The Plains Wind Farm

Scoping Report

10 November 2022

Project No.: 0606253

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Signature Page

10 November 2022

The Plains Wind Farm

Scoping Report

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Acknowledgement of Country

ENGIE Australia and New Zealand acknowledge the Traditional Custodians of all of these lands and waters upon which we work, live and play.

We particularly acknowledge the Wiradjuri, Wemba-Wemba and Nari-Nari peoples who are the Traditional Custodians of the lands proposed for The Plains Renewable Energy Park. We recognise that for many thousands of years, the Traditional Custodians of this Country cared for and lived harmoniously with this place, and we pay our respects to Elders past, present and emerging.

ENGIE is committed to a just, equitable and reconciled Australia and recognise that we all have a role to play in achieving this vision.

The Artwork

One of Hay's local First Nations artists, Emma Johnston of Wiradjuri Country, celebrates a connection to culture, Country and the wind in this piece titled '*Blue Winds*.'

"*Blue Winds* represents the cool breeze that comes from the skies, the different shades of blue create a cold tone feeling of comfort and peace. Using different sized dots to create dimension and level to this piece. White shows the wind and the blue represents the cold feeling."
– Emma Johnston, artist

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Acronyms and Abbreviations

Name	Description
ABS	Australian Bureau of Statistics
AHIMS	Aboriginal Heritage Information Management System
ASL	Above sea level
AWA	Australian Wind Alliance
BC Act	Biodiversity Conservation Act 2016
BESS	Battery Energy Storage System
CCC	Community Consultative Committee
CEF	Community Enhancement Fund
CSP	Hay Shire Council Community Strategic Plan 2017-2027
CSSS	Hay Shire Council Community and Settlement Sustainability Strategy 2012
DAWE	Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCP	Development Control Plan
DPE	Department of Planning and Environment (formerly Department of Planning, Industry and Environment, DPIE)
DPIE	Department of Planning, Industry and Environment (now Department of Planning and Environment, DPE)
EEAP	Energy Efficiency Action Plan
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
ERM	Environmental Resources Management Australia
ESD	Ecological Sustainable Development
GHG	Greenhouse gas
GWh	Gigawatt hours
ISP	Integrated System Plan
LEP	Local Environmental Plan
LGA	Local Government Area
LGC	Large-scale Generation Certificate
LRET	Large-scale Renewable Energy Target
LSPS	Hay Shire Council Local Strategic Planning Statement 2020
MNES	Matters of National Environmental Significance
MW	Megawatt
NEM	National Electricity Market
NSW	New South Wales
RAV	Restricted Access Vehicle

Name	Description
REAP	NSW Renewable Energy Action Plan
RET	Renewable Energy Target
REZ	Renewable Energy Zone
RMRP	Riverina Murray Regional Plan 2036
RNE	Register of the National Estate
SA1	ABS Statistical Area Level 1 dataset
SEARs	Secretary's Environmental Assessment Requirements
SEIFA	ABS Socio-Economic Indexes for Areas
SEC Strategy	Stakeholder Engagement & Consultation Strategy
SEED	Sharing and Enabling Environmental Data
SEPP	State Environmental Planning Policy
SIA	Social Impact Assessment
SSD	State Significant Development
STE	State and Territory
TEC	Threatened Ecological Community
UCLs	ABS Urban Centres and Localities dataset
WHL	World Heritage List
ZVI	Zone of Visual Influence

Glossary

Term	Description
dBA	dBA denotes a single number sound pressure level that includes a frequency weighting ("A-weighting") to reflect the subjective loudness of the sound level. The frequency of a sound affects its perceived loudness. Human hearing is less sensitive at low and very high frequencies, and so the A-weighting is used to account for this effect. An A-weighted decibel level is written as dBA.
L_{90}	The noise level exceeded for 90 per cent of the time and is approximately the average of the minimum noise levels. The L90 level is often referred to as the "background" noise level and is commonly used as a basis for determining noise criteria for assessment purposes.
L_{eq}	The 'equivalent continuous sound level', Leq, is used to describe the level of a time-varying sound or vibration measurement. Leq is often used as the "average" level for a measurement where the level is fluctuating over time. Mathematically, it is the energy-average level over a period of time (i.e. the constant sound level that contains the equivalent sound energy as the measured level). When the dBA weighting is applied, the level is denoted dB LAeq.
Project Area	The term Project Area refers to all affected lots where the Project may be located.
the Project	In this report, the Project refers to the proposal by the proponent (ENGIE) to construct and operate The Plains Wind Farm as described in this Scoping report.
the Proponent	ENGIE
Subject Land	The biodiversity study area targeted during the ERM field surveys, defined as a 100m buffer to turbines, and 50m to all remaining project infrastructure, including access tracks, overhead transmission line, substation and crane hard stands. It is the area in which Stage 1 of the BAM has been applied.

1. INTRODUCTION

ENGIE (The Proponent) proposes to construct and operate The Plains Wind Farm (the Project) as part of the Plains Renewable Energy Park Project, a renewable energy development located south of Hay in the Riverina Murray region of New South Wales (NSW). The Project is a proposed wind farm that will include up to 226 wind turbines with a total capacity of up to approximately 1,800 MW. The Proponent is seeking State Significant Development (SSD) Consent for the Project under Division 4.7, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by the Proponent to prepare a Scoping Report for the Project as a first step in the SSD consent process. The Scoping Report supports an application to the Secretary of the NSW Department of Planning and Environment (DPE) for Secretary's Environmental Assessment Requirements (SEARs). The SEARs will guide the preparation of an Environmental Impact Statement (EIS) for the Project as part of a broader Development Application (DA).

1.1 Proponent

The Proponent for The Plains Renewable Energy Park Project is ENGIE, a French multinational organisation that specialises in the development, operation and maintenance of large-scale assets, predominantly focusing on wind, solar and industrial-scale battery storage. The organisation aims to contribute to the transition to a carbon-neutral economy by providing innovative, sustainable energy solutions to households, businesses, communities and cities.

ENGIE operates in over 70 countries worldwide, which includes 1,800 staff in 30 locations across Australia and New Zealand. ENGIE's Australian operations include a 2GW development pipeline of wind, solar, batteries and hydrogen, as well as over 1GW of operating plant across gas and wind generation.

ENGIE have been operating in Australia for 25 years and have recently announced the construction of Australia's largest private-owned battery, the 150MW Hazelwood Battery, at the old Hazelwood mine site. ENGIE have identified targets for 2030 to have 80 GW of installed renewables capacity globally and achieve 45 Mt CO_2 equivalent avoided by clients per year.

The development of utility scale renewable energy in Australia is a focus for ENGIE and we are constantly building our asset development team to ensure quality, well communicated projects that benefit communities and regions.

The Australian Business Number (ABN) and address of International Power (Australia) Pty Limited

(trading as ENGIE ANZ) are listed below:

- **ABN:** 59 092 560 793
- **Address:** Level 23, 2 Southbank Boulevard, Southbank VIC 3006.

1.2 Project Overview

ENGIE proposes to develop The Plains Wind Farm as part of The Plains Renewable Energy Park. The Project is located near the town of Hay, in the Riverina Murray Region of NSW. The Project Area extends across an area of approximately 58,786 hectares and is situated on Mungadal Station and neighbouring properties to the east and west of the Cobb Highway. The regional context of the Project Area is identified in **Figure 1-1.**

The Project started with a concept layout of 240 turbines, after engagements with neighbours within 10km, 6 additional landowners have been included as host landowners in this concept layout with 41 turbines removed as a result of neighbour and biodiversity concerns. The proposed wind farm will consist of up to 226 wind turbine generators (WTGs) after consultation with boundary neighbours identified opportunity for 6 additional landowners to host infrastructure.

The project has an estimated maximum installed capacity of up to approximately 1,800 MW. The wind turbines will have a maximum hub height of 180 m and tip height of up to 280 m.

In addition, the Project will include the following Project infrastructure and associated works:

- One (1) Operations and Maintenance Building;
- One (1) primary 330 kV substation including a control room and switchyard to facilitate connection to the National Electricity Market (NEM). Includes transformers, voltage controls, storage units and potentially power quality controls;
- At least two (2) 132 kV collector substations including a control room within each, located at selected locations within the wind farm. Collector groups will be connected with predominately 33kV underground cabling;
- Up to six (6) permanent Meteorological Masts;
- High-voltage overhead lines connecting collector groups, main substation and connection to the NEM infrastructure;
- A construction compound and temporary construction infrastructure including concrete batching facilities;
- Electrical connections between wind turbines and site substations. The grid (a tee-connection within the Project Boundary is assumed), which will primarily be underground though may include overhead lines;
- Internal access tracks and upgrades to existing access roads where required;
- Upgrades to existing minor roads along the haulage route to the Project Area;
- Wind turbine hardstands;
- Installing maintenance and environmental managements processes and equipment;
- On-site quarries, security fencing and landscaping;
- Ancillary activities including gravel pits, water sourcing, visual screening (as required); and
- Temporary workers accommodation.

The broader Plains Renewable Energy Park project also includes a proposed 400 MWn (ac)/500 MWp (dc) solar farm and Battery Energy Storage System (BESS) with a capacity of up to 400 MW located in the south of the Project Area. The Plains Solar Farm and BESS is subject to a separate SSD application, however it may share ancillary infrastructure to be constructed and operated collectively under Plains Renewable Energy Park Project.

1.3 Project Objectives

The objectives of the Project are to:

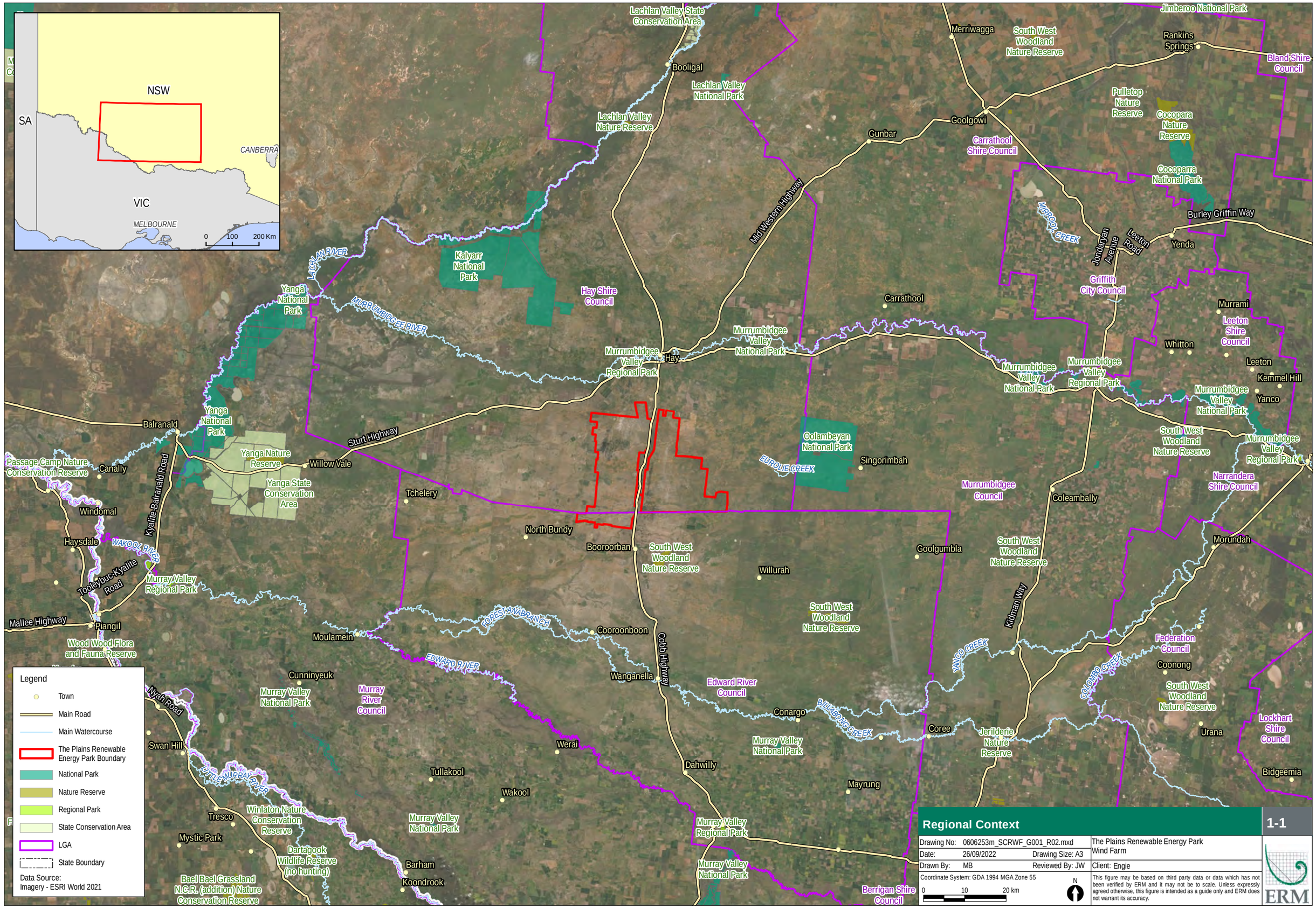
- Provide a source of renewable energy to supplement NSW and National energy requirements and assist in reducing greenhouse gas (GHG) emissions;
- Contribute to the additional generating capacity required to meet the growing energy demand in NSW and the generation shortfalls predicted as coal fired power stations reach the end of their operational lives;
- Assist in providing network stability and reliability through battery storage;
- Contribute to NSW and Commonwealth targets for renewable energy;
- Provide both direct and indirect employment opportunities during construction and operation;
- Provide additional income streams for associated landholders;

- Provide broader financial benefits to the community through the community enhancement fund and neighbour benefits;
- Liaise and work with the community and all potentially affected stakeholders in the identification, mitigation and/or monitoring of any potential environmental effects;
- Ensure quality, safety and environmental standards are maintained;
- Recycle and reuse materials where practical and economically feasible; and
- Minimise all potential adverse environmental impacts.

1.4 Purpose of this Report

This Scoping Report supports an application for SEARs which will guide the development of the EIS to support a future SSD application under Part 4 of the EP&A Act. The Scoping Report has been prepared in accordance with the following guidelines:

- State Significant Development Guidelines - Preparing a Scoping Report: Appendix A to the State Significant Development Guidelines (DPIE, 2021a) (Scoping Report Guidelines);
- Social Impact Assessment Guideline for State Significant Projects (DPIE, 2021b);
- Cumulative Impact Assessment Guidelines for State Significant Projects (DPIE, 2021c);
- Undertaking Engagement Guidelines for State Significant Projects (DPIE, 2021d);
- Wind Energy Guideline for State Significant Wind Energy Development (DPIE, 2016a);
- Wind Energy: Visual Assessment Bulletin for State Significant Wind Energy Development (DPIE, 2016b); and
- Wind Energy: Noise Assessment Bulletin for State Significant Wind Energy Development (DPIE, 2016c).



Regional Context

1-1

Drawing No:	0606253m_SCRWF_G001_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 10 20 km

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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.

ERM

2. STRATEGIC CONTEXT

2.1 Site Setting and Features

2.1.1 Regional Context

The Project Area is situated within the rural locality of Hay within the Riverina Murray Region of NSW, approximately 720 km west of Sydney. It is located south of the Hay township and within two separate Local Government Areas (LGA):

- Hay Shire LGA; and
- Edward River LGA.

The key land uses within the region are centred on agriculture and food production, and its economy is reliant on tourism, agriculture and associated industries (DPE, 2017).

Nearby Towns and Population Centres

The closest population centre is the township of Hay, NSW, which is located immediately northeast of the Project Area with a population of 2,300 (ABS, 2021).

Other key towns located near the Project Area include:

- Coleambally – 80 km east (population 1,152);
- Balranald, NSW – 85 km west (population 1,240);
- Jerilderie – 85 km southwest (population 922); and
- Darlington Point – 95 km east (population 1,030).

Project EnergyConnect and the South-West Renewable Energy Zone

The southern portions of the Project Area are situated within the EnergyConnect corridor, which is a proposed 330 kV transmission line between South Australia and New South Wales with a total length of 900 km. The NSW component is being undertaken in two stages. The Western Section, which will connect the NSW and SA transmission networks, received state and federal planning approval in late 2021. The second stage, which connects the Buronga and Wagga Wagga substations, was approved in September 2022.

The Project Area is also located within the boundaries of the proposed South-West Renewable Energy Zone (REZ), which is being developed in the areas surrounding Hay in the South-West region of NSW (Energy NSW, 2021). The South-West REZ was chosen to be located in this region due to:

- The abundance of renewable energy resources;
- The proximity of the area to Project EnergyConnect;
- A strong pipeline of proposed renewable energy projects; and
- The relative compatibility of land uses within the region.

The South West REZ will be formally declared in 2022.

Nearby Renewable Energy and Related Projects

There are a number of existing or proposed renewable energy projects located in close proximity to the Project Area, which are listed in **Table 2-1** below. There is a high concentration of renewable energy projects within the region due to its location within the proposed South-West REZ and EnergyConnect corridor. The locations of the South-West REZ, EnergyConnect corridor, and nearby renewable energy projects are displayed in Figure 2-1.

Table 2-1 Nearby Renewable Energy and Related Projects

Project	Developer / Operator	Energy	Indicative Scale	Proximity to Project*	Status
Limondale Solar Farm	RWE	Solar	349 MW	95 Km	Operational
Sunraysia Solar Farm	Maoneng	Solar	255 MW	100 Km	Operational
Lang's Crossing Solar Farm	TEC-C	Solar	5 MW	13 Km	Approved
Hay Solar Farm	Plains SF No1 Pty Ltd	Solar	110 MW	15 Km	Approved
Burrawong Wind Farm	Windlab	Wind	750 MW	82 Km	Proposed, SEARs issued
Baldon Wind Farm	Goldwind Australia and Lacour Energy	Wind	800 – 900 MW	40 Km	Proposed, SEARs not yet requested
Keri Keri Solar Farm	Acciona	Solar	400 MW	65 Km	Proposed, SEARs issued
Keri Keri Wind Farm	Acciona	Wind	1003 MW	50 Km	Proposed, SEARs issued
Dinawan Renewable Energy Hub	Spark Renewables	Wind / Solar	~2500 MW	28 Km	Proposed
Bullawah Wind Farm	Bay Wa r.e.	Wind	~1000 MW	5 Km	Proposed
Yanco Delta Wind Farm	ViRYA	Wind	1500 MW	42 Km	Proposed, SEARS issued
EnergyConnect	TransGrid	Transmission Line	330kV	0 Km	Western section approved Eastern section proposed, EIS exhibited
Currawarra Solar Farm	RES	Solar	195 MW	66 Km	Approved
Tarleigh Park Solar Farm	RES	Solar	90 MW	85 Km	Approved
Southdown Solar Farm	juwi Renewable Energy P	Solar	130 MW	85 Km	Proposed, SEARs issued
Finley	ESCO Pacific	Solar	175 MW	97Km	Operational

** Estimated distance*

TABBITA
MIDWESTERN HIGHWAY
CARRATHOOL
STURT HIGHWAY
DARLINGTON POINT
Hay Solar Farm
Lang's Crossing Solar Farm
BALRANALD
COLEAMBALLY
Limondale Solar Farm
Sunraysia Solar Farm
Burrawong WF
Keri Keri Renewable Energy Project
Baldon Windfarm
Bullawah Wind Farm
Dinawan Renewable Energy Hub
Yanco Delta Wind Farm
NEWELL HIGHWAY
COBB HIGHWAY
WANGANELLA
CONARGO
JERILDER
Currawarra Solar Farm
HAY ROAD
DENILIQUIN
Tarleigh Park Solar Farm
Southdown Solar Farm
Finley Solar Farm

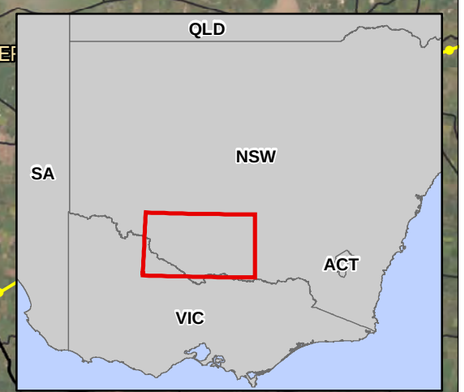
Legend

- The Plains Renewable Energy Park Boundary
- South-West REZ

Project Status:

- Operational
- Approved
- Proposed, SEARs Issued
- Proposed, SEARs Not yet Requested
- Proposed
- Project Energy Connect Augmentation Corridor - Eastern Section Proposed, EIS Exhibited
- 132kV Transmission Line
- 220kV Transmission Line
- 330kV Transmission Line
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - ESRI World 2021



Surrounding Renewable Energy Development

2-1

Drawing No:	0606253m_SCRWF_G003_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	17/10/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 10 20 km

N

ERM

2.1.2 Local Context

The Project Area is situated within the Hay Plains, which is characterised by a relatively flat topography with low relief and slight variation to elevations, it generally differs by only a few metres. The existing land uses surrounding the Project Area are predominantly agricultural and are primarily used for irrigated cropping and grazing.

There are 7 potential receivers located within 5 km of the Project Area, and 13 potential receivers located within 8 km of the Project Area, as detailed in Table 2-2 below. A minimum buffer area of 3 km has been applied to WTG and dwelling locations.

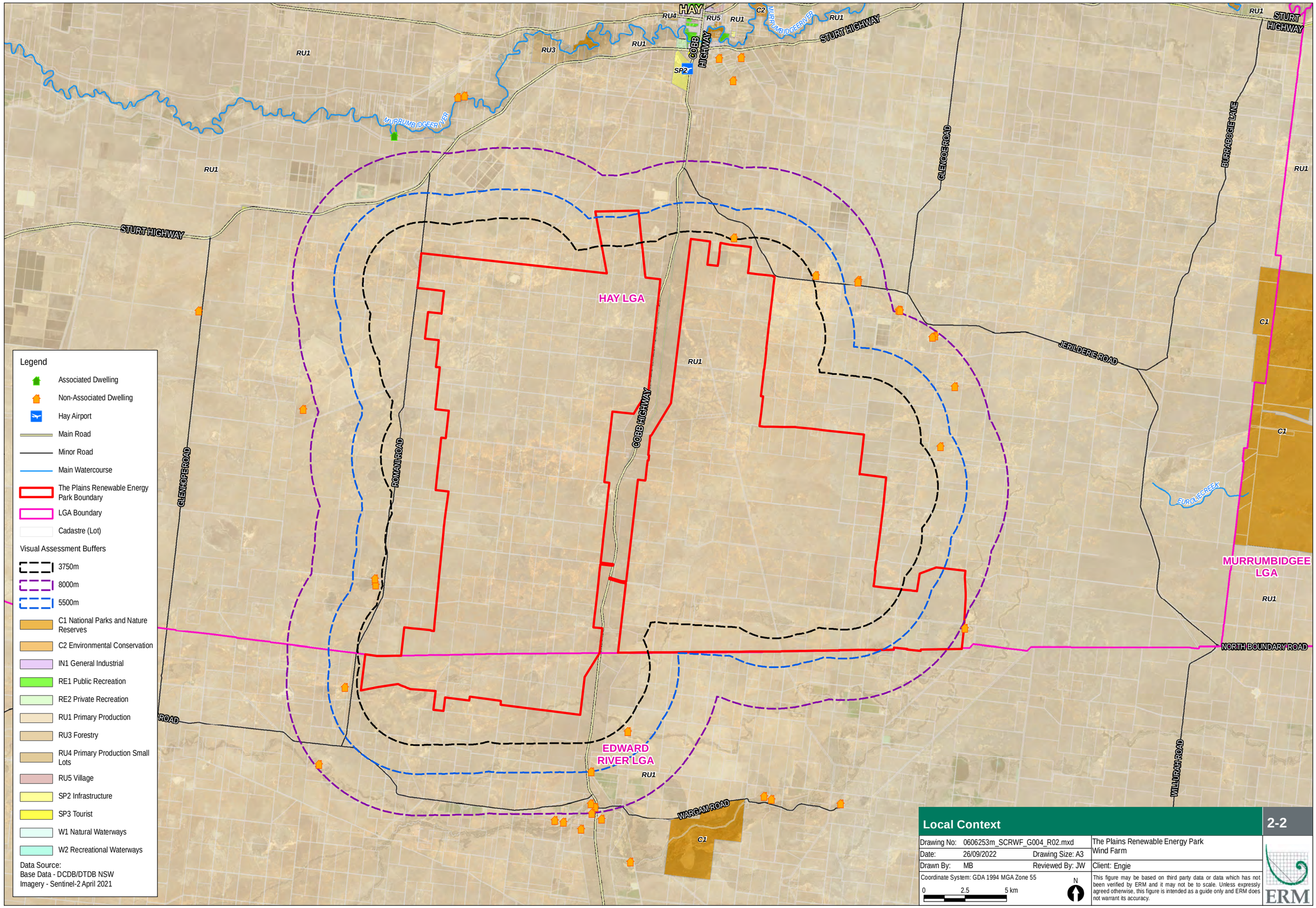
Table 2-2 Residences located within 8km of a Wind Turbine Generator

Dwelling / Residence Number	Involved / Non-Involved	Distance from nearest WTG (m)
NAD_27	Non-Involved	3827 m
NAD_26	Non-Involved	4007 m
NAD_14	Non-Involved	4138 m
NAD_13	Non-Involved	4156 m
NAD_18	Non-Involved	4223 m
NAD_15	Non-Involved	4461 m
NAD_21	Non-Involved	4603 m
NAD_17	Non-Involved	5516 m
NAD_25	Non-Involved	6349 m
NAD_25_H	Non-Involved	6402 m
NAD_22	Non-Involved	6624 m
NAD_16	Non-Involved	7441 m
NAD_43	Non-Involved	7661 m

Table 2-3 Residences located within 1km and 10km of the Project Area

Residence	1 km buffer	3.5 km buffer	5km Buffer	10km Buffer
Involved	0	0	0	1
Non-Involved	2	2	9	32

The Project Area is located immediately south of the Murrumbidgee River and approximately 9 km north of an irrigation channel, the Coleambally Outfall Drain. Both watercourses are located within the Murrumbidgee Catchment, which covers an area of 84,000 km^2, or 8 percent of the total area of the Murray-Darling Basin (MDBA, 2021).



Legend

- Associated Dwelling
- Non-Associated Dwelling
- Hay Airport
- Main Road
- Minor Road
- Main Watercourse
- The Plains Renewable Energy Park Boundary
- LGA Boundary
- Cadastre (Lot)

Visual Assessment Buffers

- 3750m
- 8000m
- 5500m
- C1 National Parks and Nature Reserves
- C2 Environmental Conservation
- IN1 General Industrial
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU3 Forestry
- RU4 Primary Production Small Lots
- RU5 Village
- SP2 Infrastructure
- SP3 Tourist
- W1 Natural Waterways
- W2 Recreational Waterways

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Local Context

2-2

Drawing No:	0606253m_SCRWF_G004_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2.5 5 km

N

ERM

The nearest national parks and conservation areas are located to the north, east, and south, and north west of the Project Area. The closest conservation area is the South West Woodland Nature Reserve located 10 km south of the nearest proposed turbine location. The zoning and location of nearby national parks and conservation areas is provided in **Error! Not a valid bookmark self-reference.** and Figure 2-2.

Table 2-4 Nearby Conservation Areas

National Park or Conservation Area	Distance & Direction from the nearest WTG	Local Environmental Plan (LEP)	Zoning
Murrumbidgee Valley Regional Park	14 km north	Hay Shire LEP 2011	C1 – National Parks and Nature Reserves
South West Woodland Nature Reserve	10 km south	Conargo LEP 2013	C1 – National Parks and Nature Reserves
Oolambeyan National Park	22 km east	Murrumbidgee LEP 2013	C1 – National Parks and Nature Reserves
Kalyarr National Park	25 km north west	Hay Shire LEP 2011	C1 – National Parks and Nature Reserves

2.1.3 The Site

The Project Area is zoned in its entirety as *RU1 – Primary Production* under the Hay Local Environmental Plan 2011 (Hay LEP) and Conargo Local Environmental Plan 2013 (Conargo LEP).

A map of the Project Area and its zoning is provided in Figure 2-2**.** It covers 700 land parcels across approximately 58,786 hectares. The elevation across the Project Area is relatively consistent, ranging from 80 m to 95 m above sea level (ASL).

The allotments within which the Project Area is located are outlined in Table 2-5. The Project Area cadastre is detailed in Figure 2-3. The Project Area also includes crown land associated with paper roads, which the Project will seek closure of during the EIS preparation stage. These areas are also shown in Figure 2-3**.**

Table 2-5 Project Area Lot and DP Details

Lot	DP
1, 2, 3, 4, 5, 6, 7, 8	113621
1, 2, 3, 4, 5	113622
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	113623
1, 2	126222
1, 2	126223
3	134910
A, C	183078
1, 2, 3, 4	394274
1, 2	529796
2	703764
105	721978
38	722043
42.74	746774

Lot	DP
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 36, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79	756262
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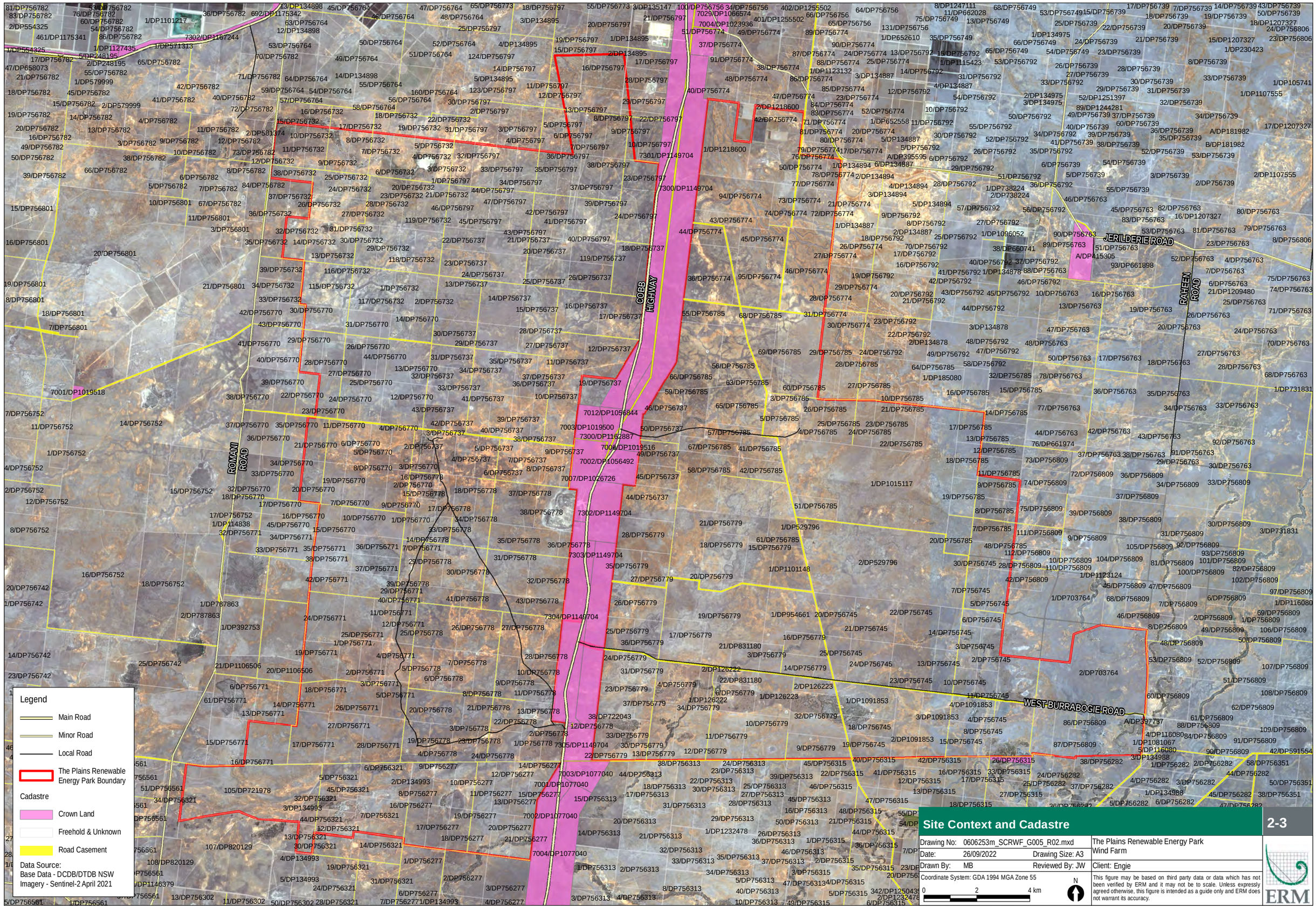
21, 22	831180
1	954661
1	1015117
1, 2, 3, 4	1091853
1	1101148
1	1124597
1, 2, 3, 4, 5, 6, 7, 8, 9	1132621
1, 2, 3, 4, 5, 6, 7, 8	1132623
11	1139344
1	1218600

The existing land uses across the Project Area are for irrigated cropping and grazing pasture. The Project Area is situated on Mungadal Station, which is a large-scale sheep breeding property that specialises in the production of Merino Sheep and wool. Following the purchase of the original Mungadal property by Paraway Pastoral Company in 2010, Mungadal Station expanded through the acquisition of the Pevensey, Ulonga, and Rosevale properties, and now covers a total area of 116,994 hectares (Paraway Pastoral Co., 2021). Mungadal Station consists mostly of native saltbush plains which are utilised for sheep grazing. It also contains numerous bores, areas of irrigated cropping, an extensive pipe and trough system, and a frontage onto the Murrumbidgee River at the northern end of the original property.

