.4.3*.

A schematic showing the maximum indicative dimensions of WTG used in the EIS is shown in *Figure 3.4*.

Figure 3.4 ***WTG Schematic Illustrating Maximum Indicative Dimensions***



Towers and Blades

The wind turbine tower supports the wind turbine rotor and nacelle. Each WTG will be mounted on a concrete foundation (approximately 25 m by 25 m) located on a cleared hardstand area. The actual foundation type to be utilised will be based on the results of geotechnical surveys undertaken prior to commencement of the construction at each WTG site. A crane pad/assembly area will also be required adjacent to the base of each WTG (refer *Section 3.3.2* below).

Nacelle

The nacelle is the housing that sits on the top of the turbine tower and accommodates the generator, control systems, pitch and yaw drives. The nacelle may also include the transformer and gearbox (if used) and is typically constructed of fibreglass. Given the nature of the components housed within the nacelle, oil containment and sound insulation will be provided for within each WTG. Access into the nacelle will be provided through an opening in the floor which leads to the tower.

Wind Turbine Rotor

The rotor, which includes the blades, is the portion of the WTG that captures the energy from the wind. The energy captured by the rotating blades is transferred to a generator housed within the nacelle. Blades are generally made of fibreglass reinforced with epoxy and carbon fibre. The rotor is controlled by a central wind turbine control unit (microprocessor). The microprocessor controls the rotational speed of the rotor and the pitch of the blades, thus enabling the rotor to maximise energy production from the wind resource and ensure the safe and reliable operation of the WTG. When wind speeds get too high the microprocessor controls the pitch of the blades to stop the WTG rotating. This minimises wear on the components from operating at too high wind speeds.

Each WTG will have a transformer located in either the tower behind the nacelle or mounted external to the WTG. The transformer is required to 'step-up' the electricity produced by each WTG to the on-site distribution voltage of 33 kV. Each WTG will be connected to the on-site substation via a network of 33 kV electrical reticulation and fibre optic cabling (installed predominantly underground, with some sections aboveground if required by topographical or other constraints).

Obstacle Lighting

The Aeronautical Impact Assessment (Aviation Projects 2016) provided in *Annex J* concluded that the Project does not require obstacle lighting to maintain an acceptable level of aviation safety. Notwithstanding, the Civil Aviation Safety Authority (CASA) has recommended the wind farm be lit with steady red low intensity lighting in accordance with the applicable standards in the Manual of Standards (MOS) 139, and has agreed that the WTGs that should be lit are those proposed for lighting within the Aviation Projects (2016) report.

3.3.2 Crane Pads / Assembly Areas

A hardstand will be required adjacent to the base of the WTGs to enable the assembly and erection of the tower, nacelle and blade components. The final design will depend on the topography of the surrounding land, however each crane pad will consist of crushed rock hardstand of approximately 50 m by 30 m.

Whilst it is anticipated that the majority of crane pads will remain in situ to allow for future maintenance or removal of the WTGs, there may be the opportunity to apply a top soil layer to the laydown portions to allow grazing activities to resume.

3.3.3 Site Access and Internal Access Roads

The PA is located adjacent to Goulburn-Braidwood Road in the northern precinct and the Kings Highway in the southern precinct. Both arterial roads are sealed and provide a strategic freight function in the locality.

Vehicle access to the northern precinct is proposed via two separate intersections off Goulburn-Braidwood Road, whilst the southern precinct will be accessed via an intersection off the Kings Highway, as shown in *Figure 3.1*.

The construction and maintenance of the Project will require the construction of a private access road network within the PA. The roads will provide ongoing access to the WTGs and other Project infrastructure. Where possible, the internal road network will be aligned on the route of existing farm or other tracks. In the case of the southern internal access road, it should be noted that the existing road alignment does not align with the current cadastral road reserve, so the proposed road corridor alignment (incorporating the 33 kV transmission line corridor) has been located within the current cadastral road reserve.

The internal roads will be up to 8 m wide (which includes an approximate 1 m shoulder on either side). Localised widening may be required in some locations in order to support transportation of the WTG components. The proposed internal road network is shown in *Figures 3-2* to *3-4*.

The internal access road network will incorporate two crossings of Lower Boro Road for access to the WTGs located in the northern precinct (between WTG 53 and WTG 73; and WTG 75 and WTG 4). Boro Road is an unsealed road that provides access to properties east of Goulburn-Braidwood Road. No major works are proposed within Lower Boro Road. Some minor works may be required at these road crossing locations, which would be determined during detailed design.

3.3.4 Electrical Reticulation Network

To distribute electricity generated from the Project, it is necessary to connect the network of WTGs into the national electricity grid. This is achieved through connecting the WTGs to the on-site electrical substation through a network of 33 kV electrical cables. From the on-site substation, a short overhead 330 kV transmission line will be constructed to connect to the existing 330 kV TransGrid transmission line, which passes through the PA (refer *Figure 3.1*).

On-Site Substation

An electrical substation compound is proposed within the Northern Precinct of approximate dimensions 350 m by 160 m. The primary purpose of the electrical substation / switchyard is the reception, transformation and distribution of electrical power and energy. The substation compound will house a series of transformers, switch gear, insulators and ancillary equipment.

The transformers and radiators in the electrical substation will be located on foundations and will be surrounded by concrete bunds. These bunds will have sufficient capacity to retain all of the oil utilised in each transformer.

The location of the substation is identified on *Figure 3.1*. An image of a typical wind farm substation is provided in *Photograph 3.1.*

Photograph 3.1 Typical Wind Farm Substation (Source: CitiPower and Powercor Australia, 2015)



330 kV Transmission Line Connection

A short 330 kV overhead transmission line connection is proposed to connect the on-site substation to the existing TransGrid 330 kV overhead transmission line network, which is located immediately adjacent to the substation compound.

EPYC has been in discussions with TransGrid regarding the Project since 2011 (refer *Annex A* for further details regarding this consultation). This consultation has determined TransGrid's support of the Project and that the existing 330 kV transmission line has the capacity to receive the electricity generated by the Project. Formal correspondence from TransGrid in August 2015 confirmed this position. Consultation with TransGrid will continue as the Project progresses.

33 kV Cable and Fibre Optic Network

Each of the WTGs will be connected to the on-site substation via a 33 kV electrical cable and fibre optic network. It is anticipated that the majority of the 33 kV electrical reticulation network within each of the precincts will be underground, however some sections of the network may be required to be located above ground due to topographical or environmental constraints. This will be confirmed during the detailed design phase.

The 33 kV transmission line connecting the 33 kV electrical reticulation networks within each precinct will extend from the southern precinct to the substation site. Both overhead and underground installation options for this transmission line have been considered during the assessment phase, and a decision has been made to adopt the underground option as preferred in order to avoid potential environmental impacts wherever feasible (refer *Chapter 5* for further discussion). As such, the assessment has been undertaken based on the assumption that the final design of the transmission line will consist predominantly (or entirely) of underground installation (consisting of a 4 m wide development corridor along the full length of the line), with overhead only utilised in specific circumstances where underground installation is not feasible. This will be confirmed during the detailed design phase.

The transmission line will be incorporated within the proposed access corridor that extends in a generally easterly direction from the southern precinct to the intersection with the Kings Highway. From there, the transmission line will cross the Kings Highway via an under bore crossing, then turn north, extending along the eastern side of the Kings Highway and Goulburn-Braidwood Road, located between the existing road verge and fence line. It will continue along Goulburn-Braidwood Road to the intersection with the existing 330 kV easement, where it turns east and run adjacent to the northern boundary of the existing easement to the substation site (refer *Figures 3.2* to *3.3*).

It should be noted that in some locations along the existing southern access road, the Kings Highway and Goulburn-Braidwood Road, the existing road pavement does not align with the current cadastral road reserve. In the case of the southern access road, the proposed road corridor alignment (incorporating the transmission line corridor) is located within the current cadastral road reserve. In the case of the Kings Highway and Goulburn-Braidwood Road, the proposed transmission line corridor alignment has been located relative to the existing road verge.

The overall construction type will be determined during detailed Project design in consultation with relevant electrical suppliers and regulatory authorities. It is anticipated that the transmission line will be designed and constructed to meet TransGrid standards and following construction, will be owned and operated by TransGrid. Formal correspondence supporting this approach was provided by TransGrid in August 2015 (refer *Annex A*).

3.3.5 Permanent Operations and Maintenance Building

A permanent site operations and maintenance facility will be constructed to provide for all operations and maintenance activities associated with the Project. It will be located adjacent to the substation site, and incorporate car parking facilities for employee and service vehicles. During operations, permanent staff will occupy these premises. Whilst most activity is anticipated to occur during business hours Monday to Friday, access to the site will be required on a 24 hour basis, seven days a week, and the facility will therefore require night lighting, which would be installed in accordance with relevant standards.

3.3.6 Meteorological Monitoring Masts

There are currently three meteorological monitoring masts located within the PA. These masts may be replaced with 3-4 permanent monitoring masts during Project construction. The monitoring masts will assist in verifying the performance of the WTGs during operation of the Project. It is anticipated that the permanent masts will be approximately 110 m AGL, equivalent to the hub-height of the installed WTGs, and would be supported by a small concrete foundation (approximately 1 m^2) and guy wires.

The locations of the existing meteorological monitoring masts are shown on *Figure 3.1*. The location of the permanent monitoring masts is not known at this stage and would be subject to detailed design, however they would be located amongst the WTGs within each precinct.

3.3.7 Temporary Facilities

Construction of the Project will require a range of temporary buildings and facilities for construction personnel / equipment, including construction compound (including site offices, car parking, and amenities for the construction work force), mobile concrete batching plant, laydown and storage areas for the temporary storage of construction materials, plant, equipment and wind turbine components, and temporary power supply for construction.

The indicative location of temporary facilities and activities associated with construction of the Project are outlined in *Section 3.4*.

3.3.8 Micrositing

The proposed layout of all Project infrastructure components will be finalised during detailed design, which would incorporate detailed geotechnical investigations and selection of the final wind turbine model. In order to facilitate refinement of the layout during the detailed design process, an allowance for micrositing of WTGs and infrastructure components by up to 100 m radius from the locations identified in the EIS is sought.

Such detailed design would be undertaken in accordance with any relevant conditions of the project approval issued by DP&E, and final layout documentation would be prepared and submitted to the DPE prior to the commencement of construction.

3.4 Project Construction

3.4.1 Staging of Construction Activities

In general, construction activities will initiate with site establishment followed by the construction of the internal access roads, crane pads and laydown areas at the WTG locations. The laying of the underground electrical cabling, which wherever practicable will be sited within the shoulder of access roads, will progress in conjunction with the access road construction. These activities will be followed by the construction of the concrete footings for the WTGs and any additional meteorological monitoring masts should they be considered necessary.

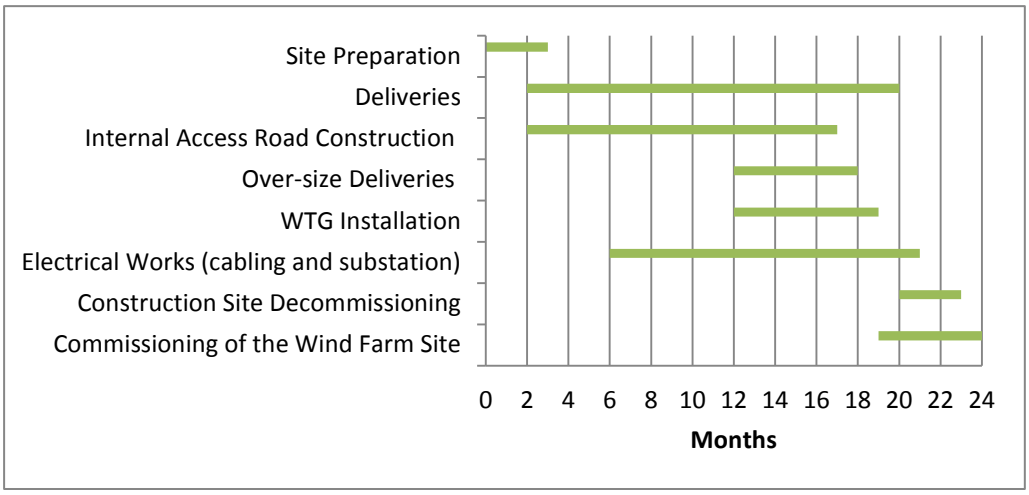
Once footings are in place and the concrete adequately cured, the WTGs can be erected. Following delivery of the main WTG components, it is anticipated that crane operations associated with WTG erection will take two or three days to complete for each WTG, depending on weather conditions. Construction of the substation, 330 kV transmission line connection, and 33 kV transmission line from the southern precinct to the on-site substation will likely be undertaken in parallel with the installation of WTGs.

The commissioning of the Project will involve checks on all high voltage equipment prior to the connection to the existing TransGrid transmission line network. Once the electrical reticulation network has been successfully energised, each WTG will be separately commissioned.

Assuming approval for the Project is granted in the first quarter of 2017, the Project is currently expected to be operational in 2020 based on an anticipated construction timeframe of approximately 18-24 months. The current indicative timing of key Project milestones is presented in *Figure 3.7*.

Construction of the Project may be staged in response to market drivers and specific construction work packages. If construction is to be undertaken in stages, notification of such will be provided to DP&E prior to the commencement of construction, and details of each proposed stage, including any associated strategies, plans or programs, would be progressively submitted to DP&E in accordance with any relevant conditions of the project approval issued by DP&E.

Figure 3.5 ***Anticipated Timeline for Construction Phase of the Project***



3.4.2 Transport of Materials and Equipment

WTG Transport

To facilitate transportation and ease of installation, the WTG tower support structure is manufactured in up to six sections. Due to the size of the WTG components, the truck and trailer configurations to transport the components are classified as Restricted Access Vehicles (RAVs). RAVs require permits which specify the designated route for travel, the number of escorts required and the time in which the RAVs can travel through certain road zones.

The proposed transport routes, including details of minor road upgrades that would be required for transport of oversized project components are discussed in detail in *Chapter 13*. In summary, the RAV route from Port Kembla to the PA would involve access from the Hume Highway southern interchange, via Goulburn through Hume Street, Clinton Street, Sloane Street and then onto Goulburn- Braidwood Road to the PA. This route was used to provide access for RAVs for the nearby Capital and Woodlawn wind farms and has therefore already been subject to a number of modifications such as mountable kerbs to accommodate the vehicles associated with these other wind farm developments.

The final RAV route will be dependent on further consultation and approval from Roads and Maritime Services (RMS), Goulburn-Mulwaree and former Palerang Councils, and private property owners along the route.

Other Vehicles

Heavy vehicles will be required transport materials and equipment associated with construction of the Project. It is anticipated that heavy vehicles will consist of vehicles up to and including 19 m long semi-trailers and B-Doubles (standard vehicles) and concrete trucks. It is expected that the presence of the temporary concrete batching plant will reduce the number of external concrete truck movements to and from the PA.

Light vehicles comprising cars, four-wheel drives and utility vehicles attributed to Project personnel will also access the PA during construction and operation of the Project.

An assessment of the road network capability to support the RAVs and all construction and operational traffic is provided in *Chapter 13*.

3.4.3 WTG Installation

Excavation for the WTG foundations will be carried out with mechanical equipment. The design of the WTG foundations will depend on localised geotechnical conditions, however will likely consist of concrete based footings. Topsoil and spoil from excavation will be stockpiled for reuse to backfill over the foundation and for vegetation rehabilitation of the PA. Excess materials will be utilised at other parts of the PA.

The towers, nacelles and blades will be lifted off delivery trucks using mobile cranes. Cranes will then assist in the assembly of the rotor and the installation of the towers, nacelles and rotors.

3.4.4 Temporary Mobile Concrete Batching Plant

A temporary mobile concrete batching plant is proposed to provide concrete for the WTG foundations but may also provide materials for building and substation foundations, bunding and culverts. The indicative locations for placement of the mobile batching plant are shown in *Figures 3.1* to *3-4*, each of which will be utilised at various periods during construction works as required.

The batching plant is likely to include a slump stand, water tanks and stockpiles of gravel and sand, and may also include rock crushing facilities depending on the source materials used for construction. Whilst the exact details of the facility will be determined during the detailed design phase, typically the area required for the plant and storage of materials will be approximately 100 m by 100 m at each of the three proposed locations. The batching plant will be bunded to contain runoff and potential contaminants.

Materials for the plant will be primarily sourced from an external supplier to be determined during the procurement phase of the Project. It is anticipated the cement will be stored in a silo adjacent to the batching process machinery. Concrete agitators will transfer the concrete from the batching plant to the WTG foundation locations.

The concrete batching plant will be removed following the completion of construction at each WTG precinct and all locations rehabilitated and returned to agricultural use.

3.4.5 Resource Requirements

Construction materials including gravel, aggregate and sand will be required for the construction of hardstands to support Project infrastructure, including internal access roads. It is anticipated that that material from the excavation of crane pad sites will be recycled into the construction of roads, however this will need to be confirmed with geotechnical testing of the excavated material as the works commence. Otherwise, gravel, aggregate and sand will be sourced externally, supplied to the PA by trucks and stockpiled within the laydown areas.

Water supply for the mobile concrete batching plant, dust suppression and other construction activities will also be required on-site. It is anticipated that water for construction will be imported from external local sources (subject to approval), or supplied from existing on-site dams (subject to seasonal availability). Estimated construction water demands and water supply options are discussed in greater detail in *Chapter 14*. The most feasible and economic water supply option will be further investigated and confirmed during detailed design.

3.4.6 Construction Work Force

It is anticipated that during construction up to 336 full time equivalent (FTE) staff will be directly employed in the local region utilising modelled estimates outlined in SKM (2012) *Wind Farm Investment, Employment and Carbon Abatement in Australia* (and based on an assumed 350 MW installed capacity for the Project).

3.4.7 Construction Hours

It is anticipated that construction of the Project will be undertaken in general accordance with the DECC (2009) *Interim Construction Noise Guideline*, with the standard hours of work being:

- Monday to Friday: 7.00am-6.00pm;
- Saturday: 8.00am-1.00pm; and
- no works on Sunday or public holidays.

Some out of hours work may be required, including vehicle movements (to, from and on-site), which could occur depending on logistical and safety requirements imposed by relevant regulatory authorities e.g. NSW Police. This work would generally be limited to delivery of oversized plant or structures or emergency work. If a need to work outside the recommended standard hours of construction is identified, these works would be justified and form part of the Construction Environmental Management Plan (CEMP) to be prepared for the Project post approval.

3.4.8 Post Construction Site Rehabilitation

The PA will be progressively rehabilitated throughout the course of construction. All temporary plant and equipment will be removed, with areas revegetated and rehabilitated as required in consultation with involved landholders hosting infrastructure. Adequate sediment, soil and erosion controls will be put in place during ground disturbing works and rehabilitation activities in accordance with the *Managing Urban Stormwater: Soils and Construction- Volume 1* (The 'Blue Book') (Landcom 2004).

Post construction rehabilitation requirements and processes will be detailed in the CEMP to be prepared prior to commencement of construction of the Project, and undertaken in accordance with any relevant conditions of the Project Approval issued by DP&E.

3.5 Development Footprint

The Development Footprint for the Project includes the Permanent and Temporary Development Footprints. These are:

- Permanent Development Footprint, which is the area of land that will be subject to permanent alteration as a result of installation and operation of Project infrastructure, covers approximately 63.7 ha, and is comprised of:
  - WTG foundation (each approximately 25 m x 25 m);
  - crane pads (each approximately 50 m x 30 m);
  - access roads (up to approximately 6 m wide);
  - substation compound and adjacent operations and maintenance facility (approximately 350 m x 160 m);
  - 33 kV transmission line from the intersection of the southern access road and the Kings Highway to the internal substation site in the northern precinct (approximately 4 m wide);
  - up to four meteorological monitoring masts (approximately 1 m^2 per mast); and
  - 330 kV overhead transmission line from the substation site to the existing TransGrid 330 kV transmission line easement (footprint contained wholly within the substation site and existing TransGrid 330 kV transmission line easement).

- Temporary Development Footprint, which is the area that will be temporarily disturbed during construction of the Project and rehabilitated following construction, covers approximately 22.6 ha, and is comprised of:
  - laydown / assembly areas (each approximately 200 m² adjacent to the crane hardstand and WTG foundation);
  - access road construction (approximately 1 m batters either side of the permanent access road); and
  - mobile concrete batching plant, including associated temporary access roads (approximately 100 m x 100 m at each location).

The anticipated total Development Footprint for the Project is approximately 86.3 ha, comprising approximately 1.7 % of the total PA.

It should be noted that the impact assessment has been undertaken based on the estimated total Development Footprint associated with the Project, notwithstanding that temporary impacted areas will be rehabilitated at completion of construction.

3.6 Project Operation

Upon commissioning, the Project will be operational 24 hours a day, seven days per week. The Project will be controlled by a remote supervisory control and data acquisition (SCADA) from a control room located within the permanent site operations and maintenance facility. Where required, assistance from an off-site SCADA engineering team may be sought. The SCADA system will allow remote operation of all WTGs with the ability to shut-down individual or all WTGs if required. The SCADA system also allows for the Project to operate at optimal capacity through synchronising with the internal WTG control systems to alter rotor speed and blade pitch depending on wind conditions.

3.6.1 Servicing and Maintenance

Regular maintenance will be undertaken on WTGs and other plant and equipment by internal and specialised contractors throughout the operation of the Project. It is anticipated that up to 32 FTE technical personnel, maintenance and support staff will be employed during operation based on modelled estimates outlined in SKM (2012) *Wind Farm Investment, Employment and Carbon Abatement in Australia* (and based on an assumed 350 MW installed capacity for the Project).

Circumstances may arise where unplanned equipment failure occurs due to environmental events or other factors. The majority of repairs can be undertaken during routine maintenance; however WTG components requiring replacement would need to be undertaken using a crane in a similar manner to their installation. In addition, replacement of WTGs may occur throughout the operational life of the Project as improved technologies become available.

3.7 Decommissioning and Rehabilitation

The WTGs have an expected 25 to 30 year operating life, at the end of which there are three main options for consideration:

- continue the use of the site as a wind farm using the existing WTGs;
- decommission the Project and remove the WTGs and associated infrastructure in accordance with a Decommissioning and Rehabilitation Plan; or
- replace the WTGs with technology current at that time and continue the use of the site as a wind farm for a further term.

Subject to the specific agreements reached with landholders hosting Project infrastructure, replacement of WTGs is considered the most probable scenario given:

- there is likely to be an ongoing and increasing demand for renewable energy into the future;
- there is a significant wind resource able to be utilised at the site; and
- the likelihood of demonstrating ongoing commercial viability of continuing an existing operation is considered high.

A Preliminary Decommissioning and Rehabilitation Plan has been prepared for the Project in accordance with the SEARs and provided in *Annex O*. The decision to decommission the Project will be subject to the wind farm owner's considerations towards the final years of the operational life of the WTGs. It will be the responsibility of the Proponent or the wind farm owner at the time of decommissioning, to fund and execute the decommissioning of the Project.

The Proponent has entered long-term lease agreements with the involved landholders for the construction and operation of the Project. The terms of these agreements make express provision for the Proponents decommissioning obligations. Until decommissioning is complete, licence fees are also payable to the involved landholders. Therefore, there is no incentive for the wind farm owner at the time of decommissioning to leave wind farm components in-situ and not complete decommissioning, as they would continue to be committed to payment of licence fees to the involved landholders without receiving income generated from the wind farm.

It is anticipated that a fund to cover the costs of decommissioning the Project infrastructure and rehabilitating the PA will be established prior to commencement of construction of the Project, once the detailed design of the Project is complete. The size of the decommissioning fund will be based on the estimated cost of decommissioning and the value of the WTGs and associated infrastructure at the time of the fund's establishment.

The decommissioning work will be undertaken in consultation with key stakeholder including the involved landholders to identify their preference to retain some Project components on their property, such as infrastructure with the potential to enhance their current agricultural activities.

It is anticipated that the decommissioning and rehabilitation phase would commence no longer than 18 months after a decision is made to cease operations and would take up to 18 months to complete, with the PA being returned, as far as practicable, to its condition prior to the commencement of construction.

3.8 References

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Sinclair, Knight and Merz (SKM) (2012) *Wind Farm Investment, Employment and Carbon Abatement in Australia***.** Report prepared for the Clean Energy Council, July 2012.

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4 SITE ANALYSIS

4.1 Introduction

This chapter describes the existing conditions and land uses within the PA and broader locality and identifies potential land use conflicts with existing and potential future land uses.

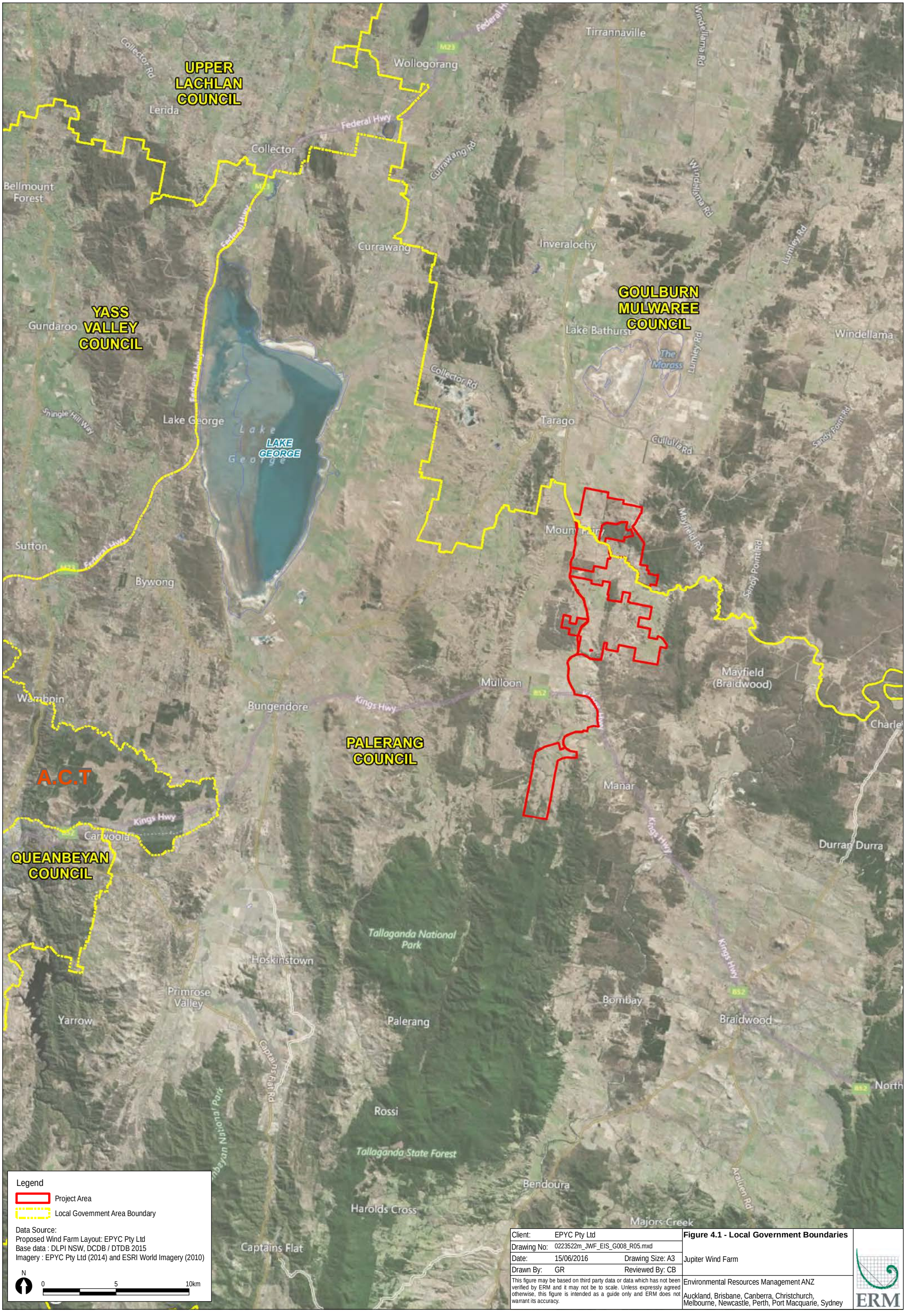
4.2 Project Location

The Project is located within the Southern Tablelands region adjacent to Goulburn-Braidwood Road, extending from approximately 5 km south of the township of Tarago, to approximately 9 km south of the intersection of Goulburn-Braidwood Road and the Kings Highway (refer *Chapter 1*, *Figure 1.1)*.

The nearest major township is Goulburn, located approximately 40 km to the north of the PA. The smaller township of Bungendore is located approximately 17.5 km west of the PA with Braidwood located approximately 20 km to the south east. Lake Bathurst is located approximately 5.5 km north of the northern extent of the PA.

Goulburn-Braidwood Road (State classified road) generally runs north-south along the western boundary of the PA and is the main access road to the northern precinct. The Kings Highway (State classified road) runs generally east-west between the northern and southern precincts, and is the main arterial road providing access to the southern precinct. Internal access roads will be constructed to provide vehicle access to WTGs and other key project infrastructure as shown in *Chapter 3*, *Figure 3.1* to *Figure 3.3*.

The PA extends across the Goulburn Mulwaree Local Government Area (LGA) and the former Palerang LGA (now merged with Queanbeyan – refer to *Chapter 6*) (refer *Figure 4.1*).



Client:	EPYC Pty Ltd		**Figure 4.1 - Local Government Boundaries**
Drawing No:	0223522m_JWF_EIS_G008_R05.mxd		
Date:	15/06/2016	Drawing Size: A3	Jupiter Wind Farm
Drawn By:	GR	Reviewed By: CB	

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4.3 Site Details

The PA covers a total area of approximately 4,999 hectares (ha). The PA is relatively narrow in its east-west extent, varying from approximately 4.5 km in the northern precinct and 2 km in the southern precinct. The length of the PA, north to south is approximately 23 km, noting that the two precincts are joined only by a narrow corridor that follows the existing road reserves of Goulburn- Braidwood Road, the Kings Highway and the proposed access road into the southern precinct, which is also the proposed alignment of the 33 kV transmission line.

The development footprint associated with the project infrastructure including WTGs, an electrical substation, operations and maintenance buildings, internal access roads and electrical reticulation network and other associated ancillary infrastructure, will cover an area of approximately 86.3 ha (including permanent and temporary infrastructure), which constitutes approximately 1.7% of the PA (refer *Chapter 3*).

The Proponent has entered into commercial lease agreements with 23 involved landholders (encompassing 87 individual lots) hosting Project infrastructure. A summary of the lots comprising the PA, separated by precinct are provided in *Table 4.1* and *Table 4.2*, and cadastral boundaries are illustrated in *Figure 4.2* and *Figure 4.3*.

Table 4.1 ***Cadastral Data within the Project Area (Northern Precinct)***

Lot Number	Deposited Plan (DP)	Lot Number	Deposited Plan (DP)	Lot Number	Deposited Plan (DP)
2	709029	44	754867	123	754867
200	727516	49	754867	51	754867
195	750033	97	754867	101	754867
2	1026850	148	754867	140	750004
33	750033	47	754867	64	750004
2	711124	146	754867	52	754867
2	842007	66	754867	102	754867
37	750004	106	754867	1	131392
134	750004	18	754867	76	754867
6	720128	89	754867	40	754867
197	750033	30	754867	1	131391
78	750033	133	754867	63	750004
146	750004	33	754867	19	754867
38	750004	24	754867	41	754867
163	750004	45	754867	*90*	*754867*
193	750033	5	711027	*150*	*754867*
2	655745	46	754867	*58*	*754867*
76	750004	21	754867	*1*	*1157498*
79	750033	127	754867	177	44403
124	754867	65	754867	199	727516
122	754867	61	754867	68	754867
50	754867	1	842007	39	754867
29	754867	17	754867	1	1140493
105	754867	4	734346	28	754867
13	754867	38	754867	3	1158319
67	754867	117	750004	105	750033
104	754867	119	754867	104	750033
93	754867	48	754867		
32	754867	60	754867		

Table 4.2 ***Cadastral Data within the Project Area (Southern Precinct)***

Lot Number	Deposited Plan (DP)
105	754897
107	754897

The proposed 33 kV transmission line alignment connecting the 33 kV electrical reticulation network from the southern precinct to the substation site extends along the proposed southern access road, along the eastern side of the Kings Highway and Goulburn-Braidwood Road, then adjacent to the northern boundary of the existing 330 kV easement to the substation site.

It should be noted that in some locations along the existing southern access road, the Kings Highway and Goulburn-Braidwood Road, the existing road formation does not align with the current cadastral road reserve. In the case of the southern access road, the proposed road corridor alignment (which will incorporate the access road and 33 kV transmission line) is located within the current cadastral road reserve. In the case of the Kings Highway and Goulburn-Braidwood Road, the proposed transmission line corridor alignment has been located relative to the existing road verge and within the current cadastral road reserve. A summary of the lots through which the proposed 33 kV transmission line passes is provided in *Table 4.3*, all of which are located within the northern precinct in proximity to the substation site *(refer Figure 4.2)*.

Table 4.3 ***Cadastral Data along the Proposed 33 kV Transmission Line from Southern Precinct to the Substation***

Lot Number	Deposited Plan (DP)	Land Status	Landholder Status
7004	1020765	Crown	-
66	754867	Freehold	Involved
1	842007	Freehold	Involved
58	754867	Freehold	Involved
1	1157498	Freehold	Involved

Involved Landholder Lots

Landholder Id			
1	11	21	31
2	12	22	32
3	13	23	33
4	14	24	34
5	15	25	35
6	16	26	36
7	17	27	37
8	18	28	38
9	19	29	39
10	20	30	40

Northern Precinct

ROSEVIEW ROAD
BRAIDWOOD ROAD
MOUNT FAIRY ROAD
HAZELDELL ROAD
BORO ROAD
BARNET DRIVE
GOULBURN ROAD
DUCKFIELD ROAD
BORO
WT02
WT03
Construction Compound / Concrete Batching Plant 3
Construction Compound / Concrete Batching Plant 2
2/DP709029
2/DP1026850
2/DP711124
5/DP711027
1/DP1157498
1/DP842007
2/DP842007
1/DP1140493
3/DP1158319
2/DP655745
4/DP734346
133/DP754867
13/DP754867

Legend

- Project Area
- Proposed Infrastructure
  - Wind Turbine Generator
  - Indicative Temporary Construction Compound / Mobile Concrete Batching Plant Site
  - Access Roads and 33kV Reticulation Network
  - 33kV Transmission Line
  - Substation / Operations Building Area
- Existing Infrastructure
  - Meteorological Monitoring Mast
  - 330kV Transmission Line
  - Major Road / Highway

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014)
Inset : DLPI Base Map WMS 2015

N
0 500 1,000m

Client:	EPYC Pty Ltd		
Drawing No:	0223522m_JWF_EIS_G016_R02.mxd		
Date:	16/11/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: CB	

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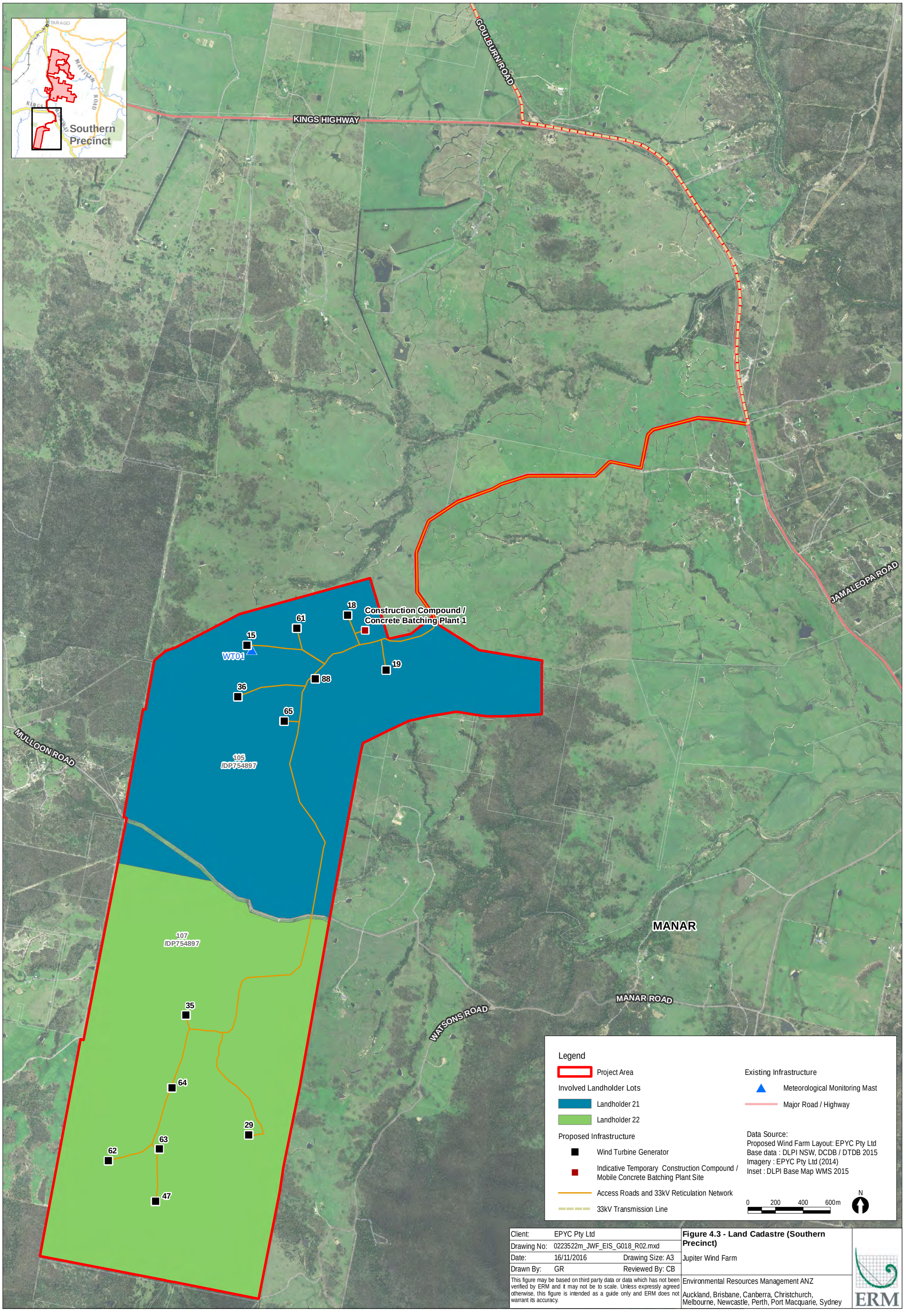
Figure 4.2 - Land Cadastre (Northern Precinct)

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Client:	EPYC Pty Ltd		**Figure 4.3 - Land Cadastre (Southern Precinct)**
Drawing No:	0223522m_JWF_EIS_G018_R02.mxd		Jupiter Wind Farm
Date:	16/11/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: CB	Environmental Resources Management ANZ

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4.3.1 Residential Dwellings

Dwelling / Receptor Identification

Properties or land holdings identified by the Proponent have been assigned a unique 'J' number. This 'J' number is determined by the Proponent on a case-by-case basis and uniquely identifies each property or land that was considered by the Proponent inside (ie. involved or participating land holders) or surrounding (non-involved land holders) the PA.

In multiple circumstances individual properties or land holdings include more than one dwelling or other structure, which would otherwise be identified by the same 'J' number based on land ownership. For the purposes of the EIS and associated technical studies however, it is important to be able to differentiate between individual dwellings or receptors, especially where multiple dwellings (or structures) existing within a property area.

Accordingly, ERM assigned each dwelling or structure a unique ID for the purposes of the EIS. These EIS ID are based on and are clearly linked to the Proponents 'J' number. Where multiple dwellings or other structures have been identified in a property or land holding the EIS ID was established by simply including a letter (A, B, C or D etc) to the end of the existing 'J' number. For example at property J103, four structures have been identified; two dwellings and two sheds. For the purpose of the EIS these structures are uniquely identified as J103A and J103B for the dwellings and J103-SA and J103-SB for the other structures (sheds). Where only one dwelling (or other structure) has been identified in a property or land holding the Proponent's 'J' number was applied for the purposes of the EIS.

The EIS ID were finalised in May 2016. Subsequently, the features of some dwellings may have changed to that assessed here. Specifically, some dwellings are identified as "to be built", or "DAA" (representing Development Application approved) but may have been partially or fully constructed and occupied at the time that the EIS (and associated technical studies) was submitted and subsequently put on public display. These features do not affect the outcomes of the EIS and associated technical studies which, for the purpose of assessing impacts, were prepared based on the dwellings being constructed and occupied.

Identified Dwellings

For the purpose of this EIS, landholders hosting Project infrastructure are referred to as 'involved landholders', with all other landholders in proximity to the PA referred to as 'non-involved landholders'.

There are a total of 15 involved landholder dwellings within the PA, all of which are located within 2 km of a proposed WTG. There are a total of 63 non-involved landholder dwellings (including one dwelling not yet constructed (J162)) located within 2 km of a proposed WTG; 50 of which (44 owners) are located with 2 km of a proposed WTG in the northern precinct, and 13 of which are within 2 km of a proposed WTG in the southern precinct. The locations of all residential dwellings within proximity to the PA are shown in *Figure 4.4* and *Figure 4.5*, and the respective approximate distance to the location of the nearest WTG is outlined in *Table 4.4*.