The Project Area covers approximately 58,786 hectares on Mungadal Station and neighbouring properties and is split into two by the Cobb Highway.

Photographs of the Project Area are provided in Figure 2-4.



Site Context and Cadastre

2-3

Drawing No:	0606253m_SCRWF_G005_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

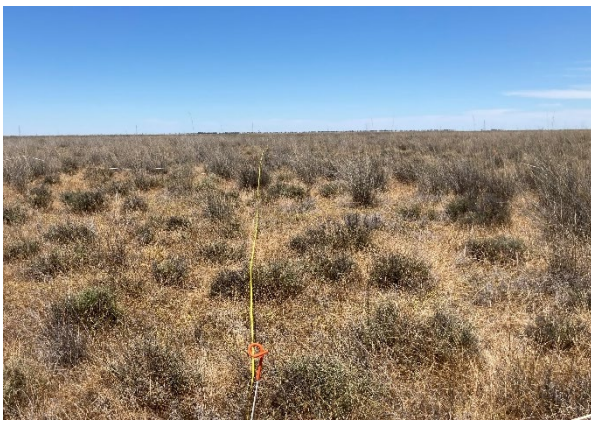
ERM

Views from south-east corner of the Project Area, facing north

Views from south-east corner of the Project Area

Views of the Cypress Woodland in the south east corner of the Project Area, facing south

Views from the south of the of Project Area along West Burrabogie Road, facing east



View of the Project Area on the western side of the Cobb Highway facing south east

Views from north-east of the Project Area facing south

Figure 2-4 Views of the Project Area

2.2 Strategic Framework

The Project will align with various strategies, policies, and plans across National, NSW, Regional, and Local contexts. The strategic framework for the Project is outlined in **Table 2-6** below.

Table 2-6 Alignment with Strategic Framework

Strategy, Policy or Plan	Description	Project Alignment
National Context		
Large-scale Renewable Energy Target (LRET)	The Large-scale Renewable Energy Target (LRET) incentivises the development of renewable energy power stations in Australia, through a market involving the creation and sale of certificates known as Large-scale Generation Certificates (LGCs) (CER, 2018) Power stations accredited under the LRET can create LGCs for the electricity generated from renewable energy sources, which can then be sold to liable entities that must meet compliance obligations under the LRET. Liable entities are predominantly electricity retailers which are required to surrender these certificates to the Clean Energy Regulator on an annual basis to demonstrate their compliance with annual targets. Selling LGCs provide accredited power stations with another source of revenue in addition to the revenue from the electricity generated (CER, 2018). The current target under the LRET is for 33,000 gigawatt hours of additional renewable energy to be generated annually. The current targets, accreditation of power stations, and creation of LGCs will remain until the end of the scheme in 2030.	Once operational, the Project will generate up to 5637 gigawatt hours of electricity annually. The Project will therefore contribute significantly in meeting the LRET target for 33,000 gigawatt hours of additional renewable energy to be generated annually.
United Nations Framework Convention on Climate Change Conference of Parties (COP26) – Glasgow 2021	COP26 was the 26th climate change COP held in Glasgow in late 2021. A key outcome of COP26 was agreement to '*revisit and strengthen …2030 targets (Paris Agreement targets) in nationally determined contributions…by the end of 2022*' (UNFCCC, 2021). The Federal Government committed to achieving net zero greenhouse gas emissions by 2050 ahead of the G20 Summit in Rome and the Glasgow United Nations climate discussions (COP26).	The Project will contribute to meeting Australia's commitments through the generation of renewable wind energy and resultant annual reduction in greenhouse gas emissions.
United Nations Framework Convention on Climate Change Conference of Parties (COP21) – The Paris Agreement	The United Nations Paris Agreement on climate change (Paris Agreement) outlines a framework for all countries to take climate action from 2020, and builds upon the existing international efforts in the period up to 2020. The aim of the Paris Agreement is to limit emissions globally to net-zero in the second half of this century. Australia is one of 195 countries that signed on to the Paris Agreement, and has set a target to reduce emissions by 26-28 per cent below 2005 levels by 2030. This builds on the 2020 target of reducing emissions by five per cent below 2000 levels (PoA, 2017).	The Project will contribute to meeting Australia's commitments under the Paris Agreement through the generation of renewable wind energy and resultant annual reduction in greenhouse gas emissions by approximately 3.7 million tonnes per annum.

Strategy, Policy or Plan	Description	Project Alignment
Integrated System Plan 2020	The Integrated System Plan (ISP) provides an integrated roadmap for the development of the NEM over the next 20 years, and the most recent ISP 2020 was released on 30 July 2020 (AEMO, 2020). The key objectives of the ISP are to design low cost and reliable energy systems through both new and existing technologies, and to identify ISP projects to achieve power needs. The ISP also serves the broader purpose of informing policymakers, investors, and consumers. It draws on stakeholder engagement and industry expertise in order to maximise the value and benefits to electricity consumers. The ISP 2020 identifies the locations of proposed Renewable Energy Zones (REZs) in Australia that can connect to existing transmission networks. The Draft 2022 Integrated System Plan was released in December 2021, and will be finalised by 30 June 2022 (AEMO, 2021).	The Project is located within the South West REZ, which has been identified as a proposed REZ in the ISP 2020. The Project will respond to Phase 2 of the ISP: "*Renewable generation development to replace energy provided by retiring coal-fired generators and supported by the actionable ISP projects*". Phase 2 will be achieved through the development of Variable Renewable Energy (VRE) in the South West REZ, which is to be supported by the proposed EnergyConnect project. The Project is proposed to connect to the EnergyConnect Project and will therefore align with the ISP 2020.
NSW Context		
Net Zero Plan Stage 1: 2020:2030	The Net Zero Plan Stage 1: 2020–2030 (DPIE, 2020a) sets the foundation for NSW's action on climate change and how the NSW Government will deliver on its objective to achieve net zero emissions by 2050. The Plan is the NSW Government's overarching strategy to reduce emissions and mitigate the impacts of climate change. In September 2021, the NSW Government announced ambitious new emission reductions, with an updated objective to reduce emissions by 50% below 2005 levels by 2030 under the Net Zero Plan Stage 1: 2020 – 2030 Implementation Update (September 2021).	This Project will contribute in addressing the Net Zero Plan, including the NSW Government's updated 2030 50% target. This will be achieved through a reduction in greenhouse gas emissions by approximately 3.7 million tonnes per annum.
NSW Electricity Strategy	The NSW Electricity Strategy is the NSW Government's plan to provide more reliable, affordable, and sustainable electricity across in NSW (DPIE, 2019). The Strategy encourages approximately $8 billion of new private investment in NSW's electricity system over the next decade, including $5.6 billion in regional NSW. It aligns closely with the NSW Government's Net Zero Plan Stage 1: 2020–2030, and supports a new affordable and reliable energy system by: ■ Delivering the coordinated Renewable Energy Zone in the Central-West Orana region; ■ Saving energy via the Energy Security Safeguard; ■ Supporting the development of new electricity generators; ■ Setting a target to increase the state's energy resilience; and ■ Making it easier to do energy business in NSW.	The Project is consistent with the Strategy as it provides renewable energy generation and storage capacity that, together with other renewable generation projects, is expected to result in lower cost of power in comparison to wholesale prices. The Project will also contribute to greater energy resilience through the use of BESS stabilisation technology and the future supply of electricity to the NEM with the impending closure of coal fired power stations over the next 20 years.

Strategy, Policy or Plan	Description	Project Alignment
NSW Transmission Infrastructure Strategy	The NSW Transmission Infrastructure Strategy is the NSW Government's plan to unlock private sector investment in priority energy infrastructure projects, which can deliver least-cost energy to customers to 2040 and beyond (DPE, 2018). The Strategy forms part of the government's broader plan to make energy more affordable, secure investment in new power stations and network infrastructure and ensure new technologies deliver benefits for consumers. The aims of the Strategy include increasing NSW's connections with Victoria, South Australia and Queensland, and increasing NSW's energy capacity through the prioritisation of Energy Zones in the Central-West, South West and New England regions of NSW. The Strategy seeks to help meet future energy needs by facilitating new transmission that could support up to 17,700 MW of new electricity generation. Other benefits include improved energy reliability, security, timely project delivery, increased affordability and access to cheaper electricity.	The Project will meet the aims of the Strategy by increasing NSW's linkages with neighbouring states, through a proposed connection to the EnergyConnect Project. The Project will also contribute to the development of the South West REZ, which will result in an overall increase to NSW's energy capacity.
NSW Electricity Infrastructure Roadmap	The NSW Electricity Infrastructure Roadmap (the Roadmap), released in November 2020, is the NSW Government's plan to transform the NSW electricity sector to be cleaner, cheaper and more reliable (DPIE, 2020b). The Roadmap builds on the NSW Electricity Strategy (2018) and the NSW Transmission Infrastructure Strategy (2019), and emphasises the need for NSW to transition to renewable energy. It aims to replace NSW's ageing coal-fired power stations with a coordinated portfolio of energy generation, storage and network investment. As part of this Roadmap, the NSW Government commits to Renewable Energy Zones (REZ), which will expand transmission and generation capabilities in strategic areas across NSW, including the South-West region of NSW. The Roadmap reinforces the key role of these REZs in delivering renewable energy, transitioning from coal fired power generation, and providing regional growth and investment in regional NSW.	The Project will assist in meeting the NSW Government's emissions reduction targets, NSW's energy generation and storage requirements, and NSW's transition from coal fired power generation to renewable energy. The Project will also contribute to the development of the South-West REZ, which will add to the regional growth and investment in regional NSW.
Wind Energy Framework	The NSW Government's Wind Energy Framework aims to provide clarity, consistency and transparency for both industry and the community in relation to the assessment and decision-making on wind energy projects. The Wind Energy Framework includes the following documents: ■ Wind Energy Guideline ■ Wind Energy: Visual Assessment Bulletin ■ Wind Energy: Noise Assessment Bulletin ■ Standard Secretary's Environmental Assessment Requirement (SEARs) ■ Wind Energy Framework Q&As	This Scoping Report and the EIS for the Project are / will be prepared in accordance with the relevant guidelines and documents under the Wind Energy Framework. In addition, the Landscape and Visual Impact Assessment (LVIA) and Noise Assessments that will be undertaken for the Project will be prepared by following relevant guidelines including the Visual and Noise bulletins under the Wind Energy Framework.

Strategy, Policy or Plan	Description	Project Alignment
Regional Context		
Riverina Murray Regional Plan 2036	The Riverina Murray Regional Plan 2036 (RMRP) is a 20-year blueprint for the future of the Riverina Murray Region (DPE, 2017). It was developed by DPIE in 2017 following consultation with local councils, key stakeholders, and local communities. The RMRP provides a framework for guiding land use plans, development proposals, and infrastructure funding decisions over the next 20 years and includes both priority and longer term actions (DPE, 2017). It aims to grow the region's cities and local centres, support the protection of high value assets, and develop a strong, diverse and competitive economy through the following four key goals: ■ A growing and diverse economy ■ A healthy environment with pristine waterways ■ Efficient transport and infrastructure networks ■ Strong, connected and healthy communities	The Project is proposed to connect with the EnergyConnect Project, and will therefore provide ready access to the electricity network. The Project is also consistent with relevant directions and actions of the RMRP listed under *Goal 1: A growing and diverse economy*. The Project will directly respond to: ■ **Direction 11**: Promote the diversification of energy supplies through renewable energy generation. ■ The Project will also respond to: ■ **Action 11.1** – Encourage renewable energy projects by identifying locations with renewable energy potential and ready access to connect with the electricity network; and ■ **Action 11.2** – Promote best practice community engagement and maximise community benefits from all utility-scale renewable energy projects.
Local Context		
Hay Shire Council Local Strategic Planning Statement 2020	The Hay Shire Council Local Strategic Planning Statement (LSPS) provides a framework for the social, economic, and environmental land use needs throughout the Hay Shire over the next 20 years (Hay Shire Council, 2020). It identifies the Council's 20-year vision for land use in the Hay Shire, alongside its local characteristics and community values. The LSPS outlines short-term, medium-term, and long-term planning priorities and actions which are being monitored in order to meet/deliver the broader vision. It also aims to implement the actions and directions which are outlined in the Riverina Murray Regional Plan 2036 at a local level.	The Project will directly address *Planning Priority 9: Renewable Energy*, which has the following objective: 'Encourage the growth of Renewable Energy Installations'. Planning Priority 9 of the LSPS aligns with *Direction 11: Promote the diversification of energy supplies through renewable energy generation* of the Riverina Murray Regional Plan. In addition, the LSPS states that the Hay shire is in a suitable position to cater for renewable energy, and there are opportunities to develop renewable energy across all scales.

Strategy, Policy or Plan	Description	Project Alignment
Hay Shire Council Community Strategic Plan 2017-2027	The Hay Shire Council Community Strategic Plan 2017-2027 (CSP) is a 10-year plan that outlines the long-term vision and strategic directions for the Hay Shire community (Hay Shire Council, 2017). The CSP identifies relevant objectives, strategies, and priorities to meet this vision, which are addressed across the following five key areas: 1. Environmental sustainability 2. Liveable & vibrant community 3. Economic prosperity & sustainability 4. Governance & organisational performance 5. Our infrastructure The CSP identifies opportunities to diversify the economy through the development of renewable energy within the economic development strategy and socio economic study, which were reviewed by Council during the preparation of the CSP.	The Project will directly respond to *Objective 1 – Environmental Sustainability* of the CSP. It aligns with *Strategy 1.1.1: Investigate renewable resource options*, and its associated Target: *Reduction in non-renewable energy and potable water usage*.
Hay Shire Council Community and Settlement Sustainability Strategy (2012)	The Hay Shire Council Community and Settlement Sustainability Strategy 2012 (CSSS) is an urban and rural land use planning and rural settlement strategy (Hay Shire Council, 2012). It provides recommendations on the future development and land uses within the Hay Shire LGA. The CSSS outlines the 2040 community vision for the Hay Shire, which was developed following consultation with the community and stakeholders.	The Project will directly align with the following key point under the 2040 community vision: *"…a community that is: responsible and committed to ecological sustainable development principles including the preservation of global resources, the use of alternative technologies and renewable energy to sustain the community"*
Edward River Council Community Strategic Plan 2022-2050	The Edward River Council Community Strategic Plan identifies the main priorities and strategies that will be implemented to achieve a shared vision for the future of the Edward River Local Government Area. The CSP identifies relevant objectives, strategies, and priorities to meet this vision, which are addressed across the following five outcomes: 1. Shaping the Future 2. An open and connected community 3. Encouraging growth through partnerships 4. Delivering community assets and services 5. Accountable leadership and responsive administration	The Project will directly respond to Outcome 1 Shaping the Future. It aligns with *Strategy 1.1.3: Responsibly address Council's carbon footprint and support renewable energy initiatives.*

2.3 Project Justification

This section provides a justification of the renewable energy park addressing Government commitments to renewable energy, the suitability / viability of the Project Area, and high-level socio-economic effects.

2.3.1 Commitments to Renewable Energy

Federal Commitments

Australia is one of 195 countries that signed on to the United Nations Paris Agreement on climate change (Paris Agreement). The Paris Agreement sets in place a durable and dynamic framework for all countries to take climate action from 2020, building on existing international efforts in the period up to 2020. The aim of the Paris Agreement is to limit emissions globally to net-zero in the second half of this century. Australia set a target to reduce emissions by 26-28 per cent below 2005 levels by 2030 as part of its commitments under the Paris Agreement, which builds on its previous target of reducing emissions by five per cent below 2000 levels by 2020 (PoA, 2017).

The current efforts to achieve this goal are reflected in the Renewable Energy Target (RET) Scheme. The RET was implemented in 2009 with an initial target of 44,000 GWh (later reduced to 33,000 GWh) of renewable energy generation by 2020. The RET has been an extremely successful initiative that has, in part, driven a more than 50% reduction in the cost of large-scale wind and solar projects over the past 10 years. The Project will contribute to meeting Australia's commitments through the generation of renewable wind energy and resultant annual reduction in greenhouse gas emissions.

The Federal Government committed to achieving net zero greenhouse gas emissions by 2050 ahead of the G20 Summit in Rome and the Glasgow United Nations climate discussions (COP26). The Project will assist in delivering on this key commitment for Australia.

State Commitments

In September 2013, the NSW Government released the NSW Renewable Energy Action Plan (REAP) with a vision to secure an affordable and clean energy future for NSW. The REAP was implemented alongside a separate Energy Efficiency Action Plan (EEAP) consisting of 30 actions to strengthen the energy efficiency market and aims to reach the following targets:

- Achieve 16,000 GWh in energy savings per year by 2020;
- Support 220,000 low income households to reduce energy use by up to 20 per cent by 2014; and
- Assist 50% of NSW commercial floor space to achieve a four-star NABERS energy and water rating by 2020 through the delivery of high-standard building retrofit programs.

Additionally, as identified above, the project falls within the New England Energy Zone as outlined in the Net Zero Plan. The Net Zero Plan outlines the NSW Government's approach to grow the economy, create jobs and reduce emissions over the next decade, including an investment in emissions reduction innovation, particularly within regional and rural NSW.

The Net Zero Plan aligns with the 'NSW Climate Change Policy Framework' (OEH, NSW Climate Change Policy Framework, 2016), which commits NSW to the aspirational objectives of achieving net-zero emissions by 2050.

The Project is consistent with the NSW Government's objectives and targets for the reduction of GHG emissions and investment in renewable energy technology, and supports regional investment and development.

Regional and Local Commitments

The development of renewable energy is supported by relevant regional and local plans and strategies which have been outlined in Table 2-6 above, and include:

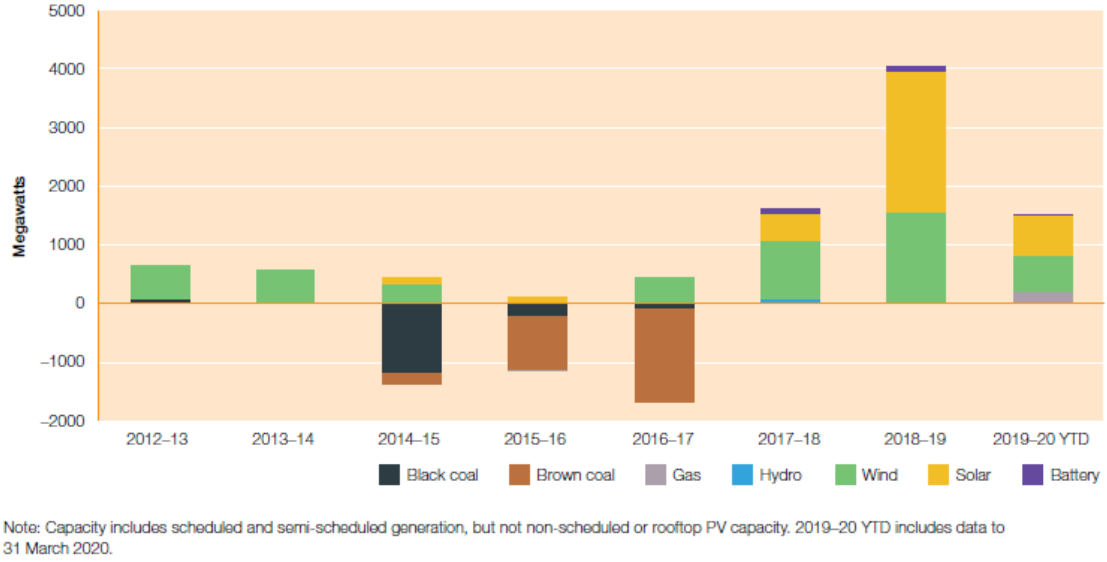
- Riverina Murray Regional Plan 2036;
- Edward River Council Community Strategic Plan 2022-2050;
- Hay Shire Council Local Strategic Planning Statement 2020;
- Hay Shire Council Community Strategic Plan 2017-2027; and
- Hay Shire Council Community and Settlement Sustainability Strategy (2012).

2.3.2 Contribution to the National Electricity Market

The National Electricity Market (NEM) operates as a power system to deliver electricity from generators to market consumers, through an extensive transmission and distribution network comprising of around 40,000 km of transmission lines and cables. The NEM services the entire eastern and south-eastern coastline of Australia, connecting five states, and providing electricity to approximately nine million customers. The Project will help to meet the forecast increasing demand for energy in the NEM as forecast demand increased from 2025-2026 onwards through production of renewable energy.

The energy sector in Australia is undergoing a necessary and inevitable transition from a centralised system of large fossil fuel generation towards a decentralised system of widely dispersed, renewable energy (mainly wind and solar) (Australian Energy Regulator, 2021). The Australia Energy Regulator (2021) identifies key drivers for the transition as:

- Increasing community concern on the impact of fossil fuel generation of carbon emissions. There has been no energy business investing in new coal fired generation in Australia since 2012, whilst investment in wind, solar and batteries continues to grow, as detailed in Figure 2-5;
- Technological advancements and cost reductions in grid scale wind and solar generation facilitating lower cost options for new build generation, including advancements in turbine technology; and
- Deteriorating economics of fossil fuel generation associated with aging of the coal fired generation fleet and increase fuel costs.



Note: Capacity includes scheduled and semi-scheduled generation, but not non-scheduled or rooftop PV capacity. 2019–20 YTD includes data to 31 March 2020.

Figure 2-5 Exit and entry of generation capacity in the NEM

Source: (Australian Energy Regulator, 2021)

Traditionally, NSW's electricity needs have been met by coal-fired generation and some gas peaking power plants. While wind and solar power has increased, fossil fuel generation continued to produce approximately 74% of electricity in the NEM, at January 2021 (Australian Energy Regulator, 2021). However, this trend is reversing and over the next two decades, 16 gigawatts (GW) of thermal generation (61% of the current coal fleet in the NEM) is expected to retire and over 26–50 GW of new large-scale wind and solar capacity is forecast to come online. To offset this, by 2040 the NEM will need 6-19 GW of new utility scale, flexible and dispatchable resources (Australian Energy Regulator, 2021).

This Project represents an investment in a new large scale renewable energy, providing approximately 1,800 MW of electricity generating capacity and 2 GWh of battery energy storage system capacity. The Project will thereby provide an essential input into the additional renewable energy sources needed in the transition from coal fired generation to renewable generation.

2.3.3 Benefits

2.3.3.1 Wind Farm Benefits

Through the generation of renewable energy, wind farms provide significant contribution to Australia's transition to greener energy. The Australian Wind Alliance (AWA) prepared the report, *Building Stronger Communities: Wind's growing role in regional Australia* (November 2019) (AWA, 2019), which outlines ways in which wind farms deliver significant financial and social benefits to their host communities. The report also investigates how income and investment from wind farms flow to local communities in the windiest parts of Australia, from payments to landowners and community sponsorships through to community co-ownership and co-investment.

Some key notes from the AWA report have been summarised below:

- The construction of existing wind farms construction has delivered an economic boost of $5.1 billion to regional Australia, and the construction of new windfarms is expected to provide a further economic boost of $4.8 billion.
- Up to $18.3 billion could be delivered to host communities across the 25-year life span of wind farm projects, including currently operational wind farms and those currently under construction.
- Regional communities benefit each year from wind farm projects through $24.9 million in payments to host landowners and $29.4 million through wind farm Community Enhancement Funds (CEFs).
- From 2021 onwards, Community Enhancement Funds will fund up to $5 million annually for community projects.

Besides direct payments to host landowners, the report also notes that wind farms deliver significant local investment and financial contributions to local Councils, which directly support local community projects and services.

2.3.3.2 Project-Specific Benefits

The Project would deliver renewable, low-cost energy to the national grid, and will contribute to Commonwealth and the NSW Government's emission reduction targets. This will be achieved by providing a source of renewable energy to supplement NSW and national energy requirements, and supporting the transition being undertaken in the energy sector away from a centralised system of large fossil fuel generation towards a more decentralised system of renewable energy production and assist in reducing GHG emissions; and

The Project is located in the South West REZ that will be formally declared in 2022. The South-West REZ policy will coordinate with policy in the other NSW REZs to provide up to 12GW of renewable energy capacity within the state. It is considered that the Project in this location can contribute significantly to this capacity.

According to the NSW Government, the expected benefits of the NSW REZs are:

- More reliable energy from significant amounts for renewable energy supply;
- Energy bill savings;
- Emissions reduction; and
- Community partnership.

In addition, the Project will deliver significant benefits to the Murray River region and local communities, including:

- Direct investment in the Murray River region;
- Opportunities for local contractors and businesses;
- 850 jobs expected to be created during construction;
- 56 long-term service and maintenance jobs created during project operation;
- Diversified income stream for rural landholders;
- Renewable low cost energy to the national grid; and
- Development of new skilled labour in the region within the growing renewable energy industry.

Construction and operation of the Project will require a range of skills including engineering, trades (electrical, mechanical, construction), transport, building material providers, equipment operators, consultants and administrative staff.

A summary of the Project benefits is displayed in Figure 2-6.

Figure 2-6 Project Benefits

2.3.4 Site Suitability

The Project Area is considered suitable for the Project due to the following reasons:

- It is located within the EnergyConnect corridor, which will allow for the renewable energy generated from the Project to be supplied to the NEM;
- It is located within the boundaries of the proposed South West REZ, and the Project will contribute to the future development of the REZ;
- there are a number of other existing and proposed renewable energy projects located within the region and in close proximity to the Project Area;
- The Project Area is easily accessible via the Sturt Highway and Cobb Highway;
- The Project is consistent with the *RU1 – Primary Production* zoning and will meet the following objective of the RU1 zone: to encourage sustainable primary industry production; and
- The Project will therefore contribute to creating greater diversity within the local economy, where land uses have experienced diversification in recent years through a growth in dryland cropping and horticulture, conservation, irrigation, native landscapes and forestry.

3. THE PROJECT

3.1 Project Area

The Project Area is defined as the area of land corresponding to property boundaries on which the Project is located. The Project Area covers a total area of 58,786 hectares and is situated on Mungadal Station and neighbouring properties to the east and west of the Cobb Highway. A map of the Project Area is provided in Figure 3-1. A detailed map series is provided in Appendix A.

3.2 Project Description and Layout

3.2.1 Project Design – Components and Specification

The indicative project design components and specifications are provided in Table 3-1.

Table 3-1 Indicative Project Design – Components and Specification

Component	Feature	Specification
Energy generation	Wind turbine generators	⩽226 turbines
		⩽280 metre tip height
Electrical Reticulation Network	On-site substations	At least 1 x 330 kV main substation and 2 x 132 kV collector substations
	Internal electrical reticulation network, underground and overhead 33 kV and 132 kV	Electrical reticulation will generally follow the access roads shown in Figure 3-1.
	330 kV overhead transmission lines	Direct connection to EnergyConnect within the Project Area
	Switchyard	Switch and other electrical equipment providing connection to the recently approved EnergyConnect 330 kV transmission line that will be located within the 330kV substation.
Access Roads	Access to site and turbines	Access is likely via the Cobb Highway and internal access roads. An indicative layout is provided in Figure 3-1.
Ancillary Infrastructure	Various supporting infrastructure	The final design and location of associated infrastructure and works including concrete batching plants, construction accommodation camps, laydown areas, carpark and turbine hardstands has not yet been finalised and will be subject to further assessment, including the outcomes of technical and environmental assessments as part of the EIS. Indicative locations are presented in Appendix A.

3.2.2 Wind Turbine Generators

The wind farm is proposed to include up to 226 turbine locations across the Project Area, across a total area of approximately 58,786 hectares. The turbines will have a maximum hub height of 180 metres and a maximum tip height of up to 280 metres above ground level. The wind farm will have a combined maximum installed capacity of 1,800 MW and will use turbines with a generator capacity between 6-8 MW. The turbines will be fixed to concrete footings which are mounted onto tubular steel towers and associated hardstand areas. The indicative turbine specifications are provided in Table 3-2.

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Table 3-2 Indicative Turbine Specification

Component	Feature	Specification
Wind turbine generator	Make / Model / Power	To be confirmed
	Blade length (incl. nacelle)	Up to 110 metres
	Rotor diameter	Up to 220 metres
	Hub height	up to 180 metres
	Tip height	Up to 280 metres
	Rotor Swept Area	22,698 m^2
	Cut-In Wind Speed	3m/s
	Cut-Out Wind Speed	26 m/s
	Maximum Sound Power Level	106.0 dB(A)

3.2.3 Substations, Switching Station, Electrical Reticulation and Grid Connection

The Project will connect to Project EnergyConnect, a proposed 330 kV transmission line that will allow for energy generated at The Plains Renewable Energy Park to be supplied to the National Electricity Market. The Project will include underground and overhead electrical reticulation network to connect to a substation/s. Interconnection infrastructure will then connect to the existing 220 kV or proposed Project EnergyConnect 330 kV transmission networks including:

- One (1) primary 330 kV substation including a control room and switchyard facilitating connection to the NEM including transformers, voltage controls, storage units and potentially power quality controls;
- Two (2) 132 kV collector substations including a control room within each, located at selected locations within the wind farm. Collector groups will be connected with predominately 33kV underground cabling; and
- High-voltage overhead lines connecting collector groups, main substation and connection to the NEM infrastructure.

3.2.4 Other Infrastructure and Associated Works

The Project will also require additional project infrastructure and associated works including:

- One (1) Operations and Maintenance Building;
- Up to six (6) permanent Meteorological Masts;
- Internal access tracks and upgrades to existing access roads where required;
- Upgrades to existing minor roads along the haulage route to the Project Area;
- Installing maintenance and environmental managements processes and equipment;
- On-site quarries, security fencing and landscaping;
- Ancillary activities including gravel pits, water sourcing, visual screening (as required); and
- Temporary workers accommodation.

3.2.5 Transport Route and Site Access

Access to the Project Area during construction and operations is proposed via the existing road network. Primary access will be via the Cobb Highway, which runs north-south through the Project Area. Secondary access, if required, may be proposed for the Sturt Highway, which borders the northern boundary of the Project Area. The need for this will be subject to assessment in the EIS phase.

The transport route of WTG components and other Project related materials are subject to a Port and Transport Route Assessment, which will be prepared as part of the EIS, the outcomes of which will be incorporated into the Traffic and Transport Impact Assessment. This assessment will identify a proposed transport route from the port to the Project Area, as well as any required road upgrades.

Whilst a port and transport route have not yet been determined, indicative options and the distance to the Project that may be considered (but not necessarily limited to) are provided in Figure 3-2.

3.2.6 Construction and Temporary Facilities

The Project will require the following construction and temporary facilities:

- Temporary construction facilities such as offices, car park and amenities;
- Construction accommodation camp;
- Fencing and landscaping works;
- Concrete batching plants;
- On-site quarries;
- Upgrading internal access roads;
- Earthworks required to establish hardstand and laydown areas for turbines;
- Installation of underground and overhead cabling;
- Water sourcing; and
- Visual screening mitigation (if required).

3.2.7 Development Footprint

The Development Footprint for the Project is subject to ongoing Project design and refinement during the EIS phase of the Project and will include the Permanent and Temporary Development Footprints. At this early scoping stage, the development footprint has been assumed to be approximately 558 hectares.

The Permanent Development Footprint is the area of land that will be subject to permanent alteration as a result of installation and operation of Project infrastructure until the Project is decommissioned at its end of life. The Permanent Development will comprise:

- WTG foundations;
- Crane pads;
- Permanent access roads;
- Transmission line and transmission line access roads;
- Substation, switching station and other facilities; and
- Road upgrades required for the transport haul route.

The Temporary Development Footprint (the area of land that will be temporarily disturbed during construction of the Project and rehabilitated following construction) will comprise:

- Access road construction batters;
- Underground electrical cable footprint;
- Concrete batching plants;
- Transmission line temporary access roads;
- Laydown and assembly areas adjacent to the crane hardstand and WTG foundation; and
- Temporary workers accommodation area.

The impact assessment to be included in the EIS will consider both the Temporary Development Footprint and the Permanent Development Footprint, noting the temporary impacted areas will be rehabilitated at completion of construction.

3.2.8 Interactions with the Plains Solar Farm

Subject to the timing of the construction of the Project, the Project may utilise shared infrastructure proposed as part of The Plains Solar Farm, which is subject to a separate SSD application. This may include:

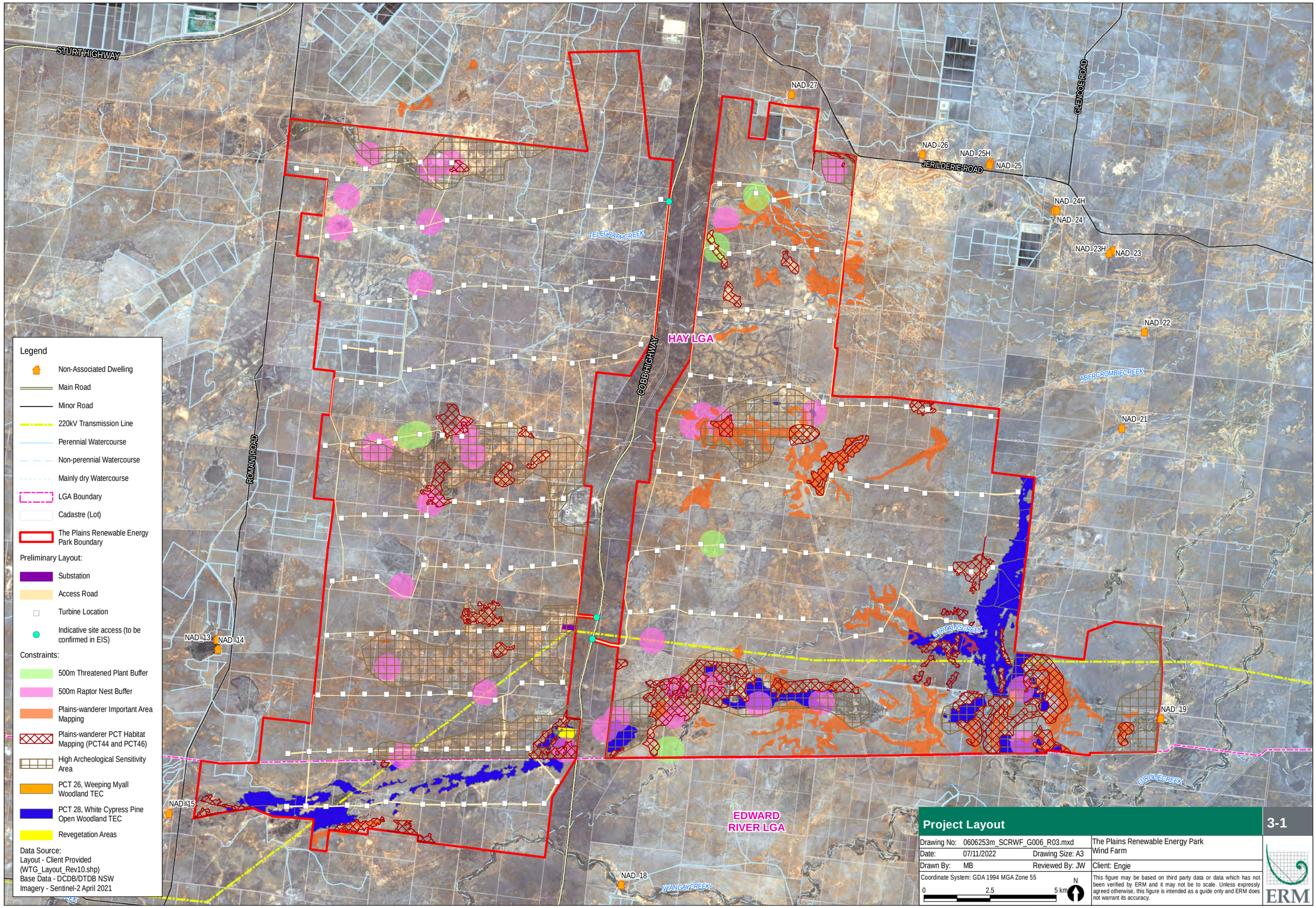
- Internal access roads to connect the WTG's and ancillary infrastructure;
- An Operations and Maintenance (O&M) building;
- Main substations, facilitating connection to the NEM including:
  - Transformers;
  - Voltage controls;
  - Storage units;
  - Power quality controls;
- Switchyard; and
- Access to the Project Area off the Cobb Highway to the east and west.

3.3 Staging

The anticipated staging of the Project is summarised in Table 3-3 and presented in Figure 3-3. The Project is currently in Stage 3, during the planning and approvals process, involving the preparation of the Scoping Report and EIS. Site selection and the feasibility for the Project were undertaken in 2021, and the planning and approval process is expected be completed by late-2023. Construction of the Project is expected to commence in 2026, with operations commencing in 2028.

Table 3-3 Project Staging

Stage of Project	Estimated Date of Completion
Site Selection	Completed mid-2021
Project Feasibility	Completed end of 2021
Planning and Approvals Process	In progress – Aim for completion late-2023
Construction	Planned for 2026
Commissioning and Operations	Planned for 2028



Project Layout

3-1

Drawing No:	0606253m_SCRWF_G006_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	07/11/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2.5 5 km

N

ERM

The Project comprises up to 226 WTGs. As is typical for projects of this scale and nature, construction and operation could be undertaken in stages. The Proponent is seeking flexibility to construct the Project in stages, if required.

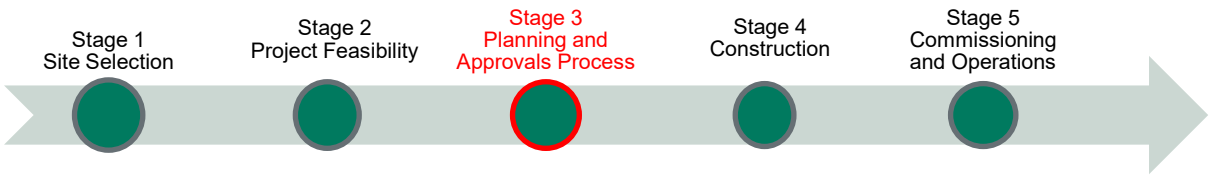


Figure 3-3 Project Staging Map

3.4 Phases

3.4.1 Construction

Construction of the Project is anticipated to commence in 2026 with design and procurement activities leading into groundworks. All on-site construction activities and erection of wind turbines is estimated to take two to three years to complete, this includes commissioning of the Project.

During the construction phase of the Project, 850 full time equivalent employees will be required. Temporary construction workers accommodation may be sited within the Project Area or may be located off site (off site would be subject to a separate development application). This will be explored and assessed further in the EIS phase, including consultation with the local councils.

3.4.2 Operations

Operations will commence for a period of up to 30 years. During the operation of the Project the workforce will consist of 56 permanent staff. Wind farms are designed to generally operate without intervention, with each wind turbine capable of operating independently of all other wind turbines within the wind farm. The vast majority of all maintenance undertaken on the operational farm will be preventative maintenance through a schedule which will cycle through all the machines to ensure service intervals are met. Implementing this preventative maintenance schedule will occupy the majority of time the staff are employed on the proposed Project once operational. In addition to the preventative maintenance work outlined above, some repair work will be required should break downs occur. In these cases, priority works would be undertaken as soon as possible to ensure all turbines are generating electricity.

3.4.3 Decommissioning

The EIS to be prepared for the Project will discuss the potential options associated with the decommissioning of the Project upon completion of operations.

At the end of the operational life of the wind farm, approximately 30 years, the site could be formally decommissioned. A decision will be made at this point whether to erect new turbines (re-power) or to remove the existing turbines and rehabilitate the site. This process of decommissioning will be undertaken in accordance with the relevant legal requirements, regulations and conditions of approval. The Project will remove all aboveground infrastructure, however access roads may be retained subject to landowner agreement.

3.5 Alternatives

Alternatives to the Project have been explored, including the alternative sourcing of energy, site locations, site layouts, and the 'do nothing' approach for the Project.

3.5.1 Alternative Sourcing of Energy

The alternative to using wind energy is the continued use of fossil fuels, including coal (both black and brown) and natural gas. The reliance on these energy sources results in the release of GHG emissions such as CO2 and contributes to the harmful effects of climate change. The RET and REAP discussed in Section 2.3.1 outline the commitment by Australia and NSW in reducing greenhouse gas emissions and have set targets for increasing the generation of renewable energy.

Other forms of large-scale renewable energy accounted for in the RET include hydro, biomass, solar and tidal energy. With the exception of solar energy, these alternative sources are in the early stages of development and are generally not 'market ready' nor as viable as wind energy in Australia.

Due to the abundance of wind resources, sparsely populated locality, and the proposed route of Project Energy Connect, it is considered that large-scale wind technology is an optimum form of energy generation.

The NSW Government has also proposed that the area between Buronga, west of Hay, Hillston and Deniliquin is an indicative Renewable Energy Zone (REZ) - the South West Renewable Energy Zone. The Project is located in the heart of this proposed area that will be formally declared in 2022. The South-West REZ policy will coordinate with policy in the other NSW REZs to provide up to 12GW of renewable energy capacity within the state – it is considered that the Project in this location can contribute significantly to this capacity.

According to the NSW Government, the expected benefits of the NSW REZs are:

- More reliable energy from significant amounts for renewable energy supply;
- Energy bill savings;
- Emissions reduction; and
- Community partnership.

Due to these benefits, alternative forms of energy generation would not be aligned with stated rationale behind REZ policy, and it is considered that the proposed Project is aligned. The Project is at scale potentially adding significant amounts of renewable energy supply over a 30-year period.

3.5.2 Alternative Site Location

The preliminary constraints assessment undertaken by NGH (2019) reviewed an initial study area which covered a total area of 240,266 hectares across approximately 90 km x 120 km. It comprised six (6) separate sites which included:

- Cooinbil (91,567 ha)
- Euroka (11,423 ha)
- Mungadal East (24,494 ha)
- Mungadal West (57,280 ha)
- Pooginook (20,331 ha)
- Steam Plains (35,171 ha)

The initial study area was subsequently revised and reduced to only cover two of the six sites, which are Mungadal East and Mungadal West. The Project Area now covers a total area of 58,786 hectares and is situated on Mungadal Station to the east and west of the Cobb Highway. As a result, the total development footprint of the Project has been reduced significantly.

3.5.3 Alternative Site Layout Options

The design of the Project will require ongoing review during the Scoping Report and subsequent EIS process. These design revisions are by nature an iterative process, allowing for improvement in turbine siting based on information from wind monitoring, environmental assessment, landowner feedback and inclusion into the project (as involved landowners), and broader community consultation.

The design process and need for design revision is focused around three main principles:

- Minimising and/or avoiding negative environmental and social impacts;
- Maximising wind energy production; and
- Incorporating feasible and reasonable mitigation/management measures, safeguards and provisions (e.g. for compliance monitoring) into the construction and operational aspects of the project.

3.5.4 Do Nothing

The Project Area is currently used for agricultural land uses. Although the 'do nothing' scenario would allow for continued use of the site for agricultural production, it will also lead to a missed opportunity to generate additional renewable energy and to reduce Australia's dependency on fossil fuels for energy generations and the consequential emissions of GHGs. The Project is expected to result in savings of approximately 3.7 million tonnes of GHGs per annum, and the electricity generated could supply up to 995,000 households with energy annually.

In addition, the local area and wider region would not realise the benefits of the Project including:

- The economic benefits to the local and regional community provided directly and indirectly by the employment associated with the Project;
- Capital investment creating direct and indirect employment during construction and operations; and
- Contributions to local community facilities and infrastructure through the Community Benefit Fund.

4. STATUTORY CONTEXT

This section outlines the key statutory requirements for the Project under the *Environmental Planning and Assessment Act* 1979 and other relevant NSW and Commonwealth legislation with regard to the *State Significant Development Guidelines – Preparing a Scoping Report* (DPIE, 2021a).

Relevant statutory requirements for the Project will be outlined in further detail within the EIS.

4.1 Power to Grant Consent

Approval for the Project will be sought under Part 4, Division 4.7 of the EP&A Act, which outlines the approval pathway for development deemed to be State Significant Development (SSD). Section 4.36(2) of the EP&A Act states:

> *(2) A State environmental planning policy may declare any development, or any class or description of development, to be State significant development.*

Relevant SEPPs include *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP).

Under the provisions of Section 2.6 (1) of the Planning Systems SEPP, a development is classified as SSD if it is specified in Schedule 1 or 2:

> *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and*
>
> *(b) the development is specified in Schedule 1 or 2.*

Schedule 1, Section 20 of the Planning Systems SEPP determines 'electricity generating works' to be SSD if it meets the following criteria:

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

The Project meets the definition of 'electricity generating works', which are defined in Section 2.35 of the Transport and Infrastructure SEPP.

> *electricity generating works means a building or place used for the purpose of—*
>
> *(a) making or generating electricity, or*
>
> *(b) electricity storage.*

The Project involves development for the purpose of electricity generating works using wind power that will have a capital investment value of more than $30 million. Therefore, the Project is classified as SSD under Part 4 of the EP&A Act.

4.2 Permissibility

The permissibility of wind farms in NSW is determined by the Transport and Infrastructure SEPP.

Section 2.36 (1) of the Transport and Infrastructure SEPP states that 'electricity generating works' may be carried out with development consent on land within a prescribed rural, industrial or special use zone.

The Project Area is contained within the Hay Shire LGA and Edward River LGA and is subject to the provisions of the Hay Local Environmental Plan 2011 (Hay LEP) and Conargo Local Environmental Plan 2013 (Conargo LEP).

The Project Area is zoned in its entirety as RU1 – Primary Production under the Hay LEP. As RU1 is a prescribed rural zone, the Project is permissible with consent under the provisions of Section 2.36 (1) of the Transport and Infrastructure SEPP.

Electricity Infrastructure Investment Act (2020)

Section 23 of the *Electricity Infrastructure Investment Act (2020)* identifies Renewable Energy Zones (REZs) in NSW. The Project Area is located within the South West REZ, which may support up to 1.2 gigawatts (GW) of additional transmission capacity.

4.3 Other Approvals

Other approvals required under relevant NSW and Commonwealth legislation are detailed in Table 4-1.

Table 4-1 Other Approvals required under NSW and Commonwealth Legislation

Approval Category	Legislation	Requirement
Consistent Approvals Section 4.42 of the EP&A Act outlines that these approvals cannot be refused if necessary for carrying out an approved SSD and are to be consistent with the terms of the SSD approval.	*Roads Act 1993* (Roads Act)	The Project will require consent from the appropriate roads authority under Section 138 of the Roads Act for any works undertaken on public roads. The impacts of the Project on roads and traffic will be assessed within the EIS.
	Protection of the Environment Operations Act 1997 (POEO Act)	Under the provisions of Schedule 1, Section 17 of the POEO Act, activities requiring an environment protection licence (EPL) include *"electricity works (wind farms)".* Accordingly, an EPL will be required for the Project.
Native Title	*Native Title Act 1993* (NT Act)	Under Section 13 of the NT Act, an individual can apply to the Federal Court for a determination of native title. A review of the potential for native title will be undertaken for the Project in the EIS, however the Native Title Vision (NTV) online mapping tool (NNTT, 2022) currently indicates there are no Native Title claims over the Project Area. Wamba Wamba native title claim (VC2021/001) is located approx. 9 km south of the Project Area.
EPBC Act Approval	*Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*	Approval from the Minister for the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) is required for any action that will or is likely to have a significant impact on one or more MNES. The findings of the Preliminary Biodiversity Assessment (Appendix D) confirmed the presence of threatened species listed under the EPBC Act within the Project Area. As such, a referral under the EPBC Act submitted on 10 November 2022.
Other Approvals	*Water Management Act 2000*	The Project may require water access licences under the Water Management Act 2000. The soil and water assessment will identify whether any water access licences will be required for the Project.
	Conveyancing Act 1919	The final development footprint will require a lease from the owners of the affected land. Lease of a wind farm site is treated as a lease of premises regardless of whether the lease will be for more or less than 25

Approval Category	Legislation	Requirement
		years. Subdivision consent is not required under Section 23G of the Conveyancing Act 1919. However, Section 23G of the Conveyancing Act 1919 may apply if subdivision for the purpose of construction, operation and maintenance of a substation is required.
	Biodiversity Conservation Act 2016 (BC Act)	The Biodiversity Assessment that will be prepared to accompany the EIS will provide a discussion of the management and protection of listed threatened species of native flora and fauna and threatened ecological communities (TECs) and assess biodiversity offsets consistent with the Biodiversity Offset Scheme. Given the Project is SSD, entry into the Biodiversity Offset Scheme is automatically triggered.
Approvals not required under SSD Section 4.41 of the EP&A Act outlines the following approvals, permits etc. are not required for an approved SSD.	*Fisheries Management Act 1994*	The Project will not require a dredging or reclamation work permit under Section 201, a marine vegetation regulation of harm permit under Section 205, or a passage of fish not to be blocked permit under Section 219.
	Heritage Act 1977	The Project will not require a Part 4 approval to carry out an act, matter or thing referred to in Section 57(1), or an excavation permit under Section 139.
	National Parks and Wildlife Act 1979	The Project will not require an Aboriginal heritage impact permit under Section 90.
	Rural Fires Act 1997	The Project will not require a bush fire safety authority under Section 100B, as the development does not involve subdivision for residential or rural residential development. A Bushfire Assessment will be prepared as part of the EIS.
	Water Management Act 2000	The Project will not require a water use approval under Section 89, a water management work approval under Section 90, or an activity approval (other than an aquifer interference approval) under Section 91.

4.4 Mandatory Matters for Consideration

The consent authority is required to consider a range of matters when deciding whether to grant consent for the Project. These are referred to as mandatory considerations, which are detailed in Table 4-2.

Table 4-2 Mandatory Considerations

Statutory Reference	Mandatory Consideration
Considerations under the EP&A Act and Regulation	
Section 1.3 – Objects of the Act	Pursuant to Section 1.3 of the EP&A Act, the Objects of the Act are: *(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,* *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,* *(c) to promote the orderly and economic use and development of land,* *(d) to promote the delivery and maintenance of affordable housing,* *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,* *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),* *(g) to promote good design and amenity of the built environment,* *(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,* *(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,* *(j) to provide increased opportunity for community participation in environmental planning and assessment.*
Section 4.15 – Evaluation	Pursuant to Section 4.15 of the EP&A Act, the consent authority is required to take the following matters into consideration in determining a development application: ■ Relevant environmental planning instruments including: – State Environmental Planning Policy No 55 – Remediation of Land; – State Environmental Planning Policy No 33 – Hazardous and Offensive Development; – State Environmental Planning Policy (Infrastructure) 2007; and – Conargo Local Environmental Plan 2013; – Hay Local Environmental Plan 2011. ■ Relevant development control plans: ■ the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; ■ the suitability of the site for the development; ■ any submissions made in accordance with this Act or the regulations; and ■ the public interest. These will be considered in the EIS.
Considerations under other legislation	
Biodiversity Conservation Act 2016 – Section 7.14	The Minister for Planning and Homes is required to take into account the impact of the development on biodiversity values as assessed in the BDAR. The Minister may (but is not required to) further consider under the Act the likely impact of the proposed development on biodiversity values.

Statutory Reference	Mandatory Consideration
Considerations under relevant EPIs	
State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) – Chapter 3	Chapter 3 of the Resilience and Hazards SEPP assesses the potential hazards associated with the proposed development by providing definitions and guidelines for hazardous industry, offensive industry, hazardous storage establishments, and offensive storage establishments. In accordance with Section 3.7 of the Resilience and Hazards SEPP, consideration will be given to current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development, including: ■ Hazardous Industry Planning Advisory Paper No 3 – Risk Assessment ■ Hazardous Industry Planning Advisory Paper No 12 – Hazards In addition, a preliminary risk screening assessment will be undertaken for the Project at the EIS phase in accordance with Chapter 3 of the Resilience and Hazards SEPP.
State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)– Chapter 4	Chapter 4 of the Resilience and Hazards SEPP provides a state-wide planning approach to the remediation of contaminated land. Under Section 4.6 (1) of the Resilience and Hazards SEPP, a consent authority is required to consider whether a proposed development site is contaminated before granting consent. An assessment will be prepared as part of the EIS to determine the potential contamination risk associated with the Project. Noting the agricultural land use of the Project Area, the assessment will take into consideration historical land use that may have resulted in contamination within and surrounding the Project Area.
Hay Local Environmental Plan 2011	The EIS will address relevant components of the LEP, including: ■ Section 1.2 – Aims of Plan ■ Land Use Table – Objectives and permissible uses of the *RU1 – Primary Production* zone.
Conargo Local Environmental Plan 2013	The EIS will address relevant components of the LEP, including: ■ Section 1.2 – Aims of Plan ■ Objectives and permissible uses of the *RU1 – Primary Production* zone.
Considerations under Development Control Plans	
N/A	There are no Development Control Plans that are applicable to the Project Area. Under Section 2.10 of the Planning Systems SEPP, DCPs do not apply to SSD projects: *2.10 Exclusion of application of development control plans* *Development control plans (whether made before or after the commencement of this Policy) do not apply to—* *(a) State significant development, or* *(b) development for which a relevant council is the consent authority under section 4.37 of the Act.* The Project will be classified as SSD.

Statutory Reference	Mandatory Consideration
Considerations under the EP&A Act and Regulation	
Section 1.3 – Objects of the Act	Pursuant to Section 1.3 of the EP&A Act, the Objects of the Act are: *(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,* *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,* *(c) to promote the orderly and economic use and development of land,* *(d) to promote the delivery and maintenance of affordable housing,* *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,* *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),* *(g) to promote good design and amenity of the built environment,* *(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,* *(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,* *(j) to provide increased opportunity for community participation in environmental planning and assessment.*
Section 4.15 – Evaluation	Pursuant to Section 4.15 of the EP&A Act, the consent authority is required to take the following matters into consideration in determining a development application: ■ Relevant environmental planning instruments including: – State Environmental Planning Policy No 55 – Remediation of Land; – State Environmental Planning Policy No 33 – Hazardous and Offensive Development; – State Environmental Planning Policy (Infrastructure) 2007; and – Conargo Local Environmental Plan 2013; – Hay Local Environmental Plan 2011. ■ Relevant development control plans: ■ the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; ■ the suitability of the site for the development; ■ any submissions made in accordance with this Act or the regulations; and ■ the public interest. These will be considered in the EIS.
Considerations under other legislation	
Biodiversity Conservation Act 2016 – Section 7.14	The Minister for Planning and Homes is required to take into account the impact of the development on biodiversity values as assessed in the BDAR. The Minister may (but is not required to) further consider under the Act the likely impact of the proposed development on biodiversity values.

Statutory Reference	Mandatory Consideration
Considerations under relevant EPIs	
State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) – Chapter 3	Chapter 3 of the Resilience and Hazards SEPP assesses the potential hazards associated with the proposed development by providing definitions and guidelines for hazardous industry, offensive industry, hazardous storage establishments, and offensive storage establishments. In accordance with Section 3.7 of the Resilience and Hazards SEPP, consideration will be given to current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development, including: ■ Hazardous Industry Planning Advisory Paper No 3 – Risk Assessment ■ Hazardous Industry Planning Advisory Paper No 12 – Hazards In addition, a preliminary risk screening assessment will be undertaken for the Project at the EIS phase in accordance with Chapter 3 of the Resilience and Hazards SEPP.
State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)– Chapter 4	Chapter 4 of the Resilience and Hazards SEPP provides a state-wide planning approach to the remediation of contaminated land. Under Section 4.6 (1) of the Resilience and Hazards SEPP, a consent authority is required to consider whether a proposed development site is contaminated before granting consent. An assessment will be prepared as part of the EIS to determine the potential contamination risk associated with the Project. Noting the agricultural land use of the Project Area, the assessment will take into consideration historical land use that may have resulted in contamination within and surrounding the Project Area.
Hay Local Environmental Plan 2011	The EIS will address relevant components of the LEP, including: ■ Section 1.2 – Aims of Plan ■ Land Use Table – Objectives and permissible uses of the *RU1 – Primary Production* zone.
Conargo Local Environmental Plan 2013	The EIS will address relevant components of the LEP, including: ■ Section 1.2 – Aims of Plan ■ Objectives and permissible uses of the *RU1 – Primary Production* zone.
Considerations under Development Control Plans	
N/A	There are no Development Control Plans that are applicable to the Project Area. Under Section 2.10 of the Planning Systems SEPP, DCPs do not apply to SSD projects: *2.10 Exclusion of application of development control plans* *Development control plans (whether made before or after the commencement of this Policy) do not apply to—* *(a) State significant development, or* *(b) development for which a relevant council is the consent authority under section 4.37 of the Act.* The Project will be classified as SSD.

5. COMMUNITY ENGAGEMENT

ENGIE is committed to an open and responsive engagement process that builds trust and constructive relationships with the community and stakeholders. ENGIE seeks to understand the values, concerns and needs of those directly and indirectly affected by its operations by proactively seeking input and feedback early and throughout the project lifecycle.

ENGIE has based its approach to engagement in alignment with regulatory approval requirements and industry best practices to ensure consistent, targeted, and meaningful engagement. This section outlines the approach to engagement, the regulatory and industry requirements and corporate principles guiding the engagement process and provides a summary of engagement activities planned and delivered to date.

To support transparent information about the project as a whole and to ensure a community-centric approach, this section details the engagement activities for all components of The Plains Renewable Energy Park including the solar, wind and ancillary infrastructure.

5.1 Engagement Considerations and Principles

The Department of Planning and Environment (DPE) has released engagement guidelines for State Significant Developments, specifically *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, 2021d). These guidelines have informed ENGIE's approach to engagement to ensure DPE expectations are addressed from the earliest possible stages in the project lifecycle.

Additionally, and to ensure alignment with leading practice, the approach to engagement also reflects industry standards and best practices, including:

- International Association for Public Participation's Quality Assurance Standard (2015); and
- Clean Energy Council's Best Practice Charter for Renewable Energy Developments (2021).

ENGIE recognises the importance of consistent, targeted and meaningful engagement with communities and stakeholders and is committed to the following guiding principles:

- We communicate decisions that will affect stakeholders as early as possible, transparently, and through channels that are accessible to all groups in the community;
- We listen to feedback and are clear with stakeholders where they can influence outcomes / co-create / participate in the decision-making process;
- We incorporate stakeholder feedback wherever possible and follow through where there has been a commitment made; and
- We give confidence to regulators, governments, decision-makers and other stakeholder representatives by demonstrating our stakeholder engagement approach.

5.2 Stakeholders

ENGIE has identified relevant stakeholders who are affected by or have an interest or influence in the Project. Table 5-1 provides an initial list of stakeholder groups who have been or will be engaged throughout the project lifecycle. This list will be reviewed and updated in response to stakeholder feedback as the project progresses.

Table 5-1 Stakeholders

Stakeholder group	Identified stakeholders
Federal Government representatives	■ Australian Energy Infrastructure Commissioner, Andrew Dyer ■ Member for Farrer, the Hon Sussan Ley MP ■ Minister for the Environment and Water, the Hon Tanya Plibersek MP
State Government representatives	■ Member for Murray, Helen Dalton MP ■ NSW Minister for Energy, the Hon Matthew Kean MP ■ NSW Minister for Environment and Heritage, the Hon James Griffin
Federal and State government departments and agencies	■ Civil Aviation and Safety Authority (CASA) ■ Emergency service organisations, including NSW Rural Fire Service ■ NSW Department of Planning and Environment (DPE) ■ NSW Environmental Protection Authority (EPA) ■ NSW Local Land Services ■ Office of the National Wind Farm Commissioner ■ Regional Development Australia (RDA) ■ Transport for NSW (TfNSW)
Hay Shire Council representatives and executives	■ General Manager, David Webb ■ Director Planning and Development, Jack Treblanche ■ Economic Development Officer, Alison McLean ■ Cr Carol Oataway, Mayor ■ Cr Lionel Garner, Deputy Mayor ■ Cr Geoff Chapman ■ Cr Jenny Dwyer ■ Cr Martyn Quinn ■ Cr Paul Porter ■ Cr Peter Handford
Edward River Council representatives and executives	■ General Manager, Phil Stone ■ Director Infrastructure, Mark Dalzell ■ Cr Peta Betts, Mayor ■ Cr Paul Fellows, Deputy Mayor ■ Cr Shirlee Burge ■ Cr Harold Clapham ■ Cr Linda Fawns ■ Cr Pat Fogarty ■ Cr Tarria Moore ■ Cr Marc Petersen
Other nearby local councils (<40 km from site)	■ Berigan Shire Council ■ Carrathool Shire Council ■ Murray River Council ■ Murrumbidgee Council ■ Riverina & Murray Joint Organization (RAMJO)
Indigenous communities and groups	■ Aboriginal Advisory Group – Local Land Services ■ Aboriginal Affairs NSW ■ AbSec ■ Hay Local Aboriginal Land Council ■ NSW Aboriginal Land Council ■ Registered Aboriginal Parties (RAPs) and Aboriginal groups ■ Riverina-Murray Regional Alliance ■ Traditional Owners

Stakeholder group	Identified stakeholders
Businesses, suppliers and economic groups	■ Industry Capability Network ■ Murray-Riverina Business Chamber ■ Regional Development Australia – Riverina and Murray Murray-Riverina Business Chamber ■ Regional/local suppliers and businesses
Industry and interest groups	■ Clean Energy Council ■ NSW Farmers Association ■ NSW Irrigators' Council ■ CANAssist ■ Intereach ■ Country Women's Association ■ Agricultural Tours Riverina ■ Murray Regional Tourism ■ Destination Riverina Murray ■ TAFE
Directly impacted host landowners	Landowners who potentially will host infrastructure for The Plains Renewable Energy Park
Adjacent landowners / neighbours	Landowners within 10 km of proposed infrastructure for The Plains Renewable Energy Park
Local community members	Community members who live greater than 10 km from proposed infrastructure for The Plains Renewable Energy Park
Local religious organisations, schools and clubs	■ Local churches, such as Hay Baptist Church of Hope, Saint Andrew's Presbyterian Church, St Fergal's Catholic Church ■ Primary and high schools, such as Hay Public School, Hay War Memorial High School and Saint Mary's Primary School ■ Sporting organisations, such as Hay Bowling & Golf Club
Local media	■ 2Hay FM Community Radio ■ ABC Radio Riverina ■ Deniliquin Pastoral Times ■ The Land (Australian Community Media) ■ The Riverine Grazier ■ WIN News Riverina

5.3 Communication Materials and Engagement Opportunities

ENGIE has developed communication materials and an extensive engagement program to build positive relationships with stakeholders and the local community. The engagement program will help to identify and understand perceived community issues and impacts as early as possible in the planning and assessment process. Table 5-2, Table 5-3 and Table 5-4 outline the range of communication and engagement activities planned and delivered to date.