Table 4.4 *Distances from Residential Dwellings to the Nearest Proposed WTG*

ID	Status	Easting (m)[1]	Northing (m)[1]	Nearest WTG	Approximate Distance to nearest WTG (m)[2]
J79	Involved Landholder	742678	6099519	17	563
J89	Involved Landholder	742923	6106135	44	605
J44	Involved Landholder	744067	6106726	75	606
J119	Involved Landholder	742009	6092676	19	634
J151	Involved Landholder	740388	6090540	35	710
J53	Involved Landholder	744982	6106579	4	751
J12B	Involved Landholder	743588	6103119	68	824
J163	Involved Landholder	745543	6100089	85	929
J12A	Involved Landholder	743409	6103064	68	1011
J165	Involved Landholder	743165	6102466	67	1020
J96A	Involved Landholder	742667	6105528	87	1086
J140	Involved Landholder	743132	6101006	9	1106
J96B	Involved Landholder	742750	6105322	87	1129
J103B	Involved Landholder	742583	6107895	73	1153
J103A	Involved Landholder	742505	6107961	22	1181
J70	Dwelling 1 - 2km	739472	6091650	36	1072
J146	Dwelling 1 - 2km	746184	6104994	32	1078
J208	Dwelling 1 - 2km	745869	6099526	85	1079
J216	Dwelling 1 - 2km	744854	6099403	60	1079
J237	Dwelling 1 - 2km	741499	6091426	19	1080
J16	Dwelling 1 - 2km	743867	6104375	68	1098
J197	Dwelling 1 - 2km	738848	6090268	35	1130
J255	Dwelling 1 - 2km	741085	6090116	35	1149
J144	Dwelling 1 - 2km	746494	6104799	32	1160
J162	Dwelling 1 - 2km	748557	6101408	14	1169
J178	Dwelling 1 - 2km	742061	6099366	17	1178
J138	Dwelling 1 - 2km	742295	6107519	73	1182
J174A	Dwelling 1 - 2km	748193	6102321	54	1186
J241	Dwelling 1 - 2km	739229	6091823	36	1194
J76A	Dwelling 1 - 2km	745945	6110174	78	1226
J145	Dwelling 1 - 2km	745726	6105138	32	1263
J141	Dwelling 1 - 2km	746551	6103871	20	1286
J20	Dwelling 1 - 2km	742740	6102263	67	1317
J76b	Dwelling 1 - 2km	745980	6110265	78	1323
J392	Dwelling 1 - 2km	742308	6107841	73	1327
J40	Dwelling 1 - 2km	744089	6104771	87	1336
J3	Dwelling 1 - 2km	745692	6110374	81	1351
J217	Dwelling 1 - 2km	745680	6099319	85	1353
J87	Dwelling 1 - 2km	742702	6105043	87	1353
J174B	Dwelling 1 - 2km	748387	6102234	54	1363
J105	Dwelling 1 - 2km	738940	6092132	36	1392
J148	Dwelling 1 - 2km	746014	6104219	20	1411

ID	Status	Easting (m)[1]	Northing (m)[1]	Nearest WTG	Approximate Distance to nearest WTG (m)[2]
J269	Dwelling 1 - 2km	746899	6097757	45	1435
J226	Dwelling 1 - 2km	745401	6099419	85	1444
J85	Dwelling 1 - 2km	742574	6102275	67	1479
J88	Dwelling 1 - 2km	738838	6092449	36	1490
J194	Dwelling 1 - 2km	740800	6087598	47	1492
J120	Dwelling 1 - 2km	738906	6091824	36	1495
J227	Dwelling 1 - 2km	741806	6089667	29	1508
J142	Dwelling 1 - 2km	746010	6104388	20	1577
J425	Dwelling 1 - 2km	741737	6098901	17	1594
J147	Dwelling 1 - 2km	746447	6104325	20	1633
J235	Dwelling 1 - 2km	745302	6099055	60	1633
J393	Dwelling 1 - 2km	738904	6091486	36	1637
J224	Dwelling 1 - 2km	738743	6092769	36	1645
J257	Dwelling 1 - 2km	741556	6110433	25	1684
J152	Dwelling 1 - 2km	746501	6110413	78	1702
J234A	Dwelling 1 - 2km	747774	6103681	82	1711
J134	Dwelling 1 - 2km	741536	6110624	25	1715
J424	Dwelling 1 - 2km	741606	6098909	17	1715
J234B	Dwelling 1 - 2km	747601	6103861	82	1735
J75A	Dwelling 1 - 2km	742333	6104756	87	1817
J422	Dwelling 1 - 2km	741808	6098273	17	1846
J5	Dwelling 1 - 2km	742375	6102772	67	1854
J116B	Dwelling 1 - 2km	742116	6101885	67	1883
J230A	Dwelling 1 - 2km	747497	6110096	76	1886
J75B	Dwelling 1 - 2km	742283	6104697	87	1894
J184	Dwelling 1 - 2km	741451	6100095	17	1900
J115	Dwelling 1 - 2km	738440	6092661	36	1914
J126B	Dwelling 1 - 2km	741615	6111462	25	1927
J153	Dwelling 1 - 2km	746929	6110488	76	1927
J60	Dwelling 1 - 2km	744900	6111980	42	1927
J135	Dwelling 1 - 2km	741319	6110706	25	1941
J116A	Dwelling 1 - 2km	742069	6102101	67	1943
J130	Dwelling 1 - 2km	741215	6110328	16	1972
J247	Dwelling 1 - 2km	745265	6098403	60	1993
J181	Dwelling 1 - 2km	742108	6102518	67	1996
J230B	Dwelling 1 - 2km	747576	6110176	76	1998
J218A	Dwelling 2 - 3km	741992	6090396	29	2041
J199	Dwelling 2 - 3km	746012	6097947	86	2045
J218	Dwelling 2 - 3km	741974	6090465	29	2071
J185	Dwelling 2 - 3km	741591	6100736	17	2092
J157	Dwelling 2 - 3km	741685	6111844	25	2104
J190	Dwelling 2 - 3km	748027	6103988	82	2107
J39	Dwelling 2 - 3km	738244	6091869	36	2122
J243A	Dwelling 2 - 3km	745358	6098308	60	2126

ID	Status	Easting (m)[1]	Northing (m)[1]	Nearest WTG	Approximate Distance to nearest WTG (m)[2]
J186	Dwelling 2 - 3km	742063	6102778	67	2135
J213	Dwelling 2 - 3km	738312	6093187	15	2137
J243	Dwelling 2 - 3km	745411	6098303	86	2155
J107B	Dwelling 2 - 3km	740958	6095052	18	2159
J186A	Dwelling 2 - 3km	742040	6102828	67	2177
J221	Dwelling 2 - 3km	747589	6110421	76	2195
J19	Dwelling 2 - 3km	740894	6109882	16	2209
J97A	Dwelling 2 - 3km	741336	6105789	44	2221
J242	Dwelling 2 - 3km	748511	6103740	54	2233
J325	Dwelling 2 - 3km	748072	6110022	76	2265
J182	Dwelling 2 - 3km	741088	6100167	17	2267
J26	Dwelling 2 - 3km	741183	6107638	73	2278
J117A	Dwelling 2 - 3km	741257	6095174	18	2279
J389	Dwelling 2 - 3km	738200	6093403	15	2305
J155	Dwelling 2 - 3km	746531	6111097	78	2307
J97C	Dwelling 2 - 3km	741204	6105879	44	2328
J127	Dwelling 2 - 3km	741047	6106970	73	2344
J46	Dwelling 2 - 3km	741729	6102476	67	2347
J43	Dwelling 2 - 3km	741925	6103019	67	2367
J423	Dwelling 2 - 3km	741244	6098128	17	2387
J244	Dwelling 2 - 3km	747474	6110737	76	2391
J156	Dwelling 2 - 3km	741703	6112262	25	2394
J259	Dwelling 2 - 3km	748543	6109461	76	2427
J93	Dwelling 2 - 3km	740797	6110817	25	2474
J91	Dwelling 2 - 3km	740881	6108236	79	2476
J275	Dwelling 2 - 3km	737992	6093419	15	2508
J33	Dwelling 2 - 3km	740791	6110997	25	2515
J101	Dwelling 2 - 3km	741845	6103423	68	2519
J275A	Dwelling 2 - 3km	737976	6093431	15	2527
J94	Dwelling 2 - 3km	737890	6093189	15	2550
J10	Dwelling 2 - 3km	740571	6109368	16	2556
J272	Dwelling 2 - 3km	740583	6110244	16	2565
J258	Dwelling 2 - 3km	748378	6110125	76	2574
J180	Dwelling 2 - 3km	740996	6100757	17	2597
J239	Dwelling 2 - 3km	747310	6111056	76	2598
J15	Dwelling 2 - 3km	741405	6101319	17	2621
J196	Dwelling 2 - 3km	749286	6103448	54	2642
J154	Dwelling 2 - 3km	747123	6111182	76	2645
J388	Dwelling 2 - 3km	737837	6093453	15	2666
J191A	Dwelling 2 - 3km	746118	6096795	45	2673
J188	Dwelling 2 - 3km	741550	6102968	67	2681
J198B	Dwelling 2 - 3km	741265	6112270	25	2702
J261	Dwelling 2 - 3km	748934	6109094	76	2722
J260	Dwelling 2 - 3km	748830	6109539	76	2724

ID	Status	Easting (m)[1]	Northing (m)[1]	Nearest WTG	Approximate Distance to nearest WTG (m)[2]
J65	Dwelling 2 - 3km	740496	6110573	16	2732
J126	Dwelling 2 - 3km	740993	6111981	25	2733
J429	Dwelling 2 - 3km	749464	6106005	32	2764
J83A	Dwelling 2 - 3km	742663	6096728	17	2775
J391	Dwelling 2 - 3km	749662	6102960	54	2776
J246	Dwelling 2 - 3km	750199	6102261	14	2785
J229A	Dwelling 2 - 3km	743290	6090453	19	2787
J129A	Dwelling 2 - 3km	743758	6094060	19	2827
J97B	Dwelling 2 - 3km	737487	6086813	62	2838
J51	Dwelling 2 - 3km	737495	6092032	36	2839
J339	Dwelling 2 - 3km	748099	6110871	76	2866
J416	Dwelling 2 - 3km	742930	6096592	17	2867
J193	Dwelling 2 - 3km	749399	6103723	54	2888
J129B	Dwelling 2 - 3km	743973	6093846	19	2903
J396	Dwelling 2 - 3km	750518	6102128	14	2933
J394	Dwelling 2 - 3km	740575	6111681	25	2946
J117B	Dwelling 2 - 3km	742025	6095719	18	2961
J158	Dwelling 2 - 3km	741673	6112940	25	2962
J31	Dwelling 2 - 3km	739764	6095613	61	2977
J58B	Dwelling 2 - 3km	741388	6103527	68	2979
J23	Dwelling 2 - 3km	741018	6101963	67	2982
J214	Dwelling 2 - 3km	749543	6103681	54	2984
J116	Dwelling 2 - 3km	740672	6100974	17	2986
J323	Dwelling 2 - 3km	743150	6087949	29	2986
J58A	Dwelling 3 - 4km	741335	6103449	68	3029
J225	Dwelling 3 - 4km	749681	6103552	54	3036
J63	Dwelling 3 - 4km	741203	6103106	67	3054
J369	Dwelling 3 - 4km	743310	6090062	29	3058
J117C	Dwelling 2 - 3km	742146	6095797	18	3074
J229D	Dwelling 3 - 4km	744020	6090844	19	3100
J74	Dwelling 3 - 4km	744317	6113407	77	3145
J150B	Dwelling 3 - 4km	749374	6107643	32	3169
J107A	Dwelling 3 - 4km	740684	6096043	18	3174
J72	Dwelling 3 - 4km	740061	6108313	79	3222
J297	Dwelling 3 - 4km	748657	6110826	76	3225
J204	Dwelling 3 - 4km	751074	6101923	39	3238
J308	Dwelling 3 - 4km	749325	6109688	76	3241
J228	Dwelling 3 - 4km	743137	6087352	29	3255
J232A	Dwelling 3 - 4km	744329	6093936	19	3262
J192	Dwelling 3 - 4km	741355	6113099	25	3271
J219	Dwelling 3 - 4km	744095	6096276	17	3281
J229C	Dwelling 3 - 4km	743889	6090358	19	3284
J229B	Dwelling 3 - 4km	743759	6090202	19	3294
J419	Dwelling 3 - 4km	743699	6088832	29	3309

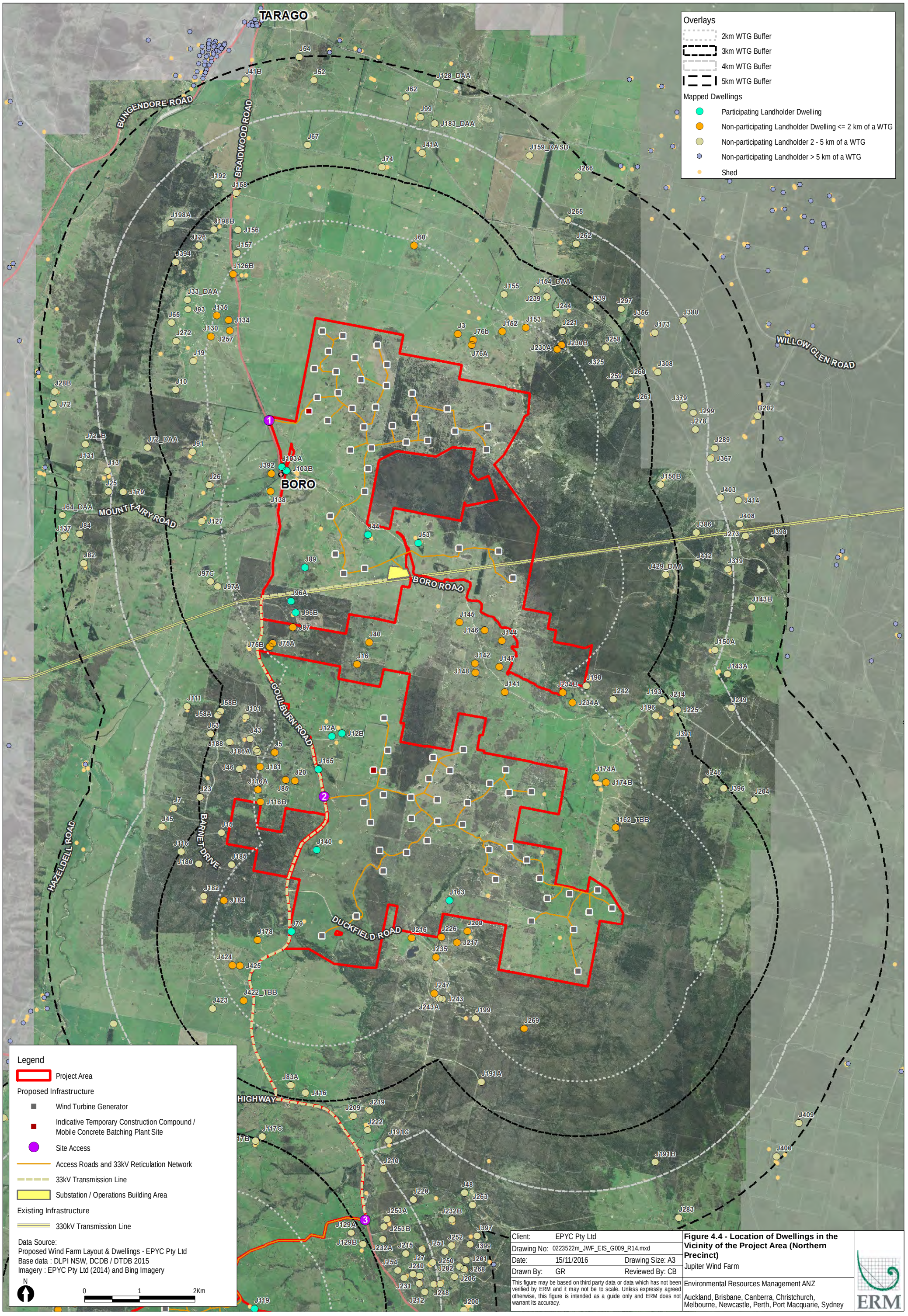
ID	Status	Easting (m)[1]	Northing (m)[1]	Nearest WTG	Approximate Distance to nearest WTG (m)[2]
J371	Dwelling 3 - 4km	736555	6090653	62	3311
J209	Dwelling 3 - 4km	743796	6096175	17	3316
J356	Dwelling 3 - 4km	748952	6110604	76	3319
J254	Dwelling 3 - 4km	744604	6093372	19	3320
J417	Dwelling 3 - 4km	743734	6089222	29	3334
J412	Dwelling 3 - 4km	750027	6106193	32	3336
J198A	Dwelling 3 - 4km	740480	6112385	25	3385
J253B	Dwelling 3 - 4km	744352	6094167	19	3390
J71	Dwelling 3 - 4km	740397	6096216	18	3395
J67	Dwelling 3 - 4km	742969	6113810	25	3395
J231	Dwelling 3 - 4km	744723	6093237	19	3404
J28A	Dwelling 3 - 4km	739209	6095888	15	3419
J386	Dwelling 3 - 4km	750023	6106767	32	3423
J7	Dwelling 3 - 4km	740535	6101770	67	3466
J173	Dwelling 3 - 4km	749272	6110391	76	3476
J253A	Dwelling 3 - 4km	744409	6094311	19	3511
J351	Dwelling 3 - 4km	743898	6089537	29	3521
J45	Dwelling 3 - 4km	740322	6101423	17	3523
J411	Dwelling 3 - 4km	741034	6085350	47	3533
J215	Dwelling 3 - 4km	744748	6093675	19	3548
J240	Dwelling 3 - 4km	744878	6093302	19	3569
J379	Dwelling 3 - 4km	749799	6109066	76	3577
J41A	Dwelling 3 - 4km	745045	6113665	42	3587
J111	Dwelling 3 - 4km	740783	6103613	68	3588
J222	Dwelling 3 - 4km	744054	6095916	17	3621
J223	Dwelling 3 - 4km	744994	6093138	19	3650
J245	Dwelling 3 - 4km	744998	6093274	19	3680
J262	Dwelling 3 - 4km	747843	6112013	76	3690
J236	Dwelling 3 - 4km	744535	6090526	19	3705
J117	Dwelling 3 - 4km	740652	6096784	17	3708
J212	Dwelling 3 - 4km	745096	6092983	19	3727
J191B	Dwelling 3 - 4km	749279	6095333	45	3739
J299	Dwelling 3 - 4km	749973	6108948	76	3740
J278	Dwelling 3 - 4km	750009	6108641	76	3767
J402	Dwelling 3 - 4km	741159	6085134	47	3781
J179	Dwelling 3 - 4km	739624	6107513	73	3791
J27	Dwelling 3 - 4km	745048	6093754	19	3857
J150A	Dwelling 3 - 4km	750355	6104633	32	3881
J415	Dwelling 3 - 4km	744274	6088715	29	3893
J319	Dwelling 3 - 4km	750596	6106101	32	3898
J191C	Dwelling 3 - 4km	744438	6095722	17	3910
J248	Dwelling 3 - 4km	745262	6093118	19	3911
J249	Dwelling 3 - 4km	750660	6103580	54	3929
J250	Dwelling 3 - 4km	745235	6093515	19	3967

ID	Status	Easting (m)[1]	Northing (m)[1]	Nearest WTG	Approximate Distance to nearest WTG (m)[2]
J210	Dwelling 3 - 4km	744347	6095209	18	3968
J265	Dwelling 4 - 5km	747689	6112445	76	4026
J207	Dwelling 4 - 5km	745378	6093130	19	4027
J211	Dwelling 4 - 5km	745354	6091707	19	4033
J380	Dwelling 4 - 5km	749786	6110615	76	4034
J403	Dwelling 4 - 5km	750465	6107403	32	4038
J13	Dwelling 3 - 4km	739337	6107891	79	4041
J25	Dwelling 3 - 4km	739355	6107521	73	4059
J367	Dwelling 4 - 5km	750283	6108112	52	4063
J322	Dwelling 4 - 5km	735426	6089981	62	4092
J220	Dwelling 4 - 5km	744888	6094661	19	4103
J97E	Dwelling 4 - 5km	739444	6097848	17	4114
J313	Dwelling 4 - 5km	744489	6089702	29	4129
J289	Dwelling 4 - 5km	750355	6108308	76	4131
J195	Dwelling 4 - 5km	736962	6095006	15	4142
J143A	Dwelling 4 - 5km	750590	6104195	54	4145
J183	Dwelling 4 - 5km	745275	6114197	42	4158
J99	Dwelling 4 - 5km	745015	6114313	77	4212
J408	Dwelling 4 - 5km	750807	6106922	32	4222
J251	Dwelling 4 - 5km	745460	6093717	19	4238
J413	Dwelling 4 - 5km	736725	6094824	15	4245
J354	Dwelling 4 - 5km	745504	6091281	19	4281
J273	Dwelling 4 - 5km	750913	6106706	32	4281
J206	Dwelling 4 - 5km	745634	6093258	19	4301
J72_B	Dwelling 4 - 5km	738932	6108373	79	4304
J414	Dwelling 4 - 5km	750783	6107361	32	4322
J143B	Dwelling 4 - 5km	751026	6105410	32	4357
J97D	Dwelling 4 - 5km	735493	6086938	62	4366
J252	Dwelling 4 - 5km	745583	6093823	19	4387
J200	Dwelling 4 - 5km	745800	6092652	19	4403
J159	Dwelling 4 - 5km	746999	6113614	42	4413
J202	Dwelling 4 - 5km	745724	6093442	19	4425
J401	Dwelling 4 - 5km	736770	6095276	15	4454
J62	Dwelling 4 - 5km	744752	6114680	77	4485
J131	Dwelling 4 - 5km	738825	6108017	79	4492
J268	Dwelling 4 - 5km	745810	6093393	19	4499
J407	Dwelling 4 - 5km	745320	6090280	19	4505
J48	Dwelling 4 - 5km	745818	6094783	45	4518
J406	Dwelling 4 - 5km	736866	6095530	15	4531
J264	Dwelling 4 - 5km	737450	6096145	15	4544
J232B	Dwelling 4 - 5km	745589	6094298	19	4558
J82	Dwelling 4 - 5km	738904	6106214	73	4566
J201	Dwelling 4 - 5km	745845	6093551	19	4567
J52	Dwelling 4 - 5km	743079	6114991	25	4568

ID	Status	Easting (m)[1]	Northing (m)[1]	Nearest WTG	Approximate Distance to nearest WTG (m)[2]
J84	Dwelling 4 - 5km	738827	6106742	73	4574
D206	Dwelling 4 - 5km	744581	6087186	29	4603
J405B	Dwelling 4 - 5km	740542	6084086	47	4619
J405A	Dwelling 4 - 5km	740303	6084038	47	4630
J263	Dwelling 4 - 5km	745965	6094559	45	4656
J8B	Dwelling 4 - 5km	735462	6091466	62	4669
DAA_3	Dwelling 4 - 5km	744706	6087224	29	4701
J399	Dwelling 4 - 5km	745915	6093844	19	4711
J398	Dwelling 4 - 5km	751384	6106628	32	4733
J28B	Dwelling 4 - 5km	738378	6109335	16	4739
J266	Dwelling 4 - 5km	747874	6113233	42	4753
DAA_1	Dwelling 4 - 5km	744946	6087633	29	4780
J41B	Dwelling 4 - 5km	741839	6114999	25	4783
J72	Dwelling 4 - 5km	738357	6109105	16	4785
J283	Dwelling 4 - 5km	749703	6094328	45	4830
J137	Dwelling 4 - 5km	738549	6106689	73	4855
J409	Dwelling 4 - 5km	751884	6096047	45	4858
J128	Dwelling 4 - 5km	745306	6114919	42	4867
DAA_2	Dwelling 4 - 5km	745055	6087687	29	4867
J64	Dwelling 4 - 5km	738517	6107086	73	4872
J397	Dwelling 4 - 5km	746044	6093993	19	4878
D202	Dwelling 4 - 5km	751135	6108887	76	4897
J8A	Dwelling 4 - 5km	735301	6091638	62	4898
J400	Dwelling 4 - 5km	751478	6095436	45	4925
D205	Dwelling 4 - 5km	745210	6087869	29	4967
J54	Dwelling 4 - 5km	742816	6115405	25	4997

1 Coordinate System is GDA94 MGA55

2 Based on data provided by the Proponent on 13 May 2016 and estimations utilising aerial imagery. ERM did not undertake any mapping of identified dwellings to verify the accuracy of this data.



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Drawn By:	GR	Reviewed By: CB	

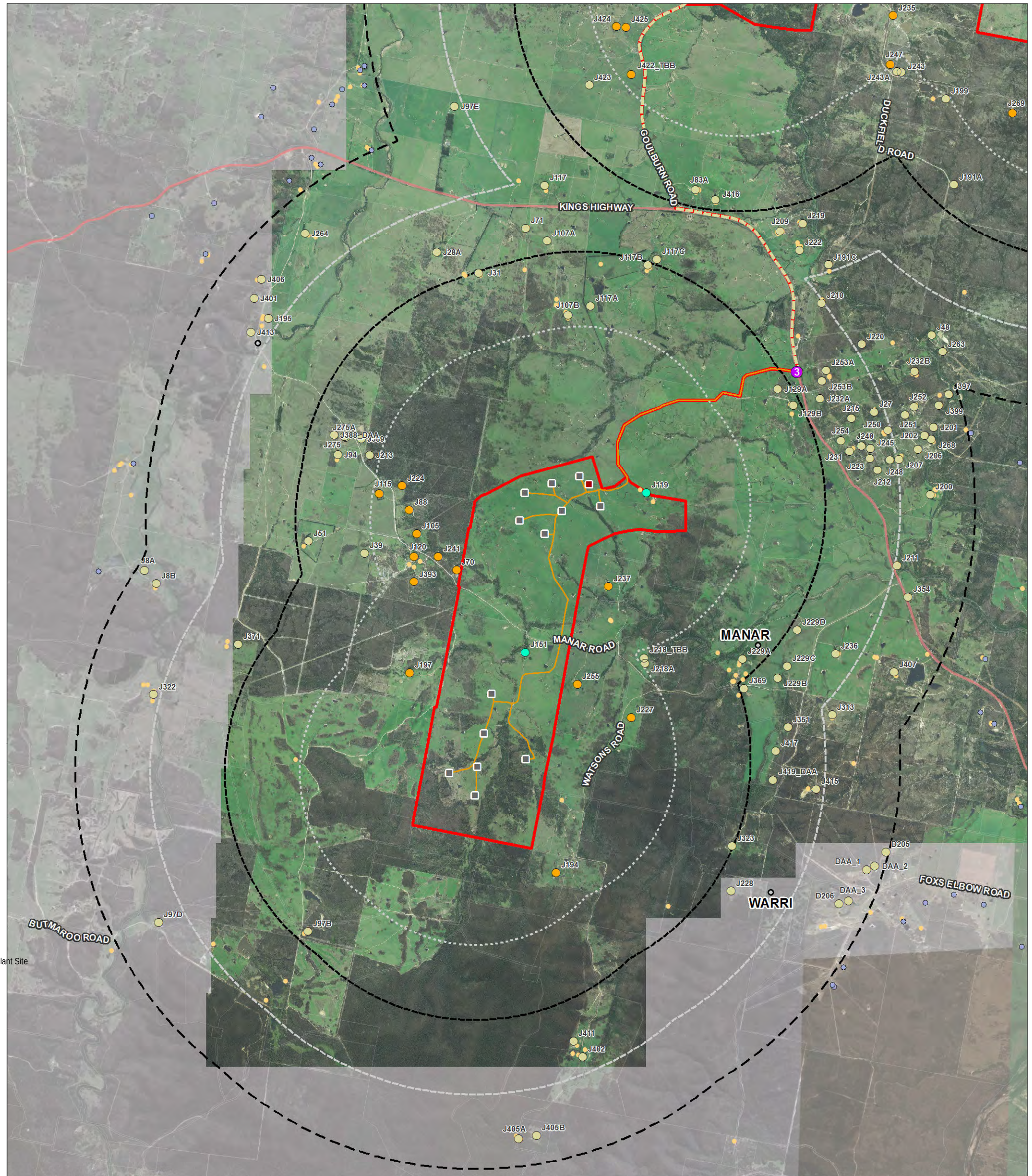
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Figure 4.4 - Location of Dwellings in the Vicinity of the Project Area (Northern Precinct)

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Figure 4.5 - Location of Dwellings in the Vicinity of the Project Area (Southern Precinct)

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4.4 Site Setting

The PA and broader region consists of extensively cleared farm land and hill formations with the PA ranging in height from approximately 835 m Australian Height Datum (AHD) in the north western portion of the PA to 616 m AHD in the south east. The elevated gentle ridgelines occurring within the PA offer a favourable wind resource and are highly suitable for the placement of WTGs.

Farm land within the PA is predominantly used for commercial grazing with isolated lots used for personal cropping. The hill formations consist of both cleared and light density tree coverage (refer *Photograph 4.1*). Remnant bushland and more heavily vegetated areas, including the Tallaganda National Park are located adjacent to the southern boundary of the PA. A number of other National Parks and Nature Reserves are also located within approximately 3-5 km from the PA, as outlined in *Section 4.5.6*.

The PA is located within the Sydney drinking water catchment, and is situated partly within the Shoalhaven River catchment area and partly within the headwaters of the Hawkesbury-Nepean catchment area upstream of the Mulwaree River. Several ephemeral creeks including Boro, Millendale, and Manar creeks, and the perennial Reedy Creek, traverse the PA, all of which are tributaries of the Shoalhaven River. Other significant natural features include Lake Bathurst, which is located approximately 5.5 km north of the northern boundary of the PA, and Lake George, located approximately 15 km west of the PA.

There are no major developments within or immediately adjacent to the PA, however Capital Wind Farm and Woodlawn Wind Farm are located on the south eastern side of Lake George, approximately 13 km from the western boundary of the PA.

Photograph 4.1 Typical Landscape of the Project Area (ERM 2015)



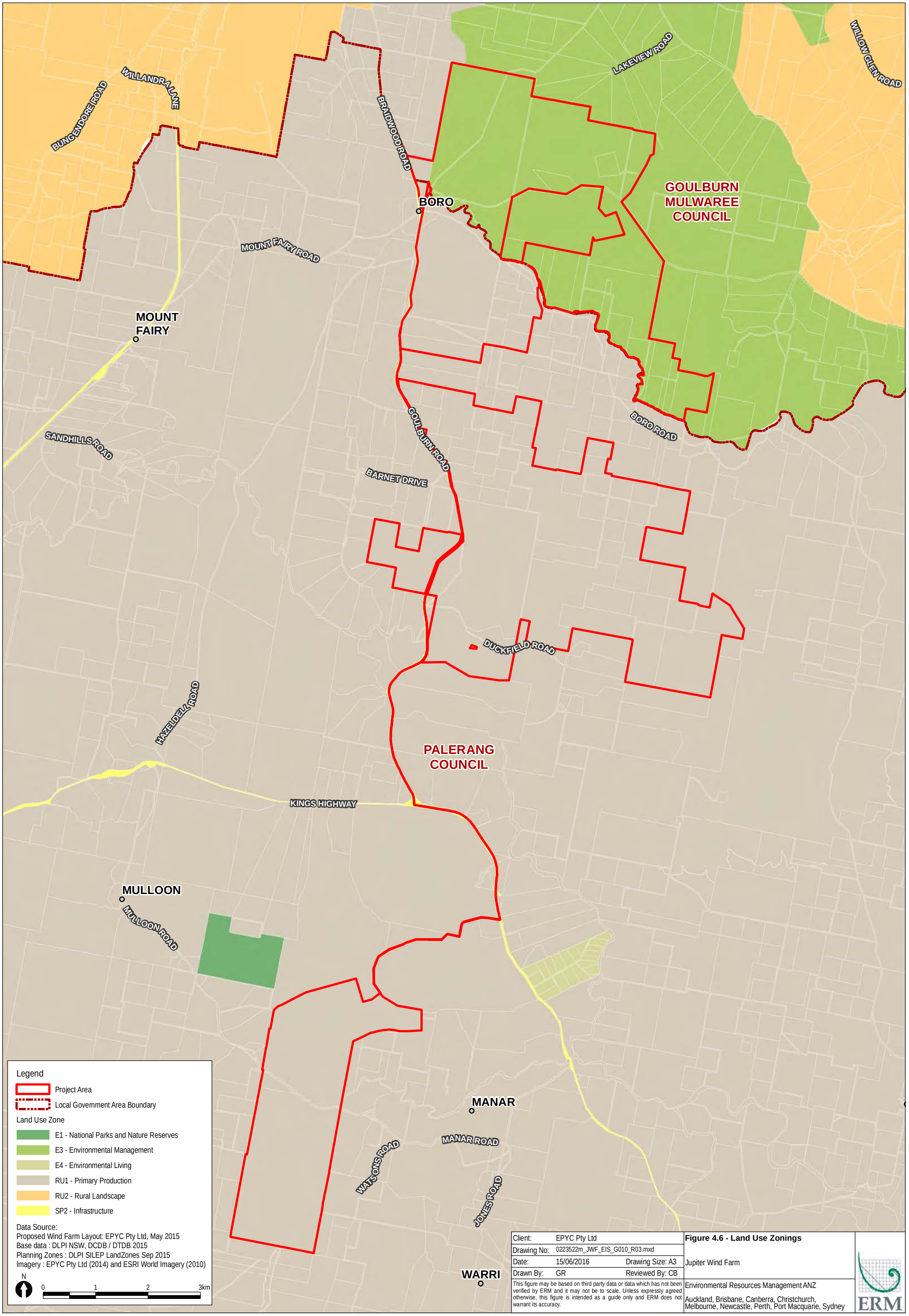
4.5 Land Use Assessment

The potential impact on existing and proposed land uses within the PA and the broader region and the associated land use conflicts that may arise as a result of the Project, have been assessed in accordance with the SEARs, with consideration of the following:

- agricultural land;
- crown land;
- environmentally sensitive areas;
- mineral resources;
- forestry and conservation areas;
- land of potential scenic value;
- residential development; and
- surrounding development.

4.5.1 Land Use Zoning

The portion of the PA located within the former Palerang LGA is zoned '*RU1 - Primary Production*' under the *Palerang Local Environment Plan 2014;* while that portion located within the Goulburn Mulwaree LGA is zoned '*RU1 - Primary Production*' and '*E3 - Environmental Management*' under the *Goulburn Mulwaree Local Environment Plan 2009.* Land use zonings are illustrated in *Figure 4.6,* and further discussion of the objectives and provisions of the zonings is provided in *Chapter 6.*



Client:	EPYC Pty Ltd		**Figure 4.6 - Land Use Zonings**
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Date:	15/06/2016	Drawing Size: A3	Jupiter Wind Farm
Drawn By:	GR	Reviewed By: CB	

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4.5.2 Agricultural Land

Land within the PA is primarily used for commercial grazing and consists of both native and improved pasture. Pockets of agricultural cropping are also present within the PA, however is limited in extent.

The NSW Department of Primary Industries (DPI) (formerly NSW Agriculture) has developed a system to classify the suitability of land for general agricultural use. The classification system is outlined in *Table 4.5*.

Table 4.5 Agricultural Land Classification

Class	Description
Class 1	Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent.
Class II	Arable land suitable for the regular cultivation of crops but not suited to continuous cultivation.
Class III	Grazing land or land well suited to pasture improvement.
Class IV	Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques.
Class V	Land unsuitable for agriculture or at best suited only to light grazing.

Source: NSW Agriculture (2002)

Based on the classification system developed by NSW Agriculture (2002), it is considered that the majority of land within the PA would be classified as Class III to Class IV indicating that the land is primarily suited to extensive agricultural grazing, which is consistent with the current land use.

As outlined previously, the disturbance footprint associated with the Project infrastructure (including permanent and temporary infrastructure) is calculated to be 86.3 ha, or approximately 1.7% of the total PA. It is therefore anticipated that the existing agricultural activities occurring within the PA can continue to coexist with the Project and the proposed infrastructure. In addition, introduction of a supporting income base assists in maintaining the agricultural capacity of the land, and the construction of improved access tracks may improve the agricultural efficiency for involved landholders.

During construction and commissioning, minor disruptions to agricultural activities may occur. Agricultural stock may need to be relocated from construction areas such as the WTG locations; however this will be temporary and can be managed through direct consultation with involved landholders, prior to the commencement of construction works.

4.5.3 Crown / Public Land

There are no Crown land parcels within the PA, with the exception of one lot through which the proposed 33 kV transmission line passes along Goulburn-Braidwood Road (Lot 7004 DP1020765 – 2.1 ha). Design of the transmission line will include consultation with relevant authorities, including the NSW Department of Trade and Investment (Crown Lands) to ensure that any specific requirements of Crown Lands are addressed and that the relevant approvals are in place prior to commencement of construction.

In addition, a number of additional Crown land parcels are located immediately adjacent to the PA, or are bisected by the road corridor in which the proposed transmission line will be located, as detailed in *Table 4.6*. No works are proposed that are likely to impact on these lots.

Table 4.6 *Crown Lots Located in the Vicinity of the PA*

Lot Number	Deposited Plan (DP)	Description	Area (ha)
7301	1151765	Adjacent to PA (Northern boundary of Northern Precinct)	3.9
128	754867	Adjacent to PA (West Boundary of Northern Precinct)	0.6
7302	1140943	Adjacent to PA (West Boundary of Northern Precinct) (very small adjacent to Lot 128/DP754867)	0.1
7300	1141203	Bisected (not intersected) by proposed transmission line and road corridor from the Southern Precinct	18.3
7005	1020769	Cluster of land parcels bisected by transmission line adjacent to the Northern Precinct (western boundary)	0.7
7301	1140944	Cluster of land parcels bisected by transmission line adjacent to the Northern Precinct (western boundary)	42.2
7300	1140944	Cluster of land parcels bisected by transmission line adjacent to the Northern Precinct (western boundary)	15.5
7300	1151763	Large lot in central island of Northern Precinct	200.2
91	750033	Smaller lot in central island of Northern Precinct	15.8

Access roads (and associated electrical reticulation network) are proposed to cross the following public roads that are controlled by the former Palerang Council:

- two crossings of Boro Road in the Northern Precinct; and
- one crossing of Manar Road within the southern precinct.

In addition, the 33 kV transmission line, is proposed to extend along Goulburn-Braidwood Road and the Kings Highway within the existing RMS road reserve.

All other proposed crossings occur on unformed Crown roads (often referred to as 'paper roads'), and therefore are currently disused and are not evident on the ground. The proponent has initiated consultation with Crown Lands and the necessary approvals to cross the Crown roads will be sought through further consultation with Crown Lands prior to commencement of construction of the Project.

The following Crown waterways are present within the PA:

- Boro Creek – located within the northern precinct;
- Reedy Creek – located in the northern precinct; and
- Doughboy Creek – located just north of the proposed access point to the southern precinct off the Kings Highway.

Boro Creek is proposed to be crossed by an access road within the northern precinct, across a low gradient, 4th order reach of this creek (described as WC21 in *Annex I*). Reedy Creek is proposed to be crossed by the 33 kV transmission line at an existing road crossing (Goulburn-Braidwood Road), across a low gradient, 4th order reach of this creek (described as WC104 in *Annex I*). Doughboy Creek will be crossed by the transmission line at an existing road crossing (the Kings Highway), across a low gradient, 4th order reach of this creek (described as WC97 in *Annex I*). Construction of the proposed crossings will be managed appropriately in accordance with the mitigation measures outlined in *Chapter 14* and in consultation with Crown Lands.

In addition, a reach of Manar Creek that is located immediately downstream of, and abuts the eastern boundary of the southern precinct is a Crown waterway, but will not be impacted by any Project infrastructure.

All Crown land parcels, road reserves and waterways located within, and in the vicinity of the PA are illustrated in *Figure 4.7a* and *Figure 4.7b*.

4.5.4 Environmentally Sensitive Areas

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 defines an '*environmentally sensitive area'* as any of the following:

(a) the coastal waters of the State;

(b) a coastal lake;

(c) land to which State Environmental Planning Policy No 14 – Coastal Wetlands or State Environmental Planning Policy No 26 – Littoral Rainforests applies;

(d) land reserved as an aquatic reserve under the Fisheries Management Act 1994 or as a marine park under the Marine Parks Act 1997,

(e) land within a wetland of international significance declared under the Ramsar Convention on Wetlands or within a World heritage area declared under the World Heritage Convention,

(f) land within 100m of land to which paragraph (c), (d) or (e) applies,

(g) land identified in this or any other environmental planning instrument as being of high Aboriginal cultural significance or high biodiversity significance,

(h) land reserved under the National Parks and Wildlife Act 1974 or land to which Part 11 of that Act applies,

(i) land reserved or dedicated under the Crown Lands Act 1989 for the preservation of flora, fauna, geological formations or for other environmental protection purposes,

(j) land identified as being critical habitat under the Threatened Species Conservation Act 1995 or Part 7A of the Fisheries Management Act 1994.

In respect to the PA, the relevant definition of 'Environmentally Sensitive Area' is likely to be associated with *(g) land identified in this or any other environmental planning instrument as being of high Aboriginal cultural significance or high biodiversity significance.*

A review of mapping data held by the former Palerang and Goulburn Mulwaree Councils relating to environmentally sensitive areas within the vicinity of the PA was undertaken.

Part of the wind farm is located within the E3 Environmental Management zone of the Goulburn Mulwaree LEP 2009, the objectives of which are:

- *To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.*
- *To provide for a limited range of development that does not have an adverse effect on those values.*
- *To facilitate the management of water catchment areas, environmentally sensitive land and areas of high conservation value.*

Detailed discussion of the Project and associated issues and potential impacts against each of these zone objectives, along with consideration of permissibility and use of the E3 zone is provided in *Chapter 6*.

Mapping detailed within the Palerang LEP 2014 and the Goulburn Mulwaree LEP 2009 do not otherwise specifically identify areas as 'Environmentally Sensitive Areas', however terrestrial biodiversity, watercourses and erodible lands are mapped (refer *Figure 4.8*).

Terrestrial Biodiversity

Whilst the Goulburn Mulwaree LEP 2009 and former Palerang LEP 2014 provide terrestrial biodiversity mapping, the detailed ecological investigations undertaken as part of this EIS (refer *Chapter 9*) have identified that high ecological values apply to a much more limited area and not across all of the terrestrial biodiversity areas mapped under the Goulburn Mulwaree LEP 2009 and former Palerang LEP 2014. On this basis, the applicability of '*environmentally sensitive area*', being an area of '*(g)…….high biodiversity significance'* is considered to be limited to those areas, in and in the vicinity of the PA, mapped as having ecological values of importance as detailed in *Chapter 9* and *Figures 9.3a* to *9.3d.*

Of the identified ecological values of importance, the development footprint will likely have residual significant impacts on the following:

- Glossy Black-cockatoo Habitat – 427 ha of glossy black cockatoo habitat has been mapped in the study area. Development footprint impact in this area is 8.1 ha, being 1.9% of the total mapped glossy black cockatoo habitat within the study area; and

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act Listed TEC) - removal of 1.63 ha.

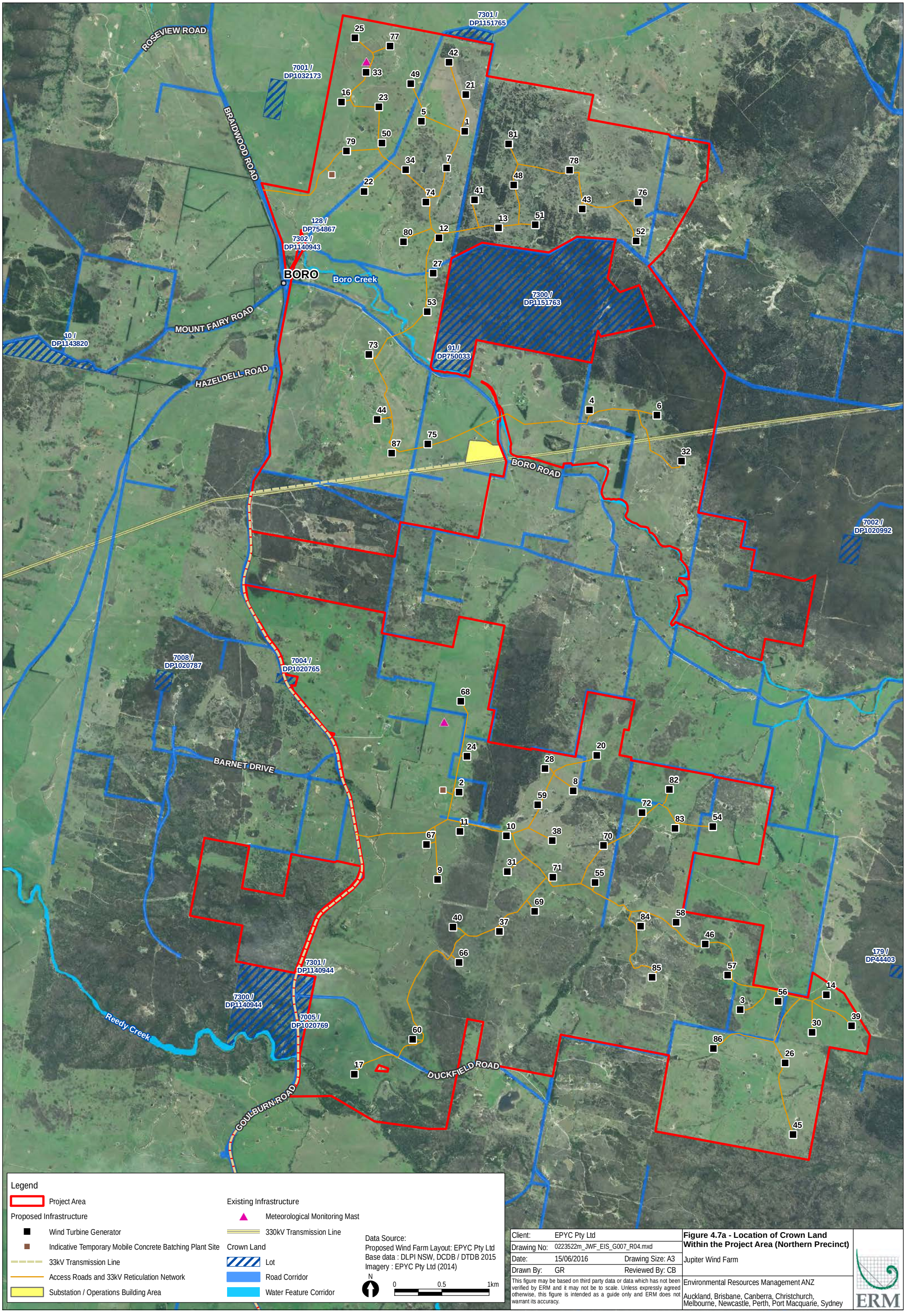
A biodiversity offset package will be prepared when the Development Footprint is finalised (refer *Chapter 9*). This will provide for the protection, management and restoration of ecological values to improve or maintain the impacts of the Project. Potential impacts on biodiversity resulting from the Project have been addressed in *Chapter 9,* including proposed mitigation and management measures.

Watercourses

Construction of the Project will require a number of waterway crossings, which are outlined in *Chapter 14* and considered in detail in *Annex I.* Watercourse crossings will be designed in consultation with a qualified engineer and in accordance with the relevant guidelines to minimise impacts.

Erodible Lands

As illustrated in *Figure 4.8*, two proposed WTGs are located within an area identified as being susceptible to erosion. Whilst it is acknowledged that these WTGs are located within an area identified as having erodible soils, it is considered that potential impacts primarily during construction can be effectively mitigated through implementation of the management and mitigation measures outlined in the Water Supply, Water Quality and Hydrology assessment report contained in *Annex I.* One small pocket of land was mapped as being subject to salinity, however is not located within the footprint of Project infrastructure.