Table 5-2 Communication channels and materials

Activity	Description
Community contact card	A community card with key project and contact details to distribute to community members at the drop-in sessions and as required.
Project community guide	A fold-out booklet with detailed information about the project, including a map of the location, frequently asked questions, and opportunities to find out more and provide feedback.

Activity	Description
Project email address	A dedicated email address (theplainsenergypark.au@engie.com) was established to receive and respond to enquiries from the community and interested stakeholders.
Project factsheet	A double-sided A4 factsheet to provide information on the project background, the need and community benefit, timeline, and contact details.
Project FAQs	Frequently Asked Questions are available on the webpage to provide key information about the project and help answer common queries. A booklet of Frequently Asked Questions has also been developed to distribute at drop-in sessions and to key stakeholders.
Project phone line	A dedicated toll-free telephone number (1800 845 067) was established to receive and respond to enquiries from the community and interested stakeholders
Project webpage	The Plains Renewable Energy Park webpage was established on ENGIE's website (www.engie.com.au/theplains). The webpage includes information on the project background and need, project milestones and timelines, community consultation opportunities, and links to further information and how to provide feedback.
Stakeholder briefing pack	A stakeholder briefing pack was developed to support initial meetings with key stakeholder groups including local government and Indigenous groups.

Table 5-3 Communication and promotional activities

Activity	Description
Community Facebook groups	Local community groups promoted the community information sessions on their Facebook pages, including the What's On in Hay group and the Hay & District Noticeboard.
Community newsletters and noticeboards	Project information was included in several community newsletters, including: ■ Hay Shire Council community newsletter ■ Hay Shire Council business newsletter ■ Hay Public School Newsletter. Community organisations also promoted the community information sessions by displaying flyers in their offices and on community notice boards.
Introductory letters	An introductory letter was sent out to surrounding community members and nearby residents to introduce them to the project and provide them with project contact details.
Print media and advertisements	Media releases were provided to local print media outlets to release and promote project news and milestones. Print advertisements promoted opportunities for the community to provide feedback and input. The community drop-in sessions held in August ,were advertised in the Riverine Grazier newspaper for three weeks prior to the events.
Project flyer	An A4 flyer was distributed throughout the Hay community using digital and print noticeboards to promote the project and community information sessions.
Project newsletter	An e-newsletter is intended to keep the community informed on project progress, good news stories and opportunities to provide feedback.
Radio advertisements and interview	A 20-second radio advertisement aired on 2HayFM for three weeks introducing the project and promoting upcoming community information sessions. The advertisements aired three times a day, Monday to Friday. In addition, a five-minute question and answer style interview aired on Friday 19 August, which provided an overview of the project, local benefits, current project timeframe and how the community can get involved in the development process.

Table 5-4 Consultation and engagement activities

Activity	Description
Community drop-in sessions	Two community drop-in sessions were held at the Hay War Memorial Hall to provide information about the project and seek early feedback: ■ Wednesday 24 August, 5 pm- 7 pm ■ Thursday 25 August 8 am- 10 am The sessions focused on providing general project information. Information sessions were widely promoted in newspaper advertisements, local radio, Facebook posts and public noticeboards.
Community survey	An online survey was available on the webpage and at community drop-in sessions to secure general feedback regarding the proposal and more specific feedback on social values, visual aspects, landscape features, scenic quality, and views. The survey was also promoted through advertisements in the local media.
Landowner and neighbour meetings	One-on-one meetings with landowners and nearby residents to introduce the project, answer questions and confirm key points of contacts.
Operational site tour	Site tours with landholders to similar project sites to increase their understanding of the requirements for the proposed project, as well as the project impacts.
Project site visits	Project site visits for landholders and nearby neighbours to deepen their understanding of the requirements for the proposed project, as well as the scope and scale.
Stakeholder briefings	Briefings and meetings with government representatives, Indigenous communities and groups and other key stakeholder groups.

5.4 Engagement Feedback and Outcomes

Engagement activities during the early planning stage have focused on introducing the project and understanding community values, potential issues and concerns. Given the early planning stage of the project, significant engagement has been undertaken with the local council, traditional owner groups, potential host landowners and nearby residents.

Approximately 200 engagement activities have been undertaken as part of the development of The Plains Renewable Energy Park, and include (but not limited to):

- 42 engagements with host landowners and neighbours, including introductory letters, face-to-face meetings and follow-up discussions;
- 128 briefings, follow-up meetings and other interactions with key local stakeholder groups including Members of Parliament, Hay Shire Council, Indigenous groups and media; and
- 2 community drop-in information sessions held on 24 and 25 August 2022 in Hay, with approximately 45 people attending.

In addition,~68,000 people were potentially reached through print, radio and online advertisements and other promotional activities, supporting awareness of the project and the community drop-in sessions. There have also been 592 views of the project webpage from 14 July 2022 through to 31 August 2022.

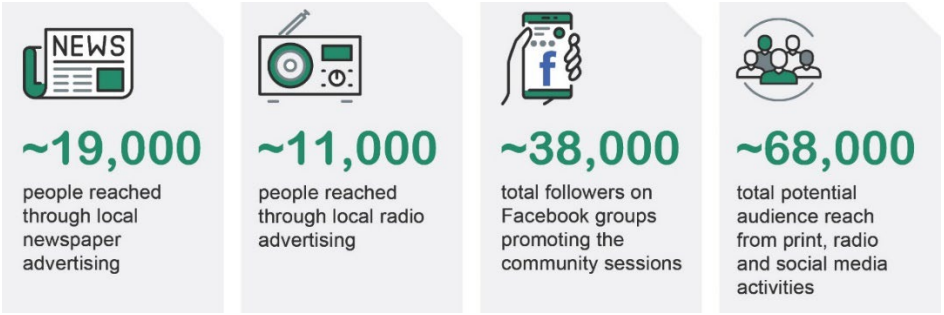


Figure 5-1 Print, radio and social media activities

Engagement feedback

Feedback received to date from the community and project stakeholders has varied across general comments about the project to detailed and specific discussions. Feedback has been largely positive, with some comments including:

- *"A very positive project proposal with numerous benefits to the local and wider community. This project seems very viable due to the close proximity to the township which would increase employment and tourism opportunities."*
- *"We are in full support of this project in our area and see only benefits to our region for our young people, environment, farming land, economy and tourism. We request more wind towers to increase the economic and energy potential for our area."*

A high-level overview of the breadth and volume of topics of discussion with the community and key stakeholders is identified in Figure 5-2 below. Greater detail on the key themes of the feedback received have been summarised in Table 5-5.

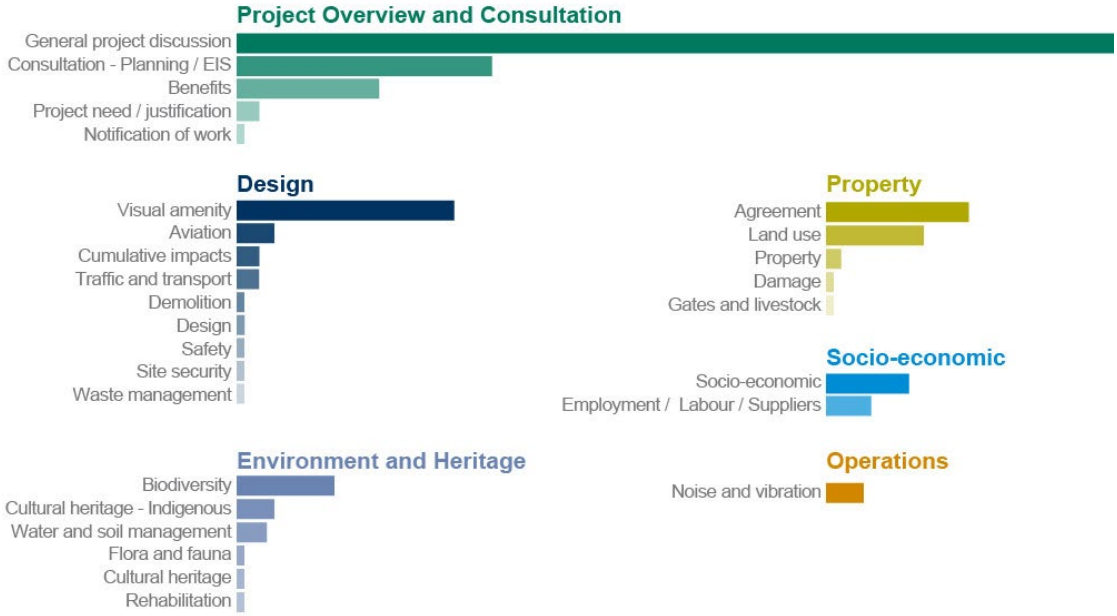


Figure 5-2 Overview of topics of conversation

Table 5-5 Feedback summary

Theme	Focus of feedback	Stakeholders
Aviation	■ Collaboration with council on considerations for changes to airport operating procedures	■ Hay Shire Council Planning Staff
Community benefits	■ Significant recognition of the positive impacts that The Plains Renewable Energy Park can bring to the region including clean energy, local community benefits and investments and increased economic benefits (see Figure 5-3) ■ Funding support for community-based organisations and local employment opportunities were identified as key benefits that would be meaningful to the local community, especially opportunities to support young people staying in the area ■ Other potential benefit initiatives that were identified include support for local tourism and health services	■ Directly impacted host landowners ■ Adjacent landowners / neighbours ■ Local community members ■ Local government Local government
Community concerns	■ Visual amenity was identified as a concern to the local community, as well as noise impacts and the effect on land use and the environment (Figure 5-4) ■ The Plains Wanderer biodiversity habitat concerns in the south-east corner of the project area ■ Visual impact considerations from viewpoints from the Murrumbidgee ■ Potential cumulative visual impacts of multiple renewable energy projects in the surrounding area	■ Directly impacted host landowners ■ Adjacent landowners / neighbours ■ Local community members
Community values	■ Key community values identified include the environment (flora and fauna), agriculture, community / family and employment opportunities	■ Directly impacted host landowners ■ Adjacent landowners / neighbours ■ Local community members ■ Local business owners
Consultation process	■ ENGIE to provide community engagement activities in Booroorban, as well as Hay ■ Provide briefings to support local businesses and contractors to be involved in the project	■ Directly impacted host landowners ■ Adjacent landowners / neighbours ■ Local community members
Infrastructure location	■ The location of infrastructure should not be limited to one property. By including additional properties, project benefits will be distributed more widely and will help local farming families	■ Directly impacted host landowners ■ Adjacent landowners / neighbours

Local landowners and community members were able to respond to an online survey, which is also provided ass a hard copy at the community information sessions. Figure 5-3 and Figure 5-4 show the results of what the community believe to be the benefits and concerns of the project.

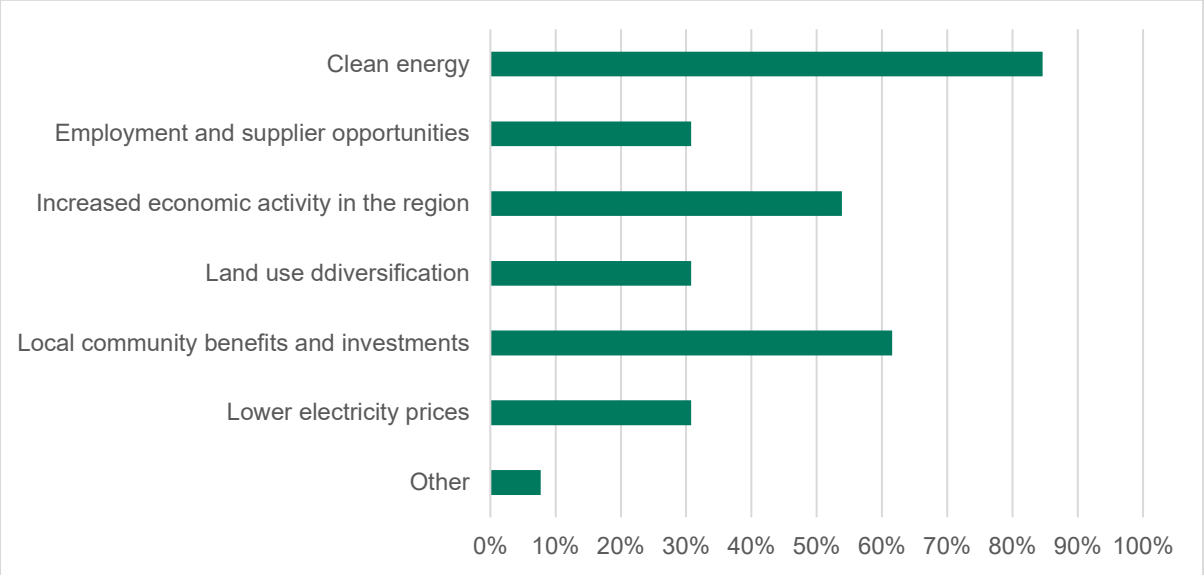


Figure 5-3 Community identified benefits of The Plains Renewable Energy Park

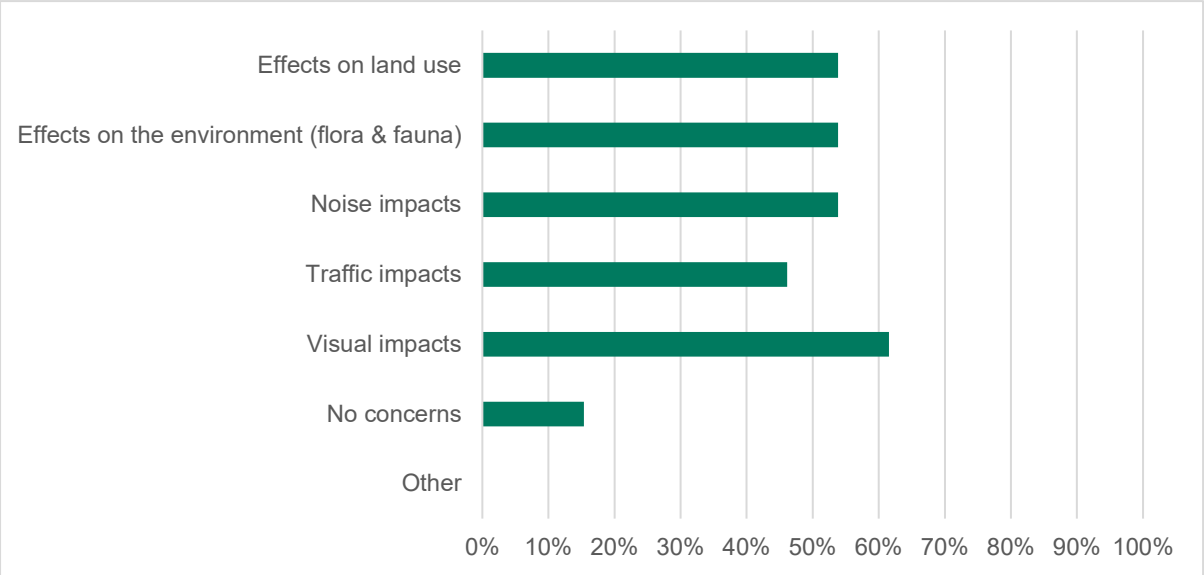


Figure 5-4 Community identified concerns of The Plains Renewable Energy Park

Consultation on Layout Changes

The project originally consulted with neighbours within 10km of the project area on the concept layout for wind and solar infrastructure. During these consultations, six landowners expressed interest in being involved with the project, and subsequently 24 turbines have been added to the layout. When consulting with the wider community, with project maps printed and laminated in A3 the additional turbine locations were discussed and feedback received was positive regarding further landowners being involved in an income opportunity from the project. In correspondence with neighbours the additional turbines were discussed, and their feedback has been considered in this scoping report. In consultation with neighbours to the south-east of the project, visual amenity concerns as well as sensitive biodiversity was raised, and the project has removed 41 turbine locations in response to issues raised. The changes to the layout have been updated through the scoping report and technical assessments and the project will continue to work with neighbours, first nations groups and the community on optimising the project design to maximise benefits and reducing potential impacts.

Outcomes of feedback

In response to the community and stakeholder feedback received to date, ENGIE are investigating the feasibility of amending the initial project scope and/or developing alternative options to support the integration of The Plains Renewable Energy Park into the local Hay community. The investigations and additional work stemming from community and stakeholder feedback are summarised in Table 5-6.

Table 5-6 Response to feedback summary

Theme	Response to feedback
Aviation	The project will continue engaging with Hay Shire Council and aviation stakeholders to work through required changes to operating procedures for Met Masts and Wind Turbine heights
Community benefits	Given significant interest in community benefits, ENGIE is in the early stages of developing a community benefit-sharing framework for The Plains Renewable Park and will work closely with stakeholders and the community to understand the local context and explore unique opportunities to share the project's benefits and deliver positive local impacts to the community.
Community concerns	Throughout our engagements with the community, we have been documenting community concerns and will utilise them throughout layout workshops to reduce impact to neighbours and the local community.
Community values	The community has high value on the agricultural production in the area, ensuring young adults stay in the area by providing them with training and job opportunities as well as cohesiveness and transparency.
Consultation process	ENGIE will continue to genuinely engage with local community members and stakeholders. As heard from community members, for future engagement activities ENGIE will expand the geographical location of community drop-in information sessions to include Booroorban in addition to Hay.
Infrastructure location	With several nearby residents expressing interest in hosting infrastructure on their properties, the project team are working to revise the initial design plan to incorporate more properties and include interested residents in the project.

5.5 Future Engagement Activities

ENGIE recognises the importance of consistent, targeted and meaningful engagement and will continue to work with stakeholders and the local community and create opportunities for them to provide input and feedback throughout the planning approval process and throughout construction and ongoing operations.

The next stage of engagement will build on the constructive relationships established with stakeholders and the local community and explore the questions, concerns, issues and opportunities that arose during early discussions. ENGIE will continue to utilise the broad range of communication and consultation activities to support genuine community engagement.

All feedback will continue to be collected and recorded in a structured manner using ENGIE's internal database. Engagement approaches will be evaluated and reviewed regularly to ensure these provide adequate participation opportunities and respond to stakeholder needs and expectations.

6. PROPOSED ASSESSMENT OF IMPACTS

6.1 Categorisation of Assessment Matters

This section outlines matters requiring further assessment in the EIS and the level of assessment that should be undertaken for each matter. A preliminary environmental assessment was undertaken to identify the potential matters associated with the proposed construction and operation of the Project. The following were considered in the identification of matters requiring further assessment in accordance with the Scoping Report Guidelines (DPIE, 2021a):

- The scale and nature of the likely impacts of the Project and the sensitivity of the receiving environment;
- Whether the Project is likely to generate cumulative impacts with other relevant future projects in the area;
- The ability to avoid, minimise and/or offset the impacts of the Project, to the extent known at the scoping stage; and
- The complexity of the technical assessment of the Project.

Each matter and its proposed level of assessment (detailed or standard) is identified in Table 6-1. Detailed assessments include environmental aspects that present a potential high constraint to the development, and other aspects which require detailed assessment, but do not pose a high risk constraint. In addition, the matters have been categorised to align with those identified in the Scoping Report Guidelines, and a Scoping Summary Table has been included in Appendix B.

The key matters requiring more detailed assessments have been identified based on a preliminary assessment of the Project Area and by taking into consideration other wind farm developments in NSW.

Table 6-1 Proposed Assessment

Level of Assessment	Aspect
Detailed (potential high constraint)	Amenity – Landscape and Visual Amenity – Noise and Vibration Aviation Biodiversity Heritage - Aboriginal Cultural
Detailed	Access - Traffic and Transport Telecommunications
Standard	Air Quality and Greenhouse Gas Hazards and Risks – Blade Throw Hazards and Risks – Bushfire Hazards and Risks – Electromagnetic Field Hazards and Risks – Preliminary Hazard Analysis Heritage – Historic Land Resources Social Waste Management Water Resources

The EIS will be prepared in accordance with the SEARs to be issued by DPIE in response to this Scoping Report, and will incorporate the issues which have been outlined in Table 6-1 above. All assessments (including specialist assessments) will be completed by taking into consideration consultation with stakeholders, industry best practice guidelines, and the experiences from other renewable energy projects.

6.2 Amenity

6.2.1 Preliminary Visual Impact Assessment

This section provides a summary of the results and findings of the Preliminary Visual Impact Assessment (PVIA) prepared and contained as Appendix C to this Scoping Report.

The PVIA was undertaken by Moir Landscape Architecture (MLA). The PVIA was prepared in accordance with the current *NSW Guidelines for Stage 1: Scoping Paper for Wind Farms Wind Energy: Visual Assessment Bulletin DPIE 2016* (the Visual Bulletin) (DPIE, 2016b).

The Study Area, as referred to in the PVIA and within this section, is generally defined as the Project Area and surrounding land requiring assessment in the PVIA. The Study Area is generally defined as the land up to 15,000 m from the nearest turbines. Closest landmarks include the towns of Hay and Booroorban, the Auscott Limited Warehouse and Oolambeyan National Park. The Project Area is located on either side of the 16 Mile Gum Rest Area

The following was undertaken in the preparation of the PVIA:

- **Desktop Assessment:** Application of Preliminary Assessment Tools to determine receptors with potential sensitivity; preparation of a preliminary Zone of Visual Influence (ZVI) to establish a theoretical zone of visibility of the Project; and identification of key viewpoints and landscape features using available mapping and background documents.
- **Site Inspection:** Photographic survey work for the assessment was undertaken in November 2021 to carry out a preliminary assessment of the existing landscape character from publicly accessible land within the Study Area. The findings of the site inspection are included in the PVIA and will form the basis for discussion with the community in the EIS Phase of the Project.
- **Community Consultation:** Community consultation has been undertaken through the scoping phase of the Project via community survey and neighbour consultations. Results of the community consultation documented in previous studies have also been utilised to gain perspective on the landscape values held by the community to inform the PVIA.

6.2.1.1 Existing Environment

Key Landscape Features and Viewpoints

The Bulletin states proponents must identify key landscape features, dwelling locations and key public viewpoints. This section provides an overview of the key features identified within and around the Project Area.

Geology and landform

The region is made up of Quaternary alluvial sediments with shallow and small depressions that are as deep as 2 m (Environment NSW, 2011). These depressions form a number of dry lakes studded in the landscape. In some areas these depressions form large scale swamps. The landform is also characterised by isolated low rises formed by aeolian processes, i.e., through wind action (Environment NSW, 2011). Landform is generally flat with dry distributary channels and floodplains.

Vegetation character

A number of saltbush and cottonbush varieties dominate the region with very sparse tree communities, thus yielding clear, open views of the expanse. The lack of tall canopy species allows higher wind speeds with continual wind actions on the landscape. Mid-canopy species such as lignum and nitre goosefoot are occasionally visible in the landscape and are favoured by emus. Predominance of low-storey vegetation allows easier grazing opportunities for sheep, thus rendering the area favourable for livestock grazing. Most canopy cover is prominent within the extents of the South West Woodlands Nature Reserve and Kalyarr National Park extents.

Creeks, swamps and dry lakes

Given the dry and arid conditions of the region, the lakes and creeklines remain dry through most of the year. The most significant hydrological features in close proximity of the Project Area include Abercrombie Creek, The Forest Creek, Murrumbidgee River, Deaf Adder Swamp and Box Swamp. Lakes or depressions are generally shallow and defined by low-storey, scrubby vegetation such as saltbush and canegrass species (Environment NSW, 2011). These areas have the capacity to hold water and are generally favoured for sheep and emu grazing. Creek floodplains, on the other hand, are defined by a denser vegetation character with scattered clumps of belah trees, saltbush, speargrass and forbs (Environment NSW, 2011). The region also presents swamps and pans with dillon bush, canegrass and nitre goosefoot spread across extensive gray clays (Environment NSW, 2011). Lack of availability of fresh water sources has led to the prominence of native grazing pastures with occasional modified pastures and dryland cropping.

Nature Reserves, State Conservation Area and National Park

South West Woodlands Nature Reserve is located to the immediate south of the Project Area. The Nature Reserve exhibits characteristics of the Riverina Bioregion's Murrumbidgee subregion. The Nature Reserve is one of the examples of undisturbed patch of dense belah, mallee, rosewood and sugarwood communities with abundant grasses and dillon bush (NPWS, 2003). A combination of these remnant native vegetation patches forms the Murrumbidgee Valley Parks that are a testimony to the endemic landscape characteristics of the western Riverina region. The region also has significant historic and cultural associations such as Aboriginal burial sites, middens, spiritual sites, woolsheds and other structures established during colonial settlement. The parks also host biologically diverse areas that provide habitat for 24 threatened species (NPWS, 2020).

Campgrounds and Points of Interest

Recreational associations occur mostly within the extents of Hay and along the Murrumbidgee River to the north of the Project Area. Wooloondool Campground offers opportunities for riverside camping, fishing, birdwatching and swimming. Groves of black box trees and river red gums dominate the riverside. A sunset lookout providing panoramic views of the surrounding landscape is located 16 kilometres north of Hay. Yanga Lake and Homestead are located further about 30 km west of the Project Area.

Hay also presents opportunities for recreation with its racecourse, small open spaces and Bidgee Riverside Trail. Hay boasts a strong heritage character is appealing to tourists for its historic buildings and heritage trail.

Consultation

In accordance with the Bulletin ongoing community consultation has been undertaken by the Proponent through an online survey that could be accessed via the Project website. The survey was distributed to both associated and non-associated landholders and interest groups between November 2021 and September 2022. As of September 2022, a total of nine (9) surveys had been completed. Community engagement will continue through the EIS Phase and provide the community with further opportunities to provide input into the Visual Baseline Study of the LVIA.

Key landscape features identified by the community include:

- "Open Native Grassland Plains"
- "Wide, flat plains" and "flat, open spaces"
- "Open Plain landscape with world renowned sunsets"
- "The Murrumbidgee River and the view across the plains and amazing sunsets"

Key public viewing locations identified by the community include:

- "16 Mile Gums on Cobb Hwy from Hay"
- "There is no "one" best viewing location in this area"

- "The open plains"

Where possible, these features and viewpoints have been mapped in the PVIA. Additional consultation and further detailed assessment of these features and viewpoints will be undertaken during the EIS phase.

6.2.1.2 Potential Visual Impacts

The potential visual impacts of the Project have been assessed within the PVIA in accordance with the Bulletin. Preliminary Assessment Tools were used and applied to both dwellings and key public viewpoints within the Study Area. The tools provide an early indication of where placement of turbines will require further assessment and justification, and where consultation with potentially affected landowners needs to be focused – including discussions for neighbour agreements.

The preliminary assessment tools involve analysis of two key visual parameters:

1. Visual Magnitude
2. Multiple Wind Turbine Tool

Dwellings identified through the application of the Preliminary Assessment tools have been assessed in detail in Appendix A of the PVIA (Appendix C).

Visual Magnitude

The Visual Magnitude Threshold is based on the height of the proposed wind turbines to the tip of the blade and distance from dwellings or key public viewpoints. The proposed wind turbines are based on a worst case scenario with a tip height of 280 metres. The 'black line' intersects at a distance of 3,750 metres and the 'blue line' intersects at 5,500 metres.

For the purpose of the Preliminary Assessment, the Visual Magnitude thresholds are based on a 2D assessment of the Project alone. Further assessment indicates factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the Project from residences.

Assessment of the Visual Magnitude Thresholds for the Project identified dwellings which that will require further assessment in accordance with the Bulletin. The assessment identified:

- No non-associated dwellings were identified within 3,750 metres of the proposed wind turbine locations (within black line of visual magnitude).
- Eight (8) non-associated dwellings have been identified within 5,500 metres of the proposed wind turbine locations (within blue line of visual magnitude). These are NAD_27, NAD_26, NAD_21, NAD_18, NAD_17, NAD_15, NAD_13 and NAD_14.
- Preliminary assessment of eight (8) representative sensitive receptors within 5,500 m of the proposed turbines have illustrates that existing intervening vegetation that surrounds majority of these non-associated dwellings is likely to reduce views to the Project.

The 3,750 m, 5,300 m and 8,000 m buffer, forming the Visual magnitude threshold and location of dwellings are identified in Figure 6-2.

Further detailed assessment, site inspections of sensitive receptors to ground truth this analysis and consideration of mitigation measures will be undertaken during the EIS phase.

Multiple Wind Turbine Tool

The Multiple Wind Turbine Tool provides a preliminary indication of potential cumulative impacts arising from the Project. To establish whether the degree to which dwellings or key public viewpoints may be impacted by multiple wind turbines, the proponent must map into six sectors of 60° any proposed turbines, and any existing or approved turbines within eight kilometres of each dwelling or key public viewpoint.

When applied to the Project, the 2D Multiple Wind Turbine Tool identified:

- 16 dwellings that will view turbines associated with the Project. Of these, three (3) non-associated dwellings will have views in up to two (2) 60 degree sectors and the remaining 13 non-associated dwellings will view the turbines within one (1) 60 degree sectors which is deemed an acceptable level in accordance with the Bulletin.
- One (1) key public viewpoint was identified within 8,000 m of the nearest turbine. The 16 Mile Gums Rest Area is located on Cobb Highway and the Project Area is located on either side of the rest area. Theoretically, the viewpoint will have views of the Project in all six (6) 60 degree sectors.
- Two (2) key public viewpoints were identified in the town of Hay - the Murrumbidgee River Rest Area and the Shear Outback Cafe. Theoretically, the viewpoints will not have views of the Project in any 60 degree sector since they are located more than 8,000m away from the nearest turbine.

Dwellings located on the eastern side of the Study Area have the potential to view turbines associated with the Project and the Bullawah Wind Farm. Bullawah Wind Farm is in its preliminary planning stages. Based on the information available in the public domain, the BWF project boundary is located approximately 5 km east of the Project. However, the layout of Bullawah Wind Farm is currently unknown (BayWa r.e., 2022) and is not yet listed on the major project portal.

Further assessment of these dwellings using 3D topographic mapping delivered the same results. Existing screening factors (including vegetation and structures) may reduce visibility of the turbines.

Further detailed assessment, site inspections of sensitive receptors to ground truth this analysis and consideration of mitigation measures will be undertaken during the EIS phase.

Zone of Visual Influence

The ZVI (also known as a Zone of Theoretical Influence Model) represents the area over which a development can theoretically be seen and is based on a Digital Terrain Model (DTM). The ZVI usually presents a bare ground scenario – i.e. a landscape without screening, structures or vegetation, and is usually presented on a base map.

The ZVI was determined through the use of digital topographic information and 3D modelling software WindPro. The ZVI has been assessed to approximately 30 km from the Project Area. Although it is possible for the development to be visible from further than 30 km away.

Figure 6-2 depicts the areas of land from which the proposed development may be visible and provides an indicative number of wind turbines based on the blade tip height of 280 metres. This indicates:

- Due to the relatively flat topography that characterises this landscape, the majority of turbines associated with the Project are likely to be visible from most areas around the Project Area.
- Certain areas such as the parts of the Murrumbidgee River that are located generally north of the Project Area have been identified in the ZVI as land parcels with views screened by topographical differences between them and the Project Area.
- Views to the majority of turbines associated with the Project are likely to be available for all dwellings within eight (8) kilometres of the wind turbines. This assessment is based on a consideration of topography alone and does not consider intervening elements such as vegetation and existing structures.

Following the development of the ZVI, detailed site investigations (in the form of a viewpoint analysis inventory and dwelling assessments) were undertaken to ground truth the findings. Preliminary viewpoint analysis (from 14 public locations) and assessment of eight (8) representative sensitive receptors have been included in Appendix A and Appendix B of the PVIA (Appendix C).

It is important to reiterate that this is a preliminary assessment based on worst case scenario that does not consider the impact of vegetation or structures. Ground-truthing during field work will ascertain potential visibility taking into account structures and vegetation, however, based on the preliminary assessments, it is likely that existing intervening vegetation surrounding

6.2.1.3 Assessment Approach

This PVIA report was undertaken in accordance with the Visual Bulletin and is contained as Appendix C to this Scoping Report. The PVIA:

- outlined the community consultation activities undertaken by ENGIE and identified the key landscape features and characteristics that were found within and surrounding the Project Area;
- noted the landscape features and locations of concern to the community and will further consider these within the EIS assessment; and
- applied the preliminary assessment tools (magnitude and multiple wind turbine) to the preliminary wind turbine layout.

Further assessment and justification for placement of turbines in multiple sectors will be detailed in the EIS, along with a description of the mitigation and management measures being employed to reduce impacts. Further assessment may identify that factors such as topography, relative distance and existing vegetation may minimise the impacts of the project on nearby involved and non-involved residences.

The scope of the LVIA will:

- Utilise the landscape character assessment to prepare a detailed Visual Baseline Study.
- Identify any additional key features, key viewpoints valued by the community through ongoing consultation.
- Refine the Landscape Character Units and allow the community to provide feedback on the relative scenic quality ratings of LCUs.
- Determine the Visual Influence Zone of key viewpoints and assess against the objectives outlined in the Visual Assessment Bulletin.
- Undertake site inspection and detailed dwelling assessment at sensitive non-associated dwellings. The LVIA will assess each ‘sensitive receptor’ in detail to take into account topography, vegetation and other screening factors.
- Determine the potential visual impact of each sensitive receptor and provide mitigation methods to reduce potential visual impacts.
- Include graphical representations of the Project via wireframes and photomontages.

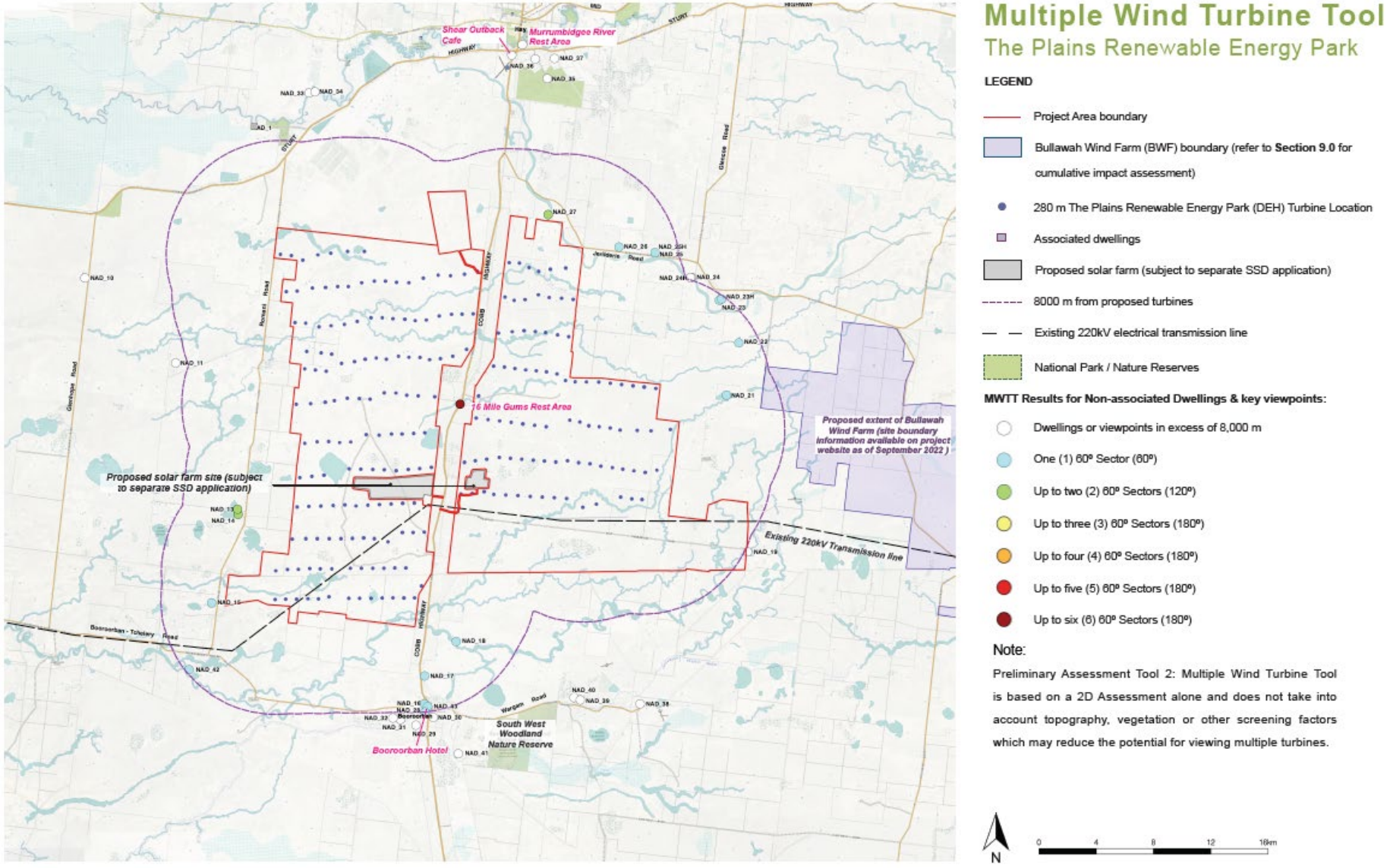


Figure 6-1 Multiple Wind Turbine Tool

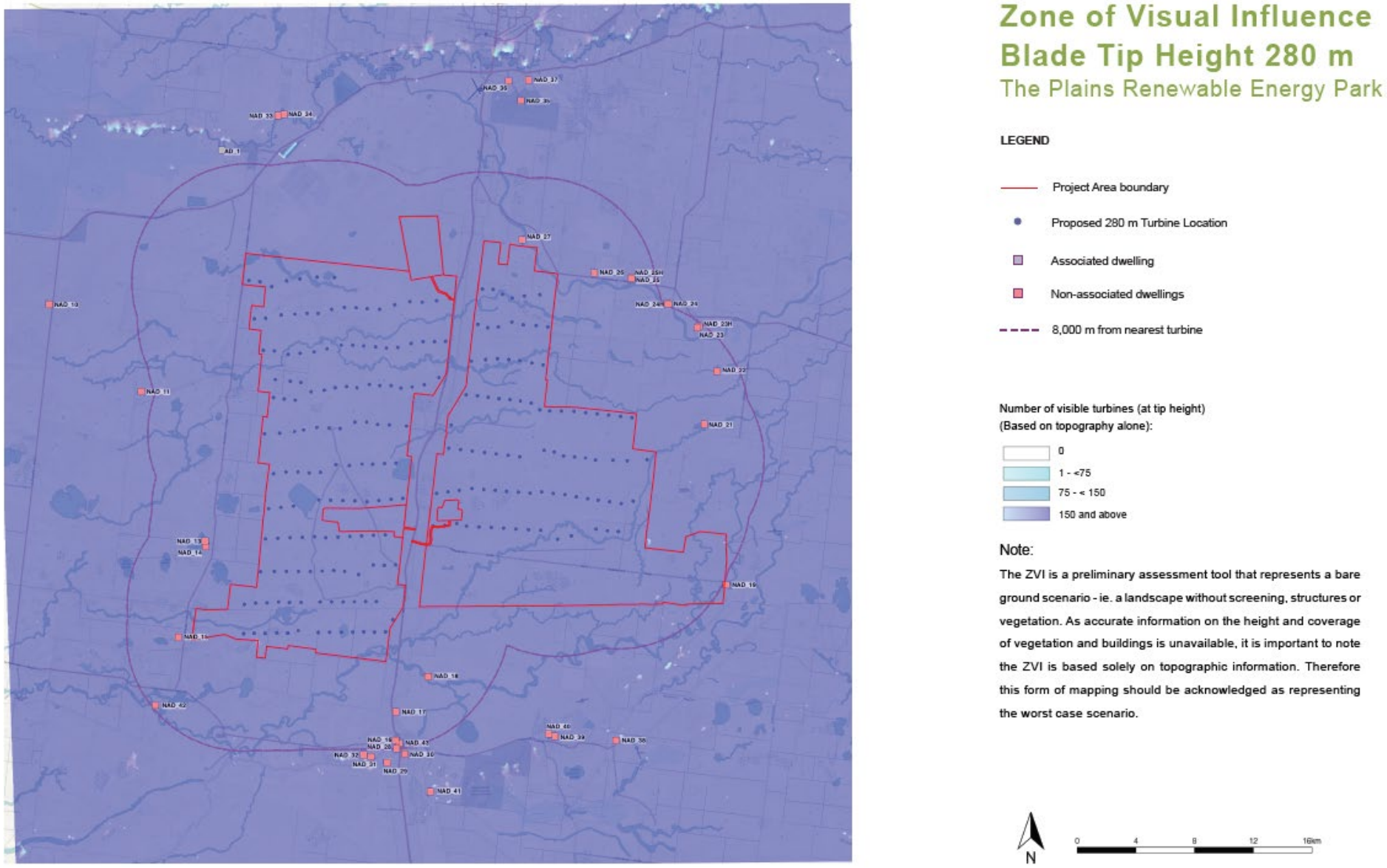


Figure 6-2 Zone of Visual Influence (Tip Height 280 m)

6.2.2 Wind Farm Noise

6.2.2.1 Existing Environment

Based on review of available online aerial imagery, the existing noise environment at the closest noise sensitive receptors is characterised to be that of a typical rural area, dominated by natural sounds and generally characterised by low background noise levels. Residential receptors are identified to be scattered with low human activity on local roads in the area of the influence of the project with some residence in close proximity to Jerilderie Road, Cobb Highway and Romani Road.

Noise monitoring will be conducted at a later stage of the project at selected receptors to ascertain the existing ambient noise levels within the area of influence.

6.2.2.2 Legislative Context

The NSW Department of Planning and Environment (DPE)[1] *Wind Energy: Noise Assessment Bulletin - for State Significant Wind Energy Developmen*t (Noise Bulletin) (DPIE, 2016c) dated December 2016, provides practical guidance to proponents, planners, regulatory authorities, acoustic specialists and the broader community on how to measure and assess environmental noise impacts from wind energy projects. It applies to all new SSD wind energy proposals seeking to obtain SEARs.

As stated in the Noise Bulletin, DPE adopted the South Australian document *Wind farms environmental noise guidelines* published in 2009 and updated in 2021 (SA EPA, 2009) to form the basis of the regulatory noise standard and assessment methodology that will apply to the Project.

The predicted noise levels in this indicative noise impact assessment are compared to the base noise criteria (the lowest criteria that can apply to any receptor) described in the Noise Bulletin. Following adjustments for tonality and low frequency noise, these indicative noise predictions ($L_{Aeq,\ 10\ minute}$) are compared against 35 dB(A).

The assessment noise predictions are made assuming continuous operation of all likely turbines proposed at their maximum sound power level, as per SA 2009 guidance.

6.2.2.3 Noise Modelling

The potential noise impacts at identified receptors were modelled and assessed based on the applicable assessment standards and guidelines. The preliminary assessment considers the worst-case noise propagation conditions based on the preliminary wind turbine layout, specification and operating mode.

Modelling Software

The wind farm and its area of influence were modelled using *SoundPLAN Noise Version 8.2* (SoundPLAN) noise modelling software package to predict noise emission levels at identified receptors by implementation the ISO 9613.2[2] noise propagation algorithm.

SoundPLAN allows 3D elevation data to be combined with ground regions, water, foliage and receptor locations, to create a detailed representation of the Project Area and surrounding area. The noise model allows the quantification of noise levels from multiple sources based on sound power levels emitted from each source. The parameter computed at all identified receptors was the $L_{eq,10\text{-}minute}$ parameter, in A-weighted decibels (dB(A).The implemented calculation method, as per ISO 9613.2, of SoundPLAN ensure that the software meets the requirements of ISO 17534[3].

[1] Previously known as The NSW Department of Planning, Industry and Environment (DPIE) prior to 2022

[2] International Organisation for Standardisation (ISO) 9613 Part 2 - 1996 - *Acoustics - Attenuation of Sound during Propagation Outdoors - Part 2: General Method of Calculation* (ISO 9613:2, 1996).

[3] International Organisation for Standardisation (ISO) 17534 - 2015 – *Acoustics - Software for the Calculation of Sound Outdoors*.

Modelling Parameters

The Noise Bulletin requires that the conditions and settings associated with worst-case noise propagation conditions be assessed. The Project is still in the concept stages of development. Preliminary noise data and specifications have been provided for the wind turbine to reflect a worst-case noise propagation scenario.

The following data and conservative assumptions were adopted to predict noise propagation in worst-case conditions:

- all 226 turbines operating concurrently as per the locations identified in Appendix Fand Figure 3-1;
- topography at 2m contour interval;
- modelling propagation extent noted to be approximately 6 km (to cover area of influence and beyond);
- dwelling/receptor locations within the area of influence as identified in Figure 6-3:
  - there are 15 receptors considered in the modelling, of which 10 are non-involved landowners;
- wind turbine Siemens Gamesa SG 6.0-170 6.2MW operating in Mode 0, with the following specifications:
  - cut-in speed of 3 m/s and cut-out speed of 26 m/s;
  - Sound Power Level of 106.0 dB(A) L_W;
  - 180 metre hub height;
  - 170 meter rotor diameter;
- Ground Factor of 0.5[4];
- Humidity 70%;
- Temperature 10°C; and
- Downwind - noise level at each receiver is predicted based on being simultaneously downwind of every wind turbine at the site.

The data provided for this preliminary noise assessment is valid for a downwind reference position as defined according to IEC 61400-11:3. Applicable environmental conditions correspond to the standardized requirements as per IEC 61400-11. Blade condition is assumed to be clean and undamaged.

6.2.2.4 Predicted Noise Levels

The noise modelling method described above was implemented to output the predicted $L_{eq,10\ minute}$ noise levels (in dB(A)) at receptors. The predicted noise levels and a preliminary compliance assessment at the closest and/or potentially most affected receptors are presented in Table 6.2. Potential non-compliances are indicated by the colour blue.

The results presented in Table 6.2 are for the maximum rated L_W value (106.0 dB(A)) of the nominated Siemens Gamesa SG 6.0-170 6.2MW turbine. A noise contour map of the modelled noise propagation is presented in Figure 6-3.

[4] A ground factor of 0.5 (mix of hard and soft ground).

Table 6.2 Predicted Noise Levels and Preliminary Compliance

Receptor ID	Co-ordinates (UTM GDA94 Zone 55)		Predicted Noise Level, $L_{Aeq,10\ min}$ dB(A)	Above 35 dB(A) Criteria (Margin of compliance, in dB)
	Easting	Northing		
AS_2	291151	6152158	39	Yes (+4.1)*
AS_4	304870	6150449	39	Yes (+3.6)*
AS_5	301358	6154312	36	Yes (+0.5)*
AS_6	304763	6154268	40	Yes (+4.6)*
AS_7	300404	6144200	27	No (-8.3)
NAD_13	282289	6146036	18	No (-16.9)
NAD_14	282337	6145664	19	No (-16.5)
NAD_15	280477	6139475	12	No (-22.7)
NAD_18	297571	6136773	17	No (-18.1)
NAD_21	316481	6154019	14	No (-20.9)
NAD_26	308949	6164362	16	No (-19.2)
NAD_27	304001	6166625	22	No (-12.9)
NAS_18	297614	6136690	17	No (-18.4)
NAS_27	303946	6166611	22	No (-12.8)
NAS_42	288128	6157481	44	Yes (+9.2)*

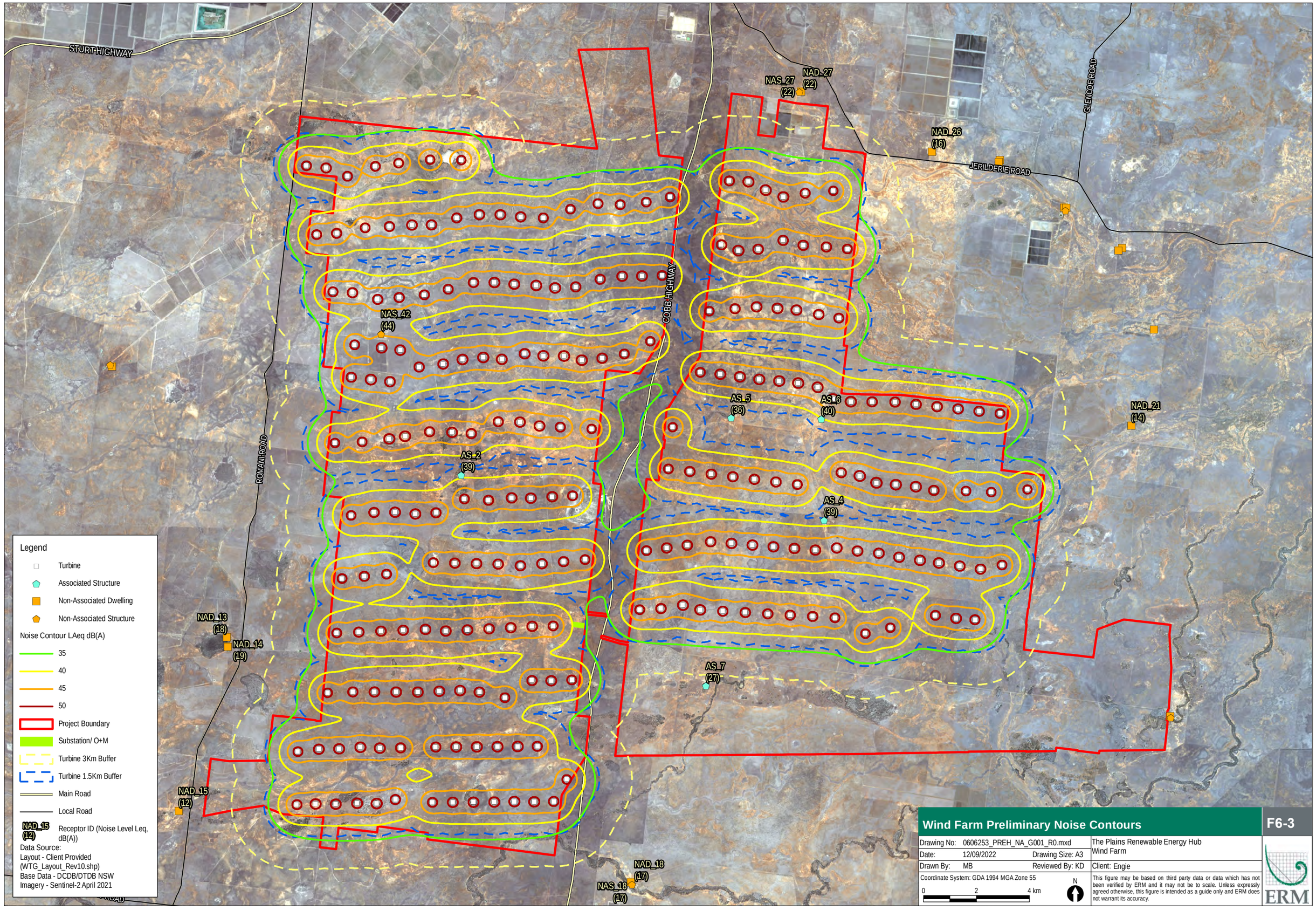
** Landowner agreements will be confirmed within the EIS phase of the project. These agreements will permit up to 45 dB(A) at all associated dwellings and structures.*

6.2.2.5 Summary of Findings

The predicted noise impact results, as presented in Table 6.2**,** indicate that potential non-compliances are at receptors AS_2, AS_4, AS_5, AS_6 and NAS_42, by 0.5 dB to 9.2 dB. Landowner agreements will be confirmed within the EIS phase of the project and will permit up to 45 dB(A) at all associated dwellings and structures.

Receptor NAS_42 is located at approximately 500 metres from the closest wind turbine, resulting into this receptor being the most impacted. NAS_42 has been confirmed to be a mobile working quarters and the landowner is working with the Project on becoming a host landowner.

Other than the five potential non-compliant receptors mentioned above which will all have negotiated landowner agreements in place to permit up to 45 dB(A), the most impacted receptor is AS_7. At this receptor, compliance is predicted to be achieved by 8.3 dB. All other compliant receptors indicate compliance margin of greater than 8.3 dB.


STURT HIGHWAY
NAS_27
(22)
NAD_27
(22)
NAD_26
(16)
JERILDERIE ROAD
GLENCOE ROAD
COBB HIGHWAY
NAS_42
(44)
ROMANI ROAD
AS_2
(39)
AS_5
(36)
AS_6
(40)
NAD_21
(14)
AS_4
(39)
NAD_13
(18)
NAD_14
(19)
AS_7
(27)
NAD_15
(12)
NAD_18
(17)
NAS_18
(17)
Legend
Turbine
Associated Structure
Non-Associated Dwelling
Non-Associated Structure
Noise Contour LAeq dB(A)
35
40
45
50
Project Boundary
Substation/ O+M
Turbine 3Km Buffer
Turbine 1.5Km Buffer
Main Road
Local Road
NAD_15 (12) Receptor ID (Noise Level Leq, dB(A))
Data Source:
Layout - Client Provided (WTG_Layout_Rev10.shp)
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
Wind Farm Preliminary Noise Contours
F6-3
Drawing No: 0606253_PREH_NA_G001_R0.mxd
The Plains Renewable Energy Hub
Wind Farm
Date: 12/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: KD
Client: Engie
Coordinate System: GDA 1994 MGA Zone 55
0 2 4 km
N
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.
ERM

6.2.2.6 Limitations

Noting that the preferred turbine model has yet to be confirmed, the preliminary assessment summarised above is based on predicted worst-case noise levels (of the nominated Siemens Gamesa SG 6.0-170 6.2MW turbine), and preliminary layout, and assessed to a 35 dB(A) baseline noise criteria in accordance with the Noise Bulletin at the Scoping stage of the project. This will be refined during the EIS phase of the project.

Noise levels from turbines rise as the wind speed at the site increases. However, an increase in wind speed typically results in an equal or greater increase in the background noise at receptor locations due to aerodynamic and foliage noise which may mask turbine noise (Noise Bulletin). Accordingly, the predicted results, as presented in Table 6.2, may change with wind speed-based noise limits that reflect this anticipated increase in background noise with elevated winds.

Background noise is also affected by factors other than wind speed. Receptors located near frequently utilised roads may experience masking from road traffic noise in addition to masking from wind noise.

Further wind turbine specifications, such as model, hub height and operating mode, or layout will be investigated in the next stage with the aim of achieving compliance at all identified receptors, while considering negotiated agreements with landowners.

6.2.2.7 Assessment Approach

Noise levels at all receptors within the area of influence of the project will be further assessed during the detailed noise impact assessment as part of the EIS and subsequent detailed design of the Project. The EIS assessment would include a noise and wind speed monitoring campaign to establish wind speed-based noise limits at identified receptors.

This preliminary assessment has focused on operational worst-case noise emissions from the wind farm, which is the main noise factor required for assessment at this stage of the Project. The EIS noise impact assessment will provide further assessment of this factor as well as other noise related aspects of the Project, as listed below:

- A baseline noise and wind speed monitoring campaign to quantify existing noise conditions (and meteorological conditions) at select non-involved landholders. From this data, wind speed-based noise levels and limits would be established from regression analysis.
- Detailed noise modelling of the Project's construction and operational phases, both of which will have been refined during the detailed design stages. This will include assessment based on the preferred wind farm layout and turbine specifications.
- Consideration of potential:
  - General construction and operational noise impacts to receptors within the potential area of influence of the Project.
  - Road traffic noise impacts (construction and operational phases, with a focus on construction) to receptors within the potential area of influence of the Project.
  - Operational ancillary noise from collector substations.
  - Vibration impacts (construction and operational phases, with a focus on construction) at receptors within the potential area of influence of the Project.
  - Cumulative operational noise impacts associated with other nearby wind farms or surrounding industry (as relevant).
- Recommendations for noise and vibration reducing mitigation, management measures, safeguards and/or provisions for monitoring.

6.3 Biodiversity

ERM conducted a Preliminary Biodiversity Assessment to inform the Scoping Report for the project, as presented in Appendix D. This section summarises the methodology, results and recommendations presented in the Preliminary Biodiversity Assessment.

The objective of this assessment was to provide an indication of potential ecological constraints that may occur within the Project area. The results of this assessment are based on desktop reviews, remote sensing, biodiversity field survey in August, October and November 2021; and February, May and August 2022. This assessment allows preliminary recommendations to be provided in terms of avoidance, mitigation and/or additional assessment for biodiversity values.

6.3.1 Existing Environment

Native vegetation and landscape features within the locality are summarised in Table 4.1 of the Preliminary Biodiversity Report. The Riverina Bioregion is characterised by extensive riverine floodplains and is often dominated by chenopod shrublands and grasslands. The climate is semiarid with low, winter-dominant rainfall, hot summers and cool winters. Large portions of land within the Project Area have been disturbed and are characterised by grazed native and modified grasslands resulting from vegetation clearing and livestock grazing.

The dominant vegetation type across the Subject Land has been identified as PCT 164, 'Cotton Bush open shrubland of the semi-arid (warm) zone', which covers 34463.70 Ha, 58% of the Project Area. The second most dominant community identified is PCT 163, 'Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones' this PCT makes up 19% of the Project Area.

Stands of remnant treed vegetation across the Project Area provide important refuge, foraging, and nesting habitat for fauna in an otherwise open landscape. All areas of Black Box (*Eucalyptus largiflorens*) and River Red Gums (*Eucalyptus camaldulensis*) were observed to contain high abundance of mature hollow-bearing trees.

A Biodiversity Values Map and Biodiversity Offsets Scheme Entry Threshold (BOSET) tool are available to identify the presence of mapped biodiversity values within land proposed for development. A review of the BOSET was undertaken on 31st August 2022 and determined that areas within the Project Area are mapped as Areas of Biodiversity Value. These areas are associated with creek lines and Plains Wanderer habitat. Validated PCT's and threatened species records within the context of the Project Area are presented in Figure 6.4.

6.3.1.1 Plant Community Types

A review of the state vegetation type mapping for the Riverina region (Version v1.2 - VIS_ID 4469) was undertaken to access existing vegetation mapping information within the Project Area. This mapping was further refined based on the ERM Spring 2021 and Summer 2021 survey observations and BAM plot data, resulting in a total of 15 PCTs being identified across the Project Area, with 12 of these being identified within the Subject Land. Table 6.3 below lists these PCTs and their area (ha), and Figure 6.4 presents updated mapping within the Project Area.

The dominant vegetation type across the Subject Land has been identified as PCT 164, 'Cotton Bush open shrubland of the semi-arid (warm) zone', which covers 34463.70 Ha, 58% of the Project Area. The second most dominant community identified is PCT 163, 'Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones' this PCT makes up 19% of the Project Area.

95 vegetation integrity plots (BAM plots) have been completed across the current Project Area to collect floristic data to identify and map PCTs. Further collection of BAM plots will be undertaken to meet the BAM requirements and will be completed in subsequent survey periods to inform the BDAR and EIS to inform the designation of vegetation zones.

During field surveys two (2) areas were observed to be fenced off with revegetation being undertaken, one making up PCT 28 and the other a mix of local native vegetation. These areas are presented in Figure 6.4.

Table 6.3 Plant Community Types within the Project Boundary

PCT No.	PCT Name	Vegetation Class	BAM Plots completed	Project Area (ha)	20% of Subject Land (ha)
0	Non Native Vegetation	-	0	1018.48	6.10
11	River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Riverine Forest	0	20.26	-
13	Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Woodlands	3	645.04	3.70
15	Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Woodlands	6	407.77	1.26
17	Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Shrublands	6	1904.27	13.05
21	Slender Cypress Pine - Sugarwood - Western Rosewood open woodland on sandy rises mainly in the Riverina Bioregion and Murray Darling Depression Bioregion	Riverine Sandhill Woodlands	0	39.74	-
26	Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Riverine Plain Woodlands	2	15.67	-
28	White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Riverine Sandhill Woodlands	9	2003.57	3.97
44	Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Riverine Plain Grassland	10	1175.11	5.68
46	Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	Riverine Plain Grasslands	7	175.23	4.14
70	White Cypress Pine woodland on sandy loams in central NSW wheatbelt	Floodplain Transition Woodlands	0	1,041.09	0.44
153	Black Bluebush low open shrubland of the alluvial plains and sandplains of the arid and semi-arid zones	Aeolian Chenopod Shrubland	4	1,698.74	7.69
157	Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion	Riverine Chenopod Shrublands	6	18.92	16.41
159	Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	Riverine Chenopod Shrublands	0	1,672.93	0.09
160	Nitre Goosefoot shrubland wetland on clays of the inland floodplains	Inland Floodplain Shrublands	5	11,322.10	10.50

PCT No.	PCT Name	Vegetation Class	BAM Plots completed	Project Area (ha)	20% of Subject Land (ha)
163	Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	Riverine Chenopod Shrubland	13	34,202.61	155.12
164	Cotton Bush open shrubland of the semi-arid (warm) zone	Riverine Chenopod Shrubland	24	1,175.11	329.68
165	Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone	Riverine Plain Grasslands	0	1.48	-
216	Black Roly Poly low open shrubland of the Riverina Bioregion and Murray Darling Depression Bioregion	Riverine Chenopod Shrubland	0	4.48	0.39
236	Derived Giant Redburr low shrubland on alluvial plains of the semi-arid (warm) climate zone	Riverine Chenopod Shrubland	0	0.01	-
		Total	**95**	**58,732.79**	**558.22**

Subject Land = The biodiversity study area targeted during the ERM field surveys, defined as a 100m buffer to turbines, and 50m to all remaining project infrastructure, including access tracks, overhead transmission line, substation and crane hard stands.

6.3.1.2 Threatened Ecological Communities

Four (4) EPBC Act Threatened Ecological Communities (TECs) were identified within the Protected Matters Search Tool as having the potential to occur within the Project Area. These TECs include:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia;
- Weeping Myall Woodlands;
- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions; and
- Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions.