Client:	EPYC Pty Ltd		
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Drawn By:	GR	Reviewed By: CB	

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Figure 4.7a - Location of Crown Land Within the Project Area (Northern Precinct)

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KINGS HIGHWAY
7301 / DP1141203
7300 / DP1141203
Doughboy Creek
JAMALEOPA ROAD
MULLOON ROAD
Manar Creek
MANAR
3 / DP1163552
MANAR ROAD
WATSONS ROAD
18
61
15
19
88
36
65
35
64
29
63
62
47

Legend

Project Area

Proposed Infrastructure

Wind Turbine Generator

Indicative Temporary Mobile Concrete Batching Plant Site

Access Roads and 33kV Reticulation Network

33kV Transmission Line

Substation / Operations Building Area

Existing Infrastructure

Meteorological Monitoring Mast

330kV Transmission Line

Crown Land

Lot

Road Corridor

Water Feature Corridor

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014)

0 0.5 1km

N

Client:	EPYC Pty Ltd		
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Date:	15/06/2016	Drawing Size: A3	
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Figure 4.7b - Location of Crown Land Within the Project Area (Southern Precinct)

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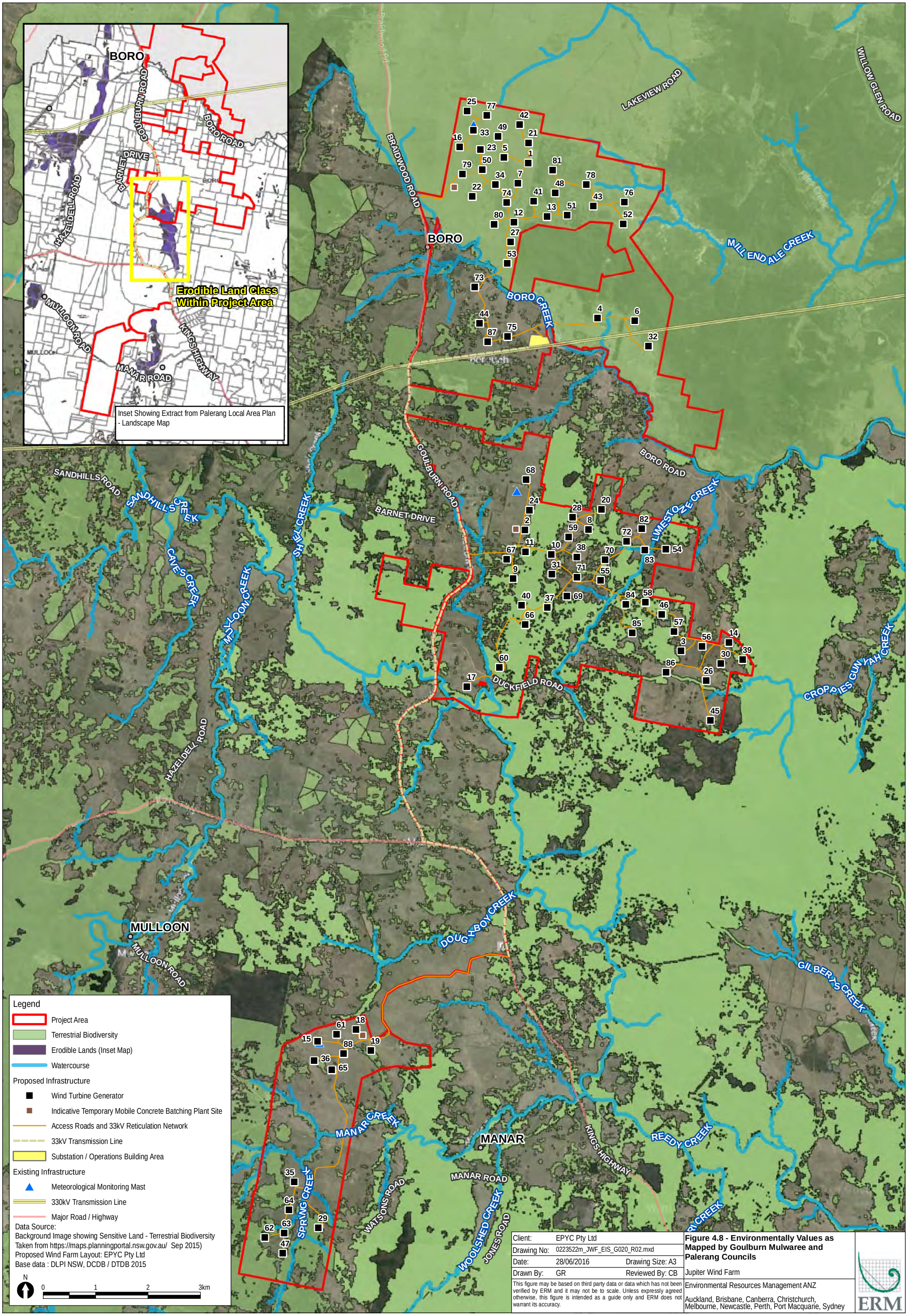
4.5.5 Mineral Resources

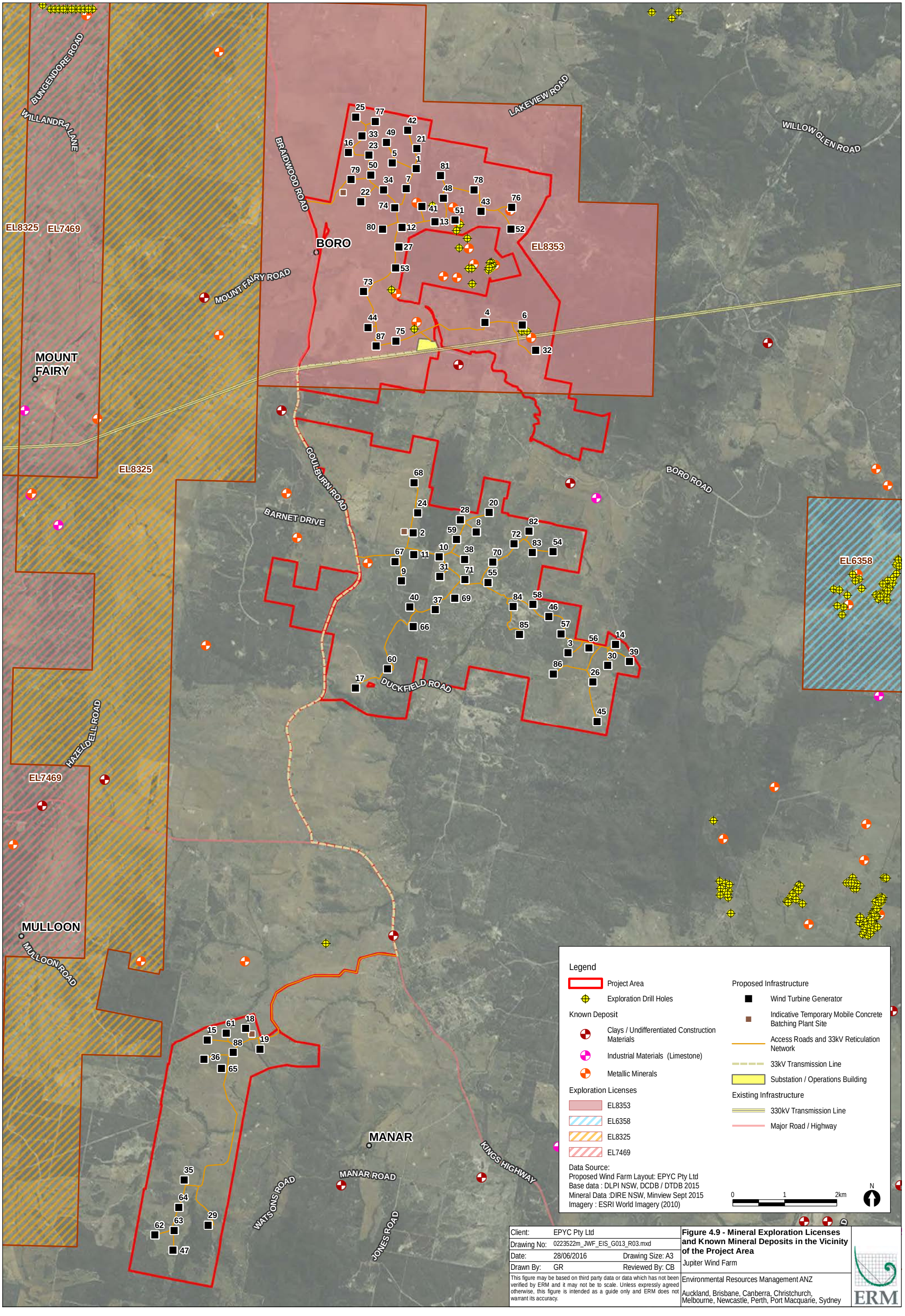
A search of the NSW Department of Industry Resources and Energy MinView mapping tool was undertaken in September 2015 to confirm the presence of any current or previous mining operations, current exploration titles in the vicinity of the PA, or other significant mineral sites. The search identified a number of minerals features, including some known mineral deposits in the vicinity of, and within the PA, and the following three exploration leases in the vicinity, one of which (EL8353) intersects the northern precinct of the PA as illustrated in *Figure 4.9*.

- EL8353 – Exploration licence (elemental minerals (metallics)) held by Ochre Resources Pty Ltd (Heron Resources Ltd), granted on 17 March 2015 and expires 17 March 2018;
- EL8325 - Exploration licence (elemental minerals (metallics); non – metallics) held by Ochre Resources Pty Ltd (Heron Resources Ltd), granted on 2 December 2012 and expires 2 December 2017.
- EL7469 – Exploration licence (elemental minerals (metallics)) held by Tri Origin Mining Pty Ltd (Heron Resources Ltd), granted on 15 April 2014 and expires on 4 March 2017.

Woodlawn Mine is located approximately 9 km northwest of the PA, is currently owned by Heron Resources Ltd, and has a current mining lease and approval to operate until 2034. It is associated with a high grade base metal deposit, with investigation and planning currently underway to expand operations at the site.

Consultation with Heron Resources Ltd has identified that there has been limited exploration of the area associated with EL8353, however it is a prospective area given its close proximity to the nearby Woodlawn deposit. Heron Resources has indicated that they have no objection to the Project at this stage, however there is potential for future exploration in the area, and should this take place, further consultation would be undertaken with the Proponent. Additional details of the consultation undertaken are provided in *Chapter 7*.


BORO
BORO ROAD
GOULBURN ROAD
BARNET DRIVE
HAZELDELL ROAD
MULLOON ROAD
KINGS HIGHWAY
MANAR ROAD
Erodible Land Class
Within Project Area
Inset Showing Extract from Palerang Local Area Plan - Landscape Map
BRAIDWOOD ROAD
LAKEVIEW ROAD
WILLOW GLEN ROAD
MILL END ALE CREEK
BORO CREEK
SANDHILLS ROAD
SANDHILLS CREEK
CAVES CREEK
MULLOON CREEK
SHELT CREEK
DUCKFIELD ROAD
LWESTONE CREEK
CROPPIES GUNYAH CREEK
DOUGHBOY CREEK
GILBERYS CREEK
MANAR CREEK
SPRING CREEK
WATSONS ROAD
WOOLSHED CREEK
JONES ROAD
REEDY CREEK
MULLOON
MANAR
Legend
Project Area
Terrestrial Biodiversity
Erodible Lands (Inset Map)
Watercourse
Proposed Infrastructure
Wind Turbine Generator
Indicative Temporary Mobile Concrete Batching Plant Site
Access Roads and 33kV Reticulation Network
33kV Transmission Line
Substation / Operations Building Area
Existing Infrastructure
Meteorological Monitoring Mast
330kV Transmission Line
Major Road / Highway
Data Source:
Background Image showing Sensitive Land - Terrestrial Biodiversity Taken from https://maps.planningportal.nsw.gov.au/ Sep 2015)
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
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Client: EPYC Pty Ltd
Drawing No: 0223522m_JWF_EIS_G020_R02.mxd
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Reviewed By: CB
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Figure 4.8 - Environmentally Values as Mapped by Goulburn Mulwaree and Palerang Councils
Jupiter Wind Farm
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Figure 4.9 - Mineral Exploration Licenses and Known Mineral Deposits in the Vicinity of the Project Area

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4.5.6 Forestry and Conservation Areas

There are no designated forestry or conservation areas within the PA, however one National Park and two Nature Reserves occur in close proximity.

The Tallaganda National Park and State Conservation Area is located approximately 3.5 km from the southern boundary of the PA, and the Scott Nature Reserve is located approximately 5 km south west of the Goulburn-Braidwood Road and Kings Highway intersection, to the immediate west of the PA. Further, the Nadgigomar Nature Reserve, which consists of three distinct sections (Sunset Mountain, east Nadgigomar and Durran Durra) is located to the east, with its closest boundary located approximately 6 km from the PA (refer *Figure 4.10*).

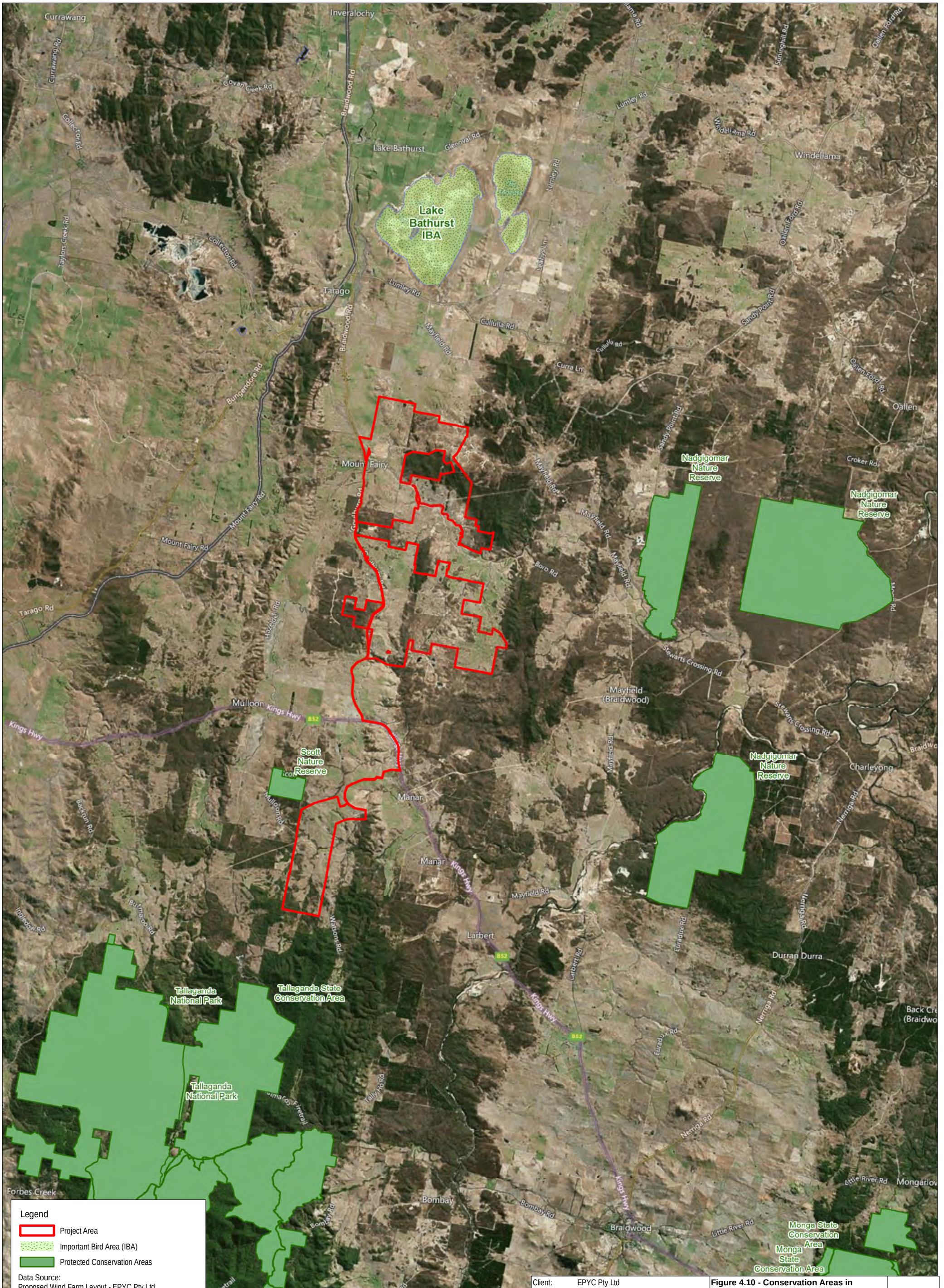
The construction and operation of the Project is unlikely to impact on the ecological value of the conservation areas as they are located outside the PA and substantial setback distances from construction works areas. Construction related impacts that have the potential to migrate offsite such as erosion and the introduction of noxious weeds can be readily managed through the implementation of the mitigation measures outlined in *Chapter 9* and *Chapter 14.*

4.5.7 Land of Potential Scenic Value

The landscape character of the PA and surrounding region has been described as typical of the Southern Tablelands, with undulating hillside, large swathes of native woodland, creeks, elevated ridge lines and a low density of rural development (Clouston Associates 2016). The PA is largely cleared, consisting of pastoral land and undulating hill formations with pockets of remnant vegetation on the steeper slopes.

It is considered that the existing rural setting and landscape features of the PA will offer scenic value to local residents and visitors to the area, however an individual's appreciation of visual characteristics or any given scene is subjective and not easily quantified. The LCVIA (*Annex F*) has undertaken to assess the potential impacts of the Project on the landscape character of the area using both qualitative and quantitative criteria, and in consideration of the various landscape character zones identified to exist within the PA and surrounds. The LCVIA concluded that the presence of the Project will alter some of the landscape characteristics of some zones to varying degrees, recognising that all zones have the capability to absorb change to some extent, and noting that physical change in appearance of the landscape is an ongoing and constant process from both human and environmental influences and can result in both positive and negative effects, depended on an individual's perspective.

The potential landscape and visual impacts associated with the Project are assessed in detail in *Chapter 11.*



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Figure 4.10 - Conservation Areas in Proximity to the Project Area

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4.5.8 Rural Residential Character

As discussed above, the PA and broader region consists of extensively cleared farm land, predominantly used for commercial grazing purposes. However, potential for future subdivision leading to a growing rural-residential character within the region has been considered in respect of potential land use conflicts.

The *Local Government Act 1993* defines rural residential land as land that '*is not less than 2 hectares and not more than 40 hectares in area*'. Land within and immediately adjacent to the PA that is located within the former Palerang LGA, is predominantly zoned 'RU1 Primary Production' with minimum lot size of either 40 ha or 80 ha under the Palerang LEP 2014. With the exception of a small parcel of land to the northwest of the PA, land within and surrounding the PA that is located within the Goulburn Mulwaree LGA, is zoned with minimum lot size of 100 ha under the Goulburn Mulwaree LEP 2009, and therefore does not currently facilitate rural residential development. Minimum lot sizes of surrounding rural lands in proximity to the PA are illustrated in *Figure 4.11*.

Consideration of the current published strategies at the regional and local level relating to current issues and ongoing management of rural and rural residential lands in the region, including potential for future subdivision of larger lots for rural-residential purposes is provided below.

Sydney – Canberra Regional Strategy 2008

The *Sydney – Canberra Regional Strategy 2008* (refer *Chapter 6*) provides the NSW Government's overarching strategic direction to accommodate and manage growth for the provision of sufficient new housing and job growth and economic development, whilst ensuring that the rural landscape and environmental settings that define the Region's character are not compromised. The Strategy applies to the local government areas of Wingecarribee, Goulburn Mulwaree, Upper Lachlan, Yass Valley, Palerang and Queanbeyan.

The Strategy identifies that there has been a trend to locate rural residential development largely within commuting zone of Sydney, Canberra and Goulburn, including in the Wamboin and Bywong areas of the Palerang Shire.

The Strategy is strongly supportive of limiting the spread of rural residential development, acknowledging that unplanned rural residential development and the break-up of agricultural land can:

- *'impact upon the potential viability of an agricultural area through a reduction in farm businesses and the capacity of the small towns and villages to support associated farm – based business;*
- *increase the potential for rural land use conflict;*
- *decrease the economic value of rural land as a resource because land values are based on residential rather than agricultural capacity;*
- *impose costs on the community to service and maintain residential development land uses within the rural landscape;*
- *result in social isolation;*
- *result in resources and ecosystem degradation; and*
- *potentially constrain the use of rural land for agricultural and resources such as mining through conflict between rural industries and those seeking a rural lifestyle.'*

The Strategy identifies as a key action that Councils are to ensure that strategies for the management of rural land uses and subdivision recognise the environmental and economic potential of wind farming activities, whilst balancing the need to protect key rural landscapes and avoid inappropriate conflict with rural residential areas. The Strategy also states that '*rural residential development should only be undertaken on the basis of an agreed local government area wide settlement strategy*', which identifies that existing supply of approved subdivided lots of 40 ha or less should be taken up and developed before any new areas are considered for subdivision, and that no new rural residential zones will be supported unless as a part of an agreed structure plan or local settlement strategy.

Draft Palerang Rural Lands Strategy 2016 - 2036

The Draft Palerang Rural Lands Strategy 2016-2036 was placed on public exhibition from Wednesday, 4 May 2016 to Wednesday, 1 June 2016, together with supporting studies including a Discussion Paper, Rural Lands Study – Information, Issues and Options Report, and Economic Profile. The aim of the Strategy was to determine a 20 year strategic direction for rural, rural residential and environmental land in the Palerang Shire from 2016 to 2036, aligned with the overarching NSW Government Policy position as detailed in the *Sydney – Canberra Regional Strategy 2008*. The draft Strategy seeks to find a balance between the competing pressures from a diverse array of land uses and to protect agricultural, environmental and landscape values of Palerang non-urban lands.

The Discussion Paper prepared by Garret Barry Planning Services Pty Ltd (2016) and Economic Profile prepared by Strategic Economic Solutions, (2014) in support of the draft Strategy identify:

- the proximity of Palerang LGA to Canberra and Queanbeyan has seen it develop with a very high proportion (almost 70%) of it population living in rural or rural residential areas;
- in the order of 70% of all employment in Palerang is outside the LGA with residents mostly commuting to Canberra / Queanbeyan; and
- 51% of all population growth between 2001 and 2011 has occurred in the rural residential areas close to Canberra / Queaneyan, with Bungendore (and its immediate surrounds) and the rural localities of Wamboin and Bywong holding about 45% of the population of Palerang.

The Rural Lands Study (Garret Barry Planning Services Pty Ltd, 2015) and the Discussion Paper recognise:

- additional rural living opportunities, especially scattered lots across the rural landscape, can generate a need for the extension of roads or pressure for the upgrading of existing pavements.;
- a consequence of relatively small lot sizes is low density rural living with associated lengthy transmission lines to service it; and
- the pressure and impact on rural land as a result of rural fragmentation for smaller allotments.

Whilst recognising that the majority of the rural residential land and population in the former Palerang LGA reside in the western portion of the LGA, in commute distance to Canberra and Queanbeyan, the Strategy and Discussion Paper provide preliminary recommendations for future rural residential areas, which are illustrated in *Figure 4.12*. This clearly demonstrates Council's intention that the vast majority of potential future rural residential zoned land will be concentrated around the western portion of the Palerang Shire, in reasonable commute distance to Canberra and Queanbeyan. The areas identified include Williamsdale, Yarrow, Googongm as well as Sutton Road, Mill Post Lane and North Carwoola.

In respect to areas in proximity to the PA, only one area of potential future rural residential zoning has been identified in the Strategy, being a land portion within the Mt Fairy area. The area of Mt Fairy and surrounds was considered in the LCVIA (refer *Annex F*; *Chapter 11).* The LCVIA assessed the overall visual impact rating in this location as moderate/low, noting that the impact on individual properties in this area will depend on their orientation and quantity of screening vegetation surrounding the property, and that increased built form and planting associated with any new residential development would likely restrict some views to the Project from any new dwellings.

Rural Residential Development - Goulburn Mulwaree LGA

In respect to the Goulburn Mulwaree LGA, existing and potential future rural residential development in the vicinity of the PA is limited to the Tarago area. All other areas surrounding the PA, including the E3 zone, have a minimum lot size of 100 ha under Goulburn Mulwaree LEP 2009, which will not facilitate rural residential subdivision. The Tarago area was subject to visual analysis as part of the Landscape and Visual Assessment detailed in *Chapter 11.*

State Environmental Planning Policy (Rural Lands) 2008 (refer *Chapter 6*), provides the statutory framework by which councils can plan strategically for dwellings in rural areas.

4.5.9 Residential Development

The majority of land within the PA is zoned as *RU1- Primary Production* under both the PLEP and GMLEP. The objectives of the RU 1 zone are focused on encouraging sustainable primary industry and promote the use of the land for agriculture, rather than residential development. Given this, future construction of residential dwellings across the PA is likely to be limited and would be largely unaffected by the Project.

Both the former Palerang and Goulburn Mulwaree Council were consulted to determine the location of any approved but not constructed dwellings or subdivisions within and in close proximity to the PA. Advice from Council (most recently in April 2016) indicates that there is one DA approved residential dwellings in proximity to the PA (refer *Table 4.4*), which is located within 2 km of a proposed WTG.

As for any rural location, it is considered that there is some potential for future residential dwellings to be approved within and in close proximity to the PA. Should any development applications for residential dwellings in proximity to the PA be lodged with Council during the environmental assessment phase of the Project, the Proponent will endeavour to consult with the applicants. In the case that any new dwellings were approved in proximity to the PA subsequent to approval of the Project, compliance with any relevant conditions of the Project approval would apply.

4.5.10 Surrounding Development

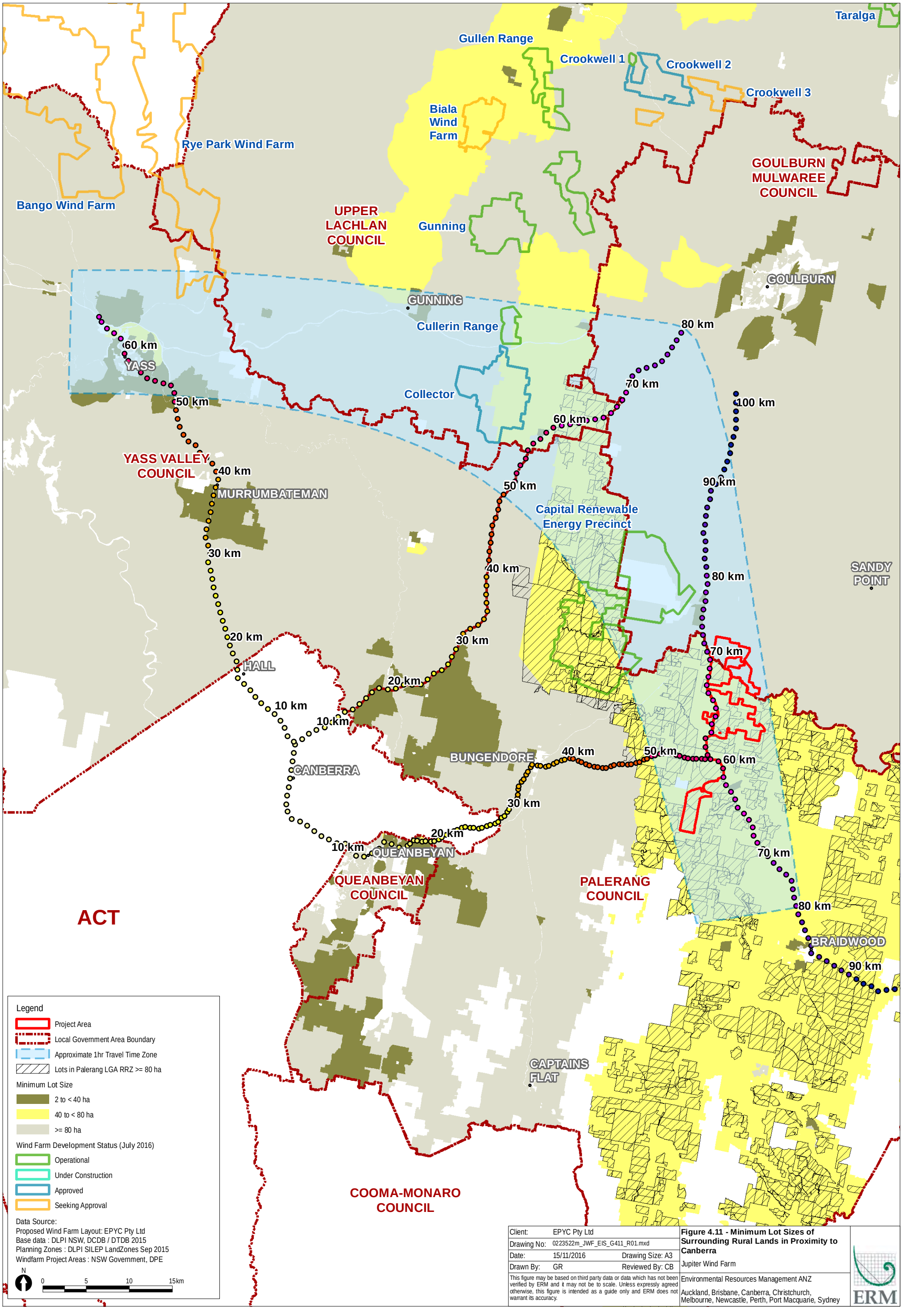
The PA and broader Southern Tablelands region has abundant wind resources, which has led to the development of numerous wind farms in the region. The existing wind farms in closest proximity to the Project are tabulated below.

Table 4.7 *Existing and Approved Wind Farms in the Vicinity to the Project*

Wind Farm	Distance and Direction from the PA
Woodlawn	6 km north west
Capital I	13 km west
Cullerin Range	43 km north west
Gunning	54 km north west
Gullen Range	56 km north west

In addition, there are a number of other wind farm projects that are approved but not yet constructed, or pending approval, the closest being Capital II, and Collector Wind Farms, which are located approximately 14 km and 38 km from the PA respectively.

An assessment of the potential cumulative impacts associated with other wind farms in the region is provided in *Chapter 17*.



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Figure 4.11 - Minimum Lot Sizes of Surrounding Rural Lands in Proximity to Canberra

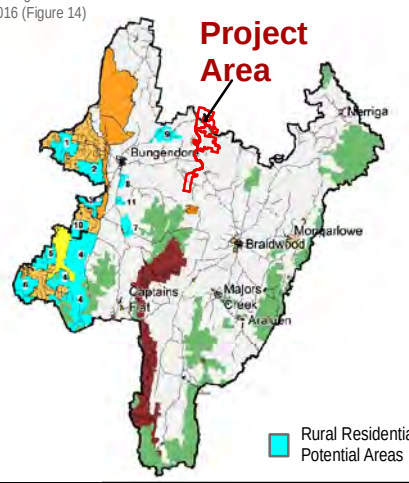
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Source: Palerang Rural Lands Discussion Paper, April 2016 (Figure 14)



1 Sutton Road

2 Mill Post Lane

3 North Carwoola

4 Yarrow

5 Googong

6 Williamsdale

7 Forbes Creek

8 Gidleigh Lane

9 Mt Fairy

10 South Carwoola

11 Neils Creek Road

Project Area

Legend

- Rural Residential Zoning Potential Area
- Project Area
- Local Government Area

Data Source:
Proposed Wind Farm Layout - EPYC Pty Ltd, (May 2015)
Palerang Rural Lands Discussion Paper, April 2016 (Figure 14)
Local Government Areas : DLPI DCDB (2015)
Imagery - Bing Imagery (2003)

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Figure 4.12 - Draft Palerang Rural Lands Strategy - Rural Residential Zoning Potential
Jupiter Wind Farm

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4.7 References

Clouston Associates (2016) *Jupiter Wind Farm Landscape Character and Visual Impact Assessment* (S14-0147, Issue H, 21/9/2016).

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Garrett Brown Planning Services Pty Ltd (2015), *Palerang Rural Lands Study Report*. Report prepared for Palerang Council. Version 3.2, June 2015.

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NSWAgriculture (2002) *Agricultural Land Classification Agfact AC.25.* Report prepared for the NSW Government, Sydney NSW.

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Strategic Economic Solutions (2014). *Palerang Economic Profile 2014*. Prepared as part of the Rural Lands Strategy for Palerang Council.

5 PROJECT ALTERNATIVES

5.1 Introduction

This chapter discusses the alternatives considered for the Project, (including not carrying out the Project); the site selection processes for the Project; the alternate site layouts; and the transmission line connection options investigated.

5.2 Alternatives to the Project

5.2.1 'Do Nothing' Approach

The 'Do Nothing' Approach instead of proceeding with the Project will lead to a missed opportunity in terms of reducing Australia's dependency on fossil fuels for energy generation and the consequential emissions of GHGs. As discussed in *Chapter 2*, the Project is expected to result in savings of approximately 0.92 Mt CO_2-e of GHGs per annum, which is the electricity generation required to supply the equivalent of 150,800 households with energy annually (based on an average NSW household electricity consumption of 7.3 MWh annually).

In addition, the local area and wider region would not realise the economic and social benefits of the Project, including a capital investment of the order of $300 million, creation of direct and indirect employment opportunities during the construction and operational phases, improvements to the local road network and contributions to local community facilities and infrastructure through the Community Enhancement Fund.

5.2.2 Alternative Energy Sources

The alternative to wind energy is the continued use of fossil fuels, including coal (both black and brown coal) and natural gas. The reliance on these energy sources however, results in the release of GHG emissions such as CO_2 and contributes to the harmful effects of climate change. The RET and REAP discussed in *Chapter 2* outline the commitment by both Australia and NSW to reducing GHG emissions and have set targets for increasing the supply of renewable energy.

Other forms of large-scale renewable energy accounted for in the LRET include hydro, biomass, solar and tidal energy. The Clean Energy Council (2015) indicates that the majority of Australia's suitable hydro sites have already been developed, and so this sector has limited potential for growth. With the exception of solar energy, the other alternative sources are in the early stages of development and are generally not 'market ready'. More importantly, these energy sources have not had the benefit of the decades of research and development that has gone into the generation of energy by wind power. To this end, wind power currently remains the most economical form of large-scale renewable energy in Australia (Clean Energy Council 2015).

5.3 Site Selection Process

Selection of an appropriate site is an integral part of a wind farm development. A suitable wind farm site is generally considered to exhibit the following key characteristics:

- consistently high wind speeds;
- connection to the national electricity grid in close proximity to the wind farm site;
- sparse native vegetation cover with minimal land clearing required to support wind farm infrastructure;
- suitable road access to the wind farm site;

- large land parcels consisting of low levels of residential development;
- willingness for landholders to support wind farm infrastructure; and
- the impact on local amenity can be minimised.

The preliminary wind resource mapping and subsequent site selection was initiated in 2010. Three meteorological monitoring masts were installed within the PA between August 2012 and April 2013 to quantify the nature of wind resources within the Project locality. Results from the monitoring program indicated that the PA is highly suitable for development as a wind farm. Following the preliminary wind resource mapping and confirmation of adequate wind speeds within the Project locality, negotiations with local landholders commenced from April 2012 until late 2014 in order to establish the defined PA. Prior to obtaining lease agreements, the former PA comprised a significantly larger area as illustrated in *Figure 5.1*.

In addition to the favourable wind resource, the PA is considered adequate due to the presence of:

- an existing 330 kV transmission line running east-west across the PA, providing for direct connection into the existing electricity network;
- adequate road access to the PA via Goulburn Road;
- proximity to key townships which include Goulburn and Braidwood that are capable of providing resources required for the construction, operation and maintenance of the Project; and
- gentle ridgelines and large cleared areas capable of supporting wind farm infrastructure.

WOODLAWN MINES
TARAGO
BUNGENDORE ROAD
BRAIDWOOD ROAD
WILLOW GLEN ROAD
BORO
MOUNT FAIRY
MOUNT FAIRY ROAD
SANDHILLS ROAD
BARNET DRIVE
BORO ROAD
LOWER BORO
COULBURN ROAD
DUCKFIELD ROAD
HAZELDELL ROAD
MULLOON
MULLOON ROAD
MANAR ROAD
MANAR
KINGS HIGHWAY
LARBERT
WATSONS ROAD
JONES ROAD
WARRI

Legend

- Project Area
- Former Project Area

Proposed Infrastructure

- Wind Turbine Generator
- Indicative Temporary Mobile Concrete Batching Plant Site
- Site Access Point
- Access Roads and 33kV Reticulation Network
- 33kV Transmission Line
- Substation / Operations Building Area

Existing Infrastructure

- Meteorological Monitoring Mast
- 330kV Transmission Line
- Major Road / Highway

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014) and ESRI World Imagery (2010)

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Figure 5.1 - Former Project Area

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5.4 Project Component Alternatives

5.4.1 WTG and Access Road Layout

During the conceptual design stage, a range of variations for the Project layout were developed and considered in the context of technical, environmental, social and commercial constraints.

As detailed in the Jupiter Wind Farm Development Request for Director General's Requirements prepared by ERM (2013), the preliminary Project layout involved the construction and operation of up to 100 WTGs to be located within the former PA (refer *Figure 5.1*).

Conceptual layouts and configurations of 100 WTGs (August 2014) and 97 WTGs (September 2014) were developed prior to and concurrently with early negotiations with owners of landholdings identified as potentially suitable for hosting Project infrastructure. These were superseded by a 95 WTG layout in October 2014, which eliminated a number of potential WTG locations based on consideration of the outcomes of preliminary landholder feedback/negotiations, identified potential for high visibility of a number of turbines in the proposed locations, and potential impacts associated with the close proximity of one potential turbine location to Tarago village (WTG 97). The 95 WTG layout of October 2014 was devised using WindFarmer, a specialised wind farm development software package developed by DNV GL. The 95 WTG layout considered key ecological, cultural heritage and topographical constraints including modelled wind speeds to maximise access to the wind resources across the PA. The revised WTG layouts are shown in *Figure 5.2a* to *5.2c.*

Following the public release of the 95 WTG layout, the layout was reduced to 88 WTGs based on the outcomes of consultation in October 2014 with local landholders, the NSW Office of Environment and Heritage (OEH), and the ecological values identified by ERM during field investigations. Of the seven removed WTGs, one was in response to consultation with two individual non-involved landholders due to its close proximity to their dwellings as well as its proximity to an existing aircraft landing strip located on a third non-involved landholder property (WTG 92); one was removed in response to consultation with two individual non-involved landholders whose dwellings were located in close proximity to the WTG, and direct request from one of these landholder that this not occur in order to avoid potential visual impacts (WTG 93).

In addition to removing seven WTGs from the 95 WTG layout, a total of 25 WTGs were relocated to avoid ecologically sensitive areas based on recommendations by OEH and site ecological investigations by ERM. A major component of the Project layout revision was the realignment of the proposed access tracks to specifically incorporate avoidance of ecological values. The WTGs and connecting access tracks were removed or relocated to avoid coinciding with areas of ecological habitat features and those containing threatened matters (and their habitats) listed under both the *Threatened Species Conservation Act* (TSC Act) and the *Environment Protection and Biodiversity Conservation Act* (EPBC Act), including:

- threatened and Endangered Ecological Communities (TEC/EEC) including Box Gum Woodland and Tablelands Snow Gum Grassy Woodland;
- threatened flora species (an orchid: Buttercup Doubletail (*Diuris aequalis*) and the herb: Hoary Sunray (*Leucochrysum albicans subsp. albicans var. tricolor*));
- hollow bearing trees and woodland vegetation providing habitat for the Glossy Black-Cockatoo (*Calyptorhynchus lathami*);
- potential habitat areas containing primary feed tree species for the Koala (*Phascolarctos cinereus*); and
- dense remnant vegetation (woodlands and forests).

It should be reinforced that the 95 WTG layout (October 2014) was devised following significant work in the environmental assessment phase to ensure that environmental constraints captured during the technical assessment adequately informed the location of the WTGs. It is for this reason that a relatively low number of WTGs were removed from the 95 WTG layout in settling on the current 88 WTG layout. These 88 WTGs and their access roads were revised twice in order to further minimise various impacts (refer *Figures 5-2a* to *5-2c*).

It is acknowledged that some impacts to ecological values are unavoidable in order to construct the Project; however the approach taken by the Proponent was to allow for avoidance and minimise impacts through design. This was achieved by undertaking ecological investigations during the design phase so that major ecological constraints to development could be accommodated in the Project design. A description of design actions taken to avoid or minimise impacts to ecological values is provided in *Table 5.1*.

Table 5.1 ***Ecological Values and Design Revision Action Taken***

Ecological Value	Precinct	Design Revision Action Taken
TECs/EECs	Northern	Realignment of the access road leading to WTG 32 to avoid a patch of Box Gum Woodland
	Northern	Relocation of WTG 32 to avoid a patch of Box Gum Woodland
	Northern	Realignment of access road between WTGs 66, 40, 37 and 69 to minimise clearing of high quality Box Gum Woodland
	Northern	Relocation WTG 69 north from within high quality Box Gum Woodland into non-native agricultural grassland avoiding clearing
	Northern	Realignment of access road between WTG 58 and WTG 46 to minimise impacts to Box Gum Woodland
	Northern	Realignment of access road between WTG 60 and WTG 66 to avoid fragmentation of a patch of Box Gum Woodland
	Northern	Removal of a WTG in a patch of high quality Box Gum Woodland (south east of WTG 37) to avoid impacts
	Northern	Realignment of access road in east of cluster linking WTG 84 and WTG 85 to minimise traversing Box Gum Woodland
	Southern	Removal of a WTG from within a patch of Box Gum Woodland (located south west of the existing WTG 35)
Threatened flora	Northern	Removal of a WTG south of WTG 8 and associated access road in an area where Buttercup Doubletail was identified
	Northern	Realignment of access roads between WTGs 8 – 72 and WTGs 28 – 82 to avoid impacts to known Buttercup Doubletail habitat
	Northern	Realignment of access road between WTGs 66, 40, 37 and 69 to minimise clearing of identified Hoary Sunray individuals
	Northern	Relocation WTG 69 north from within area of identified Hoary Sunray occurrence into non-native agricultural grassland avoiding clearing
Glossy Black-Cockatoo habitat	Northern	Realignment of access roads leading to WTG 41, 43 and 78, and relocating six WTGs to reduce clearance of high quality foraging habitat for the Glossy-Black Cockatoo
Potential Koala habitat	Southern	Realignment of access tracks south of WTG 65, to reduce the instance of access roads intersecting linear fragments of habitat with primary Koala feed trees
Woodland/Forest habitats	Northern	Removal of WTG north of WTG 6 from a large patch of woodland/forest habitat on hills in the east of the northern cluster avoiding large amounts of habitat clearing that would be required to create the long access track required for construction
	Northern	Removal of a WTG located in woodland/forest habitat south of WTG 87 avoiding habitat clearing
	Northern	Removal of a series of WTGs located in woodland/forest habitat south east of WTG 32 avoiding habitat clearing
	Northern	Removal of WTGs from woodland/forest habitat on ridge north of WTG 60
	Northern	Relocation of WTGs 3 and 67 east out of woodland/forest habitat into agricultural grassland

Ecological Value	Precinct	Design Revision Action Taken
	Northern	Realignment of access tracks in east of central cluster linking WTGs 84, 85, 86, 58, 46, 57 and 3 to avoid/minimise traversing woodland/forest habitats
	Southern	Removal of a series of WTGs in the far south of the PA located in woodland/forest habitat and in TEC/EECs avoiding long, linear clearing required for construction

Micro-Siting WTGs

The current WTG layout reflects the most appropriate arrangement of WTGs based on functional requirements and the environmental assessments undertaken to date. However, in order to provide flexibility for siting of WTGs, approval is sought for a micro-siting allowance which will authorise the final positioning of up to 88 WTGs and associated infrastructure, upon detailed design, within a radius of 100 m of indicative WTG locations documented in this EIS.

TARAGO

COULBURN STREET

BUNGENDORE ROAD

BURRABINGA ROAD

ROSEVIEW ROAD

BRAIDWOOD ROAD

LAKEVIEW ROAD

BORO

MOUNT FAIRY ROAD

HAZELDELL ROAD

BORO ROAD

BARNET DRIVE

COULBURN ROAD

Legend

- Project Area
- Former Project Area
- Ecological Values of Importance
- Woodland/Forest Areas

Current Proposed Wind Turbine Generator Layout

- Wind Turbine Generator
- Indicative Temporary Mobile Concrete Batching Plant Site (October 2016)
- Indicative Temporary Mobile Concrete Batching Plant Site (September 2015)
- Access Roads and 33kV Reticulation Network

Preliminary Wind Turbine Generator Layouts

- Wind Turbine Generator November 2014
- Wind Turbine Generator October 2014
- Wind Turbine Generator September 2014
- Wind Turbine Generator August 2014
- Preliminary Access Road Network (1)
- Preliminary Access Road Network (2)

Data Source:
Proposed Wind Farm Layouts: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015

N

0 500 1,000 1,500m

Client:	EPYC Pty Ltd		
Drawing No:	0223522m_JWF_EIS_G021_R04.mxd		
Date:	07/10/2016	Drawing Size: A3	
Drawn By:	GR/DR	Reviewed By: CB	

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Figure 5.2a - Ecological Values, Former and Current Project Layouts - Northern Precinct (Part A)

Jupiter Wind Farm

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BARNET DRIVE

BORO ROAD

DUCKFIELD ROAD

GOULBURN ROAD

Legend

Project Area

Former Project

Ecological Values of Importance

Woodland/Forest

Current Proposed Wind Turbine Generator Layout

Wind Turbine Generator

Indicative Temporary Mobile Concrete Batching Plant Site (October 2016)

Indicative Temporary Mobile Concrete Batching Plant Site (September 2015)

Access Roads and 33kV Reticulation Network

Preliminary Wind Turbine Generator Layouts

Wind Turbine Generator November 2014

Wind Turbine Generator October 2014

Wind Turbine Generator September 2014

Wind Turbine Generator August

Preliminary Access Road Network (1)

Preliminary Access Road Network (2)

Data Source:
Proposed Wind Farm Layouts: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015

0 500 1,000m

N

Client:	EPYC Pty Ltd		**Figure 5.2b - Ecological Values, Former and Current Project Layouts - Northern Precinct (Part B)**
Drawing No:	0223522m_JWF_EIS_G022_R03.mxd		Jupiter Wind Farm
Date:	07/10/2016	Drawing Size: A3	
Drawn By:	GR/DR	Reviewed By: MF	Environmental Resources Management ANZ

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JAMALEO PA ROAD

KINGS HIGHWAY

MULLOON ROAD

MANAR

MANAR ROAD

WATSONS ROAD

Legend

Project Area

Former Project

Ecological Values of Importance

Woodland/Forest

Current Proposed Wind Turbine Generator Layout

Wind Turbine Generator

Indicative Temporary Mobile Concrete Batching Plant Site

Indicative Temporary Mobile Concrete Batching Plant Site (September 2015)

Access Roads and 33kV Reticulation Network

Preliminary Wind Turbine Generator Layouts

Wind Turbine Generator November 2014

Wind Turbine Generator October 2014

Wind Turbine Generator September 2014

Wind Turbine Generator August

Preliminary Access Road Network

Preliminary Access Road Network

Data Source:
Proposed Wind Farm Layouts: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015

N

0 500 1,000m

Client:	EPYC Pty Ltd	
Drawing No:	023522m_JWF_EIS_G023_R03.mxd	
Date:	07/10/2016	Drawing Size: A3
Drawn By:	GR/DR	Reviewed By: CB

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Figure 5.2c - Ecological Values, Former and Current Project Layouts - Southern Precinct

Jupiter Wind Farm

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5.4.2 WTG Selection

As outlined in *Chapter 3*, the WTG model to be used for the Project is yet to be determined. A range of WTG options are currently under consideration but the selected model will have a maximum generation capacity of up to 4.5 MW. The dimensions of the WTG components including blade length and hub and blade tip heights will vary depending on the model selected. It is understood that this selection process will occur during the detailed design of the Project.

This detailed design process is typical of developments of this scale and investment (wind farm or otherwise) as the developer would preferentially consider new technologies available at the time of commissioning the site; in this case a wind farm. This preference exists as the technology available at the time of commissioning may vary, and offer a range of project enhancements, to those available when the environmental assessment was conducted.

In order to provide flexibility in selecting the WTG model, the WTG dimensions adopted for assessment as part of this EIS are the largest of the model options being considered for the Project, including:

- a WTG with rotor diameter of up to 126 m; and
- a blade length of up to 62 m;
- giving an overall maximum tip height of 173 m.

Alternate Noise Compliance Scenarios

Based on the outcomes of preliminary noise modelling and assessment of the full 88 WTG layout undertaken by DNV GL (2016a), it was identified that noise levels associated with a conservative worst-case and unmitigated noise scenario had the potential to exceed the applicable noise limits.

As an outcome of the preliminary modelling, three viable 'Noise Compliance Scenarios' have been established to present a range of effective noise solutions for the Project.

Each scenario is briefly described below and discussed in detail in *Chapter 10* and *Annex E*.

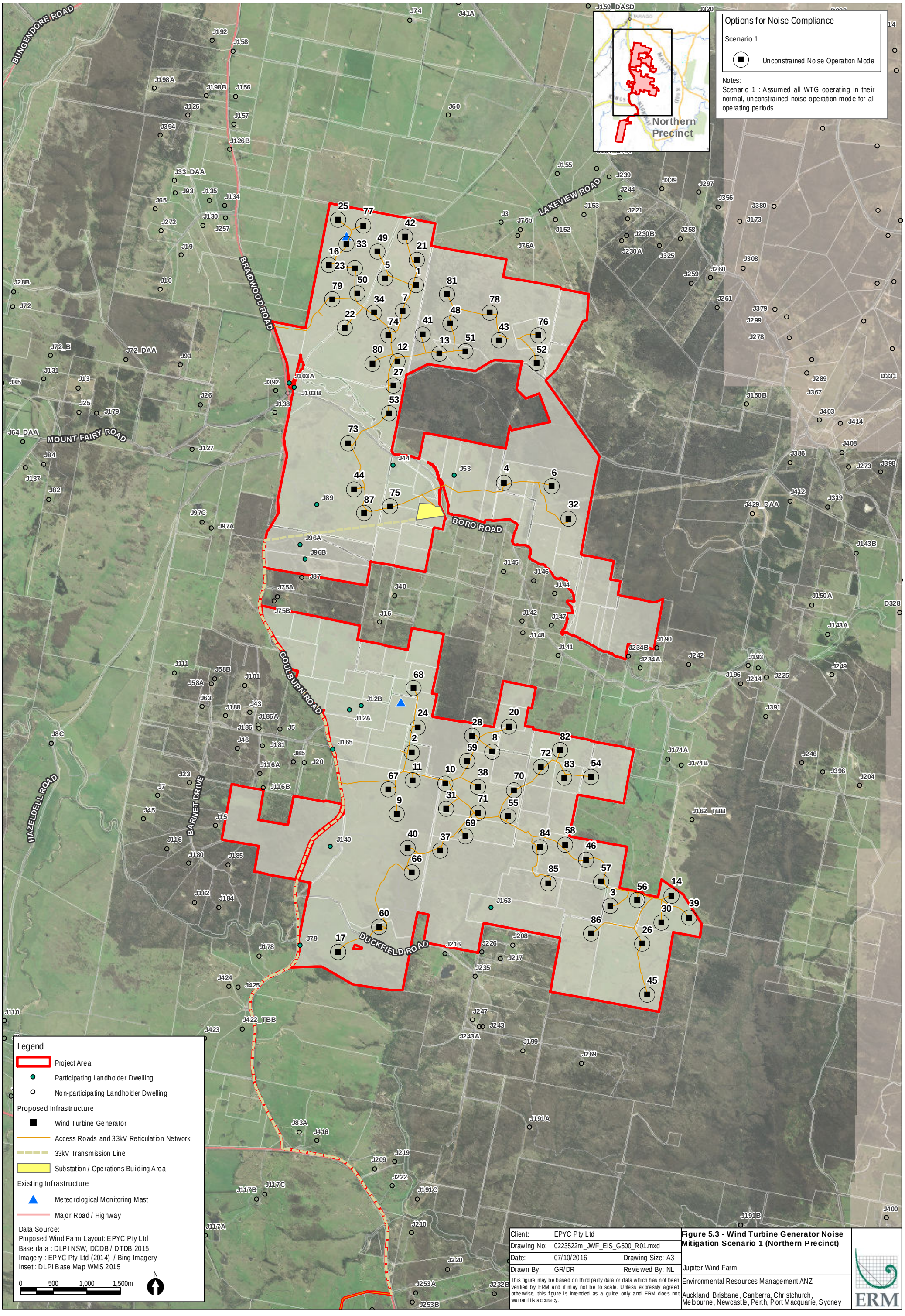
- Scenario 1 assumes the full 88 WTG layout, with the same type of WTG operating in their normal, unconstrained noise operation mode for all operating periods. This scenario is reliant on a higher performance WTG specification, or potentially negotiated agreements with a number of landholders in order to achieve full noise compliance. This scenario is presented in *Figure 5.3*.
- Scenario 2 assumes the full 88 WTG layout, with 74 WTGs of the same type operating in their normal, unconstrained noise operation mode for all operational periods, and 14 WTGs of the same type as the unconstrained WTGs operating in a noise-reduced operation mode for all operational periods. This scenario is fully noise compliant. It is presented in *Figure 5.4*, which identifies the 14 WTGs nominated by DNV GL (2016) to operate in noise-reduced operation modes.
- Scenario 3 assumes the full 88 WTG layout, with 80 WTGs of the same type operating in their normal, unconstrained noise operation mode for all operational periods, and 8 WTGs of the same type as the unconstrained WTGs that will be shut down or remain idle at selected wind speeds. This scenario is fully noise compliant. It is presented in *Figure 5.5*, which identifies the eight WTGs nominated by DNV GL (2016) to operate with constraints.

Extent of Noise Reducing Mitigation

It should be noted that only the northern precinct is shown in the figures below for all three scenarios, because WTGs proposed for operation in noise-reduced operation modes, shut down or idle (in Scenarios 2 and Scenario 3 respectively), are all located in the northern precinct of the PA only.

The Proponent will further investigate and evaluate the three viable noise solutions during subsequent detailed design to determine the most suitable option for the Project and surrounding community, and to achieve fully compliant noise levels at all receptors for all conditions.

On finalisation of detailed design of the Project, the wind farm noise assessment will be revised to incorporate assessment of noise compliance of the final Project design, including any modified layout, WTG type(s) and operational noise control strategies if required. The revised assessment will incorporate those noise management and mitigation measures to be implemented for the Project based on the final Project design.


Options for Noise Compliance
Scenario 1
Unconstrained Noise Operation Mode
Notes:
Scenario 1 : Assumed all WTG operating in their normal, unconstrained noise operation mode for all operating periods.
Northern Precinct
BUNGENDORE ROAD
BRADWOOD ROAD
LAKEVIEW ROAD
MOUNT FAIRY ROAD
BORO ROAD
GOULBURN ROAD
DUCKFIELD ROAD
HAZELDELL ROAD
BARNET DRIVE
Legend
Project Area
Participating Landholder Dwelling
Non-participating Landholder Dwelling
Proposed Infrastructure
Wind Turbine Generator
Access Roads and 33kV Reticulation Network
33kV Transmission Line
Substation / Operations Building Area
Existing Infrastructure
Meteorological Monitoring Mast
Major Road / Highway
Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014) / Bing Imagery
Inset : DLPI Base Map WMS 2015
0 500 1,000 1,500m
N
Client: EPYC Pty Ltd
Drawing No: 0223522m_JWF_EIS_G500_R01.mxd
Date: 07/10/2016 Drawing Size: A3
Drawn By: GR/DR Reviewed By: NL
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Figure 5.3 - Wind Turbine Generator Noise Mitigation Scenario 1 (Northern Precinct)
Jupiter Wind Farm
Environmental Resources Management ANZ
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Options for Noise Compliance

Scenario 2

Controlled Noise Operation

Unconstrained Noise Operation Mode

Notes:
Scenario 2 : Assumed 74 WTGs of the same type operating in their normal, unconstrained noise operation mode for all operational periods, and 14 WTGs of the same type as the unconstrained WTGs operating in a noise-reduced operation mode for all operational periods.

Northern Precinct

BUNGENDORE ROAD
BRADWOOD ROAD
LAKEVIEW ROAD
MOUNT FAIRY ROAD
BORO ROAD
GOULBURN ROAD
DUCKFIELD ROAD
HAZELDELL ROAD
BARNET DRIVE

Legend

Project Area

Participating Landholder Dwelling

Non-participating Landholder Dwelling

Proposed Infrastructure

Wind Turbine Generator

Access Roads and 33kV Reticulation Network

33kV Transmission Line

Substation / Operations Building Area

Existing Infrastructure

Meteorological Monitoring Mast

Major Road / Highway

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014) / Bing Imagery
Inset : DLPI Base Map WMS 2015

0 500 1,000 1,500m

N

Client:	EPYC Pty Ltd		
Drawing No:	0223522m_JWF_EIS_G501_R00.mxd		
Date:	07/10/2016	Drawing Size: A3	
Drawn By:	GR/DR	Reviewed By: NL	

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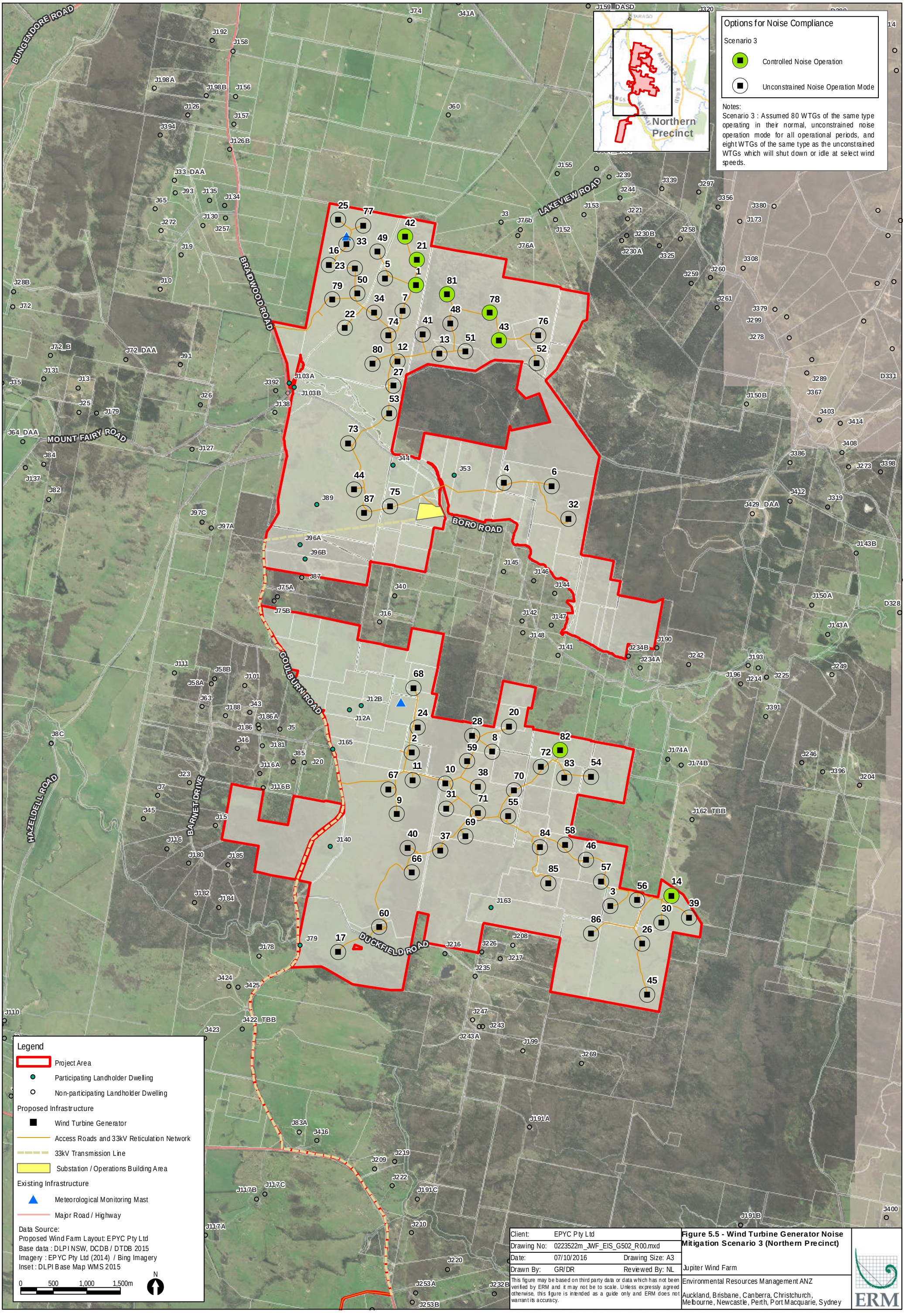
Figure 5.4 - Wind Turbine Generator Noise Mitigation Scenario 2 (Northern Precinct)

Jupiter Wind Farm

Environmental Resources Management ANZ

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BUNGENDORE ROAD
BRADWOOD ROAD
LAKEVIEW ROAD
MOUNT FAIRY ROAD
BORO ROAD
GOULBURN ROAD
DUCKFIELD ROAD
HAZELDELL ROAD
BARNET DRIVE
Northern Precinct
Options for Noise Compliance
Scenario 3
Controlled Noise Operation
Unconstrained Noise Operation Mode
Notes:
Scenario 3 : Assumed 80 WTGs of the same type operating in their normal, unconstrained noise operation mode for all operational periods, and eight WTGs of the same type as the unconstrained WTGs which will shut down or idle at select wind speeds.
Legend
Project Area
Participating Landholder Dwelling
Non-participating Landholder Dwelling
Proposed Infrastructure
Wind Turbine Generator
Access Roads and 33kV Reticulation Network
33kV Transmission Line
Substation / Operations Building Area
Existing Infrastructure
Meteorological Monitoring Mast
Major Road / Highway
Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014) / Bing Imagery
Inset : DLPI Base Map WMS 2015
0 500 1,000 1,500m
N
Client: EPYC Pty Ltd
Drawing No: 0223522m_JWF_EIS_G502_R00.mxd
Date: 07/10/2016 Drawing Size: A3
Drawn By: GR/DR Reviewed By: NL
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
Figure 5.5 - Wind Turbine Generator Noise Mitigation Scenario 3 (Northern Precinct)
Jupiter Wind Farm
Environmental Resources Management ANZ
Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney
ERM

5.4.3 Other Project Infrastructure

Onsite Substation and 330 kV Transmission line Connection

The Project is ideally located with respect to having direct access to the existing 330 kV transmission line that passes through the PA. The location of the onsite substation, as shown in *Figure 3.2* has been located in the most feasible location directly adjacent to the existing transmission line to minimise the length of the 330 kV transmission line connection, and within an area that reduces potential visual impacts.

The substation compound will also accommodate the permanent operations, amenities and maintenance buildings. Co-locating this infrastructure minimises additional clearing impacts and avoids additional alternative areas of impacts. The equipment selection and confirmation of other relevant features will occur during the detailed design of the Project and in consultation with electrical providers.

33 kV Transmission Line from the Southern Precinct

A 33 kV transmission line is required to connect the 33 kV electrical reticulation network within the southern precinct to the substation site located in the northern precinct. Through consultation with TransGrid and RMS, the initial investigation of the corridor for this transmission line incorporated consideration of the road reserves of the Kings Highway and Goulburn-Braidwood Road, and alongside the existing TransGrid easement for the 330 kV transmission line that extends through the PA past the location of the proposed onsite substation site.

Similar to the WTG layout, the proposed 33 kV transmission line corridor was formulated late in the environmental assessment phase. It's design and refinement of the alignment has been informed by the outcomes of consultation with TransGrid and RMS, and by identified environmental constraints as discussed below. It has evolved to avoid potential impacts as far as practical, and as such, no other potential transmission line corridors were assessed in detail.

Transmission Line Design Considerations

Overhead and underground installation options were considered during preliminary assessment works. However, installation of the overhead 33 kV transmission line requires a significantly larger easement width (approximately 20 to 30 m) compared to an underground installation that requires approximately 4 m. Given this larger width, an overhead line would also need to be located adjacent to the existing road corridor, as compared to an underground installation, which can be located within the existing road reserve.

The potential ecological, heritage, and visual impacts resulting from the placement of an overhead installation within less disturbed areas and the associated larger impact area, along with consideration of potential landowner issues associated with the requirement for securing an easement on private land adjacent to the existing road reserve, resulted in a decision to adopt the underground option as preferred in order to avoid such potential impacts wherever feasible.

As such, the assessment has been undertaken based on the assumption that the final design of the transmission line will consist predominantly (or entirely) of underground installation, with overhead only utilised in specific circumstances where underground installation is not feasible. This has resulted in avoidance of any significant environmental impacts associated with installation of the transmission line.

Refinement of the Alignment

Refinement of the alignment has been supported through site survey and qualitative vegetation mapping to achieve the lowest feasible ecological and heritage impacts.

The alignment has been located immediately adjacent to the existing road verge, within predominantly disturbed and previously cleared areas consisting of gravel road base and compacted soils, thereby reducing the potential for ecological and heritage impacts. Further, the 4 m wide clearing adjacent to the road will not sever the linear connectivity along the roadway as the road reserve is wider than 4 m and vegetation will be retained in the remainder of the road reserve.

The location of underground cabling will be finalised during the detailed design phase of the Project, and will avoid any identified sensitive areas wherever feasible.

Temporary Mobile Concrete Batching Plan Sites

The concrete batching plant sites have been selected to provide good access to each WTG precinct and to avoid environmentally sensitive areas. In addition, support from 'involved landholders' to host such infrastructure has been secured.

Minor relocation of the nominated batching plant site within the northern precinct took place during the assessment (refer *Figure 5.2a*). The location of this batch plant was originally based on ability to gain support from an involved landowner to host the infrastructure, however it was subsequently identified that internal access to the site was not feasible, and so to avoid creation of an additional access point into the PA, the location has been moved to a nearby location with low associated impacts, off the internal road into the northern precinct.

Transport Routes

In consultation with RMS, Goulburn-Mulwaree and former Palerang Councils, the route between Port Kembla and the PA via the Hume Highway, Goulburn township, Goulburn-Braidwood Road and the Kings Highway has been identified as the preferred RAV route for the Project. A number of route options were considered through the township of Goulburn, with the preferred route selected as it was previously used for RAVs accessing the nearby Capital I and Woodlawn wind farm sites.

As a result, a number of modifications have already been made along the route to accommodate the vehicles associated with these developments. The route is proposed subject to minor modifications to existing road network infrastructure as detailed in the Transport Impact Assessment (GTA 2016) provided in *Annex H*, and subject to further consultation and obtaining relevant approvals from RMS and Council.

5.5 References

Clean Energy Council (2015), accessed September 2015, http://www.cleanenergycouncil.org.au/technologies/

DNV GL (2016a), *Jupiter Wind Farm Project - Wind Farm Noise Impact Assessment* (Ref: 170338-AUME-R-03 Jupiter Wind Farm Noise Impact Assessment). Report prepared for ERM Australia Pty Ltd.

ERM (2013) *Jupiter Wind Farm Development Request for Director General's Requirements*. Report prepared for EPYC Pty Ltd.

GTA (2016), *Jupiter Wind Farm State Significant Development Transport Impact Assessment*. Report prepared for ERM Australia Pty Ltd.

6 STATUTORY FRAMEWORK

6.1 Introduction

This chapter outlines the relevant statutory provisions for the planning assessment process at the Commonwealth, State and local levels.

6.2 Commonwealth Legislation

6.2.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary Federal legislation relating to environment and heritage protection, land use and biodiversity conservation. It is administered by the Commonwealth Department of the Environment and Energy (DoEE).

The EPBC Act requires the referral of actions that have, or are likely to have, a significant impact on a Matter of National Environmental Significance (MNES) or on Commonwealth land, to the Commonwealth Minister for the Environment for a determination as to whether or not they are a controlled action that requires approval under the EPBC Act.

An action is defined as a project, development, undertaking, activity (or series of activities), or alteration to any of these.

The MNES protected by the EPBC Act includes:

- world heritage properties;
- National heritage places;
- wetlands of international importance (Ramsar wetlands);
- Commonwealth listed threatened species and ecological communities;
- Commonwealth listed migratory species;
- nuclear actions;
- the Great Barrier Reef Marine Park;
- Commonwealth marine areas; and
- a water resource, in relation to coal seam gas and large mining development.

Of these, the only NMES with the potential to be impacted by the Project are Commonwealth listed threatened species and ecological communities; and Commonwealth listed migratory species.

There is no Commonwealth land within the Project Area.

The Project was referred under the EPBC Act on 13 July 2015 (Reference Number 2015/7518), and was determined to be a controlled action on 8 September 2015 (refer *Chapter 1*). As a result, the project requires approval under the EPBC Act and will be assessed for the purposes of the EPBC Act via the Department of Planning and Environment (DP&E) under the terms of the bilateral agreement between the Commonwealth and NSW Governments.

The controlling provisions that apply to the Project under the EPBC Act were determined to be:

- listed threatened species and communities (sections 18 and 18A); and
- listed migratory species (sections 20 and 20A).

Consideration of the impact of the proposed activity on each of these MNES has been provided in *Chapter 9* and *Annex D*.

6.2.2 Renewable Energy (Electricity) Act 2000

The *Renewable Energy (Electricity) Act 2000* establishes the large-scale and small-scale renewable energy schemes, including the liability framework, certificate generation and administrative arrangements.

The objects of this Act are:

(a)to encourage the additional generation of electricity from renewable sources; and

(b) to reduce emissions of greenhouse gases in the electricity sector; and

(c) to ensure that renewable energy sources are ecologically sustainable.

Chapter 2 details the important role that the Project will play in reducing Australia's greenhouse gas emissions, meeting future energy demands, supporting State and Commonwealth renewable energy targets, and contribution to economic development in the region, consistent with the objectives of the *Renewable Energy (Electricity) Act 2000*.

6.2.3 Civil Aviation Safety Regulations 1998

The *Civil Aviation Safety Regulations 1998* (made under the *Civil Aviation Act 1988*) require that Civil Aviation Safety Authority (CASA) be informed of proposals to build a structure greater than 110 m above Australian Datum (AD). This is required to allow assessment of whether the structure(s) may represent a hazard to aircraft, and to provide any associated mitigation measures including any requirements for markings or lighting.

An Aeronautical Impact Assessment has been prepared by Aviation Projects Pty Ltd (refer *Annex J*) to inform this EIS. *Chapter 16* provides a summary of the findings of the assessment with respect to potential for hazard to aircraft, including consideration of requirements for hazard lighting, along with future consultation to be undertaken with CASA and other proposed mitigative measures.

6.3 NSW Legislative Requirements

6.3.1 Environmental Planning and Assessment Act 1979

The relevant planning legislation for NSW is the *Environmental Planning and Assessment Act* 1979 (EP&A Act). The EP&A Act instituted a system of environmental planning and assessment in NSW and is administered by DP&E.

The Project is State significant development (SSD) (refer *Section 6.4.1*) which requires approval under Division 4.1 of Part 4 of the EP&A Act.

The Project is also designated development under Schedule 3 of the *Environmental Planning and Assessment Regulations 2000* as it is an 'electricity generating station' which is capable of supplying more than 30 megawatts of electrical power.

Further, the Project is also integrated development under the EP&A Act because it requires:

- an Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997* (POEO Act) (refer *Section 6.3.2*); and

- approval under section 138 of the *Roads Act 1993* (Roads Act) for the works proposed to be carried out in public roads (refer *Section 6.3.4*).

The Director General for DP&E initially issued environmental assessment requirements for the Proponent to consider and address in the EIS on 31 January 2014 (issued as Director General Requirements (DGRs)) and supplemented these with additional requirements on 3 June 2014. On 10 September 2015, Supplementary Secretary Environmental Assessment Requirements (SEARs) were issued, and these were subsequently revised by DP&E and reissued on 2 March 2016. The revised SEARs (dated 2 March 2016) supersede the DGRs previously issued for the Project, and incorporate input from the various government agencies that will provide input to DP&E in the assessment of the Project (refer *Chapter 1*).

Objects of EP&A Act

The SEAR's for the Project require that the objectives of the EP&A Act (as contained in Section 5 of that Act) be taken into consideration as part of the justification of the Project. The Project is consistent with the objectives of the EP&A Act as discussed in *Table 6.1*.

Table 6.1 Consideration of the Objects of the EP&A Act

Object	Response
5(a) to encourage: *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment*	The Project will provide for the development of natural wind resources within the Southern Tablelands and will have environmental benefits by displacing greenhouse gas emissions and aid in reducing the potential impacts of climate change and global warming. The Project will provide a range of social and economic benefits as described in *Chapter 15*.
(ii) the promotion and co-ordination of the orderly and economic use and development of land	The Project will promote the orderly and economic use of the land through the provision of a use and development that is compatible with, and supplements in an orderly and economic manner, the existing agricultural activities occurring within the PA. Economic benefits locally and regionally include employment during construction and operation, as well as supply chain demand for materials.
(iii) the protection, provision and co-ordination of communication and utility services,	The Project is a form of electricity generation and so will facilitate the supply of electricity utility services. The Project will minimise potential impacts to communications by way of electromagnetic interference as discussed in *Chapter 16* and the EMI/EMF Assessment *(Annex K)*.
(iv) the provision of land for public purposes,	The project does not involve any change to the status of public land.
(v) the provision and co-ordination of community services and facilities, and	EPYC has committed to establishing a voluntary Benefit Sharing Programme for all existing dwellings located within 2 km of a WTG associated with the Project (refer Section 7.2.9).

Object	Response
(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and	The Project will deliver 100% renewable energy that will displace traditional carbon intensive energy production, such as coal fired generation, to work towards minimising the harmful impacts of climate change. The Project has been designed to minimise potential ecological impacts, supported through revision and refinement of the design and layout of the wind farm and supporting components in response to identified environmental constraints and sensitivities. Ecological values were a key consideration in the siting of the wind turbines and associated infrastructure. An assessment of impacts to flora and fauna, including threatened species, populations and ecological communities is provided at *Chapter 9* and the Ecology Impact Assessment *(Annex D)*.
(vii) ecologically sustainable development, and	The Project will promote ecological sustainable development in the manner described in *Section 6.8.*
(viii) the provision and maintenance of affordable housing, and	The Project site and broader region consists of extensively cleared farm land primarily zoned rural – primary production (with portions zoned Environmental Management). These existing zonings do not facilitate nor foresee future urban development/affordable housing within the Project site or the broader region and as such the proposal will not impact on the provision and maintenance of affordable housing.
(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and	The Project enables the sharing of responsibility for environmental planning between the various levels of government through the consideration of State and local environmental planning instruments (EPIs) and referral of the Project under the EPBC Act. The respective local Councils have also been consulted throughout the approvals process and are represented on the Community Consultative Committee (CCC) that is operational for the Project.
(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.	EPYC has developed an effective community consultation strategy that will continue to be implemented throughout the planning approvals process and construction and operational phases of the Project (refer *Chapter 7*). The EIS will be placed on public exhibition and submissions will be considered by DP&E during the assessment of the Project.

Section 79C(1) Requirements

SSD developments are assessed by the consent authority under the provisions of Section 79C (1) of the EP&A Act in accordance with Section 89H of the EP&A Act. The matters of consideration are detailed in *Table 6.2*.

Table 6.2 *Consideration of Section 79C(1) Requirements*

Requirement	Response
a(i) any environmental planning instrument.	The provisions of relevant environmental planning instruments (EPIs) relating to the Project are summarised and addressed in *Sections 6.4* and *6.5*.
a(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved).	There are no draft environmental planning instruments relevant to the PA.
a(iii) any development control plan.	The effect of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) is that development control plans (DCPs) do not apply to SSD. Nonetheless, in the interest of completeness, the specific wind farm development requirements of the *Goulburn Mulwaree Development Control Plan 2009* and the *Tallaganda Development Control Plan No. 4 for Rural 1 (A) Zoning 1996* have been considered and addressed in *Section 6.5.4*.
a(iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F.	As discussed in *Section 15.3.2*, the Proponent will establish a Community Enhancement Fund via a Voluntary Planning Agreement with the local Councils to provide ongoing contribution for the provision and enhancement of community facilities and Council funded infrastructure projects. Consultation with the relevant Councils regarding the details of these agreements is ongoing and will be finalised prior to the commencement of construction of the Project.
a(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph).	The provisions of the *Environmental Planning and Assessment Regulations 2000* as they relate to the Project have been addressed within the EIS.
a(v) any coastal zone management plan (within the meaning of the Coastal Protection Act 1979).	There are no coastal zone management plans of relevance to the PA.
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.	Assessment of the key environmental and social impacts relating to the Project is provided in *Chapters 9* to *16* and the corresponding specialist assessments that accompany the EIS (attached as Annexures).
(c) the suitability of the site for the development.	The suitability of the PA for the purposes of a wind farm is discussed in *Chapter 4*.
(d) any submissions made in accordance with the Act or the regulations.	The EIS will be placed on public exhibition by DP&E for a period of up to 60 days and submissions will be responded to by the Proponent in a submissions report that will be considered by DP&E during the assessment of the Project.

Requirement	Response
(e) the public interest.	The Project will deliver 100% renewable energy which will displace traditional carbon intensive energy production, such as coal fired generation, to work towards minimising the harmful impacts of climate change. As recently recognised by Chief Justice Preston (2007), there is a 'broad public interest in the establishment of viable renewable energy sources' which must be balanced against 'the geographically narrower' potential impacts of a Project. The EIS and supporting specialist assessments have concluded that the Project is compatible with the existing agricultural uses evident in the area, can appropriately manage the geographically localised potential environmental impacts, and accords with the planning and environmental provisions relevant to the PA. As a result, the Project is considered to be in the public interest.

The EP&A Act enables the making of environmental planning instruments (EPIs) in the form of State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). The EPIs implemented under the EP&A Act that are considered potentially relevant to the proposal are:

- *State Environmental Planning Policy (State and Regional Development) 2011;*
- *State Environmental Planning Policy (Infrastructure) 2007;*
- *State Environmental Planning Policy (Rural Lands) 2008;*
- *State Environmental Planning Policy No. 44 Koala Habitat Protection (SEPP 44);*
- *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011;*
- *Palerang Local Environmental Plan 2014;* and
- *Goulburn Mulwaree Local Environmental Plan 2009.*

The application of each of these to the Project is considered in *Sections 6.4* and *6.5* below.

6.3.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is the primary piece of legislation regulating pollution control and waste disposal in NSW. The NSW Environment Protection Authority (EPA) is the appropriate regulatory authority for large-scale wind farm premises under the POEO Act. Schedule 1 of the POEO Act defines scheduled activities and thresholds for which an Environment Protection Licence (EPL) is required. Electricity works (wind farms) that are approved as SSD are scheduled activities for the purposes of the Act, requiring an EPL for both construction and operation.

Subject to the approval of the Project, an EPL will be sought in accordance with the POEO Act.

6.3.3 Water Management Act 2000

The objectives of the *Water Management Act 2000* (WM Act) are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. The provisions of the WM Act are being progressively implemented in NSW as water sharing plans, which are made for each relevant water source.

The PA is located within the Shoalhaven catchment within the jurisdiction of two water sharing plans:

- *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2011; and*
- *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011.*

The provisions of these two water sharing plans apply, requiring that water access licences be obtained for the extraction of water from within these two water sources (except where a valid exemption applies). Further discussion of these plans and how they relate to the Project is provided in *Chapter 14*. All required water access licences for the Project will be obtained prior to any extraction occurring.

6.3.4 Roads Act 1993

The *Roads Act 1993* (Roads Act) provides the regulatory framework for undertaking various activities on public roads. Section 138 of the Roads Act outlines the provision regarding permitting for undertaking activities on public roads. The Roads Act is administered by the relevant roads authorities, being NSW Roads and Maritime Service (RMS) for major roads, councils for minor roads, and the Department of Primary Industries -Lands (DPI Lands) for Crown roads.

The Project construction phase requires minor road and intersection modification works at a number of intersections along the preferred restricted access vehicle (RAV) route (refer *Annex H*). In addition, the transmission line is to be located within the road reserve, requiring works associated with installation of underground cabling or overhead lines.

Consent will be obtained from the appropriate roads authority under Section 138 of the Roads Act for all works in, on or under public roads, including Crown roads.

RMS has been consulted during preparation of the EIS and has provided in principle support of the Project. Consultation with RMS will continue through the detailed design phase of the Project in support of obtaining all necessary RMS consents / approvals for the Project.

The two local Councils have been consulted during preparation of the EIS regarding local road impacts and proposed vehicle routes within the respective Local Government Areas (LGAs). Consultation with these Councils will continue through the detailed design phase of the Project in support of obtaining all necessary agreements / approvals for the Project.

6.3.5 Crown Lands Act 1989

The *Crown Lands Act 1989* provides for circumstances where Crown land may be leased or sold and where licenses over Crown land may be granted.

There are no Crown land parcels within the PA, with the exception of one lot through which the proposed 33 kV transmission line passes along Goulburn Road (Lot 7004 DP1020765 – 2.1 ha).

There is a network of Crown roads that traverse the PA and it is proposed that the internal access roads and underground electrical cabling will intersect some of these Crown roads. The majority of the proposed crossings occur on unformed Crown roads (often referred to as 'paper roads'), with the exception of:

- two crossings of Boro Road in the Northern Precinct;
- one crossing of Manar Road within the southern precinct; and
- the 33 kV transmission line, which is proposed to extend along Goulburn Road and the Kings Highway within the existing RMS road reserve.

A number of Crown waterways are present within the PA, including Boro, Reedy and Doughboy Creeks. Proposed crossings of these waterways are outlined *Chapter 4* and detailed in *Annex I*.

All Crown land parcels, road reserves and waterways located within, and in the vicinity of the PA are illustrated in *Figure 4.7*.

Access rights, in the form of easements or licences, will also be obtained as required in relation to all Crown land in accordance with the processes contained in the *Crown Lands Act 1989*.

6.3.6 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) establishes mechanisms for:

- the management and protection of listed threatened species of native flora and fauna (excluding fish and marine vegetation);
- the listing of threatened species or key threatening processes;
- the development and implementation of recovery and threat abatement plans;
- the declaration of critical habitat;
- the consideration and assessment of threatened species impacts in development assessment process; and
- management and regulation of actions that may damage critical or other habitat or otherwise significantly affect threatened species, populations and ecological communities.

The TSC Act amends other Acts to provide for the facilitation of the appropriate assessment, management and regulation of actions that may damage critical or other habitat, or otherwise significantly affect threatened species, populations and ecological communities. Specifically, section 5A of the NSW EP&A Act sets out seven factors to be considered during the Assessment of Significance (7-part test) when determining whether a proposed action will, or is likely to, have a significant effect on a threatened species, endangered populations or endangered ecological communities listed under the schedules of the TSC Act.

A number of threatened species or their habitats and ecological communities were identified or assessed as potentially occurring within the PA. The potential impacts on threatened species have been considered in *Chapter 9* and *Annex D* in accordance with the requirements of the TSC Act and the EP&A Act.

6.3.7 Noxious Weeds Act 1993

The *Noxious Weeds Act 1993* (NW Act) identifies, classifies and guides the control of noxious weeds in NSW. The NW Act defines the roles of government, councils, private landholders and public authorities in the management of noxious weeds. It also determines control actions for the various noxious weeds, according to their potential to cause harm to our local environment. There are five different "control classes" listed under the Act. Landowners are obliged to control all noxious weeds on their land according to specified "control classes".

Noxious weeds within the Goulburn Mulwaree and former Palerang Council LGAs and their occurrence within the PA are considered in *Annex D*, and mitigative measures to be implemented for control of weeds are outlined in *Chapter 9.*

6.3.8 Non-Applicable Approvals

Section 89J(1) of the EP&A Act removes the need for certain approvals for projects that obtain SSD development consent. This includes the following authorisations relevant to the Project, which may have otherwise needed to be attained:

- *National Parks and Wildlife Act 1974* - a permit under section 87 or consent under section 90;
- *Native Vegetation Act 2003* - authorisation under section 12 to clear native vegetation or State protected land;
- *Heritage Act 1977* - approval to disturb an item under Part 4, or an excavation permit under section 139; and
- *Water Management Act 2000* - water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91.

6.4 State Environmental Planning Policies

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

Clause 8 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) provides that the development is declared to be an SSD for the purposes of the Act if:

- the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act; and
- the development is specified in Schedule 1 or 2.

Schedule 1, Clause 20 of the SRD SEPP identifies development for the purpose of electricity generating works (using any energy source, including wind power) with a capital investment value of more than $30 million as being SSD.

The estimated capital investment value of the Project is $300 million, which exceeds the $30 million threshold and therefore the Project is considered as SSD under Part 4 of the EP&A Act.

6.4.2 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across NSW. In addition to this, it also provides for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.

Clause 34(1) of ISEEP states:

"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."

'Electricity generating works' is broadly defined to mean 'a building or place used for the purpose of making or generating electricity' and so includes a wind farm.

Clause 33 of ISEPP defines prescribed rural, industrial or special use zone as:

"...any of the following land use zones or a land use zone that is equivalent to any of those zones:

a) RU1 Primary Production,

b) RU2 Rural Landscape,

c) RU3 Forestry,

d) RU4 Rural Small Holdings,"

The majority of the PA is zoned RU1 Primary Production Zone. The Project is therefore permissible with consent under clause 31(1) of ISEPP within the majority of the zoning across the PA.

A portion of the PA that is located within the Goulburn Mulwaree local government area (LGA) contains land zoned E3 -Environmental Management. ISEPP does not apply to the land within the E3 zone and the planning approval approach in this portion of land is discussed in detail in *Section 6.5.2*.

6.4.3 State Environmental Planning Policy (Rural Lands) 2008

The aims of *State Environmental Planning Policy (Rural Lands) 2008* (Rural Lands SEPP) are:

a) to facilitate the orderly and economic use and development of rural lands for rural and related purposes,

b) to identify the Rural Planning Principles and the Rural Subdivision Principles so as to assist in the proper management, development and protection of rural lands for the purpose of promoting the social, economic and environmental welfare of the State,

c) to implement measures designed to reduce land use conflicts,

d) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,

e) to amend provisions of other environmental planning instruments relating to concessional lots in rural subdivisions.

The Rural Lands SEPP provides planning principles that apply to local councils in exercising their functions relating to local environmental plans for rural lands. It also contains provisions that apply to the determination of development applications for rural subdivisions or rural dwellings, and enables the identification of land as State significant agricultural land.

There are no provisions in the Rural Lands SEPP that are relevant to the proposed development and the PA does not contain State significant agricultural land.

However, the Project is considered to be consistent with the broad objects of the Rural Lands SEPP. In particular, the PA will continue to be used for rural uses. The Project provides for the economic use and development of rural lands in unison with the agricultural use of the land, and will thus not impact on the ongoing and future agricultural productivity of the land.

6.4.4 State Environmental Planning Policy No. 44 – Koala Habitat Protection

The aims of *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44) are *"to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline:*

a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat;

b) by encouraging the identification of areas of core Koala habitat; and

c) by encouraging the inclusion of areas of core koala habitat in environment protection zones."

SEPP 44 applies to that part of the PA within the former Mulwaree LGA, but not those parts of the PA within the former Goulburn or former Palerang LGAs.

SEPP 44 imposes specific requirements in relation to potential Koala habitat and core Koala habitat. It identifies land as potential Koala habitat if any of the feed tree species listed on Schedule 2 make up 15% of the canopy in a location and as core Koala habitat if a resident breeding population of Koalas is identified as occurring at the location.

Clause 7 of SEPP 44 provides that before a council may grant consent to an application to carry out development, it must satisfy itself whether or not the land is a potential koala habitat. If the council is satisfied that the land is not a potential koala habitat, then no further obligations arise.

An assessment of Koala habitat values of the PA has been provided in *Chapter 9* and *Annex D*. The assessment identified no Koalas, tracks or traces of Koalas in the Study Area, nor have any been recorded in the area for 12 years. Some identified areas of woodland and forest were considered either suitable or sub-optimal habitat for the species to occur, however the Project would not likely have a significant impact on the Koala. Furthermore, the Project would not impact on any area with an identified resident Koala population or a notable proportion of feed trees in the (former) Mulwaree LGA (that is, the land to which SEPP44 applies).

6.4.5 State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The aims of *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011* are:

'(a) to provide for healthy water catchments that will deliver high quality water while permitting development that is compatible with that goal, and

(b) to provide that a consent authority must not grant consent to a proposed development unless it is satisfied that the proposed development will have a neutral or beneficial effect on water quality, and

(c) to support the maintenance or achievement of the water quality objectives for the Sydney drinking water catchment.'

In accordance with Section 9 of the Policy, any development or activity proposed to be carried out on land to which this Policy applies should incorporate Water NSW's current recommended practices and standards. If any development or activity does not incorporate Water NSW's current recommended practices and standards, the development or activity should demonstrate to the satisfaction of the consent authority or determining authority how the practices and performance standards proposed to be adopted will achieve outcomes not less than those achieved by Water NSW's current recommended practices and standards.

The PA lies within the boundary of the Sydney Drinking Water Catchment, therefore the provisions of this policy apply. The requirements of the SEPP and the Project's consistency with these requirements are detailed in the Water Supply, Water Quality and Hydrology Assessment discussed in *Chapter 14*.