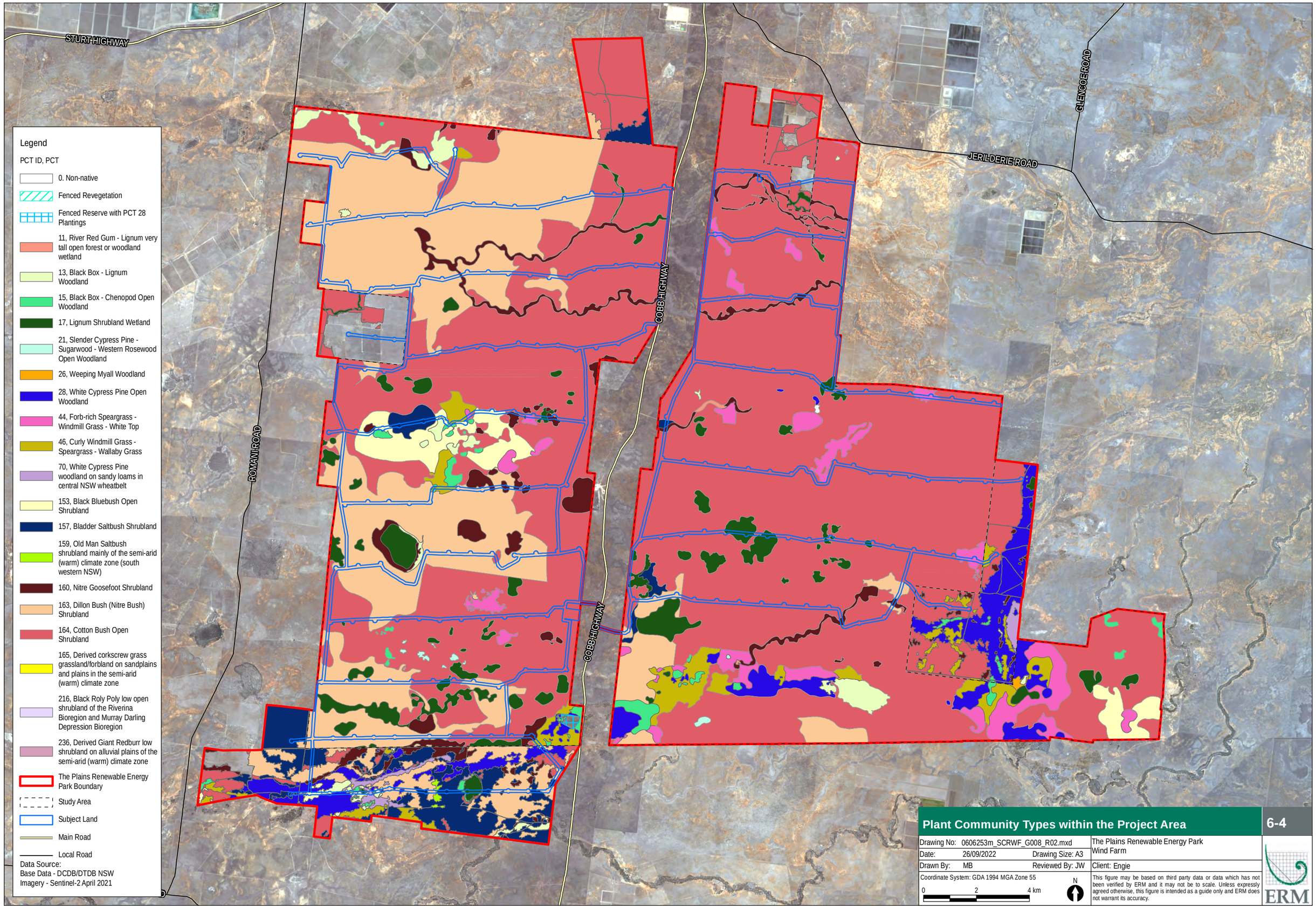
Six (6) TECs listed under either the BC Act and/or EPBC Act have the potential to occur based on their association with PCTs as presented in Table 6.4.

Based on the ERM field surveys, two (2) TECs were confirmed to occur within the Project Area and are presented in Figure 6.5:

- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions, listed as endangered under the BC Act and EPBC Act; and
- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions, listed as endangered under the BC Act.

Table 6.4 Known and Potential Threatened Ecological Communities

TEC	BC Act	EPBC Act	Associated PCTs	Recorded within the Project Area
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Endangered	Endangered	PCT 26	□
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	Endangered	-	PCT 28, PCT 21	□
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	Endangered	-	PCT 28	No
Natural Grasslands of the Murray Valley Plains	-	Critically Endangered	PCT 44, PCT 46	No
Acacia loderi shrublands	Endangered	-	PCT 153, PCT 21	No
Artesian Springs Ecological Community in the Great Artesian Basin	Critically Endangered	-	PCT 160, PCT 163	No



Plant Community Types within the Project Area

6-4

Drawing No:	0606253m_SCRWF_G008_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

PCT ID, PCT Name

- 26, Weeping Myall Woodland TEC
- 28, White Cypress Pine Open Woodland TEC
- The Plains Renewable Energy Park Boundary
- Study Area
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Known Threatened Ecological Communities within the Project Area

6-5

Drawing No:	0606253m_SCRWF_G009_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

6.3.1.3 Threatened Flora and Fauna Species

Based on the field survey effort described in the Preliminary Biodiversity Assessment (Appendix D), thirteen (13) threatened species are known to occur within the Project Area. The location of these records is presented in Figure 6.6.

- White-fronted Chat (*Epthianura albifrons*), listed as vulnerable under the BC Act;
- Black Falcon (*Falco subniger*), listed as vulnerable under the BC Act;
- Grey-crowned Babbler (*Pomatostomus temporalis*) listed as vulnerable under the BC Act;
- Chariot Wheels (*Maireana cheelii*), listed as vulnerable under the BC Act and EPBC Act;
- Winged Peppercress (*Lepidium monoplocoides*), listed as endangered under the BC Act and EPBC Act;
- Mossgiel Daisy (*Brachyscome papillosa*), listed as vulnerable under the BC Act and EPBC Act;
- Slender Darling-pea (*Swainsona murrayana*), listed as vulnerable under the BC Act and EPBC Act;
- Corben's Long-eared Bat* (*Nyctophilus corbeni*), listed as vulnerable under the BC Act and EPBC Act;
- Southern Myotis* (*Myotis macropus*), listed as vulnerable under the BC Act;
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Listed as vulnerable under the BC Act;
- Spotted Harrier (*Circus assimilis*), listed as vulnerable under the BC Act;
- Little Eagle (*Hieraaetus morphnoides*), listed as vulnerable under the BC Act; and
- Plains-wanderer (*Pedionomus torquatus*) listed as endangered under the BC Act and critically endangered under the EPBC Act.

**species presence 'possible' from call recordings. Assumed presence.*

The survey effort for threatened flora will be continued during upcoming field surveys to meet the requirements of the BAM, and to inform the EIS.

In accordance with the requirements of Section 5.2 of the BAM, the BDAR will identify the habitat suitability for threatened species within the Project Area.

Species that meet all the relevant criteria will be automatically populated in the BAM-C to be assessed either for ecosystem credits or species credits. No further assessment is required for those species that are unlikely to occur or where the Project Area is considered as unsuitable habitat.

A preliminary list of candidate species is provided in Table 6.5.

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

Bat Species

- Southern Myotis*
- Southern Myotis*, Corben's Long-eared Bat*
- Southern Myotis*, Yellow-bellied Sheathtail-bat
- Southern Myotis*, Corben's Long-eared Bat*, Yellow-bellied Sheathtail-bat

Significant Raptor

- Black Kite
- Black Kite (nest)
- Brown Falcon (nest)
- Nankeen Kestrel
- Nankeen Kestrel (nest)
- Spotted Harrier
- Wedge-tailed Eagle
- Wedge-tailed Eagle (nest)
- Whistling Kite
- Whistling Kite (nest)
- Raptor (nest)

Ecosystem Credit Species

- Black Falcon
- Black Falcon (dead)
- Grey-crowned Babbler
- White-Fronted Chat

Species Credit Species (Fauna)

- Little Eagle
- Little Eagle (nest)
- Plains-wanderer
- Plains-wanderer (adult and chick)

Species Credit Species (Flora)

- Chariot Wheels
- Mossgiel Daisy
- Slender Darling Pea
- Winged Peppercress
- 500m Threatened Plant Buffer
- Plains-wanderer Important Area Mapping
- Plains-wanderer PCT Habitat Mapping (PCT44 and PCT46)
- The Plains Renewable Energy Park Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

* Species possible based on call recording

Threatened Species known within the Project Area

6-6

Drawing No:	0606253m_SCRWF_G010_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

Table 6.5 Preliminary List of Candidate Species

Scientific Name	Common Name
Fauna	
Ardeotis australis	Australian Bustard
Burhinus grallarius	Bush Stone-curlew
Calidris ferruginea	Curlew Sandpiper
Haliaeetus leucogaster	White-bellied Sea-Eagle
Hieraaetus morphnoides	Little Eagle
Litoria raniformis	Southern Bell Frog
Lophochroa leadbeateri	Major Mitchell's Cockatoo
Lophoictinia isura	Square-tailed Kite
Phascolarctos cinereus	Koala
Pedionomus torquatus	Plains-wanderer
Polytelis anthopeplus monarchoides	Regent Parrot
Polytelis swainsonii	Superb Parrot
Tyto novaehollandiae	Masked Owl
Ninox connivens	Barking Owl
Flora	
Austrostipa wakoolica	A spear-grass
Brachyscome muelleroides	Claypan Daisy
Brachyscome papillosa	Mossgiel Daisy
Caladenia arenaria	Sand-hill Spider Orchid
Calotis moorei	A burr-daisy
Convolvulus tedmoorei	Bindweed
Cullen parvum	Small Scurf-pea
Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum
Lepidium monoplocoides	Winged Peppercress
Leptorhynchos orientalis	Lanky Buttons
Maireana cheelii	Chariot Wheels
Pilularia novae-hollandiae	Austral Pillwort
Sclerolaena napiformis	Turnip Copperburr
Solanum karsense	Menindee Nightshade
Swainsona murrayana	Slender Darling Pea
Swainsona plagiotropis	Red Darling Pea
Swainsona sericea	Silky Swainson-pea

6.3.1.4 Microchiropteran Bat Survey

Microbat calls were sampled using eight (8) Anabat Swift detectors (Titley Electronics). Passive monitoring was undertaken during the Summer 2022 field survey event. Monitoring commenced at dusk (approximately 1800 hours) and continued until dawn (approximately 0530 hours). Based on a total of 91,171 files, thirteen calls sequences were assigned to species or genus. The reliability of identification is as follows:

- **Definite** - one or more calls where there is no doubt about the identification of the species;
- **Probable** - most likely to be the species named, low probability of confusion with species that use similar calls; and
- **Possible -** call is comparable with the named species, with a moderate to high probability of confusion with species of similar calls.

Table 6.6 Microchiropteran Bat Survey Results

Scientific Name	Common Name	Reliability	BC Act status	EPBC Act Status
Austronomus australis	White-striped free-tailed bat	Definite	-	-
Chalinolobus gouldii	Gould's wattled bat	Definite	-	-
Chalinolobus morio	Chocolate wattled bat	Definite	-	-
Myotis macropus	Southern Myotis	Possible	V	-
Nyctophilus sp	-	Definite	V (*N. Coberni*)	V (*N. Coberni*)
Ozimops planiceps	South-Eastern Free-Tailed Bat	Definite	-	-
Ozimops ridei	Eastern Free-tailed Bat	Definite	-	-
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Definite	V	-
Scotorepens balstoni	Scotorepens balstoni	Definite	-	-
Scotorepens greyi	Little broad-nosed bat	Definite	-	-
Vespadelus darlingtoni	Large forest bat	Definite	-	-
Vespadelus regulus	Southern Forest Bat	Possible	-	-
Vespadelus vulturnus	Little forest bat	Possible	-	-

6.3.1.5 Bird Utilisation Surveys

Prescribed impacts related to wind farm development apply not only to threatened species but also to any resident raptor species and nomadic or migratory species whose flight paths are likely to cross the subject land and at Rotor Swept Height (Paragraph 6.7.1.5 of the BAM).

Initial Bird Utilisation Surveys (BUS) were undertaken during the biodiversity surveys to determine avian species with the potential to be impacted within the Rotor Swept Area (RSA).

57 bird species were recorded from 28 Bird Utilisation Surveys (BUS) in Spring 2021, and 40 bird species were recorded from 27 BUS in Summer 2022. The most abundant bird species across the survey efforts were the Black Kite, Galah, Torresian Crow, Crested Pigeon, Blue Bonnet and Australian Magpie. The majority of birds were observed flying short distances between trees.

Ten species were observed to utilise the rotor sweep height (RSH) of between 50 m to 250 m. All species are native, with two (2) species, the Little Eagle and Black Falcon, being considered threatened in NSW. Zero (0) species are considered threatened under the EPBC Act. The observed species include:

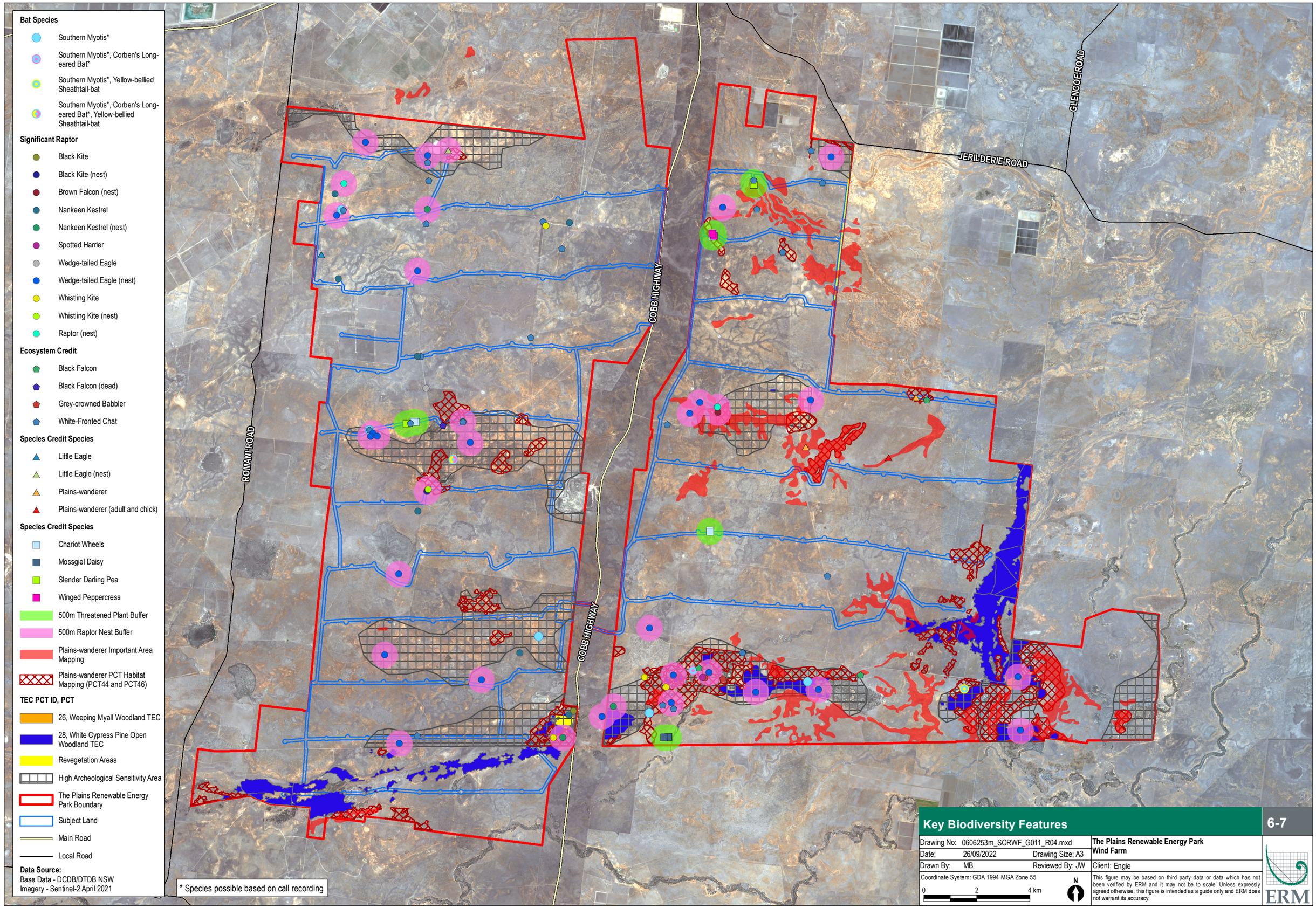
- Wedge-tailed Eagle (*Aquila audax*);
- Straw-necked Ibis (*Threskiornis spinicollis*);
- Little Eagle (*Hieraaetus morphnoides*);
- Black Kite (*Milvus migrans*);
- Brown Falcon (*Falco berigora*);
- Black Falcon (*Falco subniger*);
- Nankeen Kestrel (*Falco cenchroides*);
- Torresian Crow (*Corvus orru*);
- White-necked Heron (*Ardea pacifica*); and
- Masked Woodswallow (Artamus personatus).

During the field survey, opportunistic observations were made of large flocks of up to 100 Banded Lapwings (*Vanellus tricolor*) utilising the RSH. No species considered Migratory under the EPBC Act were identified on site.

During the field survey it was observed that the Project Area supported a very high number of breeding raptors, with the following stick nests recorded for non-threatened, resident raptors:

- 21 nests recorded for Wedge-tailed Eagle (*Aquila audax)*;
- three (3) Nankeen Kestrel (*Falco cenchroides)* nest;
- two (2) unidentified raptor nests; and
- one (1) Whistling Kite (*Haliastur sphenurus)* nest.

There was a high number of additional large stick nests observed across the site, although vacant at the time of sighting, these nests are likely to support further resident raptor species. Operational wind farms pose a collision risk to birds and bats where rotor strike can cause injury or death. Fatalities and injuries are usually caused by a collision with the moving blades (blade strike), or with the turbine infrastructure. The EIS and BDAR will assess potential collision risks to both birds and bats.


ROMANI ROAD
COBB HIGHWAY
COBB HIGHWAY
JERILDERIE ROAD
GLENCOE ROAD
Bat Species
Southern Myotis*
Southern Myotis*, Corben's Long-eared Bat*
Southern Myotis*, Yellow-bellied Sheathtail-bat
Southern Myotis*, Corben's Long-eared Bat*, Yellow-bellied Sheathtail-bat
Significant Raptor
Black Kite
Black Kite (nest)
Brown Falcon (nest)
Nankeen Kestrel
Nankeen Kestrel (nest)
Spotted Harrier
Wedge-tailed Eagle
Wedge-tailed Eagle (nest)
Whistling Kite
Whistling Kite (nest)
Raptor (nest)
Ecosystem Credit
Black Falcon
Black Falcon (dead)
Grey-crowned Babbler
White-Fronted Chat
Species Credit Species
Little Eagle
Little Eagle (nest)
Plains-wanderer
Plains-wanderer (adult and chick)
Species Credit Species
Chariot Wheels
Mossgiel Daisy
Slender Darling Pea
Winged Peppercress
500m Threatened Plant Buffer
500m Raptor Nest Buffer
Plains-wanderer Important Area Mapping
Plains-wanderer PCT Habitat Mapping (PCT44 and PCT46)
TEC PCT ID, PCT
26, Weeping Myall Woodland TEC
28, White Cypress Pine Open Woodland TEC
Revegetation Areas
High Archeological Sensitivity Area
The Plains Renewable Energy Park Boundary
Subject Land
Main Road
Local Road
Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
* Species possible based on call recording
Key Biodiversity Features
6-7
Drawing No: 0606253m_SCRWF_G011_R04.mxd
The Plains Renewable Energy Park Wind Farm
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: JW
Client: Engie
Coordinate System: GDA 1994 MGA Zone 55
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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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6.3.2 Assessment Approach

The construction and operation of the Project has the potential to cause impacts to threatened species and TECs listed under the BC Act and EPBC Act. These will need to be considered as part of the EIS to be prepared under Part 4 of the NSW EP&A Act. Additionally, the Project has been referred to the Australian Government Minister for the Environment and Energy through the preparation of a separate referral.

As there are recorded Biodiversity values within the Project Area, application of the BAM and the preparation of a BDAR will be required.

Candidate species will be selected for further assessment by considering how they and their habitat might be affected by the Project. A preliminary list has been presented above.

In this instance the main potential impacts of the Project (during construction and operation) that would need to be assessed include:

- Clearing of TECs;
- Loss of extant native vegetation communities and associated fauna habitat and the subsequent impacts to local population of native species, particularly threatened and migratory species;
- Increased habitat fragmentation;
- Mortality and injury from vehicle strikes and vegetation clearing; and
- Mitigation measures relevant to threatened species, TECs, native vegetation communities, hydrology and construction impacts will be addressed within the EIS. There is also a risk that weeds may be transported within and off-site. Mitigation measures to reduce the chance of the spread of weeds will be considered within the EIS.

The desktop assessment and field surveys undertaken to date have highlighted a range of known and potential biodiversity constraints. The following steps are considered essential in ensuring an adequate assessment of biodiversity values is continued throughout future stages of the Project:

- Prepare and submit a BDAR in accordance with the BAM;
- Prepare and submit EPBC referral to the Australian Government Minister for the Environment and Energy (completed 10 November 2022);
- Prepare a detailed assessment of MNES; and
- Conduct further targeted seasonal fauna and flora surveys for species considered likely or potentially occurring within the Project Area in accordance with relevant federal or State survey guidelines.

6.4 Heritage

6.4.1 Aboriginal Cultural Heritage

6.4.1.1 Existing Environment

The Wind Farm Project Area is located within the Murrumbidgee Province of the Riverina Bioregion. The Murrumbidgee Province is generally comprised of a natural flat landscape largely consisting of clays, silts and sands which historically has been subject to a consistent cycle of annual flooding. Environmental influences on this landscape have varied dramatically over time with post glacial climate changes in the Holocene reducing flood peaks and sediment load. Over time this has resulted in modern watercourses crossing and cutting through earlier palaeochannels. These landscape features provide complexity to an assessment of archaeological sensitivity within the Riverine region that may not be identified through the predictive features of the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (DECCW, 2010).

A localised landscape based predictive model was developed by Colin Pardoe for the 'Murrumbidgee Province' as part of the Murrumbidgee Province Aboriginal Cultural Heritage Study (Martin, S., & Pardoe, C., 2011). This predictive model has focused on the localised landform features and their relationship to site identification and includes assessment of the Project Site. Pardoe's assessments considered the relationship between several landform features and the location of sites making the following conclusions.

- Water – The pattern of site distribution was identified as having its greatest concentration within close proximity to watercourses. Some variation in site distribution based on water source type was also noted:
  - Major Streams – No site was located more than 12 km from a major river channel with most sites found with a short distance of this channel (75% of sites were within 3.3 km of a major stream).
  - Minor Streams – No site was located more than 12 km from a minor stream (75% were within 2.2 km).
  - Lakes – More than 82% of sites are found within 8 km of a lake.
  - Swamps – No obvious pattern of distribution was identified which was attributed to variations in the way swamps are described in official mapping data
- Landforms – Plains made up 93% of the Province, and as such minor variations in landform were noted to be significant as an impetus to the flow of water and location of resources. While sites were identified across most landforms patterns; channelled plain and confined trace landforms were identified as containing a disproportionate number of sites. These landforms were most often associated with the modern active floodplain. Comparatively, burials were most often associated with scalded, channelled and depressed plains associated with paleo environments.
- Soils – Soil type was noted for its association with water resources and vegetation communities. Based on this association, varying soil types were identified to be associated more closely with site features (hearths, mounds etc) rather than overall site distribution.

Additional large scale reviews of archaeological site types was completed by Martin in her review of the Hay Plain (Martin, 2007 and Martin, 2010). Martin noted a number of patterns in site distribution related to environmental features. In particular Martin noted that:

- The narrow floodplains or confined traces of the Murrabidgee and Lachlan, the Lowbidgee distributary system, the Gum Creek palaeochannel, and the Abercrombie Creek system in the Hay Plain have the highest density of sites. Large open water lakes also have a high density of sites.
- Sites are widely spread over different geomorphic categories across the Hay Plain with certain site types most likely to be identified in specific soil types. Confined traces (including the Murrumbidgee River), plains with channels, plain with depressions and channelled plains contained a higher density of sites. Localised landforms included lunettes and lakes were also identified to have a higher than average site density.
- Mounds were identified to be located to particular parts of the Hay Plain and not directly related to geomorphology. Mounds were noted however to be particularly dense along confined traces, The Lowbidgee and Hay Plain Southeast.
- Middens were identified to be largely located along the confined traces of the major rivers and on large water lakes and lunettes.
- Open sites were more commonly found away from riverine grey cracking clays.
- Burials appeared to cluster in the western portion of the Hay Plain in similar locations to mounds. These sites were not identified to be connected to geomorphology.
- Artefact sites and ground ovens were recorded to have been spread widely across the Hay Plain.
- All archaeological site types are considered likely to occur on slightly raised sandier paleochannel features.

Martin noted that on a wider scale that the gently west sloped topography of the Hay Plain was identified to have an influence on the overall presence of sites. Martin suggested this may have been related to earlier water retention environments. Prior to modern water control systems it was noted that the western half of the Hay Plain would have acted as a sump which collected seasonal floodwater and excess rainfall and would have provided appropriate resources for the growth of a number of plant and animal resources. Mound sites in the area surrounding Gum Creek and the Abercrombie Creek System was noted to be focused on paleo channel features and around ephemeral lakes and swamps (Martin, 2007, p. 199).

The vast majority of the Project Area is comprised of landform types which were identified by Pardoe and Martin as having the potential to contain Aboriginal sites. Sensitivity mapping focused on delineating sensitivity into zones based on types of sites which would be expected in each landscapes. Areas associated with scalded plains and paleo environments were assessed to contain high archaeological sensitivity associated with their potential to contain burials and intact deposits while depression plains and otherwise clay based deposits were considered to demonstrate moderate sensitivity. Delineation of soil landscapes was based off of data available from the Reconnaissance Soil Landscape of the Riverine Plains (Department of Natural Resources, 2004) which was subsequently adjusted based on visual clues available from aerial imagery.

Preliminary cultural heritage sensitivity mapping is provided in Figure 6-8. Further assessment would be required to identify additional environmental or landscape features (including palaeochannels) which may also be archaeologically sensitive, as well as historic land uses which may have disturbed or otherwise modified the archaeological sensitivity of an area. Detailed environmental modelling and ground-truthing would be required to adequately categorise the archaeological and cultural sensitivity of the Wind Farm Project Area.

In addition to the large number of tangible cultural heritage remains identified across the Murrumbidgee Province, Pardoe and Martin also noted that intangible ceremonial, dreaming and story sites were common through the region. These were often associated with landscape features such as waterholes, hills, trees or other minor features.

6.4.1.2 AHIMS Search Results

The Aboriginal Heritage Information Management System (AHIMS) database provides information concerning previously recorded Aboriginal sites in NSW. Two extensive searches of the AHIMS database were conducted on 10 August 2021 to encapsulate the Project Area. Up to date search results were downloaded on the 13 September 2022. The searches were conducted utilising the parameters provided in Table 6-7.

Table 6-7 AHIMS Database Search Details

Parametres	Search 1	Search 2
Client Service ID	612680	612684
Datum	GDA Zone 55	GDA Zone 55
Easting	279729.0 - 307594.0	284924.0 - 318182.0
Northing	6155144.0 - 6168579.0	6140851.0 - 6155132.0
Buffer	0 m	0m
Number Sites[5]	101	42

A total of 143 sites were identified within or in close proximity to the Project Area. A total of 34 sites were located within the Wind Farm Project Area boundaries. Sites within the Project Area included Artefact, Hearth and Earth Mound features. Many of the registered sites contain multiple site types in one location (e.g. Artefact and Hearth). While no sites within the Wind Farm Project Area contain burials, the presence of earth mounds within the Project Area suggest that burials may also be associated with this landscape.

The results of the full AHIMS search are summarised in Table 6-8.

Table 6-8 AHIMS Registered Site Types

Site Type	Total Number of Site types across Search parameters	Number of Sites within Project Area
Artefact	98	16
Artefact, Burial, Hearth, Potential Archaeological Deposit (PAD)	1	0
Artefact, Hearth	19	6
Earth Mound	2	2
Hearth	12	2
Modified Tree (Carved or Scarred)	10	8
Modified Tree (Carved of Scarred), Artefact	1	0
Total	**143**	**34**

[5] Number of sites registered following data download on 13 September 2022.

6.4.1.3 Assessment Approach

Recommendations

Based on the results of the preliminary assessment and the AHIMs search results, it is considered likely that there are significant areas within the project boundary which contain evidence of past Aboriginal land use. Predictive modelling prepared at this stage of the process can assist in determining sensitive landscapes; however, it is acknowledged that more detailed investigation and assessment will be required to inform the next phase of project planning and design. In consideration of these factors, the following recommendations are made:

- Comprehensive investigation, to include pedestrian field survey, consultation with Aboriginal stakeholders, sensitivity mapping, and archaeological test excavation (as required) should be undertaken during the development application stage;
- The investigations are to be undertaken in accordance with all NSW legislation and relevant guidelines including the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011), the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010), and *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010);
- Results of the investigations are to be detailed in an Aboriginal Cultural Heritage Assessment Report (ACHAR), in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010); and
- Upon completion of the ACHAR, a Cultural Heritage Management Plan (CHMP) should be prepared in consultation with the projects registered Aboriginal parties (RAPs) to ensure appropriate management of any identified cultural heritage throughout the construction process.

6.4.2 Historic Heritage

6.4.2.1 Existing Environment

Historical Background

Early European exploration of the Murrumbidgee Region occurred from 1820's with Sturt's exploration originally focused along the Murrumbidgee River. Through the 1830's, stockholders gradually encroached westward into the region Sturt and his mean explored, and by 1839, squatters had occupied the area surrounding nearby Hay, approximately 30 km east of the Project Area Occupation was initially focused on cattle and sheep farming and later grain crops.

Development of a town soon followed at the nearby Balranald, approximately 85 km to the west of the Project Area. Balranald was first investigated as the site of a township in 1848, when George James MacDonald, The Commissioner for Crown Lands for the Lower Darling District arrived in the region. That same year Leighton Robinson and Thomas Duggan established a general store at Balranald and during the same year a public-house, the Balranald Inn, was erected by a Mr Robertson (Feldtmann, 1976). The township of Balranald was formally gazetted in April 1851 and the first land sale held on 14 January 1852, with thirty-five lots submitted to public auction.

Surveying of a number of reserves on the lower Murrumbidgee River was ordered by the Colonial Secretary, which were then gazetted in October, 1852. One reserve to come out of this 1852 gazetting was the Pimpampa Reserve. In the 1860's, the surveyors Adams and Twynam laid out plans for a township at Pimpampa Reserve. They proposed the name Pimpaympa, after the original stock runs, however the town was to be called Maude. Despite valid concerns of the areas proclivity to flooding and high river levels, construction of a hotel was completed in 1862, and a post office by 1863. Local's requests for land to be posted for sale were initially rebuked with officials citing a lack of traffic and desire for European settling of the area, however land was eventually offered for sale in 1865.

In the October, 1858, Henry Leonard completed construction of an inn at Lang's-Crossing-Place, and by mid-1859, the Department of Lands had proclaimed reservations either side of the Murrumbidgee River. A township coalesced here, and by October 1859, Lang's-Crossing-Place was renamed Hay.

The Project Area is located on Mungadal Station, on the southern banks of the Murrumbidgee River, central New South Wales. The Squatters Act of 1846/7 heralded the recognition of properties claims by squatters in the early 19th century. What would become the Project Area was not excluded from this, with the subdivision of a number of stations and runs throughout the region. The Mungadal, Pevensy and Toogembie stations were all acknowledged in the 1847 declaration (Campbell, 1968).

In 1865, Colin Simson purchased Mungadal Station from the Lang brothers, who were the original European settlers of what would be called Hay (Bendleby, 1924: 2). Anthony Hordern purchased Mungadal Station in 1923 for £250,000. At the time, and at 111,710 acres, Mungadal was one of the largest freehold stations in the Murrumbidgee region. West of Mungadal is Pevensey Station. Like Mungadal, Pevensey Station is recognised as prime lamb and sheep grazing land. The 32,000 acre Pevensey Station was gazetted in 1850 and leased by John Tooth. Further west is Toogembie Station; a 66,000 acre run leased to John Church, again in 1850. Historical maps indicate that land use associated with these runs would have included the construction of homesteads as well as a variety of structures associated with grazing activities including sheds, tanks and sheering quarters.

Little has changed in the use of these properties, as pastoral grazing of sheep and cattle is still the principle industry of the region. Recently, following the purchase of the original Mungadal property by Paraway Pastoral Company in 2010, Mungadal Station expanded through the acquisition of the Pevensey, Ulonga, and Rosevale properties, and now covers a total area of 116,994 hectares (Paraway Pastoral Co., 2021). Mungadal Station consists mostly of native saltbush plains which are utilised for sheep grazing. It also contains numerous bores, areas of irrigated cropping, an extensive pipe and trough system, and a frontage onto the Murrumbidgee River at the northern end of the original property. Today, Mungadal Station and its surrounds consists mostly of native saltbush plains which are utilised for sheep grazing. It also contains numerous bores, areas of irrigated cropping, an extensive pipe and trough system, and a frontage onto the Murrumbidgee River at the northern end of the original property.

Statutory Heritage Register Searches

Commonwealth Heritage List

The Commonwealth Heritage List includes natural, Indigenous and historical heritage places owned or controlled by the Australian Government. Items on the list have satisfied the minister as having one or more Commonwealth Heritage values. There are no Commonwealth Heritage listed places within or in proximity to the Project Area .

National Heritage List

The Australian National Heritage List contains natural, historic, and Indigenous places deemed to be of outstanding heritage significance to Australia. Before a site is placed on the list a nominated place is assessed against nine criteria by the Australia Heritage Council. There are no National Heritage listed places within or in proximity to the Project Area .

State Heritage Register

A search of the NSW State Heritage Register (SHR) was conducted on 28 March 2022. No historic heritage listings have been identified for the Project Area or its immediate surrounds, with the nearest listing being found in the nearby town of Hay. One Heritage Item is recognised on the NSW SHR on Toogimbie Station for its Aboriginal heritage values.

Section 170 Heritage Registers

Section 170 of the *Heritage Act* 1977 requires all NSW state agencies to identify, conserve and manage the heritage assets owned, managed and occupied by that agency. In order to facilitate this, Section 170 heritage registers were established for all NSW government agencies. These registers are held and maintained by each state agency and updated as assets are acquired, altered, or decommissioned.

A search of the relevant Section 170 registers was undertaken on 28 March 2022.

No Section 170 heritage places are located within or in close proximity to the Project Area.

Non-Statutory Considerations

Register of the National Estate

The Register of the National Estate (RNE) is a non-statutory archive of natural, historic and Indigenous places and incorporates over 13,000 places. Originally compiled between 1976 and 2003 by the Australian Heritage Commission, the register is now maintained by the Australian Heritage Council.

Following amendments to the Australian Heritage Council Act 2003, the RNE was frozen on 19 February 2007, which means that no new places can be added, or removed. Since February 2012 the RNE has been maintained as a non-statutory listing.

A search of the Australian Heritage Database was undertaken on 28 March 2022. This search identified no RNE listed places within or in close proximity to the Project Area. The nearest RNE listings are in the nearby towns of Hay and Maude.

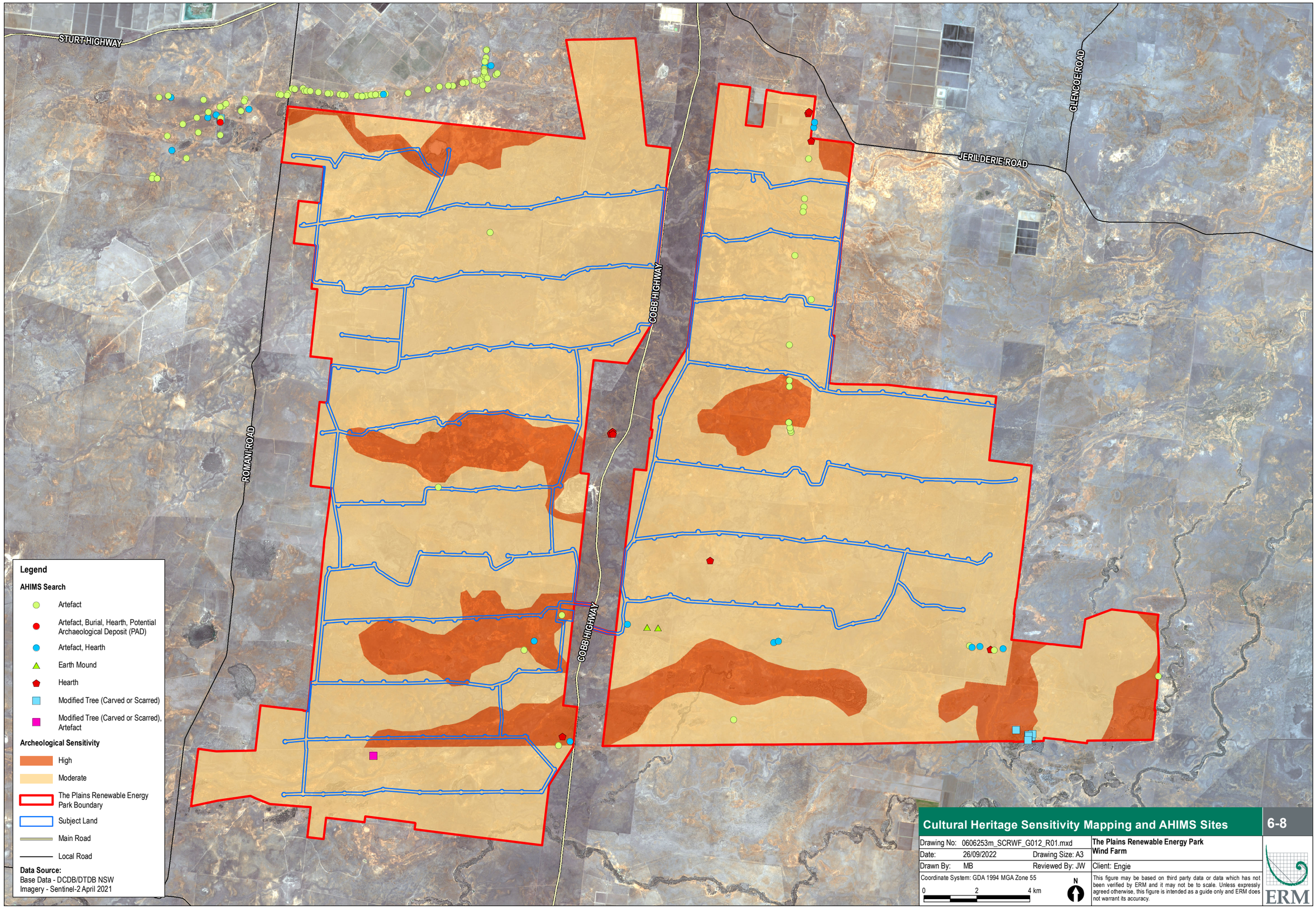
National Trust of Australia (NSW) Heritage Register

The National Trust of Australia maintains a register of landscapes, townscapes, buildings, industrial sites, cemeteries and other heritage places which the Trust determines to have cultural significance. This register is non-statutory but provides an indication of places considered significant by the wider community.

A search of the National Trust Heritage Register conducted on 28 March 2022 indicated there are no National Trust listed properties within or in close proximity to the Project Area.

6.4.2.2 Assessment Approach

Preliminary assessment has shown there are no historic heritage items within the Project Area listed on National, State or Local statutory heritage registers. Despite this, there remains the potential for historic heritage items to be present in the Project Area considering the continuous European presence since the early 19th century. Further assessment would be required to better establish the non-Aboriginal archaeological potential of the Project Area. Based on this information, it is recommended that a preliminary historic heritage assessment be prepared as part of the EIS.


STURT HIGHWAY
ROMANI ROAD
COBB HIGHWAY
COBB HIGHWAY
JERILDERIE ROAD
GLENCOE ROAD
Legend
AHIMS Search
Artefact
Artefact, Burial, Hearth, Potential Archaeological Deposit (PAD)
Artefact, Hearth
Earth Mound
Hearth
Modified Tree (Carved or Scarred)
Modified Tree (Carved or Scarred), Artefact
Archeological Sensitivity
High
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Subject Land
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Cultural Heritage Sensitivity Mapping and AHIMS Sites
6-8
Drawing No: 0606253m_SCRWF_G012_R01.mxd
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6.5 Hazards and Risks

This section provides a preliminary assessment of environmental hazards and risks that could arise during the operation of the Project. Specifically, it considers hazards and risks associated with hazardous materials, bushfire, blade throw, electromagnetic interference (EMI) and electromagnetic field (EMF).

6.5.1 Preliminary Hazard Analysis

A Preliminary Hazard Assessment (PHA) is required for potentially hazardous or offensive development under *State Environmental Planning Policy Resilience and Hazards 2021*. Clause 3.2 of the Resilience and Hazards SEPP defines a potentially hazardous industry is as

development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality—

(a) to human health, life or property, or

(b) to the biophysical environment,

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

Batteries can be a serious safety risk for occupants and installers if incorrectly installed or operated, potentially leading to electric shock, fire, flash burns, explosion or exposure to hazardous chemicals and released gases. The *Battery installation guidelines for accredited installers* guidelines, prepared by the Clean Energy Council (2017) state that there are numerous hazards associated with battery systems and storage in relation to electrical, energy, fire, chemical, explosive gas, and mechanical hazards. Where a hazard is identified, risk reduction should be applied to eliminate or reduce these risks, in order to protect persons, property and livestock from fire, electric shock, or physical injury (CEC, 2017).

A Preliminary Hazards Assessment will be undertaken as a component of the EIS, which will assess the potential hazards and risks associated with the Project in accordance with the requirements of the Resilience and Hazards SEPP. Specifically, it will assess the potential hazards associated with the inclusion of a battery energy storage system at the Project Area, and evaluate the likely risks to public safety, by focusing on the transport, handling and use of hazardous materials. The assessment will also determine whether the Project should be considered a hazardous or potentially hazardous industry under the Resilience and Hazards SEPP.

6.5.2 Bushfire

Bushfire presents a threat to human life and assets and can adversely impact ecological values. Bushfire risk can be considered in terms of environmental factors that increase the risk of fire (fuel quantity and type, topography and weather patterns), as well as specific activities (such as hot works and construction activities) or infrastructure components that exacerbate combustion or ignition risks (such as transmission lines and other electrical components).

A review of the NSW RFS Bushfire Prone Land mapping confirms that the Project Area is not currently recognised as being bushfire prone (refer to **Figure 6-9**).

However it is recognised that category 3 vegetation (including but not limited to grasslands and freshwater wetlands) will likely be added to the bushfire prone land mapping at some stage to align with the requirements of the NSW RFS Guide for Bush Fire Prone Land Mapping (RFS, 2015).

The EIS will include a Bushfire Risk Assessment and will aim to identify potential hazards and risks associated with bushfires / use of potential bushfire prone land. The assessment will aim to demonstrate that the proposed renewable energy park can be designed, constructed and operated to minimise ignition risks and provide for asset protection consistent with the *NSW Rural Fire Service Guidelines - Planning for Bushfire Protection 2019* (NSW RFS, 2019).

The Bushfire Risk Assessment and mitigation strategies will be guided by the following factors that contribute to bushfire risk:

- Fuels, weather, topography, predicted fire behaviour and local bushfire history;
- Suppression resources, access (roads, tracks) and water supply; and
- Values and assets.

Mitigation will be a combination of complementary strategies, all of which are required to provide the best possible protection outcome for the wind farm, land managers and the community.

6.5.3 Blade Throw

Blade throw is a potential risk for wind farm developments. Blade throw refers to the risk of wind turbine blades breaking during operation, which may result in human injury or potential damage to infrastructure. A minimum buffer area of 3 km has been applied to WTG and dwelling locations. Blade throw is generally considered to be a low risk during the operation phase of the Project, which will utilise wind turbine technology that has been proven to be both safe and reliable.

A Blade Throw Risk Assessment will be prepared as part of the EIS for the proposed wind farm. The assessment will describe the potential impacts associated with blade throw to nearby residential receptors during operation of the Project. It will be undertaken by considering relevant international studies and standards for the design of wind turbine components and blade throw risk.

The Blade Throw Risk Assessment will likely include the following scope of works:

- Assessment of the likelihood of occurrence for a blade throw event;
- Assessment of theoretical distance radii for a blade throw event;
- Review of distances between turbines and nearby dwellings;
- Review of historical blade throw occurrences in Australian wind farms; and
- Provision of relevant mitigation measures for Project implementation.

STURT HIGHWAY
COBB HIGHWAY
JERILDERIE ROAD
GLENCOE ROAD
GLENHOPE ROAD
ROMANI ROAD

Bushfire Prone Land

- Vegetation Category 1
- Vegetation Category 2 & 3
- Vegetation Buffer
- The Plains Renewable Energy Park Boundary
- Main Road
- Local Road

Data Source:
BFPL - NSW Rural Fire Service
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Bushfire Prone Land Mapping

6-9

Drawing No:	0606253m_SCRWF_G013_R02.mxd		**The Plains Renewable Energy Park Wind Farm**
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

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6.5.4 Electromagnetic Interference (EMI)

The operation of a wind farm has the potential to interfere with the electromagnetic signals associated with telecommunication services. Existing telecommunication services in the vicinity of the Project Area include mobile phone services, radio communication services, television and radio broadcast services, and aircraft navigation services, which local residents and local towns including Hay are reliant upon. A search of the Australian Communication and Media Authority (ACMA) database identified eight sites within 20 km of the Project Area, as presented in Figure 6-10.

An electromagnetic interference (EMI) assessment will be undertaken as a component of the EIS, which will consider the potential impacts of the Project on telecommunications services. It will involve the preparation of a detailed desktop assessment of existing electromagnetic services within the Project Area, and recommended measures to avoid or minimise potential impacts to telecommunications services during construction and operation of the Project.

The assessment will be prepared with reference to relevant legislation and guidelines, including:

- *Australian Radio and Communications Act 1992;*
- NSW Wind Energy Guideline for State Significant Wind Development (DPIE, 2016a); and
- The Clean Energy Council Best Practice Guidelines (CEC, 2018).

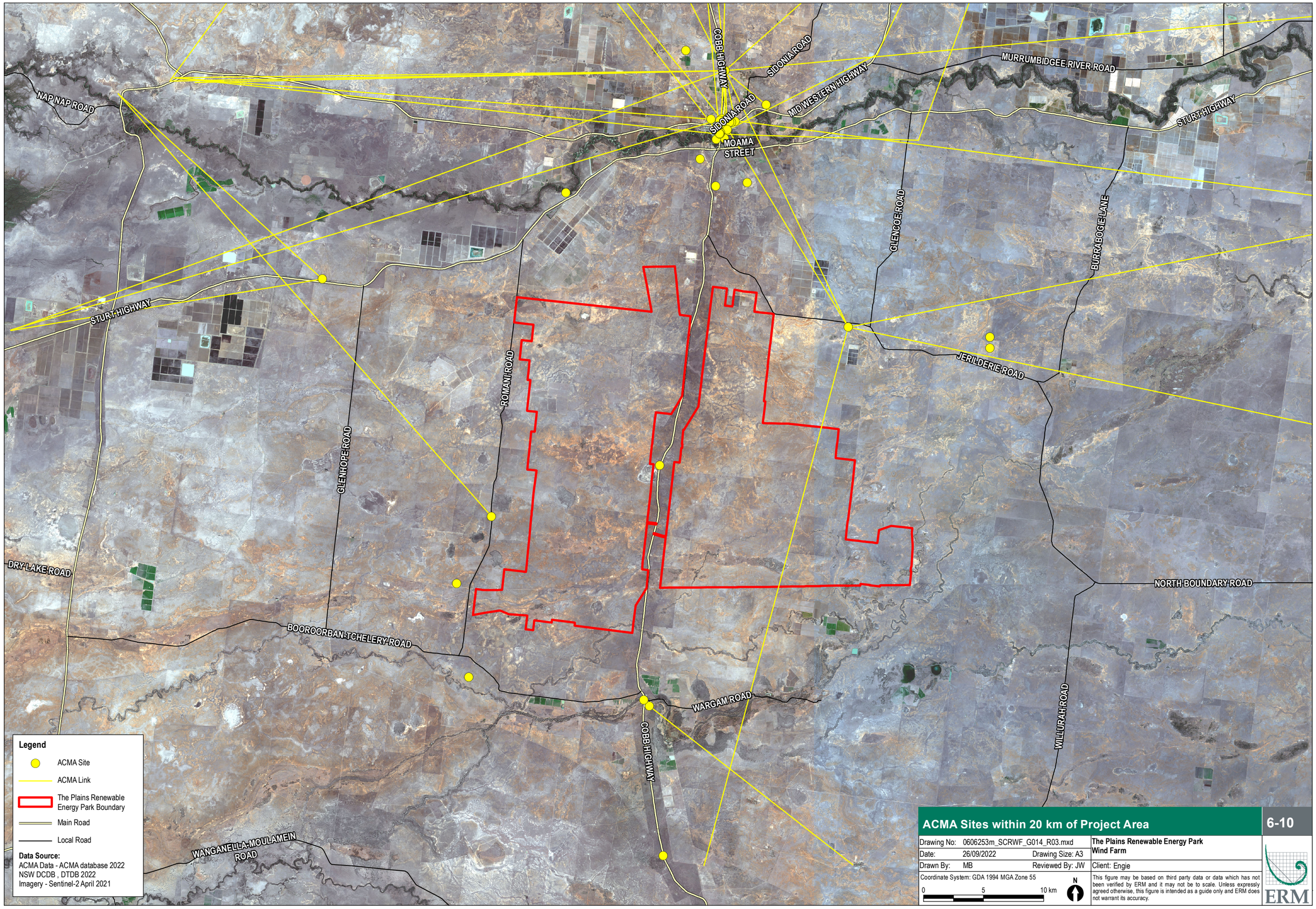
6.5.5 Electromagnetic Field (EMF)

Electromagnetic Fields (EMF) are associated with all electrical wiring and equipment. Electrical fields are caused by the voltage of the equipment, while magnetic fields are caused by the current flowing (amperage). Electric fields and magnetic fields are independent of one another and, in combination, cause energy to be transferred along electric wires.

The Project will involve the generation of EMFs during operation from the proposed transmission lines and substations. Over the past 50 years, concerns have been expressed that the EMFs associated with electrical equipment might have adverse health effects. There are known health effects from very high levels of EMFs and health standards have been established to protect against these effects. However, the WHO (WHO, 2020) recognise that no adverse health effects from long-term exposure to extremely low frequency (ELF) EMF have been confirmed.

An EMF assessment will be prepared as a component of the EIS, which will assess the potential impacts and risks to human health associated with the EMF generated by the wind turbines and associated electrical infrastructure. The EMF assessment will be prepared by taking consideration of advice from the National Health and Research Council.

While adverse health effects from exposure to ELF EMFs have not been established, the possibility remains that such effects may exist and it remains a risk during the construction and operational phases of the Project.



ACMA Sites within 20 km of Project Area

6-10

Drawing No:	0606253m_SCRWF_G014_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 5 10 km

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6.6 Access – Traffic and Transport

6.6.1 Existing Environment

Access to the Project Area, including traffic and transport, are key considerations during the construction phase of the Project. Construction of a wind farm results in increased volumes of traffic, both of light-duty vehicles used to transport workers and materials and heavy vehicle movements to transport wind turbine towers, blades, nacelles and other equipment. Once construction of the wind farm has been completed, traffic associated with ongoing operations of the power station is minimal and generally involves only light vehicle movements for operational personnel.

The Project Area is located approximately 420 km from Melbourne, 670 km from Adelaide, and 750km from Sydney (by road). The major turbine components for the wind farm are anticipated to be delivered to a port and transported by road to the Project Area. The Project Area is serviced by the Sturt Highway and Cobb Highway, both of which are major highways which have the capacity to carry oversize and overmass (OSOM) vehicles to and from the Project Area.

The transport route of WTG components and other Project related materials are subject to a Port and Transport Route Assessment, which will be prepared as part of the EIS, the outcomes of which will be incorporated into the Traffic and Transport Impact Assessment. This will identify a proposed transport route from the port to the Project Area, as well as any required road upgrades.

Whilst a port and transport route have not yet been determined, indicative options that may be considered (but not necessarily limited to) are provided in Figure 3-2 and summarised in Table 6-9.

Table 6-9 Potential Port options and distance to Project Area

Port	City and State	Approx. distance from Project Area (by road)
Appleton Dock	Melbourne, VIC	390 km
Port of Geelong	Geelong, VIC	420 km
Port of Portland	Portland, SA	615 km
Port Adelaide	Adelaide, SA	670 km
Port Botany	Sydney, NSW	750 km
Port of Newcastle	Newcastle, NSW	900 km
Port Kemba	Wollongong, NSW	720 km

The Project may require upgrades to roads along the transport route. The details and specifications of these upgrades will be depend on the size of the vehicles and infrastructure required to be delivered to the Project Area, and are subject to assessment in a Transport Route Assessment.

In addition, the construction of access tracks will also be required throughout the Project Area to facilitate construction and to allow for maintenance to occur throughout the operational phase of the Project. The Cobb Highway and Sturt Highway are expected to be used as much as possible to avoid road upgrades and impacts on local roads and local traffic.

6.6.2 Assessment Approach

As part of the EIS, a Transport Route Assessment included in the TTIA will be prepared, which will consider potential transportation routes for construction traffic and potential impacts of the size, loads, and volumes of vehicles on the road network. The TTIA will generally be prepared in accordance with:

- *Guide to Traffic Generating Developments* (RTA, 2002);
- *Austroads Guide to Road Design*; and
- *Austroads Guide to Traffic Management* (Austroads, undated).

The scope of the TTIA will likely involve:

- Assessment of haulage routes, access points, and swept paths through intersections to determine potential risks and impacts from the largest vehicles;
- Assessment of likely project-alone and cumulative traffic impacts during the construction and operational phases of the project (including intersection performance, capacity, safety and site access);
- Review of any previous traffic impact assessments undertaken for the surrounding area and traffic counts in selected areas;
- Road dilapidation surveys to inform road repairs during the construction and operational phases of the Project;
- Identification of mitigation and management measures if required, including in relation to traffic volumes and sight lines;
- Identification of any road upgrades required and associated clearing and disturbance works; and
- Assessment of the potential impacts of the proposed works on residences and access ways.

6.7 Aviation

6.7.1 Existing Environment

A preliminary review of aircraft landing areas (ALAs) was undertaken of the Project Area and its surrounding regions. Two ALAs were identified within 30 km of the Project Area, which include:

- Hay Airport (YHAY) - a regional airport located directly east of the Project Area and 9 km north of the Project Area that is operated by Hay Shire Council and services the Hay region; and
- Ravensworth Airport (YRWH) - a small airport located 34 km west of the Project Area that is likely only used for local transport and aerial application operations.

6.7.2 Assessment Approach

An aviation impact assessment will be undertaken for the EIS, which will assess any potential impacts to aviation safety associated with the Project. The assessment will include consideration of:

- Potential impacts to aviation safety including wake / turbulence issues;
- The need for aviation safety lighting;
- Air traffic routes, heights procedures, radar and communications systems and navigation aids; and
- Potential impacts on aerial emergency services, aerial firefighting, and aerial agricultural operations.

The assessment will address any aviation concerns raised during consultation with the community and key stakeholders, and identify relevant mitigation strategies to be implemented where required. Consultation with the Civil Aviation Safety Authority (CASA) will also be undertaken to determine relevant aviation safety lighting requirements, notification and reporting requirements, and the potential marking of turbines, wind monitoring towers, and overhead transmission lines and poles.

The Aviation Impact Assessment (AIA) will be prepared in accordance with:

- The Civil Aviation Regulation 1988;
- The Civil Aviation Safety Regulations 1998; and
- National Airports Safeguarding Framework Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation (DITRDC, 2019).

6.8 Social Impact

This section provides the first phase Social Impact Assessment (SIA) undertaken for the Project, in line with the Department for Planning and Environment's (DPE) SIA Guideline: For State Significant Projects (the Guideline) (DPIE, 2021b) and DPE's Technical Supplement: Social Impact Assessment Guideline for State Significant Projects (Technical Supplement) (DPIE, 2021e).

The first phase SIA involves scoping and preliminary assessment, identifies the level of assessment to be applied, and sets further parameters for the second phase SIA (the assessment report to be appended to the EIS) (DPIE, 2021b, p. 12). Accordingly, the first phase SIA includes:

- Defining the Project's Social Locality;
- Describing the profile of the community in a preliminary social baseline, outlining the potential social impacts; and
- Outlining the approach that will be undertaken to complete the second phase SIA.

6.8.1 Existing Environment

6.8.1.1 Social Locality

One of the first steps in a SIA is the scoping process, which helps to define the social area of influence, or Social Locality. Determining the Social Locality for the Project involves understanding the nature of the Project, the characteristics of the surrounding communities, and how potential positive and/or negative impacts will be experienced by different community members/groups.

In determining the Social Locality, the following Project aspects were taken into consideration:

- The location of wind turbines in the Project Area and how they are situated within the landscape;
- The location of these components within the overall Project Area relative to sensitive land uses, being residential dwellings and structures. This included proximity to environmental values and topographical features;
- Construction and operation phase activities, such as:
  - Land clearing and ongoing access for maintenance;
  - Workforce requirements, including skills required and accommodation arrangements;
  - Goods and services required by the Project; and
  - Haulage routes to and from the Project Area.

When considering these aspects, it was determined that the Project's Social Locality should include the Project Area, the area surrounding the Project Area wherein noise, visual and other amenity impacts may occur, the haulage routes where similar amenity impacts may be experienced, and the communities in larger nearby centres that may provide workers or goods and services to the Project.

With respect to decommissioning it is important to note that technology to support renewable energy projects is continuously evolving and improving. Accordingly, following the operational timeframe for the Project (in excess of 30 years), components of the Project may be upgraded to prolong the life of operation, or decommissioned and the land returned to the original land use. For the purposes of this SIA, therefore, the future decommissioning phase has not been assessed. The potential social impacts associated with the decommissioning of the Project will be considered as part of a future Decommissioning Plan (or similar).

This Project is located within the Hay Local Government Area (LGA) and the Edward River LGA. The Project Area is located approximately 13 km south of Hay town, and is accessed via the Cobb Highway, which extends horizontally through Hay, and connects to the Sturt Highway from east and west.

Town centres located in both Hay Shire and Edward River LGAs, as well as possible larger town centres, including the nearby town of Griffith, are likely to provide goods and services to support the construction and operation (e.g. ongoing maintenance) phases of the Project.

Based on the above, the Project's Social Locality, as defined for the purposes of the SIA, is comprised of the following three components:

- The Project Area and immediate surrounding areas, located within the Australian Bureau of Statistics (ABS) Statistical Area Level 1 (SA1) Nos. 10902117711 and 10903118311 (containing the Project), and 10902117712 (immediately adjacent to the Project Area). SA1 data has been used to identify key baseline indicators for the Social Locality, where applicable. Additionally, LGA level data for the Hay and Edward River LGAs, and state level data for NSW were used to provide an understanding of the broader and comparative social context within which the Project is located.
- The transportation and haulage routes, comprising vehicular routes from the south and northeast via the Cobb Highway, and from the east and west via Sturt Highway. Indicative travel distances from the approximate centre of the Project Area are provided in Table 6-10.
- The surrounding towns and regional centres of Hay, Swan Hill, Deniliquin and Griffith, which may provide goods and services to support the construction phase of the Project. ABS Urban Centres and Localities (UCLs) provide baseline data for these towns and regional centres.

The Project Area and immediate surrounding areas, SA1s, Hay and Edward River LGAs, transportation and haulage routes, and UCLs for Hay, Swan Hill, Balranald, Deniliquin, Darling Point and Griffith form the Social Locality, as depicted in Figure 6-11.

Table 6-10 Approximate Distances to the Project Area

Town/Regional Centre	Travel Distance
Hay	13 km
Swan Hill	110 km
Griffith	110 km
Balranald	100 km
Deniliquin	75 km
Darlington Point	90 km

6.8.1.2 Community Profile

The community profile presented in this section will inform the social baseline in the second phase SIA (part of the EIS), and is largely based on ABS 2016 census data[6].

Table 6-11 outlines the primary ABS datasets used to provide key demographic data across the Project's Social Locality. For the purposes of the first phase SIA only 2016 ABS datasets (i.e. latest available) were considered, however, in the second phase SIA, relevant 2011 ABS data (or 2021 ABS data, dependent upon release) will also be used for the purposes of trend analysis.

[6] The anticipated release of the 2021 Census data is from June 2022 until mid-2023. If this data is available for the Phase two SIA this will be included.

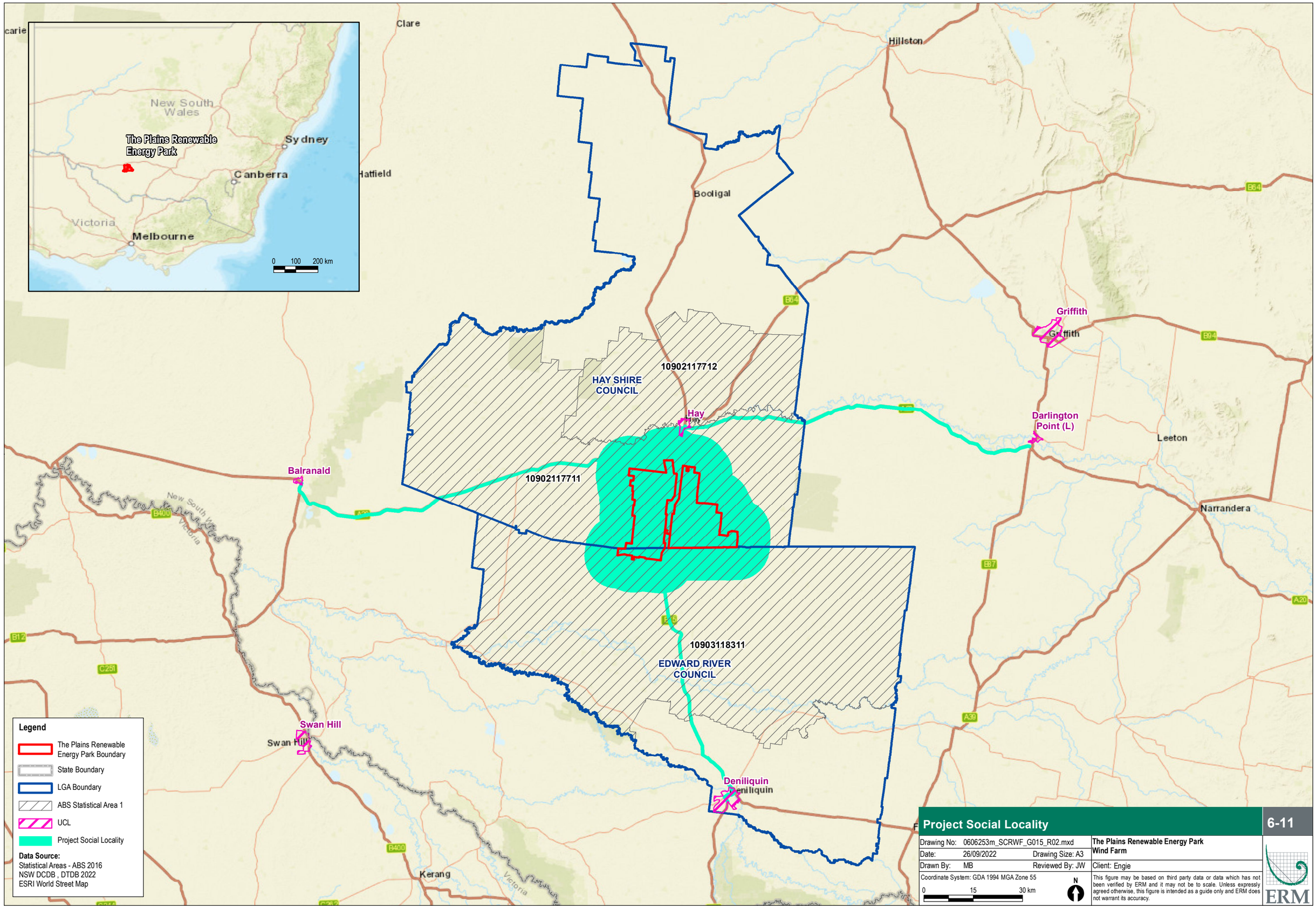
New South Wales
The Plains Renewable Energy Park
Sydney
Canberra
Victoria
Melbourne
0 100 200 km
Clare
Hillston
Hatfield
Booligal
B64
Griffith
Griffith
B64
10902117712
HAY SHIRE COUNCIL
Hay
Darlington Point (L)
Leeton
Balranald
10902117711
New South Wales
Victoria
B400
Narrandera
B12
C251
10903118311
EDWARD RIVER COUNCIL
A39
A20
Swan Hill
Swan Hill
Deniliquin
Deniliquin
B400
Kerang
Victoria
Legend
The Plains Renewable Energy Park Boundary
State Boundary
LGA Boundary
ABS Statistical Area 1
UCL
Project Social Locality
Data Source:
Statistical Areas - ABS 2016
NSW DCDB , DTDB 2022
ESRI World Street Map
Project Social Locality
6-11
Drawing No: 0606253m_SCRWF_G015_R02.mxd
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: JW
Coordinate System: GDA 1994 MGA Zone 55
0 15 30 km
N
The Plains Renewable Energy Park Wind Farm
Client: Engie
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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Table 6-11 Summary of Relevant ABS Datasets

Location	2016 ABS Data Reference (Census)
Hay LGA	13850 (LGA)
Edward River LGA	12730 (LGA)
SA1 (north of Project Area)	10902117712 (SA1)
SA1 (within Project Area)	10903117711 (SA1)
SA1 (south of Project Area)	10903118311 (SA1)
Hay	115075 (UCL)
Balranald	115004 (UCL)
Swan Hill	213015 (UCL)
Deniliquin	114010 (UCL)
Darlington Point	121031 (UCL)
Griffith	113007 (UCL)
NSW	Code 1 (STE)

In addition to the above listed ABS datasets, the second phase SIA social baseline will be informed by a desktop review of sources including from public health advisory bodies, principally NSW Health and local hospitals (i.e. regarding physical and mental health issues prevalent in the local community), and educational institutions, principally the NSW Department of Education and local schools. Information relating to the economic profile of the Project is also provided by ABS 2016 Census data, while information on developmental priorities and challenges in the region will be provided by local and State government planning documents, such as Hay and Edward River LGAs' Local Strategic Planning Statements.