6.4.6 State Environmental Planning Policy No. 55 – Remediation of Land

Under Clause 7 of *State Environmental Planning Policy No. 55 – Remediation of Land* (SEPP 55), a consent authority is required to consider whether a proposed development site is affected by soil or other contaminants before granting consent. The PA is zoned for agricultural purposes, which reflects the primary use of the land for agricultural grazing. There is no previous history of other uses that could be considered to be potentially contaminating and therefore it is considered that the PA has a low contamination risk. The PA is considered unlikely to be contaminated and suitable for the proposed development, and is therefore considered to be consistent with SEPP 55.

6.5 Local Statutory Context

The Project extends across the Goulburn Mulwaree LGA and the former Palerang LGA. The majority of the PA is located within the former Palerang LGA (refer *Figure 4.1*).

Originally known as the Eastern Capital City Regional Council, Palerang Council was proclaimed on 11 February 2004 following the amalgamation of the former Tallaganda Shire with most of the former Yarrowlumla Shire and small parts of Cooma-Monaro Shire, Gunning Shire and Mulwaree Shire. On 12 May 2016, the NSW Government announced the merger of the Palerang and Queanbeyan Councils to become the Queanbeyan-Palerang Regional Council. The Local Environment Plans (LEPs) for the former Palerang and Queanbeyan LGAs continue to apply to their respective areas. Thus, for the purposes of the EIS assessment, reference has been made to the former Palerang LGA throughout.

The Goulburn Mulwaree Council was formed as the Greater Argyle Council in 2004 as an amalgamation of Goulburn City and parts of the former Mulwaree Shire. It was renamed in 2005 as the Goulburn Mulwaree Council.

The local planning context covering former Palerang and Goulburn Mulwaree LGAs are outlined in the subsequent sections.

6.5.1 Palerang Local Environmental Plan 2014

The *Palerang Local Environment Plan 2014* (PLEP) is the principal environmental planning instrument which regulates land use in the portion of the PA within the former Palerang LGA.

The area of the PA subject to the PLEP, is zoned 'RU1 - Primary Production'. A land use zoning map is provided at *Figure 4.6*. Consideration of the consistency of the Project with the objectives of the RU1 zone is detailed in *Table 6.3*.

Table 6.3 *Objectives of Palerang Local Environmental Plan 2014 - RU1 Primary Production Zone*

Requirement	Response
a) To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.	The Project will enable the continuation of primary industry production in the PA whist providing additional income for landowners. Minor, temporary impacts on primary production activities will be experienced during construction activities, however ongoing primary industry production will continue in the PA during both construction and operation.
b) To encourage diversity in primary industry enterprises and systems appropriate for the area.	The proposed wind farm development will diversify development within the rural lands, providing an additional, non-agricultural land use that is compatible with existing agricultural activities occurring in the PA. The proposed wind farm can occur in unison with the continuing use of the land for agricultural purposes. Economic benefits locally and regionally include additional revenue source for landowners, employment during construction and operation, as well as supply chain demand for materials.
c) To minimise the fragmentation and alienation of resource lands.	The development will have no significant impact on the fragmentation or alienation of rural land. It does not require any subdivision, fragmentation or alienation of land, with the exception of subdivision of the substation site that is located adjacent to the existing TransGrid 330 kV easement, and which will be transferred to TransGrid. The proposed wind farm development will diversify development within the rural lands, providing an additional, non-agricultural land use that is compatible with existing agricultural activities.
d) To minimise conflict between land uses within this zone and land uses within adjoining zones.	The Project site and broader region consists of extensively cleared farm land primarily zoned RU1 Primary Production, with portions within the Goulburn Mulwaree LGA zoned E3 Environmental Management. The proposed wind farm development can occur in unison with the continuing use of the land for both agricultural purposes within this zone and land uses within adjoining zones.

Requirement	Response
e) To minimise the impact of any development on the natural environment.	The project has been designed to minimise impacts on the natural environment to the extent practicable. Further, this EIS and attached specialist reports assesses the environmental and social impacts of the proposed wind farm development, and recommends a range of management measures to further minimise and mitigate identified impacts.
f) To ensure that development does not unreasonably increase the demand for public services or facilities.	The project will temporarily place demand on the road networks associated with the transport of construction plant and equipment. Vehicle access to the northern precinct is proposed via two separate intersections off Goulburn-Braidwood Road, whilst the southern precinct will be accessed via an intersection off the Kings Highway. The Traffic and Transport Assessment undertaken for the Project (refer *Annex H*) anticipates no significant impacts on the capacity of the road network or road users as a result of the Project. Further, potential traffic impacts will be managed through the implementation of a range of controls, including necessary road upgrades in accordance with applicable road safety standards and guidelines, as summarised in *Chapter 13*. As discussed in *Section 15.3.2*, the Proponent will establish a Community Enhancement Fund via a Voluntary Planning Agreement with the local councils to provide ongoing contribution for the provision and enhancement of community facilities and Council funded infrastructure projects. Consultation with the relevant councils regarding the details of these agreements is ongoing and will be finalised prior to the commencement of construction of the Project.

Permissibility

The Project is prohibited under the land use table for the RU1 Zone under the PLEP. However, as outlined above, ISEPP operates to make the Project permissible with consent within the RU1 Zone under the PLEP (refer to *Section 6.4.2*).

The Project satisfies the objectives of the RU1 zone in terms of diversifying primary industry development, supporting rural communities through the income streams to involved landowners and benefits proposed via the Community Enhancement Fund. Furthermore, the Project and associated infrastructure will occupy only approximately 1.7% of the total land contained within the PA and so will not prevent ongoing agricultural activities occurring on the land. The introduction of wind farms into rural and agricultural regions provides a suitable supporting income base which in turn assists in maintaining the agricultural capacity of the land.

6.5.2 Goulburn Mulwaree Local Environmental Plan 2009

The *Goulburn Mulwaree Local Environment Plan 2009* (GMLEP) is the principal environmental planning instrument which regulates land use in the portion of the PA within the Goulburn Mulwaree LGA. Under the provisions of the GMLEP, the PA is partially zoned 'RU1 - Primary Production' and partially 'E3 - Environmental Management' (refer *Figure 4.6)*. Consideration of the consistency of the Project with the objectives of the GMLEP RU1 and E3 zones are detailed in *Table 6.4*.

The part of the PA within the Goulburn Mulwaree LGA is mapped in its entirety as containing terrestrial biodiversity and is partially zoned E3 zone under GMLEP. However:

- the primary use of the land is for rural / agricultural land use activities; and
- detailed ecological investigation identified that the ecological values apply to a much more limited area and not across all of the LEP 2009 E3 zoned / mapped terrestrial biodiversity areas (refer *Chapter 9* and *Annex D* for further discussion of identified values).

Table 6.4 ***Objectives of Goulburn Mulwaree Local Environment Plan 2009 - RU1 Primary Production and E3 Environmental Management Zones***

Requirement	Response
RU1 Primary Production Zone	
a) To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.	The Project will enable the continuation of primary industry production in the PA whist providing additional income for landowners. Minor, temporary impacts on primary production activities will be experienced during construction activities, however ongoing primary industry production will continue in the PA during both construction and operation.
b) To encourage diversity in primary industry enterprises and systems appropriate for the area.	The proposed wind farm development will diversify development within the rural lands, providing an additional, non-agricultural land use that is compatible with existing agricultural activities occurring in the PA. The proposed wind farm can occur in unison with the continuing use of the land for agricultural purposes. Economic benefits locally and regionally include additional revenue source for landowners, employment during construction and operation, as well as supply chain demand for materials.
c) To minimise the fragmentation and alienation of resource lands.	The development will have no significant impact on the fragmentation or alienation of rural land. It does not require any subdivision, fragmentation or alienation of land, with the exception of subdivision of the substation site that is located adjacent to the existing TransGrid 330 kV easement, and which will be transferred to TransGrid. The proposed wind farm development will diversify development within the rural lands, providing an additional, non-agricultural land use that is compatible with existing agricultural activities.

Requirement	Response
d) To minimise conflict between land uses within this zone and with adjoining zones.	The Project site and broader region consists of extensively cleared farm land primarily zoned RU1 Primary Production, with a portion of the Project located within the Goulburn Mulwaree LGA, zoned E3 Environmental Management. The proposed wind farm development can occur in unison with the continuing use of the land for agricultural purposes. In addition, rural residential development is currently not permitted within the surrounding areas within this LGA, including the E3 zoned land, which permits a minimum lot size of 100 ha under the Goulburn Mulwaree LEP 2009.
e) To promote the use of agricultural land for efficient and effective agricultural production.	The proposed wind farm will not significantly impact on primary industry activities. Ongoing primary industry production will not be significantly impacted due to the limited amount of land required during wind farm operations. The proposed wind farm development can occur in unison with the continuing use of the land for agricultural purposes.
f) To avoid or minimise impacts on the natural environment and protect environmentally sensitive land.	The project has been designed to minimise impacts on the natural environment to the extent practicable. Further, this EIS and attached specialist reports assesses the environmental and social impacts of the proposed wind farm development, and recommends a range of management measures to further minimise and mitigate identified impacts.
g) To allow the development of non-agricultural land uses which are compatible with the character of the zone.	The proposed wind farm provides a non-agricultural land use which is compatible with the character of the zone. The proposed wind farm development can occur in unison with, and support, the continuing use of the land for agricultural purposes.
h) To allow the development of processing, service and value-adding industries related to agriculture and primary industry production.	The proposed wind farm development will diversify development and the economy within the rural lands, providing an additional, non-agricultural land use that is compatible with agricultural activities occurring in the PA.
i) To protect and enhance the water quality of receiving watercourses and groundwater systems to reduce land degradation.	Any potential water-related impacts are primarily associated with the construction stage of the Project. Once operational, the Project will have minimal water usage requirements and very limited potential water-related impacts. *Chapter 14* of the EIS details a range of management and mitigation measures to protect and enhance the water quality of receiving waters as a result of the development during both construction and operation.

Requirement	Response
j) To minimise the visual impact of development on the rural landscape.	While all wind farms are inevitably visually prominent to some extent, the Project has been refined to minimise visual impacts to the extent practicable. A Landscape Character and Visual Impact Assessment (LCVIA) was undertaken by Clouston Associates (2016) to assess the potential visual impacts associated with the Project on public and private receptors in proximity to the PA. The LCVIA is discussed in *Chapter 11* and provided in full at *Annex F*. The highest impacts are associated with dwellings that are located on elevated ground with panoramic views over the surrounding rural landscape. The lack of tall built form within the Study Area increases the visual prominence of the WTGs. Public viewpoints are mostly limited to the minor local road network and two main thoroughfares that traverse the Study Area. The Project will not have a major impact on the character of Tarago village, where views toward the WTGs from a number of residential view locations will be screened by adjoining dwellings/structures, tree cover and landform. Landscape mitigation measures have been identified, and if necessary will be offered to reduce visual impacts to existing residential dwellings surrounding the Project.
E3 Environmental Management Zone	
To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.	**Ecological** A large amount of design effort was devoted to avoidance of ecological values by the Proponent. This was achieved through refining the Project layout during the ecological investigation period using an iterative approach. A detailed description of avoidance of ecological values through design alterations is detailed in *Chapter 5*. The WTGs and other Project infrastructure have been located to avoid the removal of large tracts of forest or woodland that would be associated with wildlife corridors within the Study Area and locality. The indicative transmission line alignment follows the existing road, which avoids additional habitat fragmentation. The ongoing revisions of the Project infrastructure layouts to avoid ecologically sensitive areas have assisted in minimising impacts to fauna habitat. However, some habitat loss will be unavoidable for the Project. Two matters are assessed as having likely significant residual impacts, in accordance with the relevant guidelines: • Based on application of the precautionary principle: the Glossy Black-cockatoo was considered as likely to be significantly impacted, relating to potential exclusion of areas of high quality foraging habitat, if the species was to avoid areas habitats immediately surrounding WTGs; and • Removal of 1.63 ha of the EPBC Act listed community - White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland. However, only 126 m^2 of this area is located within the E3 Environmental Management Zone. The ecological assessment identifies that 427 ha of

Requirement	Response
	Glossy Black-cockatoo habitat has been mapped in the E3 zone. The development footprint impact in the E3 zone is 8.1 ha, being only 1.9% of the total mapped glossy black cockatoo habitat area within this zone. A biodiversity offset package will be prepared when the Development Footprint is finalised (refer *Chapter 9*). This will provide for the protection, management and restoration of ecological values to offset the impacts as a result of this development, ensuring a net zero loss of ecological values as a result of the Project. This Project's contribution to the cumulative impacts on biodiversity from regional wind farm development is considered to be minimal. **Scientific & Cultural** There is currently no definition under NSW legislation for scientific value. However scientific value is mentioned in ecological and heritage definitions. Ecology is addressed above and in *Chapter 5,* and cultural heritage is addressed in *Chapter 12*. **Aesthetic** While all wind farms are inevitably visually prominent to some extent, the Project has been refined to minimise visual impacts to the extent practicable. The Landscape Character and Visual Impact Assessment (LCVIA) undertaken by Clouston Associates (2016) assessed the potential visual impacts associated with the Project on public and private receptors in proximity to the PA. The LCVIA is provided at *Annex F*. The Project has a relatively limited visual catchment due to surrounding topography that encloses the Study Area, blocking many views of the WTGs from distances of over 5 km; and dense stands of tree planting, windbreaks and garden plantings (associated with individual properties) that block or filter views towards the Project. The Project will have Moderate/high and High rated visual impact effects on approximately 59 dwellings associated with seven of the 12 selected private viewpoints, which are mostly limited to dwellings within 1-3 km of the WTGs. Landscape mitigation measures have been identified, and if necessary will be offered to reduce visual impact to residential dwellings surrounding the Project. As detailed in *Chapter 11,* application of mitigation (consisting of screen planting of vegetation at mature height) at these 59 dwellings is predicted to reduce the residual visual impact post mitigation to Moderate/High at 14 dwellings and High at none. Public viewpoints are mostly limited to the minor local road network and two main thoroughfares that traverse the Study Area. These view locations are dynamic with motorists travelling along the roads relatively quickly, reducing the duration of the view and hence the severity of the visual impact. The Project will not have a major impact on the character of Tarago village, where views toward the WTGs from a number of residential view locations will be screened by adjoining dwellings/structures, tree cover and landform.

Requirement	Response
k) To provide for a limited range of development that does not have an adverse effect on those values.	The proposed wind farm development will diversify development and the economy within the rural lands, providing an additional, non-agricultural land use that is compatible with the land uses of the surrounding rural landscape. The very small footprint of the Project within the E3 zone (being 23.4 ha or 1.9 % of the total E3 zone area within the Goulburn Mulwaree LGA) makes the Project compatible with, and unlikely to have any significant adverse effect on existing values. Whilst limited ecological and aesthetic impacts are likely to occur, these will be managed / mitigated through a biodiversity offset package to provide for the protection, management and restoration of ecological values to offset the impacts as a result of this development, ensuring a net zero loss of ecological values as a result of the Project (refer Chapter 9); and the implementation of landscape mitigation measures to reduce visual impact to residential dwellings surrounding the Project (refer *Chapter 11*).
l) To facilitate the management of water catchment areas, environmentally sensitive land and areas of high conservation value.	The Project is located high within the water catchment, and therefore will not impact on higher order watercourses. A range of water and erosion and sedimentation mitigation and management measures are to be implemented during construction as detailed in *Chapter 14* to ensure effective management and protection of the water catchment. Construction activities will improve existing access tracks currently utilised for agricultural purposes, thereby effectively reducing the existing risk of erosion and improving water management in the area. Mapped ecological value areas are detailed in *Chapter 9* and *Figure 9.3*. Of the identified high ecological values, the development footprint will likely have residual significant impacts on the following: • Glossy Black-cockatoo Habitat – 427 ha of glossy black cockatoo habitat has been mapped in the study area. Development footprint impact in this area is 8.1 ha, being 1.9% of the total mapped glossy black cockatoo habitat study area; and • White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act Listed TEC) - removal of 1.63 ha. Impacts on areas of high conservation value within the E3 zone will be mitigated by the biodiversity offset package in perpetuity, ensuring no net loss of ecological values as a result of the Project (refer *Chapter 9*).

Permissibility

The Project is permissible as development for the purpose of 'electricity generating works' in the RU1 Zone pursuant to GMLEP. The Project is consistent with the zone objectives which apply to the RU1 Zone pursuant to GMLEP. Development of agricultural land for a wind farm is a compatible land use and will not compromise the objectives of the RU1 Zone. It is expected that the existing agricultural activities within the PA and neighbouring properties will continue to occur post operation of the Project, as is the case for other operating wind farms in NSW. In addition, introduction of a supporting income base assists in maintaining the agricultural capacity of the land, and the construction of improved access tracks may improve the agricultural efficiency for involved landholders.

The Project is not permissible within the E3 - Environmental Management Zone under the GMLEP. However, the Project is considered to be consistent with the objectives of the E3 zones of the GMLEP as detailed in *Table 6.4*. In particular:

- The potential impacts of the Project within this zone are localised and do not diminish the options regarding land and resource use and nature conservation in the future. While the Project will have a limited impact on ecological values, this can be managed and mitigated through a biodiversity offset package in perpetuity, ensuring that ecological values are improved or maintained as a result of the Project.
- The Project has been designed to minimise visual impacts to the extent practicable, including within the E3 zoned parts of the PA. The visual impacts are considered to be acceptable and can be reduced through landscape mitigation measures as detailed in *Chapter 11*.
- Construction undertaken for the Project will reduce the existing risk of erosion and improve water management in the area, consistent with the objective of facilitating the management of water catchment areas in the E3 zone.
- Furthermore, the total PA which falls within the E3 zone is minimal in comparison to the total area of the PA and total area of the E3 zone in the Goulburn Mulwaree LGA. The total area of the E3 zone in the Goulburn Mulwaree LGA is 73,436 ha. The PA occupies a total of 1,368 ha within this zone, or 1.9 % of the total E3 zone area within the Goulburn Mulwaree LGA. The development footprint within this part of the PA in the E3 zone is much smaller again and calculated at 23.4 ha. As such, the estimated impact of the development footprint within the Goulburn Mulwaree LGA E3 zone is almost negligible as it equates to approximately 0.032% of the total area of the E3 zone in the Goulburn Mulwaree LGA and only 1.71% of the PA area that is located within the Goulburn Mulwaree LGA.

Section 89E(3) of the EP&A Act, provides that:

"Development consent (for State Significant Developments) may be granted despite the development being partly prohibited by an environmental planning instrument."

Accordingly, SSD development consent for the Project, which has been recognised by the SRD SEPP as being of State significance, can still be granted notwithstanding the partial prohibition on that part of the PA zoned E3 - Environmental Management Zone. This reflects legislative recognition that the 'broad public interest in the establishment of viable renewable energy sources' must be balanced against 'geographically narrower concerns' related to potential localised impacts of the Project (Chief Justice Preston of the NSW Land and Environment Court set out in *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd* [2007] NSWLEC 59 (12 February 2007)).

It is considered appropriate that the Project be approved as SSD in accordance with s89E(3) of the EP&A Act based on:

- the significant benefits that the project will deliver in providing renewable energy and reducing carbon emissions;
- the overall consistency of the Project with the E3 zone objectives as set out above;

- in relation to the E3 zone, the majority of the potential impacts of the Project are likely to be localised and would not diminish the options regarding land and resource use and nature conservation in the future. While the Project will have a limited impact on ecological values and areas of high conservation value, this can be managed and mitigated through a biodiversity offset package in perpetuity, ensuring a net zero loss of ecological values as a result of the Project;
- visual impacts to residential dwellings surrounding the Project can be reduced through landscape mitigation measures as detailed in *Chapter 11*; and
- the stringent measures proposed to appropriately manage and mitigate impacts as detailed in this EIS.

Use of the E3 Environmental Management Zone

In 2012 the NSW Government instigated a review of the use of Environmental Protection zones (E zones) on the North Coast of NSW. The Northern Councils E Zone Review (Final Response) was released on the 20 October 2015 by the Department of Planning and Environment. Whilst the recommendations of the study are specific to the North Coast Councils, the final response report identifies that the principles contained in the recommendations can be used by other councils within NSW that are reviewing the application of E zones.

Key recommendations of the report relating to the application of rural, E2 and E3 land are:

- *E2 and E3 zones will only be applied if the primary use of the land is considered to be environmental conservation (E2) or Environmental Management (E3) and the land contains attributes which meet one or more of the criteria for an E2 or E3 zone; and*
- *The primary use of the land is the main use for which the land has been used for the last two years. This may mean that land which is currently zoned rural will continue to have a rural zone but it may have parts of that land which may have attributes that meet the criteria for an E2 or E3 zone included in a mapped planning control.*

The report also recommends the removal of aesthetic values as an attribute to be protected and managed by an E zone, noting that aesthetic values can be addressed through DCP provisions, a Scenic Protection Strategy or the development application process.

Whilst the review does not specifically apply to the Goulburn Mulwaree LGA, it demonstrates the NSW Government's recent policy positon relating to the application of E zones, being:

- recognition that zoning decisions relating to the application of E2 and E3 zones are to be evidence based; and
- consideration of aesthetics values can be achieved through other land use planning mechanisms, and not through land use zones.

The portion of the PA located within the Goulburn Mulwaree LGA is mapped in its entirety as containing terrestrial biodiversity and is zoned E3 zone under Goulburn Mulwaree LEP 2009. However detailed ecological investigations detailed in *Chapter 9* identify that the ecological values apply to a much more limited area and not across all of the LEP 2009 E3 zoned / mapped terrestrial biodiversity areas. Development footprint impact on glossy black cockatoo habitat is 7.2 ha, being 1.7 % of the total mapped glossy black cockatoo habitat in the area. Further the primary use of the land is for rural / agricultural land use activities.

In summary, there is justification for relying upon s89E(3) for approving an otherwise partly prohibited development because the wind farm is State Significant Development that has significant policy support, is largely consistent with the E3 zone objectives, and identified impacts will be appropriately mitigated and managed.

6.5.3 Other LEP Provisions

The PLEP and GMLEP contain additional planning provisions of relevance to the Project. These are identified and discussed in Table 6.5.

Table 6.5 LEP Provisions of Relevance to the Project

Requirement	Response
PLEP 2014	
Cl 5.9 Tree Preservation	Chapter 9 and Annex D
Cl 6.3 Terrestrial Biodiversity	Chapter 9 and Annex D
Cl 6.4 Drinking Water Catchment	Chapter 14 and Annex I
Cl 6.5 Riparian Land and Watercourses	Chapter 14 and Annex I
Cl 6.7 Highly Erodible Soils	Chapter 14 and Annex I
GMLEP 2009	
Cl 5.9 Tree Preservation	Chapter 9 and Annex D
Cl 7.2 Terrestrial Biodiversity	Chapter 9 and Annex D

6.5.4 Development Control Plans

The effect of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) is that development control plans do not apply to SSD. Nonetheless, in the interests of completeness, the specific wind farm development requirements of the *Goulburn Mulwaree Development Control Plan 2009* and the *Tallaganda Development Control Plan No. 4 for Rural 1 (A) Zoning 1996* have been considered and addressed below.

Palerang Development Control Plan 2015

The Palerang Development Control Plan 2015 (PDCP) applies to all land in the former Palerang LGA except for the State Conservation Area 'Braidwood and its setting'. The PDCP commenced on the 27 May 2015. The *Tallanganda DCP No. 4 for Rural 1 (A) Zoning 1996* has been repealed by the PDCP. There are no specific controls relating to wind farm developments outlined in the PDCP.

Goulburn Mulwaree Development Control Plan 2009

The *Goulburn Mulwaree Development Control Plan 2009 (Amendment No. 2)* (GMDCP) is of relevance to the area of the PA within the Goulburn Mulwaree LGA. Section 6.3 of the GMDCP relates to wind farms and has the objective:

> *"to minimise the impacts of wind farm development on the environment of the Goulburn Mulwaree local government area."*

Table 6.6 summarises the relevant provisions of the GMDCP for consideration in the assessment of the Project.

Table 6.6 ***Wind Farm Provisions from the Goulburn Mulwaree DCP 2009***

Controls and Guidelines	Response
Proposals must be permissible under the LEP and compatible with the existing uses of the subject land and surrounding land.	As defined above, the Project is permissible under the LEP on RU1 zoned land but not E3 zoned land, however is permissible on the basis of section 89E(3) of the EP&A Act. The Project can co-exist with existing agricultural uses within the PA. It is expected that the existing agricultural activities within the PA and neighbouring properties will continue to occur during operation of the Project, as is the case for other operating wind farms in NSW. In addition, the construction of improved access tracks may improve the agricultural efficiency for involved landholders.
World Heritage Areas, other historic / heritage areas, buildings or sites.	Heritage considerations and potential impacts are addressed at *Chapter 12* and in *Annex D*.
Proposals should avoid areas of high environmental value.	Environmentally sensitive areas within the PA have been considered and are addressed at *Chapter 4*.
Investigate bird and bat habitat and flight path.	Potential impacts to fauna, including bird and bat habitat and flight path have been considered and are addressed at *Chapter 9 and in Annex D*.
Have regard to European and Indigenous Heritage.	European and indigenous heritage considerations and potential impacts are addressed at *Chapter 12* and in *Annex D*.
Noise amenity impacts on existing or proposed dwellings are not to exceed 5dBA above ambient background noise or an absolute level of 35dBA.	Potential noise impacts are addressed at *Chapter 10* and in *Annex E*.
Minimise visual impacts, with WTGs not to protrude beyond ridgelines within view of land visible from areas of existing and future closer settlement.	Potential visual impacts are addressed at *Chapter 11* and in *Annex F*.
Avoid landing strips and airport facilities, especially aircraft flight paths.	The proposed location of the wind farm avoids landing strips and airport facilities. Aviation matters are addressed at *Chapter 16* and in *Annex M*.
Site access and road construction will lead to noise, dust and interference with watercourses and vegetation.	The summary of mitigation measures at *Chapter 19* includes measures to manage potential construction impacts associated with dust, noise and interference with watercourses and vegetation.

6.6 Other Policies and Guidelines

6.6.1 Draft NSW Planning Guidelines: Wind Farms 2011

The *Draft NSW Planning Guidelines: Wind Farms, December 2011* (Draft Guidelines) were developed to provide a *'clear and consistent regulatory framework for the assessment and determination of wind farm proposals.'* These guidelines were exhibited from 23 December 2011 to 14 March 2012 and public comments on the draft guidelines were sought. The Draft Guidelines have now been superseded by the draft Wind Energy Planning Framework outlined at *Section 6.6.2* below. However, as the Draft Guidelines are referenced in the SEARs issued for the Project, they have been included in this EIS in the interests of completeness.

Table 6.7 summarises the key matters to be addressed in the assessment process as specified at Section 1.3 of the Draft Guidelines.

Table 6.7 ***Key Matters Identified in the Draft NSW Planning Guidelines: Wind Farms, December 2011***

Key Matter	Description	Response
Consultation	Proponents must undertake a comprehensive and genuine community consultation and engagement process.	The Proponent has implemented a program of community and stakeholder consultation as part of the preparation of the EIS. Refer to *Chapter 7* and *Annex B*.
Landscape and visual amenity	Comprehensive assessment of the impact of the Project on the landscape character, landscape values, visual amenity and any scenic or significant vistas to be undertaken.	A Landscape and Visual Impact Assessment has been prepared having regard for the Draft Guidelines. Refer to *Chapter 11 and Annex F*.
Noise	The Draft Guidelines outline the NSW Wind Farm Noise Guidelines to measure and assess environmental noise impacts generated from wind farms.	A Wind Farm Noise Assessment has been prepared. Refer *Chapter 10 and Annex E*.
Health	Consider and document health issues associated with the operation of the wind farm through excessive noise and/or exposure to electromagnets field from operating WTGs, with particular focus on neighbours with dwellings within 2km of a proposed wind turbine.	The health issues associated with the operation of the wind farm are addressed at *Chapter 16*.
Ecological Issues	Consider the impact on birds and bats, particularly migratory species and outline the proposed monitoring and mitigation strategy.	An Ecological Impact Assessment has been prepared. Refer to *Chapter 9 and Annex D*.
Aviation Safety	Consider the potential for the proposed wind farm to impact on aviation safety associated with agricultural aerial uses consistent with the Draft Guidelines.	An Aviation Safety Impact Assessment has been prepared. Refer to *Chapter 16 and* Annex J.
Bushfire Hazard	Consider bushfire issues consistent with the Draft Guidelines, including the risks that a wind farm will cause bushfire and any potential impacts on the aerial fighting of bushfires.	A Bushfire Risk and Hazard Assessment has been undertaken. Refer to *Chapter 16 and Annex N*.
Blade Throw	Assess blade throw risks consistent with the Draft Guidelines. Outline measures to avoid, minimise, manage and monitor impacts.	A Blade Throw Assessment has been undertaken. Refer to *Chapter 16 and Annex M.*
Economic Issues	Consider whether the wind farm is consistent with the relevant local or regional land use planning strategies	As discussed previously at *Section 6.5*, the Project promotes the economic use of the land through the provision of a use and development that is compatible with existing agricultural activities occurring within the PA. Economic matters associated with the Project are addressed in more detail at *Chapter 15*.
Decommissioning	Develop a Decommissioning and Rehabilitation Plan for inclusion in the EIS.	A Preliminary Decommissioning and Rehabilitation Plan (DRP) has been prepared as part of the EIS, refer *Annex O*.
Auditing and compliance	Outline program to monitor the environment performance to ensure compliance including mechanisms for reporting outcomes and procedures to rectifying non-compliance – including any provisions for independent reviews.	The Applicant is committed to undertake compliance monitoring as part of conditions of consent and any environmental licensing requirements.
Council Planning Controls	Outline whether the proposal is consistent with any relevant provisions of the relevant council's Development Control Plan and list any variations	Refer *Section 6.5.*

6.6.2 Draft Wind Energy Planning Framework

This section has been prepared to recognise and acknowledge the *draft Wind Energy Planning Framework (Draft Framework)* placed on exhibition by the DPE in August to September 2016. The Draft Framework has yet to be finalised and may be amended from the version placed on exhibition. Further, the draft Wind Energy: Assessment Policy (Draft Assessment Policy), which forms a key part of the Draft Framework, states that the Draft Framework will only apply where SEARs were issued after the date of the publication. As SEARs were issued for the Project well before publication of the Draft Framework, the Draft Framework does not apply to the Project. Nonetheless, in the interests of completeness, this section of the EIS provides a brief summary of the key elements and address framework application to the Project.

Framework Overview

The Draft Framework consists of Draft Assessment Policy and the following supplementary documents:

- *Wind Energy: Noise Assessment Bulletin* - Draft for Consultation (draft noise bulletin), dated August 2016 (Draft Noise Bulletin);
- *Wind Energy: Visual Impact Assessment Bulletin* - Draft for Consultation (draft visual bulletin), dated August 2016 (Draft Visual Bulletin); and
- *Wind Energy Framework: Standard Secretary's Environmental Assessment Requirements, Draft for Consultation* (Draft Standard SEARs), dated August 2016.

Summary of Framework Documents

Draft Assessment Policy, August 2016

The purpose of the Draft Assessment Policy is to provide the community, industry and consent authorities with guidance on the planning framework for the assessment of large-scale SSD wind energy development proposals. It identifies the key planning considerations relevant to wind energy development in NSW and aims to assist stakeholders in the design and siting of SSD wind energy development proposals, and their subsequent assessment, evaluation, determination, and where approved, their construction and operation.

While the assessment process for SSD wind energy development projects is generally the same as it is for other types of SSD projects, there are certain aspects that are unique for wind energy development and warrant special consideration. These are recognised in the Draft Assessment Policy which provides the overarching planning framework for assessing SSD wind energy projects and is supported by additional bulletins which DP&E issues periodically to provide technical guidance on key issues, such as noise, and visual assessment.

The Draft Assessment Policy also provides guidance to the community, proponents and consent authorities in understanding the level of engagement expected from proponents of SSD wind energy projects.

The objectives of Draft Assessment Policy are:

- To provide clear and consistent technical guidance to regulators, industry and the community about how to measure and assess key environmental impacts of SSD wind energy development in NSW.
- To facilitate community understanding of the issues involved in the design and installation of wind energy development.
- To promote effective community consultation including opportunities for community input throughout the decision making process.
- To encourage benefit-sharing between wind energy operators and the communities in which they operate, where appropriate.

The Draft Assessment Policy provides an overview of the assessment process, strategic context, statutory controls and the key assessment issues relevant for wind energy proposals. In addition, it provides information regarding 'associated' or 'non-associated' properties; 'negotiated agreements'; decommissioning of wind turbines; property values; and hazards and risks for aviation and bushfire.

Draft Noise Bulletin, August 2016

The Draft Noise Bulletin aims to provide proponents of wind energy developments and the community with advice about how noise impacts are assessed for large-scale SSD wind energy development projects.

The Draft Noise Bulletin provides practical guidance to applicants, planners, regulatory authorities, acoustic specialists and the broader community on how to measure and assess environmental noise impacts from wind energy developments. The Draft Noise Bulletin aims to provide greater clarity and rigour for the assessment and regulation of wind energy development noise, including low frequency noise, tonality and auditing and compliance issues. The objective is to ensure that the noise impacts of wind energy developments are appropriately identified, avoided, mitigated and managed.

Correlation and Link to EIS

The Draft Noise Bulletin proposes to adopt the South Australian EPA's 2009 Noise Guidelines, with a couple of minor variations appropriate to the NSW context. Amongst other requirements, the South Australian EPA's 2009 Noise Guidelines were specified in the Project SEARs and have been adopted for the Project wind farm noise assessment, conducted by DNV-GL (refer Chapter 10 and Annex E). Other noise and vibration requirements of the SEARs are addressed in the supplementary noise assessment conducted by ERM (refer Chapter 10 and Annex E).

6.6.3 Draft Visual Bulletin, August 2016

The Draft Visual Bulletin has been developed to guide the appropriate location of wind energy development in NSW and to establish an assessment framework for the assessment of visual impacts associated with wind energy.

The objectives of the Draft Visual Bulletin are to:

- Provide the community, industry and decision-makers with a framework for visual impact analysis and assessment that is focused on avoiding, minimising and managing the highest impacts in the context of considering economic, social and environmental impacts.
- Facilitate improved wind turbine siting and design during the siting and pre-lodgement phase of a development to avoid or minimise conflicts and delays where possible, and provide for a better planning outcome.
- Provide the community and other stakeholders with greater clarity on the process along with an opportunity to integrate community landscape values into the assessment process.
- Provide greater consistency.

Correlation and Link to EIS

The key components of the Draft Visual Bulletin include:

- the Stage 1 preliminary environmental assessment (and screening tools) that are to occur pre-lodgement and inform SEARs. This Stage 1 preliminary screening is not relevant to the Project which has already had SEARs issued; and

- the Stage 2 assessment and determination process including requirements for a visual baseline study, use of visual influence ones, visual performance evaluation and impact mitigation options. As SEARs have already been issued for the Project, the Stage 2 assessment and determination process in the Draft Visual Bulletin does not apply to the Project. However, in the interests of completeness, the following section outlines the extent to which the landscape character and visual impact assessment, conducted by Clouston Associates, addresses the new technical requirements arising under the Draft Visual Bulletin.

The SEARs issued for the Project included a rigorous set of assessment requirements that have been adopted for the Project landscape character and visual impact assessment, conducted by Clouston Associates. Importantly, the Project landscape character and visual impact assessment has provided a comprehensive assessment of the visual impacts of all components of the project (including turbines, transmission lines, sub-stations, and any other ancillary infrastructure) on landscape values, scenic vistas, rural townships, non-associated residences (including approved but not yet developed dwellings or subdivisions with residential rights), significant public viewing locations, and any cumulative impacts associated with surrounding proposed, approved or operational wind farms in the locality.

The Project landscape character and visual impact assessment utilised recognised tools (such as photomontages and wireframes) at representative locations to comprehensively assess the visual impacts of the Project, particularly for non-associated residences within 3 km of a proposed turbine. It also provided detailed consideration of the feasibility and effectiveness of the proposed mitigation measures, including consultation with landowners of non-associated residences within 3 km of a proposed turbine where significant visual impacts were predicted to identify potential approaches to mitigate any adverse impacts, including consideration of negotiated agreements.

6.6.4 Draft Standard SEARs, August 2016

The Draft Standard SEARs aim to provide an example of standardised requirements for assessing remaining key issues in wind farms. Specific SEARs for applicable projects will however still be applied as needed. As specific SEARs have been issued for the project, the Draft Standard SEARs do not apply.

6.6.5 Draft South East and Tablelands Regional Plan

In July 2016, the NSW Government released the Draft South East and Tablelands Regional Plan for public comment until 23 August 2016. The Plan, once finalised, will replace the Sydney – Canberra Corridor Regional Strategy 2006-2031; South Coast Regional Strategy 2006-2031; and South Coast Regional Conservation Plan. Only the Sydney – Canberra Corridor Regional Strategy 2006-2031 is relevant to the PA.

The vision of the draft Plan is to build resilient and sustainable communities by balancing growth opportunities with protecting the region's diverse environment and lifestyles. A key goal of the draft Plan is to strengthen the economic opportunities of the region through a focus on six priority growth sectors, one growth sector being primary industries and renewable energy. The draft Plan recognises the valuable renewable energy resources in the Region, including wind resources, and acknowledges the economic opportunity renewable energy presents.

The draft Plan commits to the implementation of the NSW Renewable Energy Action Plan 2013 to increase renewable energy generation in the region. The NSW Renewable Energy Action Plan 2013 is discussed in more detail in *Chapter 2*. The PA falls within an area mapped in the NSW Renewable Energy Action Plan 2013 as being located within a high wind resource potential area.

Key goals of the NSW Renewable Energy Action Plan 2013, which the draft Plan supports the implementation of, include: attracting renewable energy investment and projects; building community support for renewable energy; and attracting and growing expertise in renewable energy technology.

The proposed Jupiter Wind Farm development is consistent with the draft Plan and seeks to facilitate the achievement of the goals and outcomes of the draft Plan and the NSW Renewable Energy Action Plan 2013.

6.6.6 Sydney – Canberra Corridor Regional Strategy 2006-2031

The *Sydney – Canberra Regional Strategy 2006-2031* provides the NSW Government's overarching strategic direction to accommodate and manage growth for the provision of sufficient new housing and job growth and economic development, whilst ensuring that the rural landscape and environmental settings that define the Region's character are not compromised. The Strategy applies to the local government areas of Wingecarribee, Goulburn Mulwaree, Upper Lachlan, Yass Valley, Palerang and Queanbeyan.

The Strategy identifies that there has been a trend to locate rural residential development largely within commuting zone of Sydney, Canberra and Goulburn, including in the Wamboin and Bywong areas of Palerang Shire.

The Strategy acknowledges that the rural lands of the Region provide significant opportunities for the establishment of wind farms, with consistent high wind levels and good access to high voltage distribution networks, whilst balancing the need to protect key rural landscapes and avoid inappropriate conflict with rural residential areas.

The Strategy is strongly supportive of limiting the spread of rural residential development, acknowledging that unplanned rural residential development and the break-up of agricultural land can:

- *'impact upon the potential viability of an agricultural area through a reduction in farm businesses and the capacity of the small towns and villages to support associated farm–based business;*
- *increase the potential for rural land use conflict;*
- *decrease the economic value of rural land as a resource because land values are based on residential rather than agricultural capacity;*
- *impose costs on the community to service and maintain residential development land uses within the rural landscape;*
- *result in social isolation;*
- *result in resources and ecosystem degradation; and*
- *potentially constrain the use of rural land for agricultural and resources such as mining through conflict between rural industries and those seeking a rural lifestyle.'*

The Strategy identifies as a key action that councils are to ensure strategies for the management of rural land uses and subdivision recognise the environmental and economic potential of wind farming activities, whilst balancing the need to protect key rural landscapes and avoid inappropriate conflict with rural residential areas. The Strategy also states that '*rural residential development should only be undertaken on the basis of an agreed local government area wide settlement strategy*', identifies that existing supply of approved subdivided lots of 40 ha or less should be taken up and developed before new areas are considered, and that no new rural residential zones will be supported unless as a part of an agreed structure plan or local settlement strategy.

6.6.7 Draft Palerang Rural Lands Strategy 2016-2036

The Draft Palerang Rural Lands Strategy 2016-2036 was placed on public exhibition from Wednesday, 4 May 2016 to Wednesday, 1 June 2016, together with supporting studies including a Discussion Paper, Rural Lands Study – Information, Issues and Options Report, and Economic Profile.

The aim of the Draft Palerang Rural Lands Strategy 2016-2036 is to provide a strategic direction for rural, rural residential and environmental land in the former Palerang LGA. The Strategy seeks to find a balance between the competing pressures from a diverse range of land uses and to protect the agricultural, environmental, and landscape values of Palerang non-urban lands. The Strategy will provide guidance on the location and nature of the land use categories, which will assist Council and government agencies to plan and manage hard and soft infrastructure outside of the town and village areas and for Council to prepare land use and development control provisions that aim to achieve the Strategy principles.

Whilst recognising that the majority of the rural residential land and population in Palerang reside in the western portion of the LGA, in commute distance to Canberra and Queanbeyan, the Strategy and Discussion Paper provide preliminary recommendations for future rural residential areas, as illustrated in *Figure 4.12* of this EIS. This clearly demonstrates Council's intention that the vast majority of potential future rural residential zoned land will be concentrated around the western portion of the Palerang Shire, in reasonable commute distance to Canberra and Queanbeyan, and not in the vicinity of the PA. The areas identified include Williamsdale, Yarrow, Googongm as well as Sutton Road, Mill Post Lane and North Carwoola.

In respect to the PA, only one potential future rural residential zoning as identified in the Strategy, in the Mt Fairy area. The area of Mt Fairy and surrounds was considered in the Landscape and Visual Assessment detailed in *Chapter 11.*

6.6.8 NSW Biodiversity Offsets Policy for Major Projects

The *NSW Biodiversity Offset Policy for Major Projects* (OEH 2014) outlines a standardised method for assessing impacts of major projects and determining offset requirements. The Policy was introduced in September 2014. Options to deliver biodiversity offsets under the NSW Biodiversity Offset Policy for Major Projects are discussed in the Ecology Impact Assessment provided at *Annex D.*

6.7 Ecologically Sustainable Development

The EP&A Act adopts the definition of ecologically sustainable development (ESD) contained in the *Protection of the Environment Administration Act 1991* (PEA Act) and recognises that ecologically sustainable development (ESD) requires the effective integration of economic and environmental considerations in decision-making processes.

The four key principles pertaining to ESD, which can be used to guide the decision making process are as follows:

- the precautionary principle;
- inter-generational equity;
- biodiversity and ecological diversity; and
- economic valuation of environmental assets.

An assessment of the Project against the above ESD principles is discussed in the sections below.

Based on the assessment of the broad public and environmental interest in ensuring viable renewable energy sources, the economic benefits of the Project, and the assessed impacts on the environment and their ability to be managed, it is considered that the project is ecologically sustainable.

6.7.1 Precautionary Principle

The precautionary principle is defined under the PEA Act as follows:

"if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

In accordance with the precautionary principle, the decision making process should be guided by:

- careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- an assessment of the risk-weighted consequences of the options considered.

As discussed in Chapter 5, the layout of the Project has evolved and been refined based on significant work during the environmental assessment phase, and in particular in undertaking ecological investigations to avoid sensitive ecological areas. It is acknowledged that some impacts to ecological values are unavoidable as discussed in Chapter 9, however, the approach taken by the Proponent during the design phase has accommodated major ecological constraints to development of the Project, resulting in avoidance and minimisation of impacts.

The precautionary principle has been adopted in the assessment of impact. All potential impacts have been considered and mitigated where a risk is present. Where uncertainty exists, measures have been suggested to address the uncertainty.

Further, if SSD consent is granted for the Project, then it will be issued subject to detailed conditions. These are likely to include conditions which adopt a precautionary and adaptive management approach to issues (for example bird strike).

6.7.2 Inter-Generational Equity

Inter-generational equity as defined under the PEA Act states:

"the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations."

Wind farm developments are a sustainable form of large scale renewable energy production with clear greenhouse gas benefits. Throughout operation, the Project will contribute to meeting Australia's energy demand at a reduced cost to the environment in terms of GHG emissions. This will help ensure intergenerational equity by working to minimise the harmful impacts of climate change on future generations.

6.7.3 Biodiversity and Ecological Diversity

The PEA Act states that:

"the conservation of biological diversity and ecological integrity should be a fundamental consideration for developments."

A discussed previously and detailed in *Chapter 9*, the Project has been refined and optimised during the design and environmental phase to consider and avoid ecologically sensitive areas identified during the field surveys. Notwithstanding this, it is acknowledged that some impacts to ecological values are unavoidable to construct the Project and mitigation measures have been recommended and will be implemented to effectively manage potential impacts on biodiversity during the construction and operational phases of the Project.

6.7.4 Economic Valuation of Environmental Assets

One key aspect associated with the ESD principle is the notion that the polluter pays - that is:

"those who generate pollution and waste should bear the cost of containment, avoidance or abatement."

The Preliminary Decommissioning and Rehabilitation Plan provided at *Annex O* outlines the Proponent's obligations at the end of the operational life of the Project. The Proponent is committed to funding the decommissioning of the Project and rehabilitation of the PA in accordance with the plan and in consultation with the relevant stakeholders at the time of decommissioning. Further, impacts of the Project on protected flora and fauna species and communities will be mitigated by the provision of biodiversity offsets.

6.8 References

NSW Department of Planning and Environment (October 2015). *Northern Councils E Zone Review Final Recommendations Report*.

Chief Justice Preston (2007) of the NSW Land and Environment Court. *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd* [2007] NSWLEC 59 (12 February 2007).

7 COMMUNITY AND STAKEHOLDER ENGAGEMENT

7.1 Introduction

This Chapter outlines the process of consultation and engagement the Proponent has undertaken with key stakeholders (including the local community and government), and highlights where key issues raised throughout the consultation process to date have been addressed in the EIS.

Community and stakeholder engagement is an integral part of any major development. EPYC is committed to effective and genuine engagement with key stakeholders and the local community to seek feedback and help inform the Project design and layout. Consultation with the community commenced in March 2012. The Stakeholder and Community Consultation Strategy (the Strategy) was originally prepared by ERM in 2014. Consultation has been undertaken in accordance with this Strategy and the following documents, with the strategy being updated during this period as required (ERM 2016) (refer *Annex B*):

- DGRs issued 31 January 2014;
- Supplementary SEARs dated September 2015;
- Draft Wind Farm Guidelines (DP&I 2011); and
- Revised SEARs dated March 2016.

7.2 Stakeholder and Community Consultation Strategy

A Stakeholder and Community Consultation Strategy was originally prepared by ERM in 2014 to guide stakeholder engagement and consultation throughout the development phase of the project (up to project approval).

The Strategy, which reflects the requirements of the SEARs issued for the Project by the NSW DP&E is a dynamic tool and has, and will continue to be periodically updated throughout the Project stages, as required. A full copy of the Strategy is contained in *Annex B*, with the key processes and outcomes of the consultation process undertaken to date outlined in subsequent sections.

7.2.1 Consultation and Engagement Objectives

The objectives of the consultation and engagement process, as defined in the Strategy, include:

- identification of all key stakeholders that require engagement during the consultation process;
- identification of the relevant techniques and methods and the extent of engagement with the identified stakeholders;
- to ensure all stakeholders understand the environmental approvals process for the Project;
- to ensure that the community and stakeholders are routinely informed throughout all stages of the Project through the provision of factual Project information;
- to devise a system to document all issues raised by the stakeholders and the community and procedures for responding to the issues raised; and
- to ensure compliance with the consultative requirements specified under Part 4 of the EP&A Act, the DP&E NSW *Draft Planning Guidelines: Wind Farms 2011* and other relevant guidelines and policies.

7.2.2 Identified Stakeholders

As part of preparation of the Strategy, a stakeholder mapping process was undertaken in order to identify all key stakeholders, their level of interest and level of potential impact from the Project, gauged based on ERM's knowledge of existing wind farm developments and experience in previous wind farm approvals, and the outcomes of preliminary consultation activities. The result of the mapping process is the list of identified stakeholders outlined in *Table 7.1*, which is updated as any additional stakeholders are identified through the ongoing consultation process.

Table 7.1 Identified Stakeholders

Stakeholder	Description	Level of Interest	Potential Level of Impact
	Local Landholders		
Landholders	• *landholders who will host turbines on their land or are part of the Project* • *landholders within 2 km of a proposed turbine in accordance with the NSW Draft Planning Guidelines for Wind Farms, December 2011.* • *landholders to host transmission line infrastructure or other ancillary infrastructure associated with the Project.* • *residents within 5 km of a WTG in the townships/localities of Tarago, Boro, Mayfield, Mount Fairy and Manar.*	*High*	*High*
	Local Community Groups		
Tarago Landcare Group	• *potential environmental impacts.*	*High*	*Moderate*
Tarago and District Progress Association (TADPAI)	• *facilitate and unify the efforts of the community in the development and maintenance of the rural lifestyle valued by the residents of this district*	*High*	*Moderate*
	Local Members of State and Federal Parliament		
Mr Angus Taylor MP (LP)- Federal Member for Hume. *The Hon. (Pru) Prudence Jane Goward, MP (LP)- State Member for Goulburn (Minister for Mental Health, Minister for Medical Research, Assistant Minister for Health, Minister for Women, and Minister for the Prevention of Domestic Violence and Sexual Assault)* *Mr Rob Stokes MP-State Member for Pittwater, (Minister for Planning)* *Mr John Giovanni Domenic Barilaro, MP- State Member for Monaro, (Minister for Regional Development, Minister for Skills, and Minister for Small Business)* *Dr Peter Hendy MP (LP)- Former Federal Member for Eden-Monaro* *Dr Mike Kelly AM, MP (ALP)-Federal Member for Eden-Monaro*	• *community complaints and objection to the Project.* • *environmental and community impacts.*	*High*	*Moderate*

Stakeholder	Description	Level of Interest	Potential Level of Impact
	Local Government		
Mr Peter Harrison, Mayor of former Palerang Council *Mr Peter Bascomb, General Manager, former Palerang Council* *Mr John Wright, Director of Environment and Planning, former Palerang Council* *Mr Geoff Kettle, former Mayor Goulburn Mulwaree Council* *Mr Bob Kirk, Mayor Goulburn Mulwaree Council (elected 2016)* *Mr Warwick Bennet, General Manager, Goulburn Mulwaree Council* *Ian Aldridge, Manager engineering services.* *Stephanie Mowle, Town Planner, Goulburn Mulwaree Council.* *Other Council Staff (Goulburn Mulwaree and former Palerang Councils)*	• *community complaints and objection to the Project.* • *environmental and socio-economic benefits and impacts, in particular, potential impacts on local roads.* • *representation on Community Consultative Committee* • *establishment of Community Enhancement Fund*	*High*	*Moderate*
	Government Agencies		
NSW Department of Planning and Environment (DP&E)	• *as the key approval authority for the Project*	*High*	*Low*
NSW Environment Protection Authority (EPA)	• *as licensing authority and regulator of pollution*	*Moderate*	*Low*
NSW Office of Environment & Heritage (OEH)	• *as a key regulator, OEH will have an interest in the potential environmental impacts associated with the Project, especially in relation to threatened species (flora and fauna) and Indigenous Heritage.*	*High*	*Moderate*
NSW Department of Primary Industries (DPI) - Water (formerly NSW Office of Water) (incorporating the former Sydney Catchment Authority (SCA))	• *concerns with potential impacts to groundwater and surface water bodies.*	*Moderate*	*Low*
WaterNSW (formerly State Water)	• *facilitates the supply of water across the state and to protect and manage catchment areas and water management works so as to promote water quality, public health and safety and the environment*	*Moderate*	*Low*
NSW Department of Primary Industries (DPI) – Land and Natural Resources (Crown Lands)	• *key regulator and manager of Crown Lands, with an interest in works and activities within the Crown lands reserve.*	*Moderate*	*Moderate*
NSW Department of Primary Industries (DPI) –Fisheries	• *manages risks from use of land and water*	*Moderate*	*Low*
NSW Department of Primary Industries (DPI) –Agriculture	• *responsible for increasing the productivity and resilience of the agricultural sector*	*Moderate*	*Low*

Stakeholder	Description	Level of Interest	Potential Level of Impact
NSW Department of Industry (Resources & Energy) (formerly NSW Trade and Investment, Resources and Energy)	• *key driver for sustainable economic growth with key interests in large scale regional developments such as wind farms and meeting growing energy demands in NSW.*	*Moderate*	*Low*
Greater Sydney and South East Local Land Services (previously known as the Hawkesbury Nepean and Southern Rivers Catchment Management Authorities respectively)	• *concerns with potential impacts to surface water bodies.*	*Moderate*	*Moderate*
NSW Rural Fire Service (RFS)	• *potential impacts on safety and accessibility for aerial fire fighting activities.*	*High*	*Moderate*
NSW Roads and Maritime Services (RMS)	• *potential vehicular/ traffic impacts and structural impacts to roads under the jurisdiction of the RMS.*	*Moderate*	*Low*
NSW Department of Health	• *concerns regarding health effects, including those associated with noise, shadow flicker and electromagnetic fields*	*Moderate*	*Low*
NSW Department of Education and Communities	• *concerns regarding the impact on school numbers*	*Moderate*	*Low*
NSW Department of Family and Community	• *no specific concerns identified, however to be consulted as per DP&E advice*	*Low*	*Low*
Civil Aviation Safety Authority (CASA)	• *concerns regarding wind turbine placement and their impact on flight paths and the safety of aviation operations in the area.*	*Moderate*	*Low*
Department of Defence (DoD)	• *Potential impacts to flight paths utilised by the DoD.*	*Moderate*	*Low*
NSW Government Telco Authority	• *issues relating to or impacting on telecommunication systems used by NSW government organisations*	*Low*	*Low*
Commonwealth Department of Environment	• *As the key federal regulator, Commonwealth Department of the Environment has a particular interest in potential impacts to listed threatened species und the Environmental Protection Biodiversity and Conservation Act 1999 (EPBC Act); and other impacts to Matters of National Environmental Significance (MNES) as described under the Act.*	*High*	*Moderate*
Other Relevant Agencies and Groups			
Airservices Australia	• *the impact of wind turbine placement compromising flight paths and/or affecting the safety of aviation operations in the area.*	*Moderate*	*Low*

Stakeholder	Description	Level of Interest	Potential Level of Impact
Aerial Agricultural Association of Australia	• *wind turbine placement causing access and safety issues for agricultural aerial application activities to the surrounding farmland.*	*High*	*Low*
NSW Farmers Association	• *issues affecting NSW farmers*	*Low*	*Low*
Operators of non-regulated aerodromes (e.g. Canberra and Goulburn Airports)	• *the impact of wind turbine placement on aviation operations*	*Moderate*	*Low*
Australian Wind Alliance	• *interested in promoting the benefits of wind power*	*High*	*Moderate*
Communications service providers (e.g. Telstra, Optus, Internet Providers etc.)	• *issues relating to or impacting on communication services in the area.*	*Low*	*Low*
Organisations with existing communications infrastructure/services in the area (e.g Essential Energy)	• *issues relating to or impacting on communication services in the area.*	*Medium*	*Low*
Organisations reliant on communication services in the area (e.g Fire and Rescue NSW, St. John Ambulance Australia, Wamboin Rural Fire Brigade)	• *issues relating to or impacting on communication services in the area.*	*Medium*	*Low*
Mineral exploration and mining title holders (OCHRE Resources)	• *placement of wind farm infrastructure within mineral exploration and/or mining tenements*	*High*	*Moderate*
Royal Flying Doctor Service	• *the impact of wind turbine placement affecting flight paths for aircraft.*	*Low*	*Low*
Batemans Bay LALC Aboriginal Land Council	• *impacts to known or previously unknown areas of Indigenous cultural significance.*	*High*	*Moderate*
Ngambri Aboriginal Land Council			
Pejar Aboriginal Land Council			
Media			
Bungendore Mirror	• *headlines regarding local interests.* • *political and community conflict.*	*Low*	*Low*
Tarago Times			
The District Bulletin			
Goulburn Post			
Braidwood Times			
Canberra Times			

7.2.3 Overview of the Consultation Process

Engagement Activities

Activities to engage the community in two-way dialogue have been undertaken for the purpose of receiving feedback, local knowledge and thereby maximising the suitability of the Project to the site and the community's acceptance of the Project.

The community consultation process, which commenced in March 2012, has continued up to the date of this EIS (October 2016) and has included the following activities:

- provision of factual information regarding wind farms for residents in the vicinity of the preliminary investigation area;
- face-to-face meetings with those landholders interested in hosting Project infrastructure to discuss the details of the Project and planning approval process, and terms of agreement for involved landholder;
- ongoing open dialog with involved landholders hosting Project infrastructure to address their queries and provide updates on the Project;
- establishment of a project website, telephone information line and email address;
- distribution of newsletters;
- community information sessions, including distribution of feedback forms;
- door-knocking in the local community and one-on-one meetings with non-involved landholders in the vicinity of the Project, regarding the Project generally, and in response to specific issues of concern to individual landholders;
- establishment of a Community Consultative Committee (CCC);
- advertisement of important events in the local media;
- targeted and specific discussions with non-involved owners of nearby dwelling regarding the proposed benefit sharing programme; and
- targeted and specific discussions with non-involved owners of nearby dwellings identified as having potential for significant visual impacts associated with the Project, to discuss potential impacts at their property and site specific mitigation options.

A chronological summary of these key consultation and engagement activities completed for the Project is provided in *Table 7.2* and additional details are provided in subsequent sections.

A consultation log, summarising the frequency and method of consultation for each individual dwelling located within 3 km of a WTG, along with copies of the consultation material prepared for the Project are included in *Annex C*. A complete list of all consultation is detailed in Table 7.1 of *Annex B*.

Project Information Disseminated

Project information made available to the community to date has included:

- facts about the Project and renewable energy (via the project website; newsletters; community information sessions; and CCC meetings);
- information about the SSD approval process (via the project website; newsletters; community information sessions; and CCC meetings);
- project layouts (at various times as revised); and
- photomontages of the WTGs from a number of public and private viewpoint (shared during one-on-one meetings with non-involved landholders and during targeted discussions regarding visual impacts and benefit sharing), along with an example photomontage of the WTGs from a public viewpoint (displayed at Community Information Session 2).

Table 7.2 Summary of Key Community Consultation Activities -Pre EIS Lodgement

Activity	Timing	Objectives	Targeted Stakeholders and Delivery Mode	Status
Consultation with former Palerang Council	*June 2011 – on going*	• *Introduce the Project, the Project team and provide contact details* • *Seek feedback on key assessment requirements and issues of concern to Council* • *Facilitate Council involvement and agreement on key aspects of the Project as required*	• *Introductory meetings with Council planning officers (June 2011 and November 2013)* • *Planning Focus Meeting and Site Visit (December 2013)* • *Introductory meeting with Mayor and General Manager (February 2014)* • *Project introduction to Councillors and Council Executive representatives (July 2014)* • *Meeting with planning officer on Project progress and crown lands (June 2015)* • *Appointment of Council representative on the CCC (August 2015)*	*Completed and Ongoing*
Initial distribution of general fact sheets about wind farms and an introductory letter to the residents	*March 2012*	• *Introduce EPYC and the company's interest in developing a wind farm in the area* • *Provide accurate information about wind farms* • *Seek feedback as to key community issues* • *Build trust with the local community*	• *184 Residents within and surrounding the preliminary project investigation area with available correspondence addresses* • *Postal address mailout*	*Completed*
Contact with the community members in response to the initial information distributed in the area and follow ups	*March 2012-on going*	• *To establish contact with more members of the local community* • *Answer questions with respect to the proposal to various community members as one-one one or in small groups* • *Seek feedback as to key community issues*	• *Local residents within and surrounding the PA (those other than, but not limited to the initial residents identified)* • *Phone calls, one-on-one meetings with individuals and some established local groups*	*Completed and Ongoing*

Activity	Timing	Objectives	Targeted Stakeholders and Delivery Mode	Status
Provide information and ongoing consultation with potential landholders to host Project infrastructure	*2012 - 2014*	• *To provide relevant information to landholders interested in participating in the Project through hosting Project infrastructure* • *Gain agreement with those landholders interested to be involved and host Project infrastructure*	• *Potential landholders within the PA to host Project infrastructure* • *Postal mailout, one-on-one meetings with individual landholders, ongoing phone/email correspondence* • *Signed involved landholder agreements*	*Completed*
Ongoing contact with involved landholders hosting Project infrastructure	*June 2012 – on going*	• *To maintain ongoing contact with involved landholders hosting Project infrastructure to address their queries and provide updates on the Project*	• *Involved landholders*	*Ongoing*
Project presentation to the United Farmers Organisation (UFO)	*29 July 2012*	• *Introduce EPYC and the company's interest developing a wind farm in the area.* • *Seek feedback as to key community issues*	• *United Farmers Organisation* • *Face-to-face presentation to local UFO members and Q&A following the presentation*	*Completed*
Consultation with Goulburn Mulwaree Council	*November 2013 – on going*	• *Introduce the Project, the Project team and provide contact details* • *Seek feedback on key assessment requirements and issues of concern to Council* • *Facilitate Council involvement and agreement on key aspects of the Project as required*	• *Introductory meeting with Council planning officers (November 2013)* • *Planning Focus Meeting and Site Visit (December 2013)* • *Project introduction to Councillors and Council Executive representatives (July 2014)* • *Meeting with planning officer and briefing for Mayor and General Manager on Project progress and Voluntary Planning Agreement (June 2015)* • *Appointment of Council representative on the CCC (August 2015)* • *Meeting with Council Director of Planning regarding Project benefits and progress (January 2016)*	*Completed and Ongoing*

Activity	Timing	Objectives	Targeted Stakeholders and Delivery Mode	Status
Newsletter 1	*February 2014*	• *Introduce the Project, the Project team and provide contact details* • *Explain the planning process and matters to be addressed in the environmental assessment* • *Outline the benefits of the Project for the community* • *Invite for community Input* • *Provide a map showing the investigation area (area of interest) for the proposed wind farm*	• *Landholders and residents within an approximate 5 km radius of the initial investigation area* • *Goulburn-Mulwaree and former Palerang Councils* • *Political stakeholders as defined in the Stakeholder and Community Consultation Strategy (Annex B) and Section 7.2.2* • *Postal/email address mailout* • *Subsequently published on the Project website (May 2014)*	*Completed*
Newsletter 2	*May 2014*	• *Provide information regarding Community Information Session 1* • *Provide a Project update and indicative timing of future activities for Project assessment and determination* • *Provide a map showing the active land area of the proposed wind farm* • *Provide website address for community reference*	• *Landholders and residents within an approximate 5 km radius of the initial investigation area* • *Former Palerang and Goulburn-Mulwaree councils* • *Political stakeholders as defined in the Stakeholder and Community Consultation Strategy (Annex B) and Section 7.2.2* • *Hand delivered to local residents within 5 km radius of the site by EPYC as well as posted to those who provided an alternate correspondence address and those who provided an email address* • *Subsequently published on the Project website*	*Completed*
Website, Information Line and Project Email Address	*May 2014 - Ongoing*	• *Provide information about EPYC and the Project to the public via the internet* • *Seek feedback and enquiries*	• *All stakeholders* • *General public*	*Completed (and ongoing)*

Activity	Timing	Objectives	Targeted Stakeholders and Delivery Mode	Status
Community Information Session 1	*14 June 2014*	• *Provide information about EPYC and the Project to the public via a face to face community information session* • *Gather information and feedback from the community* • *Provide website and email address for community reference*	• *All stakeholders* • *General public (approximately 150 people attended)* • *Political stakeholders* • *Notice of event was published in two local newspapers* • *Invitations were forwarded to relevant Political stakeholders (refer Section 7.2.6) (none attended)* • *Event held at the local Tarago Town Hall* • *Presentation material subsequently published on the Project website*	*Completed*
Newsletter 3	*September 2014*	• *Provide information regarding the one-on-one community consultation sessions planned for October 2014* • *Provide a project update and indicative timing of future activities for Project assessment and determination* • *Provide a preliminary layout of the proposed WTG locations*	• *Landholders and residents within an approximate 5 km radius of the initial investigation area* • *Former Palerang and Goulburn-Mulwaree councils* • *Representatives of former Palerang and Goulburn-Mulwaree Councils (Mayor/General Manager/Councillors)* • *Postal mailout to non-local residents / hand delivered to local residents by EPYC & forwarded via registered email addresses* • *Project website*	*Completed*
Two weeks of one-on- one consultation	*13 -16 October 2014; and* *27-30 October 2014.*	• *Identify additional stakeholders* • *Provide a Project update, including a preliminary layout of the proposed WTG locations, and indicative timing of future activities for Project assessment and determination* • *Gather information and feedback from the community regarding the release of the preliminary WTG layout for consideration in updating the layout in order to address specific concerns* • *Receive any other specific community feedback on relevant community issues*	• *Landholders and residents within an approximate 5 km radius of the PA and others who requested a meeting* • *Opportunity for meeting advertised in the Bungendore mirror and Tarago times, and in Newsletter 3* • *Face-to-face meetings at landholder residences* • *Facilitated in response to direct request from individual landowners and door-knock across the area*	*Completed*

Activity	Timing	Objectives	Targeted Stakeholders and Delivery Mode	Status
Newsletter 4	*December 2014*	• *Provide information regarding Community Information Session 2* • *Provide a Project update, Advise of revised layout to be released during second info day.* • *Provide information regarding the establishment of the Community Consultative Committee*	• *Landholders and residents within an approximate 5 km radius of the PA.* • *Former Palerang Council* • *Goulburn-Mulwaree Council* • *Other identified community groups, including the Tarago and District Progress Association Inc. (TADPAI).* • *Postal mailout to non-local residents / hand delivered to local residents by EPYC and forwarded via registered email addresses* • *Project website*	*Completed*
Community Information Session 2	*11 December 2014*	• *Provide information about EPYC and the Project to the public via a face to face community information session* • *Gather information and feedback from the community regarding the revised WTG layout, and seek feedback on the revised layout*	• *General public (approximately 54 people attended)* • *Political stakeholders* • *Notice of event was published in two local newspapers* • *Invitations were forwarded to former Palerang and Goulburn-Mulwaree Councils* • *Event held at the local Tarago Town Hall* • *Presentation material subsequently published on the Project website*	*Completed*
Newsletter 5	*July 2015*	• *Provide a Project update* • *Provide details on the appointment of the CCC members and scheduled date of first meeting of August 2015*	• *Landholders and residents within an approximate 5 km radius of the PA.* • *Former Palerang Council* • *Goulburn-Mulwaree Council* • *Other identified community groups, including the Tarago and District Progress Association Inc. (TADPAI).* • *Postal mailout to non-local residents / hand delivered to local residents by EPYC and forwarded via registered email addresses* • *Project website*	*Completed*

Activity	Timing	Objectives	Targeted Stakeholders and Delivery Mode	Status
First Meeting of the CCC	*5 August 2015*	• *Discuss the functioning of the CCC* • *Provide a Project update* • *Identify information needs of the CCC going forward*	• *CCC members (by invitation only)* • *Meeting minutes subsequently published on Project website*	*Completed*
Second Meeting of the CCC	*20 August 2015*	• *Provide a Project update* • *Discuss key issues of concern to the CCC* • *Identify issue for further discussion at the next meeting*	• *CCC members (by invitation only)* • *Meeting minutes subsequently published on Project website*	*Completed*
Third Meeting of the CCC	*8 September 2015*	• *Provide a Project update* • *Discuss key issues of concern to the CCC*	• *CCC members (by invitation only)* • *Meeting minutes subsequently published on Project website*	*Completed*
Fourth Meeting of the CCC	*14 October 2015*	• *Provide specific Project information previously requested by CCC* • *Discuss key issues of concern to the CCC* • *Advise of proposed Benefit Sharing Programme*	• *CCC members (by invitation only)* • *Meeting minutes subsequently published on Project website*	*Completed*
Fifth Meeting of the CCC	*2 December 2015*	• *Provide update on the project and adequacy review* • *Discuss key issues of concern to the CCC*	• *CCC members (by invitation only)* • *Meeting minutes subsequently published on Project website*	*Completed*
Newsletter 6	*December 2015*	• *Provide a Project update and general industry news* • *Advise community on establishment of the CCC and ongoing meetings*	• *Landholders and residents within an approximate 5 km radius of the PA.* • *Former Palerang Council* • *Goulburn-Mulwaree Council* • *Other identified community groups, including the Tarago and District Progress Association Inc. (TADPAI).* • *Postal mailout to non local residents / hand delivered to local residents by EPYC and to registered email addresses* • *Project website*	*Completed*

Activity	Timing	Objectives	Targeted Stakeholders and Delivery Mode	Status
Initial Discussions of Proposed Benefit Sharing Programme and Options for Visual Mitigation	*Separate occasions in December 2015; January 2016; February 2016; March 2016; and April 2016*	• *Advise of proposed Benefit Sharing Programme, and offer involvement in this programme* • *Discuss with non-involved landholders visual concerns and possible mitigation options.*	• *Neighbouring non-involved landholders with a dwelling within 3 km of a WTG* • *Hand delivered letters, posted letters, phone calls and emails to those with registered contact details* • *Face-to-face meetings with individual landholders who responded to communication from EPYC. This will be repeated during exhibition phase and continue as required*	*Ongoing*
Sixth Meeting of the CCC	*2 March 2016*	• *Provide update on the project. DPE also advised on updated SEARs.* • *Discuss key issues of concern to the CCC*	• *CCC members* • *Meeting minutes subsequently published on Project website* • *Question and Answer and Outstanding Action Log (dated 8 June 2016) subsequently published on Project website*	*Completed*
Seventh Meeting of the CCC	*6 July 2016*	• *Provide update on the project. Particularly regarding submission of EIS.* • *Discuss key issues of concern to the CCC and community.*	• *CCC members* • *Meeting minutes subsequently published on Project website* • *Question and Answer and Outstanding Action Log (dated 5 August 2016) subsequently published on Project website*	*Completed*
Notification of Public Exhibition of EIS	*Just Prior to Public Exhibition of the EIS (anticipated November 2016)*	• *Provide update on Project status.* • *Provide notification of public exhibition of the EIS.* • *Provide contact details and opportunity for consultation with the Proponent, and/or invitation for feedback through the public exhibition process.*	• *Non-government stakeholder organisations/groups that may not receive direct notification from DPE or be alerted to local notifications/advertising that would accompany public exhibition of the EIS*	*Completed (at the time of public exhibition of the EIS)*

7.2.4 Website, Information Line and Project Email Address

The Jupiter Wind Farm Project web page, hosted on the EPYC website (http://www.epyc.com.au/), was launched in May 2014 and is regularly updated to provide current information about the Project (refer *Figure 7.1*).

Figure 7.1 *Screen Shot of the Jupiter Wind Farm Project Web Page*



A dedicated project information line "1300 number" (1300 896 189), which is staffed Monday to Friday, along with an email address (info@epyc.com.au), was initially established in May 2014 for stakeholders to register an interest in the Project, submit concerns or request Project information.

In response to a recommendation by the National Wind Farm Commissioner, a free call service (1800 750 746) was set up by EPYC in August 2016 (in addition to the 1300 number) to provide ease of access for community members during the preparation of exhibition of the EIS and beyond. This initiative was encouraged by the National Wind Farm Commissioner for all developers and proponents to enable a more accessible base for the community in terms of communicating with the proponent with respect to a wind farm project.

Both contact numbers are advertised on the Project website.

7.2.5 Newsletters

Six newsletters have been distributed to date via hand delivery to letterboxes, postal/mail out to alternative addresses provided, and email to residents within the PA and an approximate 5 km radius of the PA. They have also been distributed to anyone who has registered interest in the Project, as well as published through the Project website. The newsletters were emailed to the councils and community groups that may not have been covered in the above mentioned categories.

Newsletters have included updates on the Project, including an outline of the planning and environmental assessment process, advice on upcoming consultation activities, and other activities being undertaken by the Project team to progress the assessment of the Project. A summary of the content of each newsletter is provided in *Table 7.3*. Copies of the newsletters are provided in *Annex C*.

Table 7.3: Summary of Content of Community Newsletters

Date	Summary of Contents
Issue 1: February 2014	• Introduce the Project and the Project team; • provide a rationale for the project including potential community benefits; • explain the planning process and matters to be addressed in the environmental assessment; and • provide contact information of the Project team- 1300 number and email address.
Issue 2: May 2014	• Inform the public of the upcoming information session; • provide an update of where the Project is up to in the planning and environmental assessment process; • provide the latest Project information including a map of the PA; • invite expressions of interest for the CCC; • outline future activities and timing; and • provide updated contact details including the Project website and postal address.
Issue 3: September 2014	• provide an update on the EIA; • provide dates and details for one-on-one meetings and consultation activities; • provide a map of preliminary wind turbine locations; • outline future activities and timing; and • provide information on renewable energy and climate change.
Issue 4: December 2014	• inform the public of the upcoming information session; • provide a Project update, advise of revised layout to be released during second Community Information Session; • notify the community of the extended period to submit an expression of interest to join the CCC; and • provide a brief progress update including the timing of future activities.
Issue 5: July 2015	• provide an update on the EIS and consultation activities; • provide an update on the appointment of the CCC and an indicative start of the process; and • outline future activities and timing.
Issue 6: December 2015	• provide an update on the project Status; • advise community of benefit sharing program for neighboring dwellings to the Project Area; and • outline future activities and timing.

7.2.6 Community Information Sessions

Two community information sessions were held in Tarago on 14 June 2014 and 11 December 2014. These sessions provided an opportunity for interested members of the community to meet with representatives of the Project team; view a poster display; register an interest in the Project or ask questions.

These sessions were advertised in Project newsletters (Newsletters #2 and #4), which were distributed to residences within 5 km of the PA; on the Project website; and through the local press (Bungandore Mirror and Tarago Times). Invitations were also extended to a number of political stakeholders, including representatives of former Palerang and Goulburn-Mulwaree Local Councils, and a number of State and Federal members.

Table 7.4 provides a summary of purpose and outcomes of each of the community information sessions.

Table 7.4 Community Information Sessions

Date	Purpose	Attendance	Community Issues Raised / Discussed
Session 1 **14 June 2014** **Tarago Town Hall, Tarago**	• Introduce the Project and the Project team; • explain where the Project was up to in the planning and environmental assessment process; • answer questions about the Project and identify potential areas of concern; and • gather names and contact details of people who wished to be kept informed about the Project.	• 60 individuals filled out the attendance register. • Approximately 150 individuals attended (based on headcount undertake upon entry by EPYC representative).	• Location of project infrastructure • Planning process • Land value concerns • Community consultation queries • EcologyPotential noise and visual issues
Session 2 **11 December 2014** **Tarago Town Hall, Tarago**	• display maps of a provisional WTG layout for the Project; • provide feedback on the outcomes of some of the specialist environmental studies; • display indicative photomontages of selected public viewpoints of the WTG's; and • outline the way forward with the environmental assessment process.	• Approximately 54 attended.	• Potential visual and noise issues • Wind resource and wind data • Zoning concern • Land value concerns

7.2.7 Door knocking and One-on-One Meetings

Following public release of the preliminary turbine layout, the Proponent undertook door knocking and one-on-one meetings with residents within 3 km of the Project during two separate campaigns in October 2014. The purpose was to:

- identify additional stakeholders;
- provide a Project update and indicative timing of future activities for Project assessment and determination;
- gather information and feedback from the community regarding the release of the preliminary WTG layout for consideration in layout amendments in order to address specific concerns; and
- receive any other specific community feedback on relevant community issues.

The meeting campaigns were advertised in the Bungendore mirror and Tarago times, and dates were also included in the third newsletter. The two separate weeks of one-on-one consultation occurred 13 – 16 October and 27 - 30 October 2014. EPYC took several appointments for the meetings, and where there was time available in the schedule, and in between appointments, door knocks were undertaken to reach as many residents as possible.

The SEARs require consultation with non-involved landholders in proximity to the PA, in particular those located within 3 km of a WTG (at the time of these meetings, the now superseded DGRs required consultation with the community within 2 km of WTGs). During this campaign, EPYC endeavoured to reach as many residents as possible within 3 km (which was beyond the expectations of the DGRs applicable at the time) to ensure they were provided with opportunity to be involved in the ongoing consultation process. Where a resident was not at home a "we missed you letter" with contact details for the Proponent was left at their door or letter box. Follow up arrangements were made with those who contacted EPYC following the receipt of the letters.

The consultation log included in *Annex C* highlights the individual landholders/dwellings that were captured during this campaign, along with email, phone and letter correspondence that took place prior or subsequent to these meetings.

On the advice of DP&E in March 2015, further door knocking has not been undertaken, however consultation with local residents has continued since this time via various other means as outlined in this Chapter.

7.2.8 Community Consultative Committee

Purpose

A CCC has been established to provide a forum for open discussion between representatives of the wind farm, the community, relevant Councils and other stakeholders. The CCC was formulated in accordance with the *Draft NSW Planning Guidelines for Wind Farms*, December 2011.

In general, the Committee is intended to provide:

- community insights into issues relating to the proposed wind farm;
- helps to identify opportunities for the community to benefit from the Project; and
- facilitates communication of relevant information to the broader community.

The CCC should complement other community engagement methods and allow key stakeholders to inform the final Project design.

Structure of the Committee

The CCC comprises the following:

- an independent Chairperson appointed by the DP&E;
- seven representatives of the local community and other stakeholders, also appointed by DP&E. This includes at least two representative of any landholders who own dwellings within 2 km of a proposed WTG;
- one representative from each Council; and
- 2-3 representatives from EPYC.

These meetings will generally occur every 2-3 months or at a frequency agreed to by the CCC during the environmental assessment phase.

Operation of the Committee

Expression of interest forms for joining the CCC were made available to the community during the first Community Information Session in June 2014. These were also placed on the Project website for ease of access by members of the community. The Goulburn-Mulwaree and former Palerang Councils were also contacted to nominate their representatives for the CCC. An application pack was forwarded to those who registered their interest in participating in the CCC process.

The CCC process was originally the responsibility of the Proponent as advised by the DP&E, however in September 2014, the (then) Minister for Planning announced that DP&E would be responsible for selecting and establishing the CCC. Subsequent to this announcement and direction from DP&E, invitations for expressions of interest to participate in the CCC were published in the Tarago Times, Bungendore Mirror, the District Bulletin and the Braidwood Times under the guidance of DP&E in November 2014. In mid-December 2014, reminders were published in Braidwood Times and Bungendore Mirror.

In May 2015, the CCC members were selected by DP&E, and in July 2015, DP&E appointed an independent chair person. The first meeting of the CCC was held on 5th August 2015. A further 6 meetings have been held up until the date of finalisation of the EIS (October 2016). Following release of draft minutes by the Chair, these are placed on the Project website following each meeting. Upon endorsement by the Chair and the CCC during the following meeting, the final minutes are uploaded to the Project website. In addition, in 2016, Question & Answer logs (originally included as part of the minutes) were provided as a separate document on the Project website for the community's ease of access. The chair will oversee the update of the Question & Answer logs and once responded to, will be part of the archive for reference purposes.

A summary of the CCC meetings, include key issues raised and discussed, and actions and outcomes arising is provided in Table 7.5. Copies of CCC minutes are provided in *Annex C*.

CCC meetings will continue to take place through subsequent phases of the Project at a frequency agreed by the CCC.

Table 7.5 Summary of CCC Meetings

Date	Purpose	Summary of Issues Raised / Discussed and Actions / Outcomes
First Meeting of the CCC ***5 August 2015***	• *Discuss the functioning of the CCC* • *Provide a Project update* • *Identify information needs of the CCC going forward*	*A number of questions were raised by the CCC during the session and those relevant to the processes of the DP&E were addressed by Mike Young from DP&E who was in attendance. The questions relevant to the Project were addressed by EPYC representatives where possible, or taken on notice when the information was not available or required further clarification. The key issues raised and discussed included:* • *EIS process and timing* • *PAC approval process and decisions* • *draft wind farm guidelines* • *WTG coordinates* • *Confidentiality agreements with hosts*
Second Meeting of the CCC ***20 August 2015***	• *Provide a Project update* • *Discuss key issues of concern to the CCC* • *Identify issue for further discussion at the next meeting*	*The key issues raised and discussed included:* • *The timing for submission of EIS and DA* • *Consultants working on EIS* • *Substation location* • *Micrositing distance* • *Property addresses for involved owners* • *Whether EPYC had acquired any property in the area* • *GPS coordinates for noise loggers* • *GPS coordinates for visual assessment*
Third Meeting of the CCC ***8 September 2015***	• *Provide a Project update* • *Discuss key issues of concern to the CCC*	*The key issues raised and discussed included:* • *Confirmation that the turbine numbers were not going to increase from those that had been communicated* • *EIS timing and update* • *Construction timing* • *Property values* • *EPYC specifically requested to have assistance from the CCC to reach a number of landholders who are not residents of the area, but may be known by CCC members as community representatives*

Date	Purpose	Summary of Issues Raised / Discussed and Actions / Outcomes
Fourth Meeting of the CCC ***14 October 2015***	• *Provide specific Project information previously requested by CCC* • *Discuss key issues of concern to the CCC* • *Advise of proposed Benefit Sharing Programme*	*The key issues raised and discussed included:* • *Announced that EIS was submitted for adequacy review by DP&E* • *turbine GPS coordinates and a map were provided to CCC* • *List of GPS coordinates for noise loggers were provided to CCC* • *List of GPS coordinates for visual assessment were provided to the CCC* • *Announcement of Voluntary Benefit Sharing Program for non-involved land owners with dwellings within 2 km of a proposed turbine* • *Community enhancement funds* • *Property values*
Fifth Meeting of the CCC ***2 December 2015***	• *Provide update on the project and adequacy review* • *Discuss key issues of concern to the CCC*	*The key issues raised and discussed included:* • *Project progress after revising the EIS* • *Decommissioning of wind farm*
Sixth Meeting of the CCC ***2 March 2016***	• *Provide update on the project. DPE also advised on updated SEARs.* • *Discuss key issues of concern to the CCC*	*The key issues raised and discussed included:* • *Revised SEARs details* • *Project progress after revised SEARs* • *Benefit sharing program* • *Visual amenity and noise*
Seventh Meeting of the CCC ***6 July2016***	• *Provide update on the project. Particularly regarding submission of EIS.* • *Discuss key issues of concern to the CCC and community.*	*The key issues raised and discussed included:* • *Project update and EIS timing* • *Transmission line corridor* • *GPS coordinates of proposed site entrance for central cluster of turbines* • *visual, noise, and decommissioning*

7.2.9 Consultation Regarding Proposed Benefit Sharing Programme

In December 2013, as part of the preliminary environmental assessment prepared to accompany the request for DGRs for the Project, EPYC identified internally the potential to establish a Benefit Sharing Programme as a means to share the financial benefits of the Project with the broader community beyond those landholders directly involved in the Project via Involved Landholder Agreements.

The concept of this programme was reinforced through initial one-on-one community consultation undertaken in October 2014, at which time many of the residents in the vicinity of the PA indicated that they would like to receive more direct benefit to them rather than a potential benefit through the operation of a Community Enhancement Fund that will be set up for community based projects in the area (refer *Chapter 6* for further discussion).

Following further consideration and development of the concept, EPYC announced at the 4th CCC meeting of 14 October 2015, a commitment to establishing a Voluntary Benefit Sharing Programme for all neighbouring existing dwellings/residents located within 2 km of a WTG from the Project. Through one-on-one consultation, EPYC has also extended this offer to those landholders identified in the LCVIA (refer *Annex F*) as likely to experience significant visual impacts and will continue consultation with these residents to reach an agreement.

Through this voluntary Benefit Sharing Programme, the Proponent intends to establish Benefit Sharing Agreements with all non-involved landholders who have an existing dwelling/residence or an approved DA (at the date of the EIS) located within 1-2 km of a proposed WTG. Those with dwellings located within 2-3km of a proposed WTG with potential for significant visual impact as identified in this EIS, would also be considered for the programme.

Following negotiations with each neighbour, and if agreed, a Benefit Sharing Agreement will be put in place in order to protect the interest of both parties. The agreements would allow the non-involved landholder to benefit financially from the wind farm for the operational life of the Project. The offer is completely voluntary and up to the individual if they wish to share the financial benefit generated by the wind farm. The Proponent will endeavour to work with these residents towards resolving any outstanding issues they may have with respect to the Project where practicable prior to reaching an agreement.

Alternatively, any non-involved landholders who have an existing dwelling or an approved DA within 2-3 km of a proposed WTG with potential for significant visual impact as identified in this EIS, may choose to take up the visual mitigation option. Negotiations for mitigation will occur at the same time as the Benefit Sharing offer and the outcome will be dependent on the preference of each non-involved landholder for the offers, the specific details of each dwelling, and the locations and the mitigation potential as per EIS assessment. This provides many options for the non-involved neighbours in the vicinity of the Project to share the benefits from the wind farm in one form or another.

The consultation log included in *Annex C* highlights the individual landholders with whom consultation regarding the proposed Benefit Sharing Programme has been undertaken, including face-to-face meetings, email, phone and letter correspondence that has taken place.

Further consultation and meetings will continue as required. During earlier consultation efforts undertaken for the Voluntary Benefit Sharing Program, most non-involved neighbours expressed the importance of seeing the EIS and having the opportunity to review it as a whole before they make a decision. The proponent understood the importance of this request and with respect for the majority, decided to continue the consultation further once the EIS was placed on public exhibition. Most of this will occur prior to the end of the public exhibition period.

7.2.10 Consultation Regarding Visual Amenity

Background

In October 2015, DP&E requested that additional consultation be undertaken with neighbouring non-involved landholders of associated dwellings that have been identified in the LCVIA (refer *Annex F*) as likely to experience significant visual impacts associated with the Project (those rated as Moderate/High or High).

Following this, further visual impact assessment was undertaken by Clouston Associates in late 2015 and early 2016 in support of these additional consultation requirements, which included assessment of the potential feasibility and effectiveness of implementation of mitigation measures at those non-involved landholder dwellings that were assessed as likely to experience Moderate/High or High visual impacts. This additional requirement was also subsequently formally incorporated in the revised SEARs for the Project that were issued in March 2016, which requires the following:

'*provide detailed consideration of the feasibility and effectiveness of the proposed mitigation measures, including consultation with all landowners of non-associated residences within 3 km of a proposed turbine where significant visual impacts are predicted to identify potential approaches to mitigate any adverse impacts, including consideration of negotiated agreements*'.

Consultation Process

The consultation process and discussions relating to visual amenity and potential mitigation options began in December 2015 and are ongoing. Following this initial consultation, but in light of the majority landholders requesting to first review the EIS, it was decided that while consultation would continue, the main consultation effort regarding these issues should be directed towards the duration of the public exhibition period, during which time non-involved neighbours would have access to the EIS in order to gain a better understanding of the Project and facilitate more meaningful discussions regarding potential impacts and mitigation options.

EPYC attended site for two days in February (16th to 18th) and two days in March (2nd and 3rd) 2016. In February 2016, prior to the visits, a letter was delivered/mailed to non-involved landholders with a dwelling (or a DA for a dwelling) within 3 km of a WTG. The purpose of the letter was to advise the landholder of planned site attendance by EPYC representatives and provide contact details for EPYC with request for owners to inform EPYC of a suitable time for a visit. The letter was dropped off at letter boxes of each of the identified properties and where there was no letter box, the letters were attached to the gates in a water-proof envelope. Follow up phone calls were made to those landholders whose contact details were publicly available, or that had been made available to EPYC previously for corresponding purposes. Where appointments were taken up, EPYC met with landholder and discussed the Voluntary Benefit Sharing Programme and where applicable, the potential visual impacts at their dwelling. The potential for implementing mitigation measures was also discussed in general terms.

Following the receipt of the revised SEARs in early March 2016, further consultation effort was directed to all non-involved landholders within 3 km of a WTG. A letter was delivered on the 23rd of March and some were mailed on the 24th of March to residents within 3 km of a WTG where significant visual impacts were anticipated. The purpose of the letter was to make suitable arrangements for visit by EPYC and the visual consultant (Clouston Associates) to facilitate as assessment of potential mitigation options at their dwelling.

Following the mail out in March, where appointments were taken targeted site visits were conducted over two days in April 2016 (27th and 28th), by EPYC representatives and a representative of Clouston Associates as the technical specialist responsible for preparation of the LCVIA. The purpose of these visits was to assist in developing a detailed consideration of the feasibility and effectiveness of any proposed mitigation measures within the LCVIA, and to facilitate Proponent discussion with individual landholders regarding visual impact and mitigation issues, including consideration of negotiated agreements.

The outcomes of the visual mitigation analysis are outlined in Section 6 of the LCVIA included as *Annex F*.

The consultation log included in *Annex C* highlights the effort undertaken by EPYC for the individual landholders with whom consultation regarding the visual impacts and mitigation measures has been taken up by the community member.

To date approximately 50 non-involved landholders have acknowledged the letters issued in February/March of 2016, and have either been involved in preliminary discussions with EPYC regarding mitigation, received a Project update, or declined to meet. The majority of those consulted have expressed interest to see the EIS prior to committing to any specific mitigation or an agreement.

Consultation with non-involved landholders regarding these issues will continue during the subsequent phases of the Project, following public release of the EIS.

7.3 Community Issues and Concerns

The key community issues and concerns raised during consultation activities described in this chapter are summarised in *Table 7.6*. The relevant chapter in which each issue of concern has been addressed is included. Further discussion of Project alternatives and evolution of the Project design and layout, which has been undertaken in response to a range of constraints, including key environmental and social issues identified through the consultation process, is provided in *Chapter 5*.

Table 7.6 ***Key Community Issues / Concerns and Response***

Issue/Concern	Response
Decrease in property values - ***A number of community members raised concerns regarding property values being negatively affected***	*Chapter 15*
Impact on visual amenity and landscape character	*Chapter 11*
Turbine noise generation	*Chapter 10; Annex E*
Increased traffic during construction	*Chapter 13*
Glossy Black Cockatoo and ecology concerns near mount fairy and Scott's Nature Reserve	*Chapter 9*
Potential health impacts from electromagnetic radiation	*Chapter 16*
Fire Safety	*Chapter 16*
Decommissioning	*Annex O*

7.4 Government Agency and Non-Government Organisation Consultation

Consultation has been undertaken with relevant government departments and agencies and non-government organisations throughout the environmental assessment process. Consultation has included briefings, presentations and ongoing information sharing to keep key stakeholders informed, and to ensure that the environmental assessment met key agency requirements. Details of consultation undertaken with key agencies and other relevant stakeholders has been included in the specialist assessment reports contained within *Annex D* to *Annex O* of this EIS.

Key agencies and organisations consulted with during preparation of the EIS and up to commencement of public exhibition of the EIS are listed in *Table 7.7*.

Table 7.7 Government Agency and Non-Government Organisation Consultation

Stakeholder	Organisations Consulted and Notified
Government Departments and Agencies	• Department of Planning and Environment (DP&E) (previously DP&I); • Goulburn Mulwaree Council; • Former Palerang Council; • Sydney Catchment Authority (SCA) (now part of DPI Water); • South East Local Land Service (previously known as Southern Rivers Catchment Management Authority); • Greater Sydney Local Land Service (previously known as Hawkesbury-Nepean Catchment Management Authority); • NSW Office of Environment and Heritage (OEH) (Queanbeyan office) • NSW Environment Protection Authority (EPA); • NSW Department of Trade and Investment (Resources and Energy); • NSW Department of Primary Industry (Lands) (Crown Lands); • NSW Department of Finance, Services and Innovation (Land and Property Information) • NSW Department of Primary Industries (including Fisheries NSW, Agricultural NSW and NSW Office of Water); • NSW Department of Education and Communities; • NSW Department of Family and Community; • NSW Government Telco Authority; • NSW Health; • NSW Roads and Maritime Services (RMS); • Fire and Rescue NSW; • NSW Rural Fire Service; • NSW State Emergency Service (SES); • Civil Aviation Safety Authority (CASA); • Commonwealth Department of Defence; • Commonwealth Department of the Environment; • National Native Title Tribunal; • Native Title Services Corporation; • Office of the Register, *Aboriginal Land Rights Act 1983*; • Australian Federal Police; • NSW Police; and • Ambulance Service of NSW.
Non-Government Agencies and Organisations	• Airservices Australia; • Aerial Agricultural Association of Australia (AAAA); • Bureau of Meteorology (BoM); • TransGrid; • Geoscience Australia; • Telstra; • Optus; • Vodafone; • Yless4U Pty Ltd; • Native Title Services Corporation; • Batemans Bay Local Aboriginal Land Council; • Ngambri Local Aboriginal Land Council; • Pejar Local Aboriginal Land Council; • Royal Flying Doctor Service; • Operators of non-regulated aerodromes; • NSW Farmers Association; • Yass Aerial Services; • Fred Fahey Aerial Services; • St Johns Ambulance Australia Incorporated; • Mulwaree Goulburn Emergency Repeater Group; • Tallaganda Shire State Emergency Services Auxiliary; • Wamboin Rural Fire Brigade; • Former Palerang Local Government Area (Lake George office) Fire Control Centre; and • OCHRE Resources.

7.5 Future Engagement and Consultation Activities

Future engagement activities will be similar to what has been undertaken to date and will include a range of activities, including:

- continued presence of the dedicated email, telephone and website to provide direct and formal feedback options to stakeholders and the community;
- newsletters providing regular updates on the progress of the Project and important dates and events;
- ongoing CCC meetings; and
- further consultation with key stakeholders, including:
    - Goulburn Mulwaree Council and the former Palerang Council, in order to establish a voluntary planning agreement for community enhancement fund;
    - ongoing community engagement regarding the Benefit Sharing Programme, visual impacts, mitigation and establishment of agreements.

Table 7.8 Summary of Planned Future Consultation Activities

Upcoming Consultation Activities	Estimated Timeframe	Purpose of Consultation	Relevant Stakeholders	Status
Voluntary Benefit Sharing Offer & mitigation for significant visual impacts as assessed in EIS	*November – December 2016*	• *Provide mitigated examples to neighbours. Further discuss mitigation and Benefit sharing.*	*Discussions with Non-participating land holders with existing dwellings or DA approved at the time of this EIS located within:* • *2km of a proposed turbine (offer of voluntary benefit sharing and relevant discussions including those related to the dwellings which have been identified in this EIS as having significant visual impact)* • *2-3km of a proposed turbine (mitigation options for those which have been identified in this EIS as having significant visual impact or offer of benefit sharing)*	*Planned & Ongoing*
Presentation of EIS to CCC	*November/December 2016*	• *Provide overview of EIS and assessment results*	• *CCC members*	*Planned*
Community Information Session	*Q4 2016 (during exhibition period)*	• *Provide overview of assessment outcomes and assessment process*	• *Landholders and residents in the area* • *Former Palerang Council* • *Goulburn-Mulwaree Council* • *All other stakeholders were welcomed to attend and those registered previously*	*Planned*

7.6 References

Clouston Associates (2016) *Jupiter Wind Farm Landscape Character and Visual Impact Assessment*.

DP&E (2011) NSW *Draft Planning Guidelines: Wind Farms 2011*.

ERM (2016) Stakeholder and Community Consultation Strategy.

8 ENVIRONMENTAL RISK ASSESSMENT

8.1 Introduction

This chapter outlines the methodology and findings of the Environmental Risk Assessment (ERA) undertaken to identify and rate the potential environmental and community risks generated by the Project. The primary purpose of the ERA was to inform the assignment of effort to each of the environmental and community issues identified, with a greater depth of analysis being allocated to those issues identified as being of high or medium risk without application of mitigation or management measures.

8.2 Methodology

The key risks identified for the Project were assessed in accordance with the methodology outlined in Standards Australia's *HB 203:2012 Managing Environmental Related Risk* and *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines*.

The ERA categorised the level of risk for a given event based on the significant effect (consequence) and the probability (likelihood) of the event occurring, assuming that no control measures had been applied. The likelihood and consequences categories used in the ERA are outlined in *Table 8.1* and *Table 8.2* respectively. Each negative environmental risk was then ranked as low, medium, high or very high using the risk matrix in *Table 8.3*. Positive outcomes were also ranked as low, medium or high using the risk matrix in *Table 8.4*.

Table 8.1 ***Probability Categories for Environmental Risk Assessment***

Rank	Probability	Description
A	Almost Certain	Happens often and is expected to occur
B	Likely	Could easily happen and would probably occur
C	Possible	Could happen and has occurred elsewhere
D	Unlikely	Unlikely to happen but may occur
E	Rare	Could happen, but only in extreme circumstances

Table 8.2 ***Consequence Categories for Environmental Risk Assessment***

Rank	Consequence	Description
1	Extreme	Permanent and catastrophic impacts on the environment; large impact area: reportable incident to external agency; substantial community concern.
2	Major	Permanent and detrimental impacts on the environment; large impact area: reportable incident to external agency; high level of community concern.
3	Moderate	Substantial temporary or minor long term detrimental impacts on the environment; moderate impact area; reportable incident to external agency; some community concern.
4	Minor	Limited detrimental impacts on the environment; small impact area; not reportable incident; limited community concern.
5	Low	Nil or temporary impacts to the environment, small or isolated impact area; not reportable incident; no community concern.
Positive Consequences		
1	Major	Permanent beneficial impacts on the environment or population; large impact area.
2	Moderate	Substantial temporary or minor long term beneficial impacts on the environment or population; moderate impact area.
3	Minor	Limited beneficial impacts on the environment or population; small impact area.

Table 8.3 *Risk Matrix for Environmental Risk Assessment - Negative Consequences*

Likelihood	Negative Consequences				
	1. Extreme	2. Major	3. Moderate	4. Minor	5. Low
A. Almost certain	VH	VH	H	H	M
B. Likely	VH	H	H	M	M
C. Possible	H	H	M	M	L
D. Unlikely	H	M	M	L	L
E. Rare	H	M	L	L	L
VH – Very High, H – High, M – Medium, L - Low					

Table 8.4 *Risk Matrix for Environmental Risk Assessment - Positive Consequences*

Likelihood	Positive Consequences		
	1. Major	2. Moderate	3. Minor
A. Almost certain	H	H	M
B. Likely	H	M	M
C. Possible	M	M	L
D. Unlikely	M	L	L
E. Rare	L	L	L
H – High, M – Medium, L - Low			

8.3 Findings of the Environmental Risk Assessment

The findings from the ERA are outlined in *Table 8.5* and indicate that in the absence of control measures, the majority of identified environmental and community issues incurred medium levels of risk, whilst others demonstrated a low level of risk. Biodiversity and landscape and visual impacts were assessed as presenting a high and very high risk level respectively.

All potential impacts with inherent risk ratings of low were considered and addressed in this EIS, however a higher degree of assessment was undertaken for the environmental issues with risk levels ranging from medium to very high. A summary of the ERA in relation to each aspect, including where certain positive impacts were identified, is provided in *Table 8.6*.

Table 8.5 *Environmental Risk Ratings*

Aspect	Positive	Low	Medium	High	Very high
Biodiversity				✓	
Noise and Vibration				✓	
Landscape and Visual					✓
Cultural Heritage			✓		
Traffic and Transport			✓		
Soil and Water			✓		
Social and Economic Issues*	✓		✓		
Hazards and Risks			✓		
Other Environmental Issues					
Climate and air quality		✓			
Greenhouse gas reduction	✓				
Mineral and Petroleum Exploration		✓			
Waste		✓			
* Potential positive and negative impacts been identified in relation to socio-economic matters.					

A detailed assessment of the potential environmental issues identified in the ERA is discussed in *Chapters 9-17*. Where appropriate, mitigation and management measures have been developed to reduce the risks to as low as reasonably practical (ALARP). These measures are described in each chapter and collated in full in *Chapter 18*.

Table 8.6 Preliminary Environmental Risk Assessment

Aspect	Potential Impact	Likelihood	Consequence	Potential Risk Level
Avifauna strike during operation of the Project	Injury or mortality to avifauna such as birds and bats from a turbine blade strike.	(C) Possible	(2) Major	High
Removal of vegetation and loss of habitat.	Direct removal of vegetation to support Project infrastructure causing the loss of habitat for terrestrial fauna species.	(A) Almost certain	(3) Moderate	High
Impacts to threatened species and communities	The construction and operation of the Project adversely impacting on threatened species and/or communities listed under State and/or Commonwealth legislation.	(C) Possible	(3) Moderate	Medium
Noxious weeds and disease	Spread of noxious weed and disease, particularly during construction, impacting on native flora and fauna species.	(C) Possible	(4) Minor	Medium
Construction / decommissioning noise	Noise generated during the construction and decommissioning of the Project exceeding specified noise management levels at nearby receptor locations.	(D) Unlikely	(4) Minor	Low
Operational noise	Noise emissions from WTGs, substation and ancillary infrastructure exceeding the prescribed operational noise limits at nearby receptors.	(B) Likely	(3) Moderate	High
Visual Impact	The physical presence of Project infrastructure including but not limited to WTGs, electrical substation and the transmission lines impacting on the visual amenity experienced at receptor locations and nearby public viewpoints.	(A) Almost certain	(2) Major	Very High
Shadow Flicker	Amenity related impacts at nearby receptor locations caused from periodic shadow flicker. This is generated from the casting of shadows from the rotating WTGs under certain conditions.	(C) Possible	(3) Moderate	Medium
Blade Glint	The reflection of sunlight off WTG blades under certain conditions causing amenity impacts at nearby receptor locations.	(D) Unlikely	(3) Moderate	Medium
Cumulative Impacts	Other wind farm developments and existing infrastructure such as transmission line networks in proximity to the Project compounding the impacts on amenity particularly relating to visual, noise, and biodiversity.	(C) Possible	(3) Moderate	Medium
Aboriginal Heritage	Potential disturbance during construction activities to previously recorded and unrecorded items of Aboriginal Heritage significance within the PA.	(C) Possible	(3) Moderate	Medium
Historic/ European Heritage	Potential disturbance to European heritage objects or places during construction and operation of the Project.	(C) Possible	(3) Moderate	Medium
Road Safety	Increase in heavy vehicle movements during construction causing potential impacts on road safety.	(C) Possible	(3) Moderate	Medium
Damage to local roads	Damage to local roads from heavy vehicle movements particularly during construction and decommissioning.	(C) Possible	(3) Moderate	Medium

Aspect	Potential Impact	Likelihood	Consequence	Potential Risk Level
Soil erosion	Soil erosion generated from: • off-road vehicle use during construction, operation and decommissioning; • direct ground disturbance during construction; and • clearing of vegetation to support Project infrastructure.	(C) Possible	(3) Moderate	Medium
Contamination	Accidental spills causing localised contamination to soil, groundwater or surface water bodies.	(D) Unlikely	(4) Minor	Low
Surface water bodies	Sediment run-off generated from ground disturbing activities entering existing surface water bodies. Impacts to surface water flows generated from construction activities. Impacts to watercourse crossings.	(C) Possible	(3) Moderate	Medium
Water demand	Increase in water demand to service the Project during construction causing changes to baseline groundwater and/or surface water levels	(E) Rare	(3) Moderate	Low
Property values	Reduction in property values for those properties not involved with the Project.	(D) Unlikely	(4) Minor	Low
Local and regional investment	Positive impacts on the local and regional economy through the provision of employment opportunities, demand for local goods and services, and direct investment through the community enhancement initiatives.	(A) Almost certain	(1) Major	High (Positive)
Negative community perception of wind farm developments	Social impacts generated from the negative perception (visual, noise, health etc.) of wind farm developments.	(B) Likely	(3) Moderate	High
Land use constraints	Disruption to existing land uses (eg agricultural land activities) and impacts on the ability to use and develop surrounding properties for residential dwellings.	(C) Possible	(3) Moderate	Medium
Mineral Exploration	Potential limitations on future mining activities due to presence of Project infrastructure.	(C) Possible	(3) Moderate	Medium
Aviation risk	Impacts to flight paths for commercial and recreational aircraft. WTGs impacting on the safe operation of aircraft in the region for agricultural purposes and the aerial based water application for fighting bushfires.	(E) Rare	(3) Moderate	Low
Bushfire	Impacts to/from the Project on bushfire risk (accidental ignition of bushfire during construction and operation of the Project). The physical presence of the Project impacting on bushfire management capabilities.	(E) Rare	(2) Major	Medium
Blade throw	Accidental release of WTG blades during operation.	(E) Rare	(3) Moderate	Low
Interference to communications infrastructure	WTGs may cause electromagnetic interference (EMI) by blocking, scattering or reflecting waves between transmitters and receivers. This may include television, radar and radio transmissions.	(D) Unlikely	(4) Minor	Low

Aspect	Potential Impact	Likelihood	Consequence	Potential Risk Level
Human health	Impacts on human health from perceived sources such as: • audible and inaudible noise; • shadow flicker; • blade glint; • night lighting impacting sleep; and • electromagnetic fields (EMF).	(C) Possible	(3) Moderate	Medium
Hazardous materials	Exposure to and/or accidental release of hazardous materials during construction and operational maintenance.	(D) Unlikely	(4) Minor	Low
Climate and air quality	Dust and particulate release during ground disturbing works causing amenity impacts at nearby receptors. Emissions from vehicles during construction and decommissioning phases.	(C) Possible	(5) Low	Low
	Contribution to the reduction in greenhouse gas emissions at the State and National level through the development of the Project.	(A) Almost Certain	(2) Moderate	High (Positive)
Waste	Improper management of waste streams during construction, operation and decommissioning of the Project impacting on the receiving environment.	(D) Unlikely	(4) Minor	Low

9 BIODIVERSITY

9.1 Introduction

This chapter discusses the potential impacts to biodiversity associated with the Project and outlines the proposed mitigation measures to manage any adverse impacts on biodiversity. This includes both biodiversity values in general and those listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and/or the *Threatened Species Conservation Act 1995* (NSW) (TSC Act). The full biodiversity specialist assessment is located in *Annex D*.

9.1.1 Study Area

The biodiversity assessment focussed on values of the PA at four spatial scales:

- the Development Footprint (as defined for this biodiversity assessment) - the area in which physical disturbance is proposed for the development of the Project. It is based on an indicative layout, which remains subject to detailed design and micrositing;
- the Study Area - defined as a buffer of 200 m around the majority of the Development Footprint, with the exception of the areas around the 33 kV transmission line linking the southern precinct to the substation in the northern precinct, for which the Study Area is defined as:
    - the cadastral road reserve of Goulburn-Braidwood Road and the Kings Highway; and
    - 10 m either side of the Development Footprint where the alignment runs west-east between Goulburn-Braidwood Road and the substation site in the northern precinct;
- the PA - the area in which the Proponent has applied to develop the Project; and
- the locality (as defined for this biodiversity assessment) - an approximate 10 km buffer to the PA used to compare ecological values within the PA to the surrounding areas.

9.1.2 Methodology

The biodiversity assessment was undertaken in accordance with the SEARs issued by DP&E for the Project and NSW Office of Environment and Heritage (OEH) assessment requirements as detailed in Section 3.2 of *Annex D*.

The overall approach in determining the biodiversity values of the Study Area considered two phases: an initial desk based assessment, followed by field surveys. The desk based phase included a review of relevant literature and database searches of the locality. The field survey site selection and sampling approach for vegetation mapping, threatened flora searches, threatened flora habitat searches, fauna species and fauna habitat surveys were informed by the initial literature and data review.

Field surveys were undertaken over 58 separate days in the Study Area, PA and locality by various field teams between December 2013 and August 2015. A full description of field methodology is provided in Chapter 4 of *Annex D*. Field investigations equated to 944 person hours of survey effort. Field surveys included:

- vegetation mapping and condition;
- targeted threatened flora searches;
- fauna habitat assessment;
- targeted fauna surveys; and
- incidental observations for the duration of the field surveys.

The field survey methods were also adapted to account for changes in the Project design, which occurred throughout this study, following a series of revisions to the Project infrastructure layout. The current Project layout is the result of an iterative planning approach including consideration of biodiversity values at the early stages of the development planning process, consistent with the avoidance hierarchy.

The data collected through both the desk based assessment and the field surveys were used to identify the biodiversity values of the Study Area, the presence (or likely presence) of any species or ecological communities listed as threatened under the EPBC Act and/or TSC Act ('threatened matters') or migratory species listed under the EPBC Act. The definitions used for the likelihood of occurrence are described in *Table 9.1*.

Table 9.1 ***Definitions of known, potential and unlikely to occur in the PA***

Category	Description
Known	• the threatened matter has been recorded in the Study Area during recent field surveys; or • database records demonstrate that the threatened matter has been known to occur in the Study Area within the last 10 year period.
Potential	• the threatened matter's known distribution includes the PA, and suitable habitat is present within the Study Area; or, • database records demonstrate that the threatened matter has been known to occur in the Study Area, however has not been recorded within the last 10 years; or • the threatened matter is a wide ranging volant (flying) species which may 'fly-over' the Study Area, regardless of the habitat types present and has been recorded within 10 km of the PA.
Unlikely	• the threatened matter has not been recorded within 10 km of the PA and suitable habitat does not occur within the Study Area; or • the PA is not within the threatened matter's known distribution; or • sufficient field surveys have been conducted within the Study Area to conclude that the species is likely to be absent.

These data were then used to inform the impact assessment of the proposed Project on the biodiversity values of the PA using a project-specific biodiversity impact assessment matrix (refer to Chapter 4 of *Annex D*). The significance of the Project's residual impacts on threatened matters and migratory species known or with potential to occur was undertaken according to the factors set out in:

- section 5A of the NSW *Environmental Planning and Assessment Act 1979* (commonly referred to as a seven-part test) for threatened species, populations and communities listed under the TSC Act; and
- the Commonwealth Significant Impact Assessment Guidelines 1.1 (DoE 2013) for each ecological Matter of National Environmental Significance (MNES) listed under the EPBC Act (eg threatened species, ecological communities and migratory species).

A preliminary calculation of the offset requirements for the Project's impacts has been undertaken on the residual ecological impacts of the indicative Development Footprint using data collected from the field survey and desktop analysis according to the BioBanking Assessment Methodology (BBAM) 2014 (OEH 2014). This calculation was completed using OEH's online BioBanking Credit Calculator by an Accredited Assessor and is detailed in *Annex G* of *Annex D*. The calculation provides a metric representation of the biodiversity impacts of the indicative Development Footprint. The full offset requirement will be determined following detailed project design. Offsets for the Project may be provided through a range of alternative options to ensure the long-term protection and management of the offset sites which may include either BioBanking credits or other means such as registered Conservation Agreements (more detail is contained in Annex G of *Annex D*). The relationship between the offset calculations using the BBAM and the DoE *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (DoE 2012) is detailed in Annex G of *Annex D*.

9.2 Existing Environment

The land within the PA is primarily used for agricultural grazing and consists of both native and improved pasture with remnants of native woodlands. The PA comprises private farming properties, mostly used for sheep and cattle grazing. Pockets of agricultural cropping are also present within the PA however these are limited in extent.

The morphology of woodland vegetation suggests that the present distribution of woodland is a result of land clearing to increase the area of grasslands on which livestock can graze. It is likely that the areas covered by these fragments of woodland are on very poor soils, as retention of woodland fragments in an otherwise mostly cleared landscape may indicate that there was minimal agricultural benefit from their clearing and/or maintaining them as cleared areas.

9.2.1 General Biodiversity Values

A total of 11 Plant Community Types (PCTs) were identified across the Study Area. Each PCT was further classified using a condition class (ie classification of their current condition and degree of disturbance). The unique combination of PCT and condition assessment is referred to as a Vegetation Zone.

There are 39 Vegetation Zones in the Study Area with additional vegetation types including planted native vegetation and non-native agricultural land and other land cover types eg roads, dams and buildings (refer to *Figure 9.1*). A detailed description of the PCTs and Vegetation Zones is provided in Sections 4 and 5 of *Annex D*.

These Vegetation Zones were used as a basis for classification of fauna habitat types across the Study Area resulting in the identification of five habitat types with additional non-native vegetation and other land cover types (refer to *Figure 9.2*). A detailed description of the fauna habitats is provided in Section 5 of *Annex D*.

A total of 214 flora species were identified during the flora surveys of the Study Area - 161 (75.2%) of which are indigenous; and 53 (24.8%) are introduced. The total number of native fauna species recorded during the field surveys was 153, comprising 10 frogs; 13 reptiles; 103 birds; 10 non-volant (ie non-flying) mammals; and up to 17 bats. There is uncertainty in the total number of bat species recorded due to some species having overlapping call characteristics. Refer Section 5 of *Annex D* for further discussion.

Legend

- Apple Box - Candlebark - Snow Gum shrubby open forest on valley floors, southern South Eastern Highlands Bioregion_Mod-Good_Mod
- Apple Box - Candlebark - Snow Gum shrubby open forest on valley floors, southern South Eastern Highlands Bioregion_Mod-Good_Low
- Apple Box - Candlebark - Snow Gum shrubby open forest on valley floors, southern South Eastern Highlands Bioregion_Mod-Good_Poor
- Apple Box - Candlebark - Snow Gum shrubby open forest on valley floors, southern South Eastern Highlands Bioregion_Mod-Good_Weedy
- Apple Box - Candlebark - Snow Gum shrubby open forest on valley floors, southern South Eastern Highlands Bioregion_Mod-Good_Shrubby
- Black Sallee - Tussock Grass open woodland of the South Eastern Highlands Bioregion_Mod-Good_Mod
- Black Sallee - Tussock Grass open woodland of the South Eastern Highlands Bioregion_Mod-Good_Low
- Black Sallee - Tussock Grass open woodland of the South Eastern Highlands Bioregion_Mod-Good_Poor
- Black Sallee - Tussock Grass open woodland of the South Eastern Highlands Bioregion_Mod-Good_Weedy
- Black Sallee - Tussock Grass open woodland of the South Eastern Highlands Bioregion_Mod-Good_Shrubby
- Burgan - Pink Kunzea derived tall shrubland, South Eastern Highlands Bioregion and South East Corner Bioregion_Mod-Good_Mod
- Derived grasslands of the South Eastern Highlands Bioregion and South East Corner Bioregion_Mod-Good_Low
- Inland Scribbly Gum - Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion_Mod-Good_Good
- Inland Scribbly Gum - Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion_Mod-Good_Mod
- Inland Scribbly Gum - Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion_Mod-Good_Low
- Inland Scribbly Gum - Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion_Mod-Good_Poor
- Inland Scribbly Gum - Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion_Low
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion_Mod-Good_Good
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion_Mod-Good_Mod
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion_Mod-Good_Low
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion_Mod-Good_Poor
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion_Mod-Good_Weedy
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion_Mod-Good_Shrubby
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion_Low
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion_Mod-Good_Good
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion_Mod-Good_Mod
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion_Mod-Good_Low
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion_Mod-Good_Poor
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion_Mod-Good_Weedy
- River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion_Mod-Good_Low
- Silvertop Ash - Blue-leaved Stringybark shrubby open forest on ridges, north east South Eastern Highlands Bioregion_Mod-Good_Good
- Silvertop Ash - Blue-leaved Stringybark shrubby open forest on ridges, north east South Eastern Highlands Bioregion_Mod-Good_Mod
- Silvertop Ash - Narrow-leaved Peppermint open forest on ridges of the eastern tableland, South Eastern Highlands Bioregion and South East Corner Bioregion_Mod-Good_Good
- Silvertop Ash - Narrow-leaved Peppermint open forest on ridges of the eastern tableland, South Eastern Highlands Bioregion and South East Corner Bioregion_Mod-Good_Mod
- Silvertop Ash - Narrow-leaved Peppermint open forest on ridges of the eastern tableland, South Eastern Highlands Bioregion and South East Corner Bioregion_Mod-Good_Low
- Silvertop Ash - Narrow-leaved Peppermint open forest on ridges of the eastern tableland, South Eastern Highlands Bioregion and South East Corner Bioregion_Mod-Good_Poor
- Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion_Mod-Good_Good
- Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion_Mod-Good_Mod
- Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion_Mod-Good_Low
- Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion_Mod-Good_Poor
- Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion_Mod-Good_Weedy
- Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion_Low
- Planted Native Vegetation
- Non-native Trees
- Non-native Pasture (Paddock Trees)
- Non-native Pasture or Cropland
- Dam
- Roads, Buildings, Yards or Other Disturbance

BORO

MULLOON

MANAR

LAKEVIEW ROAD
BRAIDWOOD ROAD
GOULBURN ROAD
BARNET DRIVE
BORO ROAD
DUCKFIELD ROAD
KINGS HIGHWAY
MULLOON ROAD
WATSONS ROAD
JONES ROAD
BUTMAROO ROAD

Legend

- Project Area
- Study Area

Proposed Infrastructure

- 33kV Transmission Line

Existing Infrastructure

- 330kV Transmission Line
- Major Road / Highway
- Local Road
- Track

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015

N
0 1 2 3km

Client:	EPYC Pty Ltd		
Drawing No:	0223522m_JWF_EIS_G091_R01.mxd		
Date:	26/09/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: MF	

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

Figure 9.1 - Vegetation Zones of the Study Area

Jupiter Wind Farm

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Fauna Habitat
- Glossy Black-cockatoo Habitat with Foraging Signs
- Koala Habitat with Primary Feed Tree Species
- Woodland/Forest
- Native Shrubland
- Open Woodland with Native Understorey
- Native Grassland with Scattered Native Trees
- Non-native Pasture with Scattered Native Trees
- Native Grassland
- Non-native Forest
- Non-native Pasture
- Dam

LANDRA LANE
TAYLORS CREEK ROAD
BUNGENDORE ROAD
MOUNT FAIRY ROAD
SANDHILLS ROAD
MOUNT FAIRY
HAZELDELL ROAD
MULLOON
MULLOON ROAD
BUTMAROO ROAD
BRAIDWOOD ROAD
BORO
LAKEVIEW ROAD
GOULBURN ROAD
BARNET DRIVE
BORO ROAD
DUCKFIELD ROAD
KINGS HIGHWAY
MANAR
WATSONS ROAD
JONES ROAD

Legend
- Project Area
- Study Area

Proposed Infrastructure
- 33kV Transmission Line

Existing Infrastructure
- 330kV Transmission Line
- Major Road / Highway
- Local Road
- Track

Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015

N
0 1 2 3km

Client:	EPYC Pty Ltd		**Figure 9.2 - Fauna Habitats of the Study Area**
Drawing No:	0223522m_JWF_EIS_G092_R01.mxd		Jupiter Wind Farm
Date:	26/09/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: MF	

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ERM

9.2.2 Threatened Matters

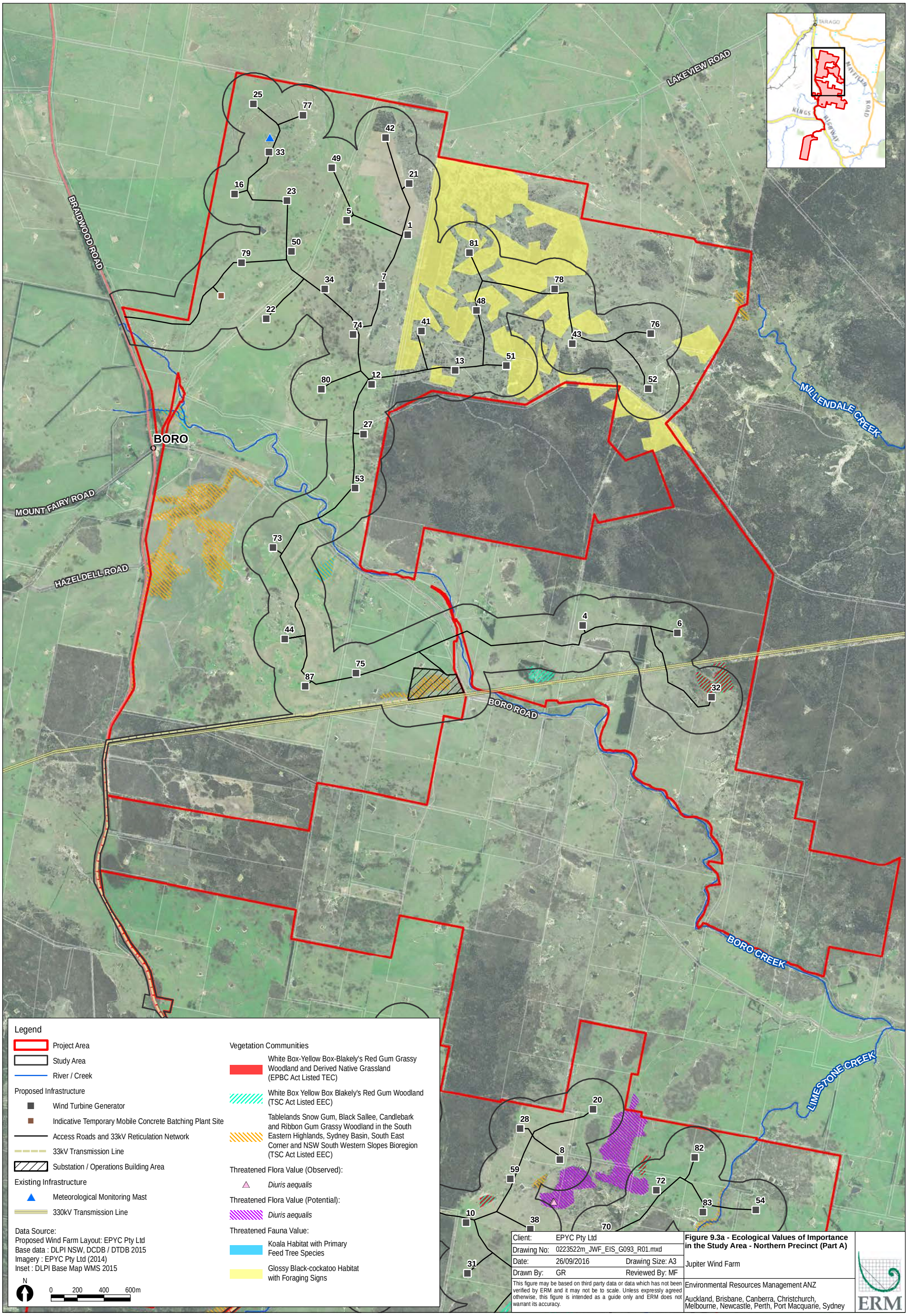
Field investigations identified two threatened ecological communities, two species of threatened flora, nine threatened bird species and one threatened bat species. Observations made during field surveys combined with desktop data analysis resulted in an assessment of the likelihood of occurrence of threatened matters and migratory species known or with potential to occur in the PA (refer to *Table 9.2* and *Figures 9.3a-d*). All other threatened matters nominated in the SEARs that are not included in *Table 9.2* are omitted because they were deemed not likely to occur in the PA.

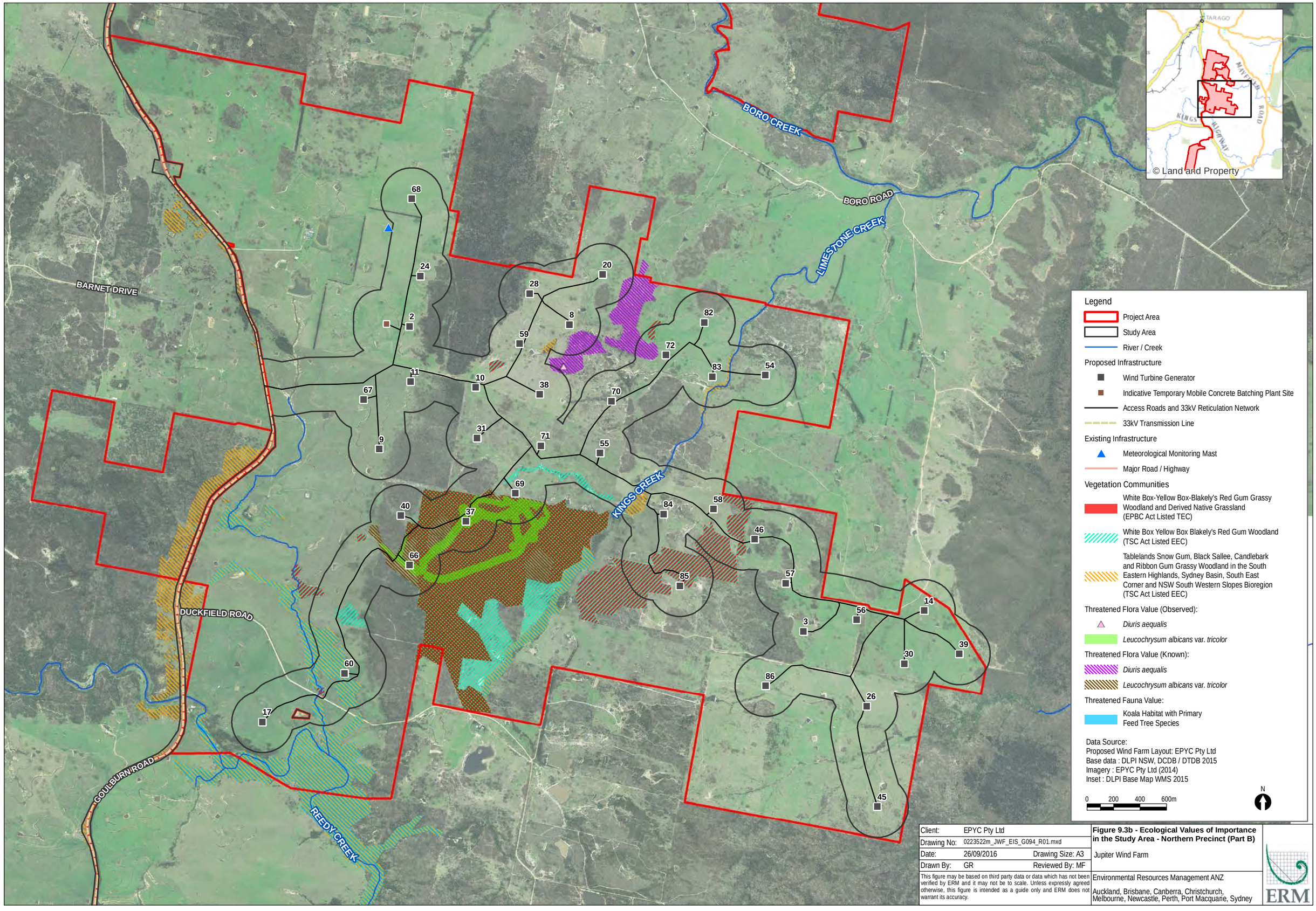
Table 9.2 ***Migratory Species, Threatened Species and Threatened Communities known or with Potential to Occur in the Project Area***

Species group	Common Name	Species Name	TSC Act Status	EPBC Act Status
Communities known to occur in the Project Area				
White Box, Yellow Box, Blakely's Red Gum Woodland and Derived Native Grassland Box Gum Woodland			-	CE
White Box Yellow Box Blakely's Red Gum Woodland			EEC	-
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion			EEC	-
Species known to occur within the Project Area				
Birds	Blue-billed Duck	*Oxyura australis*	V	-
Birds	Diamond Firetail	*Stagonopleura guttata*	V	-
Birds	Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V	-
Birds	Scarlet Robin	*Petroica boodang*	V	-
Birds	Speckled Warbler	*Chthonicola sagittata*	V	-
Birds	Spotted Harrier	*Circus assimilis*	V	-
Birds	Varied Sittella	*Daphoenositta chrysoptera*	V	-
Birds	White-fronted Chat	*Epthianura albifrons*	V	-
Birds	White-throated Needletail	*Hirundapus caudacutus*	-	Mi
Flora	Buttercup Doubletail	*Diuris aequalis*	E	V
Flora	Hoary Sunray, Grassland Paper-daisy	*Leucochrysum albicans subsp. albicans var. tricolor*	-	E
Mammals	Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V	-
Species with potential to occur within the Project Area				
Birds	Barking Owl	*Ninox connivens*	V	-
Birds	Bar-tailed Godwit	*Limosa lapponica*	-	Mi
Birds	Black Falcon	*Falco subniger*	V	-
Birds	Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V	-
Birds	Cattle Egret	*Ardea ibis*	-	Mi
Birds	Common Greenshank	*Tringa nebularia*	-	Mi
Birds	Common Sandpiper	*Actitis hypoleucos*	-	Mi
Birds	Curlew Sandpiper	*Calidris ferruginea*	CE	Mi, Ma
Birds	Double-banded Plover	*Charadrius bicinctus*	-	Mi
Birds	Flame Robin	*Petroica phoenicea*	V	Ma
Birds	Fork-tailed Swift	*Apus pacificus*	-	Mi
Birds	Freckled Duck	*Stictonetta naevosa*	V	-
Birds	Gang-gang Cockatoo	*Callocephalon fimbriatum*	V	-
Birds	Glossy Ibis	*Plegadis falcinellus*	-	Mi
Birds	Great Egret, White Egret	*Ardea alba*	-	Mi
Birds	Hooded Robin	*Melanodryas cucullata cucullata*	V	-
Birds	Little Curlew, Little Whimbrel	*Numenius minutus*	-	Mi
Birds	Little Eagle	*Hieraaetus morphnoides*	V	

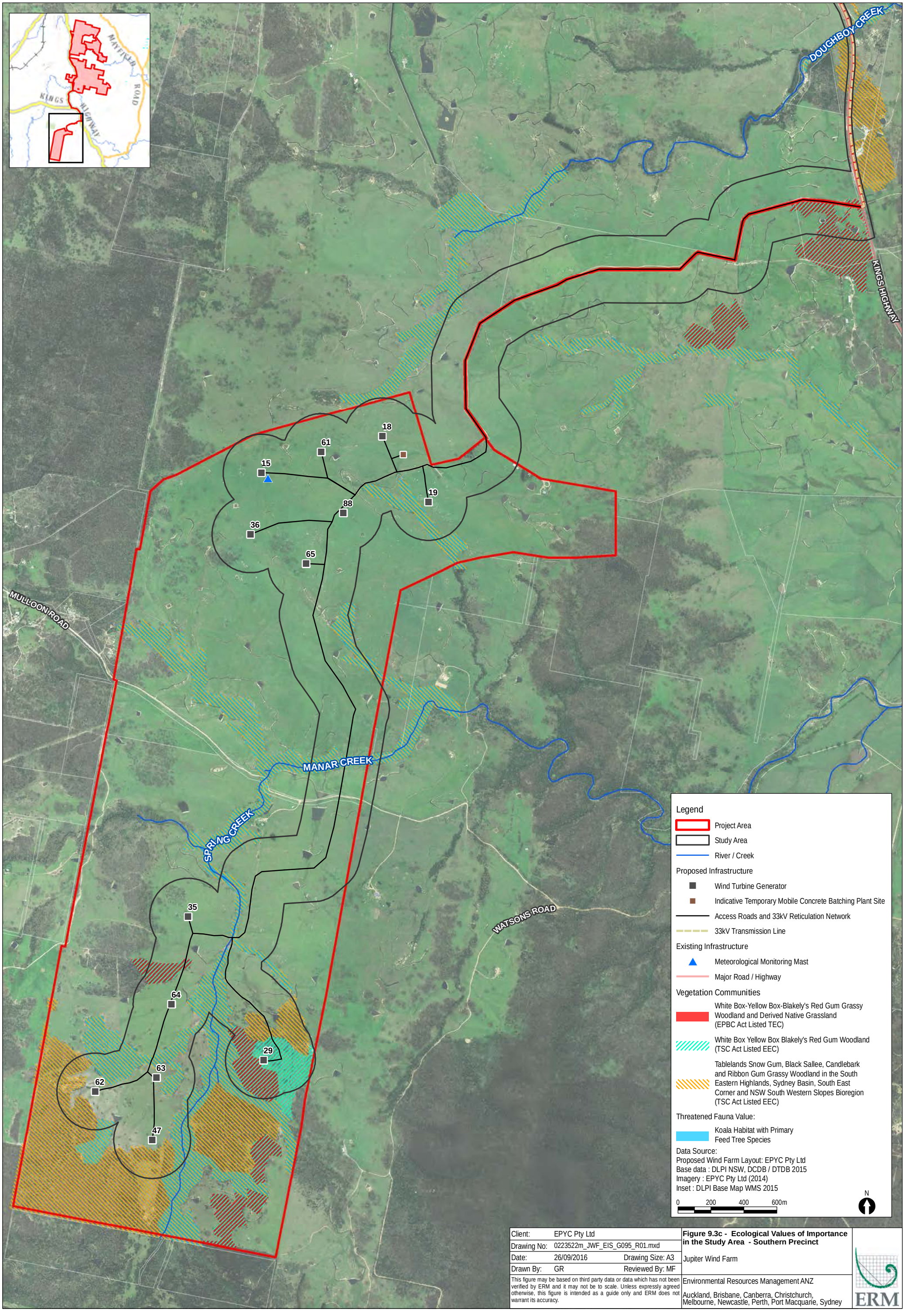
Species group	Common Name	Species Name	TSC Act Status	EPBC Act Status
Birds	Marsh Sandpiper, Little Greenshank	*Tringa stagnatilis*	-	Mi
Birds	Pacific Golden Plover	*Pluvialis fulva*	-	Mi
Birds	Pectoral Sandpiper	*Calidris melanotos*	-	Mi
Birds	Pink Robin	*Petroica rodinogaster*	V	-
Birds	Powerful Owl	*Ninox strenua*	V	-
Birds	Rainbow Bee-eater	*Merops ornatus*	-	Mi
Birds	Red-necked Stint	*Calidris ruficollis*	-	Mi
Birds	Satin Flycatcher	*Myiagra cyanoleuca*	-	Mi
Birds	Sharp-tailed Sandpiper	*Calidris acuminate*	-	Mi
Birds	Swift Parrot	*Lathamus discolour*	E	E, Ma
Birds	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	-	Mi
Birds	White-winged Black Tern	*Chlidonias leucopterus*	-	Mi
Flora	Austral Toadflax	*Thesium austral*	V	V
Flora	Basalt Pepper-cress	*Lepidium hyssopifolium*	E	E
Flora	Black Gum	*Eucalyptus aggregate*	V	-
Flora	Few-seeded Bossiaea	*Bossiaea oligosperma*	V	V
Flora	Matted Bush-pea	*Pultenaea pedunculata*	E	-
Flora	Pale Pomaderris	*Pomaderris pallida*	V	V
Mammals	Eastern False Pipistrelle	*Eastern False Pipistrelle*	V	
Mammals	Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V
Mammals	Koala	*Phascolarctos cinereus*	V	V
Mammals	Southern Myotis	*Myotis macropus*	V	-
Mammals	Spot-tailed Quoll, Spotted-tail Quoll	*Dasyurus maculatus maculatus*	V	E
Mammals	Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	V	-
Reptiles	Little Whip Snake	*Suta flagellum*	V	-
Reptiles	Rosenberg's Goanna	*Varanus rosenbergi*	V	-

TSC Act Status and EPBC Act Status: V – Vulnerable, E – Endangered, CE – Critically Endangered, Mi – Migratory, Ma – Marine, EEC – Endangered Ecological Community


LAKEVIEW ROAD
BRAIDWOOD ROAD
MOUNT FAIRY ROAD
HAZELDELL ROAD
BORO ROAD
BORO
MULLENDALE CREEK
BORO CREEK
LIMESTONE CREEK
TARAGO
MAYFIELD ROAD
KINGS HIGHWAY
25
77
33
42
49
21
16
23
5
1
50
79
34
7
22
74
81
78
48
41
76
43
13
51
80
12
52
27
53
73
44
75
87
4
6
32
20
28
8
82
59
72
83
54
10
38
70
31
Legend
Project Area
Study Area
River / Creek
Proposed Infrastructure
Wind Turbine Generator
Indicative Temporary Mobile Concrete Batching Plant Site
Access Roads and 33kV Reticulation Network
33kV Transmission Line
Substation / Operations Building Area
Existing Infrastructure
Meteorological Monitoring Mast
330kV Transmission Line
Vegetation Communities
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act Listed TEC)
White Box Yellow Box Blakely's Red Gum Woodland (TSC Act Listed EEC)
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion (TSC Act Listed EEC)
Threatened Flora Value (Observed):
Diuris aequalis
Threatened Flora Value (Potential):
Diuris aequalis
Threatened Fauna Value:
Koala Habitat with Primary Feed Tree Species
Glossy Black-cockatoo Habitat with Foraging Signs
Data Source:
Proposed Wind Farm Layout: EPYC Pty Ltd
Base data : DLPI NSW, DCDB / DTDB 2015
Imagery : EPYC Pty Ltd (2014)
Inset : DLPI Base Map WMS 2015
N
0 200 400 600m
Client: EPYC Pty Ltd
Drawing No: 0223522m_JWF_EIS_G093_R01.mxd
Date: 26/09/2016 Drawing Size: A3
Drawn By: GR Reviewed By: MF
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
Figure 9.3a - Ecological Values of Importance in the Study Area - Northern Precinct (Part A)
Jupiter Wind Farm
Environmental Resources Management ANZ
Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney
ERM



Client:	EPYC Pty Ltd		**Figure 9.3b - Ecological Values of Importance in the Study Area - Northern Precinct (Part B)**
Drawing No:	0223522m_JWF_EIS_G094_R01.mxd		Jupiter Wind Farm
Date:	26/09/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: MF	
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.			Environmental Resources Management ANZ Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney



Client:	EPYC Pty Ltd	
Drawing No:	0223522m_JWF_EIS_G095_R01.mxd	
Date:	26/09/2016	Drawing Size: A3
Drawn By:	GR	Reviewed By: MF

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

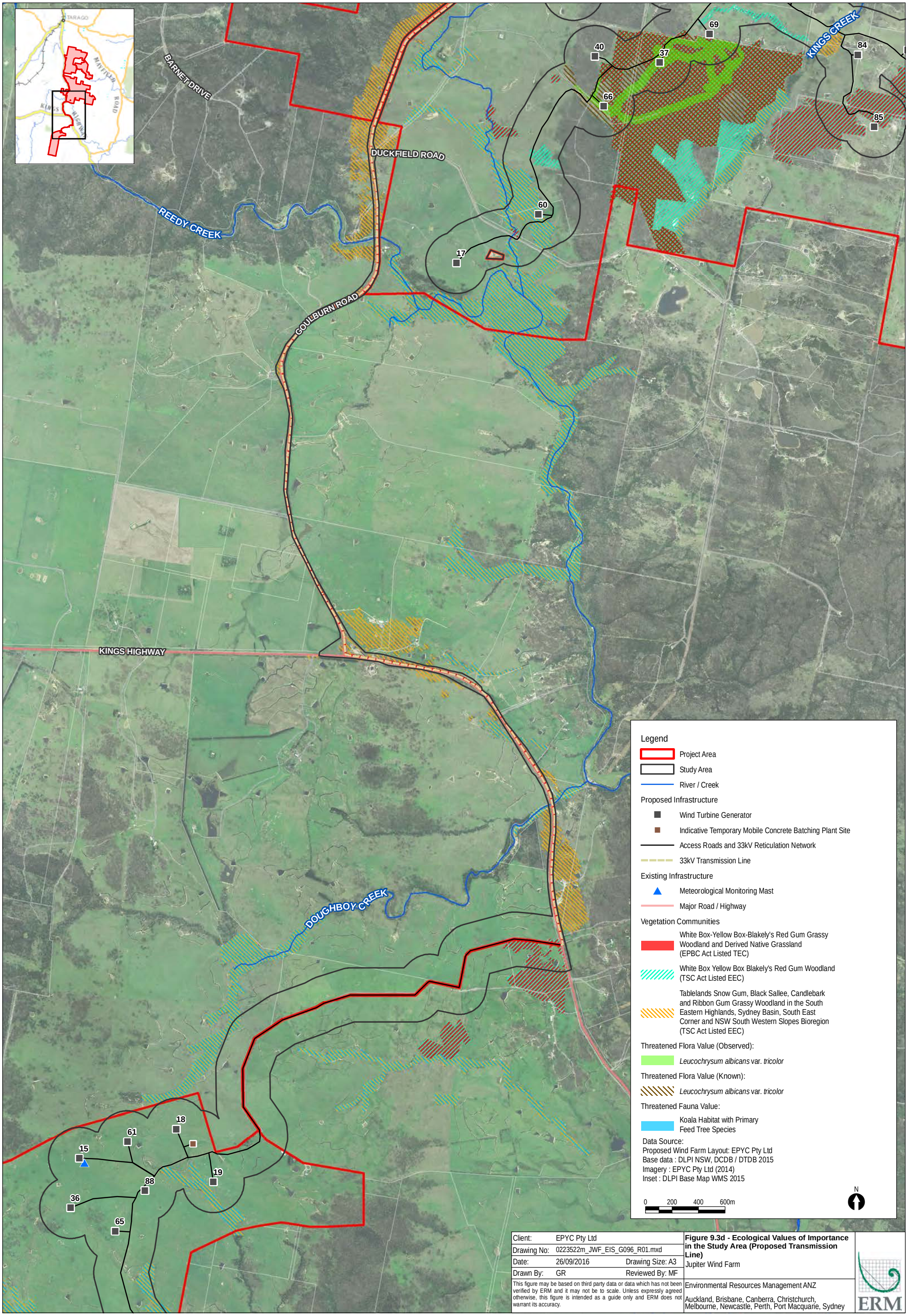
Figure 9.3c - Ecological Values of Importance in the Study Area - Southern Precinct

Jupiter Wind Farm

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM



Client:	EPYC Pty Ltd		**Figure 9.3d - Ecological Values of Importance in the Study Area (Proposed Transmission Line)** Jupiter Wind Farm
Drawing No:	0223522m_JWF_EIS_G096_R01.mxd		
Date:	26/09/2016	Drawing Size: A3	
Drawn By:	GR	Reviewed By: MF	
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.			Environmental Resources Management ANZ Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

9.3 Assessment of Impacts

A large amount of design effort by EPYC was devoted to avoidance of ecological values, which was achieved through an iterative approach, incorporating refinement to the Project layout during the ecological investigation period. A detailed description of avoidance of ecological values achieved through design alterations is detailed in *Chapter 5*. This section quantifies the direct residual impacts that are anticipated to occur as a result of the Project, following consideration of the avoidance and mitigation measures to be implemented for the Project (refer to *Section 9.4*). A detailed assessment of the impacts of the Project is provided in Section 7 of *Annex D*.

9.3.1 Impacts to Habitat

Native Vegetation Removal

Removal of native vegetation, which provides habitat for native flora and fauna, will be required for the construction of the Project. Of the 86.27 ha of clearing required for the Development Footprint, 49.09 ha is native vegetation and 37.18 ha is non-native vegetation. The area of removal proposed for each Vegetation Zone is shown in *Table 9.3*.

Threatened and Endangered Ecological Community Loss

Vegetation clearance will remove areas of Threatened Ecological Communities (TEC) (EPBC Act-listed) and Endangered Ecological Communities (EECs) (TSC Act-listed). The areas proposed for removal within the Development Footprint are:

- 1.63 ha of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act Listed TEC);
- 2.19 ha of White Box Yellow Box Blakely's Red Gum Woodland (TSC Act Listed EEC); and
- 4.70 ha of Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion (TSC Act Listed TEC).

Table 9.3 Areas of Each Native Vegetation Zone in the Study Area and to be Cleared Within the Development Footprint

PCT	Vegetation Zone ID	Equivalent EEC	Equivalent TEC	Study Area (ha)	Area to be Cleared Within the Development Footprint (ha)	Percentage of area in Study Area that is within Development Footprint
Apple Box - Candlebark - Snow Gum shrubby open forest on valley floors, southern South Eastern Highlands Bioregion	650_M-G_L	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		2.08	0.00	0.00
	650_M-G_M	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		19.05	0.32	1.70
	650_M-G_P	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		0.08	0.00	0.00
	650_M-G_S	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		0.55	0.00	0.00
	650_M-G_W	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		1.22	0.06	5.23
Black Sallee - Tussock Grass open woodland of the South Eastern Highlands Bioregion	680_M-G_L	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		0.09	0.00	0.00
	680_M-G_M	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		5.69	3.39	59.55
	680_M-G_P	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		0.18	0.05	29.71
	680_M-G_S	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		1.66	0.12	7.38
	680_M-G_W	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		4.99	0.15	2.94
Burgan - Pink Kunzea derived tall shrubland, South Eastern Highlands Bioregion and South East Corner Bioregion Derived grasslands of the South Eastern Highlands Bioregion and South East Corner Bioregion Inland Scribbly Gum - Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion	757_M-G_M			5.18	0.29	5.54
	797_M-G_L			158.45	4.59	2.90
	888_M-G_G			6.31	0.00	0.00
	888_M-G_L			104.27	5.47	5.25
	888_M-G_M			81.20	0.67	0.83
	888_M-G_P			4.91	0.36	7.26
Burgan - Pink Kunzea derived tall shrubland, South Eastern Highlands Bioregion and South East Corner Bioregion Derived grasslands of the South Eastern Highlands Bioregion and South East Corner Bioregion	757_M-G_M			5.18	0.29	5.54
	797_M-G_L			158.45	4.59	2.90
Inland Scribbly Gum - Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion	888_M-G_G			6.31	0.00	0.00
Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion	1093_L			515.86	21.78	4.22
	1093_M-G_G			56.31	0.41	0.73
	1093_M-G_L			38.86	1.84	4.74
	1093_M-G_M			79.82	0.78	0.97
	1093_M-G_P			136.52	5.06	3.71
	1093_M-G_S			0.93	0.11	12.41
	1093_M-G_W			0.18	0.03	16.96
Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	1100_M-G_G	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		0.61	0.00	0.00
	1100_M-G_M	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		47.61	0.58	1.22
	1100_M-G_W	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregion		0.14	0.02	14.31

PCT	Vegetation Zone ID	Equivalent EEC	Equivalent TEC	Study Area (ha)	Area to be Cleared Within the Development Footprint (ha)	Percentage of area in Study Area that is within Development Footprint
River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	1110_M-G_L			15.78	0.08	0.48
Silvertop Ash - Blue-leaved Stringybark shrubby open forest on ridges, north east South Eastern Highlands Bioregion	1150_M-G_G			46.68	0.07	0.16
	1150_M-G_M			1.04	0.00	0.00
Silvertop Ash - Narrow-leaved Peppermint open forest on ridges of the eastern tableland, South Eastern Highlands Bioregion and South East Corner Bioregion	1155_M-G_G			0.34	0.00	0.00
	1155_M-G_L			12.59	0.48	3.80
	1155_M-G_M			0.96	0.00	0.00
	1155_M-G_P			3.01	0.03	0.99
Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion	1334_M-G_G	White Box Yellow Box Blakely's Red Gum Woodland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	31.57	0.91	2.89
	1334_M-G_L	White Box Yellow Box Blakely's Red Gum Woodland		0.16	0.00	0.00
	1334_M-G_M	White Box Yellow Box Blakely's Red Gum Woodland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	43.37	0.72	1.66
River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	1110_M-G_L			15.78	0.08	0.48
Planted Native Vegetation	NA			1.98	0.15	7.51
Total EPBC Act Listed EEC				*74.94*	*1.63*	*2.18*
Total TSC Act Listed TEC				*173.15*	*6.89*	*3.98*
Total Native Vegetation				**1444.33**	**49.09**	**3.40**

1. This is a combination of the PCT Code and condition class as:
   M-G_G = Mod-Good_Good
   M-G_M = Mod-Good_Mod
   M-G_W = Mod-Good_Weedy
   M-G_S = Mod-Good_Shrubby
   M-G_P = Mod-Good_Poor
   M-G_L = Mod-Good_Low
   L = Low

Threatened Flora Loss

Of the two threatened flora identified in the Study Area (Buttercup Doubletail and Hoary Sunray), only the Hoary Sunray occurs in the Development Footprint. The known area of occurrence in the PA is a polygon measuring 125 ha in area. Using an estimated average density of 200 individuals per hectare (refer to Section 5.5.1 of *Annex D*) a total population of approximately 25,000 individuals is estimated to occur within the PA. Of this total population, it is estimated there are approximately 8,594 individuals within the Study Area (42.97 ha of known habitat) and approximately 342 individuals within the Development Footprint (1.71 ha). Therefore, it is estimated that the Project will remove 3.98% of the population in the Study Area and 1.37% of the estimated local population.

Habitat Loss

The ongoing revisions of the Project infrastructure layouts to avoid ecologically sensitive areas have assisted in minimising impacts to fauna habitat (refer *Chapter 5*). However, some habitat loss will be unavoidable for the Project. A summary of the areas of each fauna habitat type within the Study Area and Development Footprint are provided in *Table 9.4* and habitat loss for threatened flora and fauna species are provided in *Table 9.5, Table 9.6* and *Table 9.7*.

This is a worst case scenario as each species is unlikely to occur through the whole habitat in the Study Area and it is likely that much smaller areas than described here will be utilised by each species or may represent optimal habitat for the species. Further, it is noted that woodland patches are frequent throughout the wider PA and have similar habitat value to those in the Study Area. The impacted area is not unique within the locality and the most important areas of habitat have been avoided through iterative design modifications.

Table 9.4 Impacts to Fauna Habitat

Habitat Type	Corresponding Vegetation Zone ID	Study Area (ha)	Development Footprint (ha)	Percentage of habitat type in Study Area also within Development Footprint
Native Habitat Types:				
Native Grassland	797_M-G_L	674.31	26.37	3.91
	888_M-G_L			
	1093_M-G_L			
	1334_L			
Native Grassland with Scattered Native Trees	650_M-G_L	332.15	13.92	4.19
	650_M-G_P			
	680_M-G_L			
	680_M-G_P			
	888_M-G_L			
	888_M-G_P			
	1093_M-G_L			
	1093_M-G_P			
	1100_M-G_L			
	1100_M-G_P			
	1110_M-G_L			
	1155_M-G_L			
	1155_M-G_P			
	1334_M-G_P			
Native Shrubland	Planted Native Vegetation	10.30	0.67	6.54
	650_M-G_S6			
	680_M-G_S			
	757_M-G_M			
	1093_M-G_S			
Open Woodland with Native Understory	1334_M-G_G	75.10	1.63	2.17
	1334_M-G_L			
	1334_M-G_M			

Habitat Type	Corresponding Vegetation Zone ID	Study Area (ha)	Development Footprint (ha)	Percentage of habitat type in Study Area also within Development Footprint
Woodland/ Forest	650_M-G_M	352.14	6.49	1.84
	650_M-G_W			
	680_M-G_M			
	680_M-G_W			
	888_M-G_G			
	888_M-G_M			
	1093_M-G_G			
	1093_M-G_M			
	1093_M-G_W			
	1100_M-G_G			
	1100_M-G_M			
	1100_M-G_W			
	1150_M-G_G			
	1150_M-G_M			
	1155_M-G_G			
	1155_M-G_M			
Non-native Habitat Types:				
Non-native Pasture (includes non-native pasture with scattered native trees)	NA	790.29	34.34	4.35
Non-native Forest	NA	8.58	0.20	2.36
Other Land Cover:				
Hardstand	NA	24.81	2.58	10.40
Dams	NA	1.35	0.07	5.02
Subtotal	*Native Habitat Types*	*1444.00*	*49.09*	*3.40*
Subtotal	*Non-native Habitat Types*	*798.87*	*34.54*	*4.32*
Subtotal	*Other Land Cover*	*26.16*	*2.65*	*10.12*

Table 9.5 Threatened Flora Habitat Proposed to be Removed

Common Name	Species Name	TSC Act	EPBC Act	Potential Habitat			Known Habitat		
				Study Area (ha)	*Development Footprint (ha)*	*Percentage of Habitat in Study Area that is within Development Footprint*	*Study Area (ha)*	*Development Footprint (ha)*	*Percentage of Habitat in Study Area that is within Development Footprint*
Few-Seeded Bossiaea	*Bossiaea oligosperma*	V	V	223.64	1.86	0.83	-	-	-
Buttercup Doubletail	*Diuris aequalis*	E	V	62.62	0.41	0.65	6.11	0.00	0.00
Black Gum	*Eucalyptus aggregata*	V	-	90.66	4.55	5.02	-	-	-
Basalt Pepper-cress	*Lepidium hyssopifolium*	E	E	214.52	6.81	3.17	-	-	-
Hoary Sunray	*Leucochrysum albicans*	-	E	482.41	19.96	4.14	42.97	1.71	3.98
Pale Pomaderris	*Pomaderris pallida*	E	V	223.64	1.86	0.83	-	-	-
Matted Bush-pea	*Pultenaea pedunculata*	E	-	223.64	1.86	0.83	-	-	-
Austral Toadflax	*Thesium australe*	V	V	115.54	6.07	5.25	-	-	-
V = Vulnerable, E = Endangered									

Table 9.6 Habitat impact areas for threatened fauna species known to occur in the PA

Common/Species Name	TSC Act	EPBC Act	Habitat Type						Study Area (ha)	Development Footprint (ha)	Percentage of area in Study Area that is within Development Footprint
			Native Grassland	*Native Grassland with Scattered Native Trees*	*Native Shrubland*	*Open Woodland with Native Understory*	*Woodland/ Forest*	*Dam*			
Birds											
Glossy Black-Cockatoo *Calyptorhynchus lathami*	V	-				S	S, F		427.24	8.12	1.90
Speckled Warbler *Chthonicola sagittata*	V	-				F, S	F, S		427.24	8.12	1.90
Spotted Harrier *Circus assimilis*	V	-		F		F, S	F, S		759.39	22.03	2.90
Varied Sittella *Daphoenositta chrysoptera*	V	-				F, S	F, S		427.24	8.12	1.90
Spotted Harrier *Circus assimilis*	V	-		F		F, S	F, S		759.39	22.03	2.90
Varied Sittella *Daphoenositta chrysoptera*	V	-				F, S	F, S		427.24	8.12	1.90
White-fronted Chat *Epthianura albifrons*	V	-	F						674.31	26.37	3.91
Blue-billed Duck *Oxyura australis*	V	-						F, S	1.35	0.07	5.02
Scarlet Robin *Petroica boodang*	V	-				F, S	F, S		427.24	8.12	1.90
Diamond Firetail *Stagonopleura guttata*	V	-		F		F, S	F, S		759.39	22.03	2.90
Mammals											
Eastern Bentwing Bat *Miniopterus schreibersii oceanensis*	V	-				F, S	F, S		427.24	8.12	1.90
TSC Act Status and EPBC Act Status: V – Vulnerable, E – Endangered, CE – Critically Endangered, Ma – Marine F = Foraging Habitat, S = Sheltering Habitat											

Table 9.7 Habitat impact areas for threatened fauna species with potential to occur in the PA

Common	Species Name	TSC Act	EPBC Act	Habitat Type						Study Area (ha)	Development Footprint (ha)	Percentage of area in Study Area that is within Development Footprint
				Native Grassland	*Native Grassland with Scattered Native Trees*	*Native Shrubland*	*Open Woodland with Native Understory*	*Woodland/ Forest*	*Dam*			
Birds												
Curlew Sandpiper	*Calidris ferruginea*	E	CE, Mi, Ma							0.00	0.00	0.00
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V	-				F, S	F, S		427.24	8.12	1.90
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V	-				F, S	F, S		427.24	8.12	1.90
Black Falcon	*Falco subniger*	V	-		F		F, S	F, S		759.39	22.03	2.90
Little Eagle	*Hieraaetus morphnoides*	V			F		F, S	F, S		759.39	22.03	2.90
Swift Parrot	*Lathamus discolor*	E	E, Ma		F*					89.21	2.19	2.45
Hooded Robin	*Melanodryas cucullata cucullata*	V	-				F, S	F, S		427.24	8.12	1.90
Barking Owl	*Ninox connivens*	V	-				F, S	F, S		427.24	8.12	1.90
Powerful Owl	*Ninox strenua*	V	-				F, S	F, S		427.24	8.12	1.90
Flame Robin	*Petroica phoenicea*	V	Ma				F, S	F, S		427.24	8.12	1.90
Pink Robin	*Petroica rodinogaster*	V	-				F, S	F, S		427.24	8.12	1.90
Freckled Duck	*Stictonetta naevosa*	V	-						F, S	1.35	0.07	5.02
Curlew Sandpiper	*Calidris ferruginea*	E	CE, Mi, Ma							0.00	0.00	0.00
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V	-				F, S	F, S		427.24	8.12	1.90

Common	Species Name	TSC Act	EPBC Act	Habitat Type						Study Area (ha)	Development Footprint (ha)	Percentage of area in Study Area that is within Development Footprint
				Native Grassland	*Native Grassland with Scattered Native Trees*	*Native Shrubland*	*Open Woodland with Native Understory*	*Woodland/ Forest*	*Dam*			
Mammals												
Spot-tailed Quoll, Spotted-tail Quoll	*Dasyurus maculatus maculatus*	V	E				F, S	F, S		427.24	8.12	1.90
Southern Myotis	*Myotis macropus*	V	-				F, S	F, S		427.24	8.12	1.90
Koala	*Phascolarctos cinereus*	V	V				F, S	F, S		427.24	8.12	1.90
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V				F	F		427.24	8.12	1.90
Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	V	-		F		F, S	F, S		759.39	22.03	2.90
Reptiles												
Little Whip Snake	*Suta flagellum*	V	-	F, S	F		F, S	F, S		1433.70	48.40	3.38
Rosenberg's Goanna	*Varanus rosenbergi*	V	-				F, S	F, S		427.24	8.12	1.90

TSC Act Status and EPBC Act Status: V – Vulnerable, E – Endangered, CE – Critically Endangered, Ma – Marine

F = Foraging Habitat, S = Sheltering Habitat

*Potential habitat is a sub-set of this habitat type only.

Habitat Fragmentation

The Development Footprint is located in an agricultural landscape containing poor native habitat connectivity. It is generally described as patches of native woodland separated by large areas of agricultural grassland (both native and non-native). Habitat fragmentation prior to development of this Project is high.

The WTGs and infrastructure have been located to avoid the removal of large tracts of forest or woodland associated with wildlife corridors within the Study Area and locality. The ultimate footprint of the infrastructure will not lead to habitat fragmentation as the footprint will generally be a network of up to 8 m wide linear access roads linking the WTG pads. Each WTG pad is like an 'island' of impact where any habitats adjacent to the pad will remain connected around the pad. The 33 kV transmission line linking the northern and southern precincts is narrow (4 m wide) and is immediately adjacent to the existing road shoulder. The impact will be similar to road widening and vegetation removal to construct the transmission line will not exacerbate habitat fragmentation because the vegetation in the road reserves is already fragmented and the narrow strip of required clearing will allow some vegetation retention within the road reserve adjacent to the cleared area.

Habitat Alienation

Raptors, including the threatened Spotted Harrier, have the potential to be alienated from the habitats immediately surrounding WTGs, although this is not likely to result in any significant impact on the species as they range over wide areas and the habitat within the Study Area is not unique or of particularity high value for the species (refer Section 7.3 of *Annex D*). Alienation may result in a positive outcome by further reducing the risk of rotor strike.

There is potential for microbat species to avoid the WTGs, however the level of avoidance is difficult to determine. If microbat species do exhibit avoidance behaviour this could be considered a positive as it reduces the risk of barotrauma or rotor strike. The alienation of the foraging habitat is not considered significant as the Study Area is unlikely to provide important habitat for a population of bats nor be regionally important habitat (refer Section 7.3 of *Annex D*).

The recommended separation distances from woodland/forest edges to avoid habitat alienation can be calculated for each WTG individually using an equation that involves the WTG dimensions and the characteristics of the habitat features. Setback analyses will be undertaken during detailed design, when specific WTG dimensions and locations are known, with consideration made to avoidable impacts within functional parameters using micrositing (refer to Section 7.1.1 and Section 7.3.1 of *Annex D* for further clarification).

9.3.2 Collision Risk and Barotrauma

Two groups of species are at risk from rotor blade collision: birds and bats, with bats the only group likely to be affected by barotrauma.

Birds

Field survey and desktop analysis did not identify any important bird flight paths occurring across the Study Area and no large aggregations of birds were observed migrating through the Study Area. It is expected that, in the majority of circumstances, birds will take avoiding action or avoid the area where WTGs are present. It is suggested that an avoidance rate of 99% is conservative enough for collision risk assessment (Biosis Research Pty Ltd 2006).

The data collected in this study indicates that the most abundant bird species flying at Rotor Swept Area (RSA) height was the Wedge-tailed Eagle. Other species flying at RSA height include the White-throated Needletail, Australian Raven, and Sulphur Crested Cockatoo. Given that the species recorded flying at RSA height are abundant and have a wide distribution, population scale impacts are not considered likely within the Study Area. The White-throated Needletail is listed as migratory and was recorded in aggregation of up to 100 individuals within the locality (but outside of the Study Area). This species is not expected to have a high risk of rotor strike as it is anticipated to have high avoidance capability based on its very fast, manoeuvrable flight behaviour and small size (compared to large raptors).

The Spotted Harrier, recorded within the PA, typically flies close to the ground while hunting. It is also likely to hunt mainly over the lower lying areas of the Study Area rather than over the top of ridgelines and hilltops, where the WTGs will be located. The highest risk for this species is expected to be when they travel between different foraging areas. Use of thermals and gaining height to travelling distances may put the species at risk. The species was recorded once within the survey period and a low number of birds are likely to be affected. Specific level of avoidance was not found in the literature for this species, however avoidance behaviour has been demonstrated for several other Australian raptors including the Wedge-tailed Eagle (Biosis Research Pty Ltd 2006).

Currently, there is limited research in Australia on the actual rate of mortality of raptors as a result of WTG collision. One study undertaken monitored bird and bat fatalities at two Tasmanian wind farms: Bluff Point Wind Farm, with 38 WTGs, monitored over eight years; and the Studland Bay Wind Farm, with 25 WTGs, monitored over three years (Hull *et al.* 2013). Bird utilisation surveys at these two wind farms recorded the White-bellied Sea Eagle (*Haliaeetus leucogaster*), Swamp Harrier (*Circus approximans*), Brown Falcon (*Falco berigora*), Australian Kestrel (*F. cenchroides*), Peregrine Falcon (*F. peregrinus*) and Australian Hobby (*F. longipennis*). Of these species, three White-bellied Sea Eagles, two Swamp Harriers, and six Brown Falcons were recorded as fatalities throughout the study period across the two windfarms (Hull *et al.* 2013). The findings of this study can be used to gain an understanding of the potential scale of fatalities of raptors as a result of the Project.

There is anticipated to be mortality of birds, especially common species, associated with development of the Project. The number of individuals affected is likely to be low and not involve any significant proportions of any threatened or migratory species. A Bird and Bat Adaptive Management and Monitoring Plan will be prepared prior to construction of the Project and implemented during the operational phase of the Project, which will help quantify its impact and provide a mechanism for adaptive management.

Bats

There are two threatened bat species recorded within the Study Area which may be susceptible to rotor strike and barotrauma due to their habit of flying at RSA height and being highly mobile over large areas. These are the Eastern Bentwing Bat and the Yellow-bellied Sheathtail-bat. One other species, the Grey-headed Flying Fox, has the potential to occasionally occur in the Study Area and is also vulnerable to these risks.

The Eastern Bentwing Bat was recorded flying at height within the Study Area and is most likely to do so when exhibiting directed movement, such as during migrations between coastal overwintering habitats and inland maternity roosts. When foraging, the species is more likely to fly closer to wooded areas, reducing the risk of the rotor impacts. There was no evidence to suggest that significant proportions of the population pass through the Study Area at height and therefore it is anticipated that the impacts will not affect the subspecies population as a whole.

The Yellow-bellied Sheathtail-bat forages for insects in most habitats across its very wide range, and flies high and fast over the forest canopy, but lower in more open country (OEH 2015). This species was recorded flying at height within the Study Area and is likely to be vulnerable to rotor impacts while foraging. As the Study Area does not include unique habitat and similar habitat is widespread in the region, there is no reason to suggest that the Study Area would host a higher concentration of the species than surrounding areas. The number of individuals likely to be affected by the Project is difficult to ascertain due to the lack of knowledge of detailed population sizes and movements of the species within eastern Australia. Post construction monitoring will be vital to assuring that this species is not significantly impacted.

The Grey-headed Flying Fox is at risk from rotor strike as it typically flies between foraging areas at RSA height. The species was not recorded within the PA and no records exist within the locality, with only sub-optimal habitat recorded. The species may not occur within the Study Area or rarely occur on an intermittent basis. Due to the low likelihood of occurrence the collision risk is considered low.

Other threatened bat species, such as the Eastern False Pipistrelle and Southern Myotis, which may occur within the Study Area, have a low risk of rotor strike and barotrauma. These species tend not to fly at height in open areas, preferring to forage under or just above the forest canopy including along riparian corridors. In the unlikely event of rotor strike or barotrauma, a very low number of individuals would be impacted on an occasional basis. No impacts to the local populations are anticipated.

9.3.3 Cumulative Impacts

Chapter 17 contains a description of neighbouring wind farms and detailed discussion of potential cumulative biodiversity impacts resulting from regional wind farm development in the vicinity of the PA, including those resulting from:

- the combined land clearing causing loss of habitat; and
- the combined rotor strike and barotrauma impacts to motile, flying species that could potentially interact with numerous wind farms.

It is considered that the Project's contribution to potential cumulative biodiversity impacts is minimal, as summarised below.

Habitat Loss

The Project will add to the cumulative habitat loss caused by wind farms within the area. In the regional context, the amount of habitat loss is likely to be insignificant owing to the relatively small clearance footprint required for the wind farms and due to the large amount of remaining habitat within the landscape. Furthermore, wind farms are located in predominately cleared areas with areas of high ecological value typically avoided.

In addition to the impact footprint of wind farms, WTGs may also change the movement and behaviour of birds and bats, if they exhibit avoidance of the WTGs. The Project is not directly adjacent to any other wind farm, with a minimum of 6 km between the Project and any other wind farm in the locality (distance between respective Project Area boundaries). If birds and bats demonstrate avoidance behaviour it is most likely to result in alienation from the habitats immediately surrounding WTGs rather than acting over distances that would coincide with corresponding alienation immediately around the WTGs of neighbouring wind farms. Furthermore, there is not anticipated to be any cumulative landscape-scale avoidance of large tracts of habitat caused by this Project as the WTGs of all wind farms combined will not form a continuous length of WTGs. Bird and bat species will be able to move through habitats between the wind farms (ie the individuals would not have to penetrate a continuous length of WTGs to move from one side of the region to the other).

Collision Risk Impacts

Wide ranging and migratory birds and bats have the potential to encounter several wind farms while flying within the immediate locality. Accordingly, the cumulative risk of rotor strike for these species is increased. However, there is no evidence to suggest that any wide ranging species identified within the PA will be attracted to the ecological attributes or habitat of the other wind farms in the locality at a rate higher than that of the surrounding landscape.

The nearest wind farm is approximately 6 km away from the Project (distance between respective Project Area boundaries), which is considered sufficiently distant that it is likely that these wide ranging birds and bats will spend the vast proportion of their lifecycle in areas without WTGs. Therefore the cumulative risks, though present, are considered low. Furthermore, defined migration routes that are used repeatedly (either seasonally or inter-annually) are not common for Australian species. Australian species are more likely to respond to ephemeral resource availability and change movement patterns accordingly. Field observation and data supports this, with a lack of regular, directional movement recorded (refer *Annex D*). Distinct movement pathways through or around the PA were not observed and therefore have not been mapped for the PA or surrounds. There are no known distinct migratory corridors (for birds or bats) between the Project and any of the closest wind farms. Much of the landscape within the locality is cleared with no connecting forests and no connecting valleys that may provide defined flight paths or encourage direct movement of birds and bats between the wind farms. A north-south orientated ridgeline exists west of the PA between Bungendore Road and Braidwood Road, and while birds and bats will fly across the ridgeline, it may act to discourage regular movement between the Project and the closest wind farms, which are located west of that ridge.

Due to the distance between the wind farms and the lack of connecting vegetation, it is considered that the majority of birds and bats recorded within the Study Area will not encounter any of the other neighbouring wind farms. This includes the majority of sedentary and territorial woodland bird species and those species of bat which avoid flying in large open areas, instead using vegetated corridors as flight paths.

Biosis (2006) highlights the difficultly in drawing conclusions about cumulative operational risk. Based on collision risk modelling and population viability analysis, the assessment of significance of cumulative risk from all wind farms operational in Australia at that time (2005) was inconclusive due to variation in site specific factors and poor scientific knowledge of bird populations (Biosis 2006).

It is considered that the potential cumulative biodiversity impacts associated with this Project are insignificant given that there is sufficient separation between adjacent wind farms, and the chance of impacts interacting are expected to be minimal. Nevertheless, it is recommended that the results of operational bird and bat carcass monitoring are pooled to give an idea of the cumulative strike risk. This may highlight any cumulative issues relating to a particular threatened species or migratory species, which may be impacted at several wind farms. The Bird and Bat Adaptive Monitoring Program will attempt to address this uncertainty and provide a mechanism for adaptive management.

9.3.4 Assessments of Significance

The potential impacts of the Project on each threatened matter known to occur within the PA, or assessed as having potential to occur, was assessed using a Project-specific impact assessment process. The residual impacts were then assessed using the 'legislated impact assessment processes' (refer Section 4.4.2 of *Annex D*) in accordance with the guidance provided in the *Threatened Species Assessment Guidelines* (DECC 2007) (refer to Annex E of *Annex D*) and the *Significant Impact Guidelines 1.1* (DoE 2013) (refer to Annex I of *Annex D*). An overview of the results of these assessments is provided in Table 7.8 of *Annex D*. The conclusion of the legislated impact assessment processes was that the Project would not significantly impact on the majority of threatened matters. Two matters are assessed as having likely significant residual impacts, in accordance with the relevant guidelines, based on application of the precautionary principle:

- the Glossy Black-cockatoo was considered as likely to be significantly impacted, as a result of the potential for exclusion from areas of high quality foraging habitat, if the species was to avoid areas habitats immediately surrounding WTGs; and
- removal of 1.63 ha of the EPBC Act-listed community White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland may be considered a significant impact in accordance with the Significant Impact Guidelines 1.1 (DoE 2013a).

9.4 Mitigation Measures

The proposed mitigation measures to minimise the consequences of the Project's residual impacts on biodiversity are listed in *Table 9.8*. These will be captured in a series of management plans to be prepared for the Project prior to commencement of construction and/or operation as required.

Table 9.8 Proposed mitigation measures

Mitigation measures	Impact Targeted	Environmental Outcome	Timing for Implementation	Plan
PRE-CONSTRUCTION				
A pre-clearance protocol will be established and will define survey and management requirements for fauna during clearing.	Fauna mortality	Reduce risk of fauna injury or mortality, or disruption to breeding fauna.	Protocol established prior to vegetation clearing.	Flora and Fauna Management Plan (FFMP) / Construction Environmental Management Plan (CEMP)
Where reasonable and feasible, infrastructure will be microsited to avoid native vegetation, proximity to woodland/forest edges and avoid microhabitat features, such as hollow bearing trees, surface rock and termite mounds.	Habitat Loss	Retention of microhabitat features. Turbine setback guidance considered during detailed design.	During detailed design.	NA - Pre-construction
Where reasonable and feasible, laydown or temporary disturbance areas will be located in already disturbed areas to avoid any unnecessary clearing of native vegetation and habitat.	Habitat Loss	Reduction in area of native vegetation or habitat removed.	During detailed design.	NA - Pre-construction
Watercourse crossings will be designed to avoid blockage of fish passage in accordance with relevant NSW Fisheries Policy and Guidelines (refer *Chapter 14*).	Habitat/Ecological Community Degradation	Minimise impacts to fish movement or aquatic habitats.	During detailed design.	NA - Detailed Design
CONSTRUCTION				
Weed management and biosecurity measures will be implemented, including: • importing only weed-free materials; • importing machinery only when clean; • regular weed checks in and around construction zones; and • controlling existing weed infestations with consideration to potential adverse effects of chemicals or other mechanisms on potentially occurring threatened species.	Habitat/Ecological Community Degradation	Prevention of weed invasion into native vegetation communities and habitats, including threatened ecological communities.	Implementation of plan to occur prior to, and during, construction.	Weed Management Plan

Mitigation measures	Impact Targeted	Environmental Outcome	Timing for Implementation	Plan
An Environmental Compliance Manager or field officer qualified in the handling of fauna will be present on-site during clearing to capture and re-release fauna (where appropriate).	Fauna mortality	Reduce risk of fauna injury or mortality, or disruption to breeding fauna, during vegetation clearing.	During vegetation clearing.	CEMP
Where trenches are to remain open overnight a ramp will be constructed (at 1 in 4 grade) in the trench to allow for fauna escape.	Fauna mortality	Prevent injury or distress to fauna.	Ramps will be constructed as soon as trenches established.	CEMP
Trenches will be regularly checked during construction by the Environmental Compliance Manager to ensure any captured fauna are released according to the Construction Environmental Management Plan.	Fauna mortality	Minimise injury or distress to fauna.	Through the duration that trenches are open.	CEMP
Where reasonable and feasible, moveable microhabitat features, such as large woody debris and surface rocks, will be relocated from the clearing area to adjacent habitat.	Habitat Loss	Retention of microhabitat features.	During vegetation clearing/site preparation.	CEMP
Hollows removed will be replaced with artificial hollows within adjacent suitable habitat at a suitable replacement ratio to be calculated.	Habitat Loss	Maintenance of roosting and nesting habitat features for hollow-roosting birds, bat and arboreal mammals.	Artificial hollows to be replaced within one month of removal.	CEMP
Areas will be reinstated and rehabilitated as soon as no longer required for construction (eg laydown areas following construction).	Habitat Loss	Replacement of removed habitat and native vegetation. Prevention of erosion and sediment runoff from disturbed areas.	Reinstatement to occur within one month of completion of use. Rehabilitation to be monitored as per the Rehabilitation Plan.	CEMP Decommissioning and Rehabilitation Plan
The area to be cleared at the site will be clearly demarcated using flagging or fencing, and mapped on construction plans, to prevent breaches of the construction boundary.	Habitat/Ecological Community Degradation	Avoid unnecessary disturbance to native vegetation and habitats.	Prior to vegetation removal.	CEMP
Appropriate erosion and sediment controls will be defined in the Construction Environmental Management Plan and implemented.	Habitat/Ecological Community Degradation	Reduced erosion, avoiding deposition of sediment to surrounding terrestrial and increased sediment load in aquatic habitats.	Plan prepared prior to construction, and implemented during construction, and until temporary disturbance areas have been reinstated to an erosion-resistant state.	Soil and Water Plan in the CEMP
In-stream habitat features at watercourse crossings, such as rocks, cobbles and woody debris will be left in place or relocated nearby within the same creek system.	Habitat/Ecological Community Degradation	Retention of aquatic habitat features.	Prior to construction of watercourse crossings.	CEMP

Mitigation measures	Impact Targeted	Environmental Outcome	Timing for Implementation	Plan
Appropriate sanitation procedures will be implemented to reduce the risk of introduction of *Phytophthora cinnamomi*. If a risk of *Phytophthora cinnamomi* is suspected, boots, vehicle tyres, tools and machinery will be regularly cleaned of any soil and drenched in a 1% solution of bleach.	Habitat/Ecological Community Degradation	Prevent introduction or spread of *Phytophthora cinnamomi*.	Sanitation procedures to be implemented throughout the construction period.	FFMP
Tree Protection Zones will be established to prevent damage to trees to be retained in close proximity to the Development Footprint.	Habitat/Ecological Community Degradation	Maintain health of retained trees.	Tree Protection Zones to be identified and established prior to construction commencing at that location.	CEMP
Pre-clearance surveys will be undertaken in areas of potential habitat and a chance-finds procedure will be developed to outline the appropriate actions if a threatened flora species population is identified.	Threatened Flora Species Removal	Prevent inadvertent clearing of unidentified threatened flora.	Pre-clearance surveys to be undertaken at least two weeks prior to clearing.	CEMP
OPERATION				
A Bird and Bat Adaptive Management and Monitoring Program will be developed, which is to include details of techniques for monitoring, frequency of monitoring, adaptive management provisions; and reporting requirements.	Fauna mortality	Identify bird and bat mortalities to understand impact of the project, add to body of knowledge of collision impacts in an Australian context, and identify corrective actions.	The management and monitoring program will be prepared prior to operation, and implemented throughout the operation period.	Bird and Bat Adaptive Management and Monitoring Program
DECOMMISSIONING				
Following completion of the Project, disturbed areas will be rehabilitated in accordance with the Jupiter Wind Farm Decommissioning and Rehabilitation Plan (refer *Annex O*).	Habitat Loss	Replace lost habitat in areas no longer required for use.	Implemented following completion of the project.	Decommissioning and Rehabilitation Plan (existing plan)
WHOLE OF PROJECT				
Vehicle speed limits of a maximum 60 km/hour will be introduced, to reduce the risk of vehicle strike.	Fauna mortality	Reduced risk of fauna mortality or injury due to vehicle strike.	Implemented for vehicle access throughout the Project.	CEMP/Operational Environmental Management Plan (OEMP)
Vehicles will remain on formed roads designed specifically for the purposes of the wind farm construction and operation where possible;	Habitat/Ecological Community Degradation	Avoid unnecessary disturbance to native vegetation and habitats.	Implemented for vehicle access throughout the Project.	CEMP/OEMP

9.5 Summary

The infrastructure layout used as the basis of the impact assessment was developed through an iterative design process avoiding biodiversity values of importance throughout the assessment process. Potential residual impacts to threatened matters, as well as general biodiversity values, were identified, and mitigation measures have been developed to minimise potential impacts. In consideration of the implementation of mitigation measures, the Project is considered unlikely to have a significant impact on the majority of threatened matters known, or considered to have potential to occur, within the PA.

The conclusion of the legislated impact assessment processes was that the Project would not significantly impact on the majority of threatened matters. Two matters are assessed as having likely significant residual impacts, in accordance with the relevant guidelines, based on application of the precautionary principle:

- the Glossy Black-cockatoo was considered as likely to be significantly impacted, as a result of the potential for exclusion from areas of high quality foraging habitat, if the species was to avoid areas habitats immediately surrounding WTGs; and
- removal of 1.63 ha of the EPBC Act-listed community White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland, which may be considered a significant impact in accordance with the Significant Impact Guidelines 1.1 (DoE 2013).

An offset package will be prepared when the Development Footprint is finalised. The offset will be determined in accordance with the *NSW Biodiversity Offsets Policy for Major Projects* which includes a range of options available to proponents. The analysis will include analysis of options to achieve the required offset, not limited to use of the BioBanking scheme. The BBAM was used as a metric to quantify the biodiversity impacts using the indicative Development Footprint. The result of the preliminary calculation is that the Project will require 1430 ecosystem credits and three species will require species credits: the fauna species Speckled Warbler (*Chthonicola sagittata*) and the Eastern Bentwing-bat (*Miniopterus schreibersii subsp. oceanensis*); and the flora species Hoary Sunray (*Leucochrysum albicans subsp. albicans var. tricolor*).

9.6 References

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