Table 6-12 draws on the ABS datasets listed in Table 6-11 to provide a demographic overview of the Project's Social Locality. As outlined above, the Project Area is located within ABS Statistical Area Nos. 10903117711 and 10903118311. These Statistical Areas are the primary source of information about the potentially impacted community's, which defines the characteristics and is used to provide an understanding of potentially vulnerable groups within the Project's immediate Social Locality.

Table 6-12 also includes the ABS' Socio-Economic Indexes for Areas (SEIFA)[7] to provide an indication of comparative socio-economic advantage and disadvantage, alongside details of unoccupied dwellings, dwelling tenure, and household composition (ABS, 2018). The SEIFA scores in Table 6-12 are a percentile score, where a lower SEIFA score indicates that an area is relatively disadvantaged compared to an area with a higher score.

Table 6-12 shows that Hay LGA has a low SEIFA index, 24, indicating that the LGA is relatively disadvantaged, however the SA1 within the Project Area has a score of 69. SA1 10903117711, within the Project Area, has an unemployment of 0.0%. There is a high level of unoccupied dwellings across the social locality, ranging from 9.7% in Griffith UCL to 33.0% in SA1 10903117711 within the Project Area.

[7] SEIFA is a product developed by the ABS that ranks areas in Australia according to relative socio-economic advantage and disadvantage. The indexes are based on information from the five-yearly Census, available at: https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/2033.0.55.001Main+Features12016?OpenDocument.

Table 6-12 Key Indicators for all ABS Datasets (2016) Across the Project's Social Locality

Population	Median Age	Indigenous Pop. (%)	Pop. Over 65 Years of Age	Median Weekly Household Income	Unemployment (%)	SEIFA (Percentile in NSW)	Dwelling Count (Occupied / Unoccupied (%))	Dwelling Tenure (Owned Outright + Mortgaged / Rented, %)	Household Composition (Families / Singles / Groups, %)
Hay LGA 13850 (LGA)									
2,946	46	6.0%	21.8%	$1,075	4.6%	24	1,087/ 294 (21.3%)	62.8%/ 30.3%	66.8% / 31.6% / 1.6%
Edward River LGA 12730 (LGA)									
8,851	45	4.0%	22.2%	$1,080	5.0%	37	3,378/ 472 (12.3%)	67.5% / 28.4%	65.2% / 32.2% / 2.6%
SA1 10902117712 (SA1) (north of Project Area)									
338	42	5.3%	13.8%	$1,465	2.3%	52	103 / 29 (22.0%)	87.0% / 13%	82.2% / 17.8% / 0.0%
SA1 10903117711 (SA1) (within Project Area)									
197	45	2.0%	12.5%	$1,437	0.0%	69	61 / 30 (33.0%)	63.5% / 28.4%	77.1% / 18.6% / 4.3%
SA1 10903118311 (SA1) (south of Project Area)									
308	45	3.5%	13.3%	$1,211	2.6%	55	106 / 48 (31.2%)	60.0% / 31.3%	69.8% / 27.4% / 2.8%
Hay 115075 (UCL)									
2,316	47	6.3%	24.4%	$1,013	5.5%	-	891 / 213 (19.3%)	60.9% / 32.8%	63.0% / 35.1% / 1.9%
Balranald 115004 (UCL)									
1,159	46	13.4%	21.5%	$1,012	7.9%	-	450 / 108 (19.4%)	63.8% / 33.6%	64.7% / 34.5% / 0.7%
Swan Hill 213015 (UCL)									
10,600	39	3.6%	20.6%	$1,090	5.0%	-	3,924 / 426 (9.8%)	62.1% / 33.6%	64.3% / 31.7% / 4.0%
Deniliquin 114010 (UCL)									
6,833	45	4.7%	24.1%	$1,018	5.9%	-	2,704/ 298 (9.9%)	66.0% / 30.6%	62.0% / 35.2% / 2.8%
Darlington Point 121031 (UCL)									
930	41	17.8%	17.4%	$1,066	6.9%	-	341 / 45 (11.7%)	57.6% / 38.4%	70.1% / 24.9% / 5.1%
Griffith 113007 (UCL)									
18,874	36	5.0%	16.9%	$1,304	5.3%	-	6,354 / 682 (9.7%)	59.9% / 35.4%	71.0% / 25.4% / 3.6%
NSW Code 1 (STE)									
7,480,228	38	2.9%	16.2%	$1,486	6.3%	-	2,604,320 / 284,741 (10%)	64.5% / 31.8%	72.0% / 23.8% / 4.2%

Table 6-13 outlines the key industries and areas of employment for SA1s and the Hay and Edward River LGAs, included in the Project's Social Locality, and NSW as a whole. The most prominent occupation across the Hay LGA, Edward River LGA, SA1 10902117712, SA1 10902117711 and SA1 10902118311 is manager. The Hay LGA and SA1 10902117711, within the Project Area, has a prominent amount of the workforce in sheep farming.

Table 6-13 Key Industries for Select ABS Statistical Areas

Location	Key Occupation and Industries (2016 Census Data)
Hay LGA	■ The most common occupations in Hay LGA included Managers (19.4%), Labourers (15.8%), Technicians and Trades Workers 13.7%, Machinery Operators and Drivers (11.6%), and Clerical and Administrative Workers (10.0%). ■ Of the employed people in the LGA, 6.2% worked in Sheep Farming (specialised). Other major industries of employment included Supermarket and Grocery Stores (4.7%), Local Government Administration (4.6%), Accommodation (3.6%), and Primary Education (3.6%).
Edward River LGA	■ The most common occupations in Edward River LGA included Managers (18.2%), Professionals (14.6%), Labourers (14.4%), Technicians and Trades Workers (12.6%), and Clerical and Administrative Workers (11.8%). ■ Of the employed people in the LGA, 3.5% worked in Other Social Assistance Services. Other major industries of employment included Supermarket and Grocery Stores (3.0%), Primary Education (2.9%), Hospitals (except Psychiatric Hospitals) (2.6%), and Other Grain Growing (2.6%).
SA1 10902117712 (north of Project Area)	■ Of the 338 residents in this SA1, there were 174 people who were reported as being in the workforce in the 2016 Census, including four (4) unemployed persons. ■ The most common occupations in this SA1 included Managers (22.6%), Clerical and Administrative Workers (16.1%), Labourers (13.1%), Technicians and Trades Workers (10.7%), and Community and Personal Service Workers (9.5%). ■ Of the employed people in this SA1, 9.4% worked in Sheep Farming (specialised). Other major industries of employment included Primary Education (7.9%), Cotton Growing (5.0%), Cotton Ginning (5.0%), and Sheep-Beef Cattle Farming (4.3%).
SA1 10902117711 (within Project Area)	■ Of the 197 residents in this SA1, there were 103 people who were reported as being in the workforce in the 2016 Census, no residents were unemployed as the time of the Census. ■ The most common occupations reported were Managers (47.7%) Labourers (12.1%), Professionals (9.3%), Clerical and Administrative Workers (8.4%) and Community and Personal Service Workers (7.5%). ■ Of the employed people in this SA1, 21.5% worked in Sheep Farming (specialised). Other major industries of employment included Beef Cattle Farming (specialised) (17.7%), Cotton Growing (10.1%), Primary Education (7.6%), and Sheep-Beef Cattle Farming (6.3%).
SA1 10903118311 (south of Project Area)	■ Of the 308 residents in this SA1, there were 151 people who were reported as being in the workforce in the 2016 Census, including four (4) unemployed persons. ■ The most common occupations in this SA1 included Managers (43.1%), Labourers (19.6%), Professionals (12.4%), Clerical and Administrative Workers (8.5%), and Technicians and Trades Workers (5.9%). ■ Of the employed people in this SA1, 27.4% worked in Sheep Farming (specialised). Other major industries of employment included Beef Cattle Farming (specialised) (13.3%), Sheep-Beef Cattle Farming (8.8%), Grain-Sheep or Grain-Beef Cattle Farming (6.2%), and State Government Administration (4.4%).
NSW Code 1 (STE)	■ The most common occupations in NSW included Professionals (23.6%), Clerical and Administrative Workers (13.8%), Managers (13.5%), Technicians and Trades Workers (12.7%), and Community and Personal Service Workers (10.4%). ■ Of the employed people in New South Wales, 3.5% worked in Hospitals (except Psychiatric Hospitals). Other major industries of employment included Cafes and Restaurants (2.4%), Supermarket and Grocery Stores (2.2%), Aged Care Residential Services (2.0%) and Primary Education (1.9%).

6.8.1.3 Social Infrastructure Overview

Social infrastructure comprises schools and other education institutions, medical services, emergency services, recreational facilities and community organisations. Some commercial services are also listed under social infrastructure, such as childcare facilities.

Given the rural location of the Project Area, the nearest town is Hay, which is approximately 13 km north of the Project Area. Hay has a hospital which provides primary health care services including community nursing, early childhood nursing, mental health services, palliative care, physiotherapy, speech therapy and nutrition. The Hay Hospital also has a 24-hour Accident and Emergency Department. Hay is serviced by Fire and Rescue NSW, Hay Police Station and NSW Ambulance. In terms of education, Hay has one preschool, one private primary school and three public primary schools, one public high school and a TAFE. Hay also includes a variety of sporting and social clubs, aged care services, support services, religious groups, a post office, supermarkets, accommodation and community infrastructure such as a public swimming pool, library, memorial hall, and airport.

Balranald is located approximately 100 km west of the Project Area. Balranald has a District Hospital, that is open 24/7 to provide medical services and includes an emergency facility. Emergency services based in Balranald include Fire and Rescue NSW, NSW Police, Ambulance NSW, NSW Rural Fire and Service and the Balranald Rescue Squad. Balranald has two schools, a private primary school and a public school which is from Kindergarten to Year 12. There are four churches located at Balranald, including Catholic, Presbyterian, and Anglican. Balranald also provides grocery stores, a post office, hardware stores, and service stations.

Swan Hill is a city located in Victoria approximately 110 km south-west of the Project Area. Swan Hill has the Swan Hill District Health Centre, which is a major medical facility offering a wide variety of medical services. Aside from the hospital, there is a dentist, a doctor's surgery, maternal and child health and various pharmacies located throughout Swan Hill. There are nine churches located at Swan Hill, which include Anglican, Catholic, and Presbyterian. Swan Hill also has a variety of social infrastructure, such as petrol stations, a post office, banks, supermarkets, library, newsagents and an airport. Swan Hill has 10 primary schools (two private schools and eight public schools), two high schools and one TAFE.

Deniliquin is located approximately 75 km south of the Project Area. Deniliquin has a hospital that provides a 24-hour Accident and Emergency Department, the hospital has a day surgery and maternity ward, as well as a Renal Unit and separate Oncology Service. Emergency services based in Deniliquin include Ambulance NSW, NSW Police, NSW Fire Brigade, and the Deniliquin-Conargo State Emergency Services Unit. There are a variety of places of worship in Deniliquin including Catholic, Baptist, Uniting, Presbyterian, and Anglican churches, and Kingdom Hall of Jehovah's Witnesses. Deniliquin has four primary schools (one private schools and three public schools), one public high school, one private school for kindergarten to year 10, and a TAFE. There is a variety of social infrastructure including sporting facilities and clubs, a swim centre, aged care services, service stations, supermarkets, post office, library, newsagents, banks, and an airport.

Darlington Point is located approximately 90 km east of the Project Area. Darlington Point has a community health centre that provides medical care to community members two days per week. There is one public primary school located in Darlington Point. There are no emergency services based in Darlington Point. Darlington Point has two churches, a Catholic and an Anglican Church. Darlington Point has a post office, a supermarket, service station, newsagent, and pharmacy.

Griffith is located approximately 110 km north-east, of the Project Area. Griffith has two hospitals, the Griffith Base Hospital and St Vincent's Private Community Hospital, which both have 24-hour emergency centres, the hospitals are both comprehensive and provide a range of specialist services. Emergency services based in Griffith include NSW Police, NSW Rural Fire Service, Fire and Rescue NSW, and NSW Ambulance. Griffith has a variety of public and private primary and high schools including Kalinda School, which provided education services to students with intellectual and physical disabilities.

Additionally, Griffith has a range of tertiary education including TAFE, University of NSW rural medical school, and Western Riverina Community College. Griffith has an array of community infrastructure including supermarkets, churches, banks, sporting and recreation facilities, community gardens, community centre, and an airport.

The Project Area is located approximately 80 km south-east of the Yanga National Park, Reserve and Conservation Area. The Yanga National Park is a valued recreation area for the purposes of tourism, fishing, hiking, bird watching, and also contains a number of heritage listed homesteads, woolsheds and camping grounds.

6.8.2 Potential Social Impacts

The first phase SIA provides a preliminary desktop assessment of the potential impacts while the second phase SIA, that will be incorporated into the EIS, develops this preliminary assessment into a full assessment report. The full assessment report provides a detailed analysis of the potential impacts and incorporates key stakeholder feedback.

The scoping of potential social impacts was initially facilitated through consideration of the updated SIA Scoping Tool (DPIE, 2021f) that complements the SIA Guideline (DPIE, 2021b). The scoping tool identifies the potential social impacts that are considered likely to occur, and the corresponding level of assessment for each potential social impact. Use of the updated SIA Scoping Tool allows for the level of assessment to be identified, which in this case was determined to be 'detailed assessment'.

An outline of the methodology that will be followed in the second phase SIA is provided below. The second phase SIA will elaborate on potential cumulative impacts in view of recent and proposed renewable energy projects, and other large-scale projects in the Project's Social Locality.

As this is a first phase SIA, this impact assessment is preliminary in nature and makes assumptions about community perceptions and potential impacts from the renewable energy hub, based on the desktop review, prior wind farm SIA experience, and the outcomes of engagement activities carried out to-date (refer to Section 5). The identified potential impacts listed in Table 6-14 will be ground-truthed, supplemented by additional stakeholder feedback, and reviewed against any changes associated with further design development subsequent to issuing the SEARs.

Table 6-14 Preliminary Social Impact Assessment

Description of Impact	Impact Categories	Impact Influence	Project Phase	Level of Assessment
Employment and Procurement				
Increased demand for labour in the Social Locality (generates direct and indirect employment opportunities)	Livelihoods	Positive	Construction	Detailed Assessment
Increased demand for labour in the Social Locality leading to a skill shortages/ reduced labour availability for local services and/or businesses	Livelihoods	Negative	Construction	Detailed Assessment
Increased demand for goods and services in the Social Locality (stimulates local economies)	Livelihoods	Positive	Construction	Detailed Assessment
Increased demand for goods and services in the Social Locality (creates shortages)	Livelihoods	Negative	Construction	Detailed Assessment
Diversification of income streams for host landowners	Livelihoods	Positive	Life of the Project	Detailed Assessment

Description of Impact	Impact Categories	Impact Influence	Project Phase	Level of Assessment
Increased tourism opportunities to the Social Locality	Livelihoods Culture	Positive	Life of the Project	Detailed Assessment
Local Disruptions				
Disruptions to agricultural activities / farming practices (e.g. activities may limit access and cause temporary inconveniences for the operation of rural properties, such as stock movements, paddock access, etc.)	Livelihoods	Negative	Construction	Detailed Assessment
Increased vehicular movement from workers employed by the Project, and the transportation of materials and equipment to site, increasing the potential for accidents and wear and tear on road infrastructure	Health and Wellbeing	Negative	Construction	Detailed Assessment
Interruptions to daily life, such as changes in traffic conditions (e.g. diversions for school buses, road closures, changes to public vehicular access), utility disruptions, etc.	Way of Life Access	Negative	Construction	Detailed Assessment
Impacts associated with noise, vibration, and dust, which may cause impacts or disruptions to community health.	Health and Wellbeing Surroundings	Negative	Construction	Detailed Assessment
Changes to public vehicular access in the vicinity of the Project Area has the potential to impact community access	Access	Negative	Life of the Project	Detailed Assessment
Impact to the operation of Hay airport and surrounding airstrips (e.g. flight path disruptions, glint/glare, disruptions to aerial spraying or water bombers, etc.)	Surroundings	Negative	Life of the Project	Detailed Assessment
Land Use and Landscape				
Perceived impacts on land and/or property values (i.e. a decrease in land values)	Livelihoods	Negative	Operation	Detailed Assessment
Perceived health impacts associated with noise, vibration, shadow flicker, glint/glare, and blade throw	Health and Wellbeing Way of Life Community Culture	Negative	Operation	Detailed Assessment
Visual impact through altered rural character/changes to rural amenity (i.e. loss of scenic views and negative changes to visual amenity)	Way of Life Surroundings	Negative	Life of the Project	Detailed assessment
Altered landscape has the potential to impact tangible and intangible Aboriginal heritage	Culture	Negative	Life of the Project	Detailed Assessment

Description of Impact	Impact Categories	Impact Influence	Project Phase	Level of Assessment
Accommodation and Worker Influx				
Increased demand / pressures on housing and accommodation potentially resulting in a shortage and/or increased cost of living	Way of life	Negative	Construction	Detailed Assessment
Increased demand and pressure on social, emergency, community, and recreational services and/or facilities including health care	Access Way of Life	Negative	Construction	Detailed Assessment
Stakeholder and Community				
Development of a Community Benefit Fund (or similar Project-specific community benefit sharing scheming), which may generate positive outcomes for the local community (e.g. support of local community groups, scholarships, etc.)	Livelihoods Culture	Positive	Life of the Project	Detailed Assessment

6.8.3 Assessment Approach

This section outlines the plan for developing the second phase SIA, in accordance with the requirements of the Social Impact Assessment Guideline and Technical Supplement (DPIE 2021a, 2021b). Accordingly, the second phase SIA will be structured according to the following sections:

1. **Introduction, Project Description, Regulatory Context**

   This section will provide a detailed overview of the Project locale, components, stages, and history. It will also provide a detailed review of the legislative and regulatory framework applicable to the SIA, taking into account relevant company policies.

2. **Social Locality and Stakeholder Identification**

   This section will elaborate on the preliminary outline of the Project's Social Locality. The update will incorporate regulator and client feedback on the preliminary identification and provide an updated stakeholder list as the SIA moves into the second phase and more information becomes available.

3. **Methodology**

   The impact assessment methodology to be applied to the second phase SIA follows DPE's Social Impact Significance matrix (DPIE, 2021b, pp 12-13), as depicted in

   Table 6-15. In this matrix, the likelihood level refers to the probability of a social impact's occurrence as a result of the Project while the magnitude is considered in terms of the following elements:

   - **Extent:** Who specifically is expected to be affected (directly, indirectly, and/or cumulatively), including any potential vulnerable people? Which location(s) and people are affected? (e.g. near neighbours, local, regional).
   - **Duration:** When is the social impact expected to occur? Will it be time-limited (e.g. over particular Project phases) or permanent?
   - **Severity**: What is the likely scale or degree of change? (e.g. mild, moderate, severe).

- **Intensity:** How sensitive/vulnerable (or how adaptable/resilient) are affected people to the impact, or (for positive impacts) how important is it to them? This might depend on the value they attach to the matter; whether it is rare/unique or replaceable; the extent to which it is tied to their identity; and their capacity to cope with or adapt to change.
- **Level of Concern/Interest**: How concerned/interested are people? Sometimes, concerns may be disproportionate to findings from technical assessments of likelihood, duration and/or severity. Concern itself can lead to negative impacts, while interest can lead to expectations of positive impacts.

The characteristics of the magnitude of impact combine with their likelihood of occurrence to yield a rating of social impact significance, as indicated in

Table 6-15. The social impact significance matrix depicted in

Table 6-15 will be applied to yield the initial evaluation of social impacts that are likely to be experienced by different groups within the Project's Social Locality.

Table 6-15 Adapted Social Impact Significance Matrix

Likelihood level	Magnitude level: 1 Minimal	2 Minor	3 Moderate	4 Major	5 Transformational
A Almost certain	Medium	Medium	High	Very High	Very High
B Likely	Low	Medium	High	High	Very High
C Possible	Low	Medium	Medium	High	High
D Unlikely	Low	Low	Medium	Medium	High
E Very unlikely	Low	Low	Low	Medium	Medium
F Positive	P1	P2	P3	P4	P5

4. Stakeholder Engagement for SIA

This section will provide a summary of stakeholder engagement relevant to the SIA. Key stakeholder interviews will be conducted as part of wider stakeholder engagement activities. The SIA tailored questions and discussion topics will guide semi-structured interviews with key informants in a manner designed to elicit honest responses underpinned by free, prior informed consultation with the participants. The broad categories of stakeholders to be targeted for the SIA include: host landowners, neighbouring landowners, Aboriginal groups, local governments, local businesses and representative groups, social and community service providers, and the wider community. More extensive details of stakeholder engagement activities will be included in appendices, where relevant.

5. Social Baseline

This section will update and expand on the community profile. The preliminary desktop assessment will be supplemented and ground-truthed with data obtained during fieldwork, including from stakeholder engagement activities outlined above.

6. **Expected and Perceived Impacts**

   This section explains the potential social impacts as identified through the preceding sections of the SIA, particularly the stakeholder inputs into the social baseline as limited by identification of the Project's Social Locality.

7. **Impact Assessment and Prediction**

   This section will update and expand on the preliminary social impact assessment, providing an impact assessment informed by the stakeholder engagement. Two ratings will be provided in the impact assessment table covering pre- and post-mitigation levels of impact significance.

8. **Social Impact Enhancement, Mitigation, and Residual Impacts**

   This section provides a summary of all of the impact assessment mitigations which have applied to the Project through all phases, including earlier phases of planning and development. As noted, the impact assessment will include pre- and post-mitigation impact significance levels. This section elaborates the mitigation measures which may be applied to reduce the social impact significance levels for the various social impacts identified. The level of residual impacts will also be noted.

9. **Monitoring and Management Framework**

   This section will provide an overview of the recommended monitoring and social impact management measures that are to be put in place covering both the construction and operation phases of the Project. For the post-mitigation impact significant levels to be achieved, the social impact mitigations outlined in this section will need to be implemented according to the plan outlined in this section.

10. **References**

    List of all documents and other resources cited in the SIA.

11. **Appendices**

    Appendices will include community profiles and other supporting information such as summaries of stakeholder engagement and primary research.

6.9 Water Resources

6.9.1 Existing Environment

6.9.1.1 Hydrology

The Project Area is located within the Murrumbidgee Catchment of the Murray Darling Basin. The Murrumbidgee Catchment covers an area of 84,000 km2 and comprises 8 percent of the total area of the Murray-Darling Basin (MDBA, 2021). It contains a number of sites of international ecological significance, including the Lowbidgee Wetlands and Fivebough and Tuckerbil Swamps (MDBA, 2021).

The Project Area is located immediately south of the Murrumbidgee River and approximately 9 km north of the Coleambally Outfall Drain, which is an irrigation channel. There are irrigation channels are located in the northern areas of Mungadal East. In addition, there are several creeks that lie within the boundaries of the Project Area, which include Abercrombie Creek, Curtains Creek and Telegraph Creek. For much of the year these creeks may have no running water. A map of the watercourses present within the Project Area and its surrounding areas is provided in Figure 6-12.

The Project Area has a relatively flat terrain, with a nominal ground elevation of 95 m AHD. The smaller creeks within the region only carry water during periods of high flow on the rivers, and remain dry at other times along with the numerous intermittent lakes and swamps.

6.9.1.2 Flooding

The Project Area is characterised by relatively flat terrain with several local farm drains, open channels and meandering creeks. Land uses are typical of a rural setting, with large pockets of farmland, isolated buildings/sheds and unsealed roads (Aurecon, 2021).

The Project Area is not mapped as flood prone land under NSW state flood information, however other areas of the Hay and Edward River LGAs are subject to flooding from the Murrumbidgee River, Lachlan River, and Mirrool Creek. Hay has experienced 20 floods greater than 8.0 metres since 1952, with the largest floods recorded in 1956 (8.99 m), 1974 (9.02 m), 2010 (8.48 m) and 2012 (8.99 m) (SES, 2014). Drainage throughout the LGA is relatively slow due to its relatively flat topography, where inundation can often last for several months (SES, 2014).

Preliminary Flood Modelling

The Riverina Wind and Solar Farm Flood Modelling report was prepared by Aurecon (2021), to determine the flood risks across the Project Area. The indicative flood assessment identified the 1% Annual Exceedance Probability (AEP) design flood event for the existing pre-development site conditions. The assessment approach to flood modelling incorporated a hydrological analysis followed by a 2D hydraulic analysis. The assessment results are summarised as follows.

For the purposes of the assessment, Mungadal West was referred to as “Site A” and Mungadal East was referred to as “Site B”. The following section highlights the risks and flood behaviours identified for a 1% AEP design flood event across the two sites.

Site A (Mungadal West)

For Site A, the northern most region was identified as being heavily affected by flooding, with large portions of the site inundated by more than 200 mm of flooding. To the south, two channels enter Site A form the east and traverse to the west before combining to cross the eastern portion of site. The open channel flows regularly exceed a depth of 500 mm. Site A has several local storage dams and ponds with depths exceeding 1000 mm for large areas of the sites.

Site B (Mungadal East)

Starting along the eastern upstream boundary, four channels enter Site B and traverse to the western and southern boundary. The open channel flows exceed a depth of 500 mm. Similarly to Site A, Site B contains a localised low point (possible dam) with depths exceeding 500 mm. In addition, a large region of the site in the south-eastern corner is inundated to greater than 200 mm, which may present issues relating to accessibility.

Flood risk and hazard

It is noted that while the study did not consider the flood influence from the Murrumbidgee River, this may cause additional flood risk to Site A. In the 1% AEP design event, the flood extent of Murrumbidgee River could reach up to 2.5 km from the southern side of the bank, which may cause a high hazard of greater than H3. If the similar flood extent is considered for Site A, a portion of the land at the northern side of site A would experience high hazard flooding issue.

The regions discussed above are generally locations where the hydraulic hazard, as classified by the *Australian Disaster Resilience Handbook 7: Guideline 7-3 Flood Hazard*, as a hazard classification of H2 or less. Classification H2 has been deemed unsafe for small vehicles with a limiting still water depth of 0.3 m and a limiting velocity of 2.0m/s. Where regions exceed the H2 hazard classification, further investigation should be conducted.

The flood assessment for the 1% AEP event was prepared for the Project Area to provide a baseline understanding of existing estimated flood conditions. The assessment concluded with the following key findings:

- For both Sites A and B, the flood depths are between 200 mm – 2000 mm with the corresponding flood hazards categorized into H3 or above. These areas are likely to experience significant flood risk and require specific design considerations and suitable mitigations.
- The areas within the sites but not inside of the reporting polygons experience shallow flood depth (less than 200 mm) and flood hazard (H1 and H2). Further refinement of the flood analysis and flood impact assessment of the potential development is recommended.
- More refined flood modelling is recommended to accurately inform flood levels across the sites.
- While the flood influence from the Murrumbidgee River was not taken into consideration in the study, it is noted that the Murrumbidgee River may cause wider spread of flooding at Site A.

6.9.2 Assessment Approach

The following approach to water resources will be undertaken as part of the EIS:

Flooding and Hydrology Assessment will be undertaken which will assess:

- Existing flood behaviour through review of existing available data, developing computer models and defining flood levels, depths, velocities and flood hazard category for the Project Area for existing topographic conditions; and
- Post development flood behaviour, including quantifying flood levels, depths, velocities and flood hazard category with the Project in place.

A Water Impact Assessment will be undertaken (forming a 'Soils and Water Assessment), which will include a review of standard construction environmental management plans to ensure that impacts during excavation, road works, transport of machinery, etc. are adequately mitigated through avoidance, minimisation and management.

The assessment will consider the potential impacts of the Project on hydrology and groundwater and will determine the need for further hydrological investigations. The assessment will also identify and quantify sources of water required during construction and operation of the Project, and determine whether any water access licences under the *Water Management Act* 2000 will be required. All required licences and approvals will be obtained prior to the commencement of construction activities.

The water impact assessment will be generally undertaken in accordance with the following guidelines and resources:

- Managing Urban Stormwater; Soils & Construction (Landcom, 2004);
- Guidelines for Controlled Activities on Waterfront Land (DPI Water, 2018);
- Relevant Water Sharing Plans (DPI Water); and
- Guidelines for Watercourse Crossings on Waterfront Land (DPI Water, 2012).

6.10 Land Resources

6.10.1 Existing Environment

A preliminary review of the Soil and Land Capability Mapping data for NSW (DPIE, 2020d) suggests that there are a range of the land and soil capability (LSC) classes within the Project Area.

The majority of land within the Project Area is classified as *Class 5 – Severe limitations*. There are some areas in the north and south of the Project Area are classified as *Class 6 – Very severe limitations,* while areas along the eastern Project Boundary are classified as *Class 4 – Moderate to severe limitations*. A map of soil classes in the vicinity of the Project Area is provided in Figure 6-13**.**

A search of the Australian Soil Classification (ASC) Soil Type Map of NSW (DPIE, 2017) reveals that the site is largely dominated by Vertosols (VE) soils, which are also known as cracking clay soils.

They have a clay texture throughout the profile, display strong cracking when dry, and shrink and swell significantly during wetting and drying phases. Vertosols generally have high soil fertility, and have a large water-holding capacity.

To a lesser extent, the ASC Soil Type Map of NSW also revealed the presence of Rudosols (RU) and Chromosols (CH) within the Project Area.

A review of Biophysical Strategic Agricultural Land (BSAL) data showed that there are no areas of BSAL mapped within, or in close proximity to the Project Area.

6.10.2 Assessment Approach

Revised Large Scale Solar Guidelines have been prepared by DPE and provide further guidance on the process for assessing impacts on agricultural land and principles to encourage development on land with limited agricultural productivity. The guidelines were on exhibition to 25 February 2022.

Whilst the guidelines apply to large scale solar developments, the guideline may also be relevant to large scale wind farm developments and the Project EIS proposes to follow the approach to soils and agricultural impact assessment as detailed in Appendix B of the guideline. Figure 1 of Appendix B of the guideline provides a flow chart outlining various levels of assessment. In accordance with that flow chart, the Project Area is:

- On land zoned RU1;
- Not mapped as Land and Soil Capability Class 1 – 4, nor BSAL nor Critical Industry Cluster (CIC);
- Not adjacent to land mapped as Land and Soil Capability Class 1 – 3, nor BSAL nor CIC; and
- Adjacent to land zoned RU1.

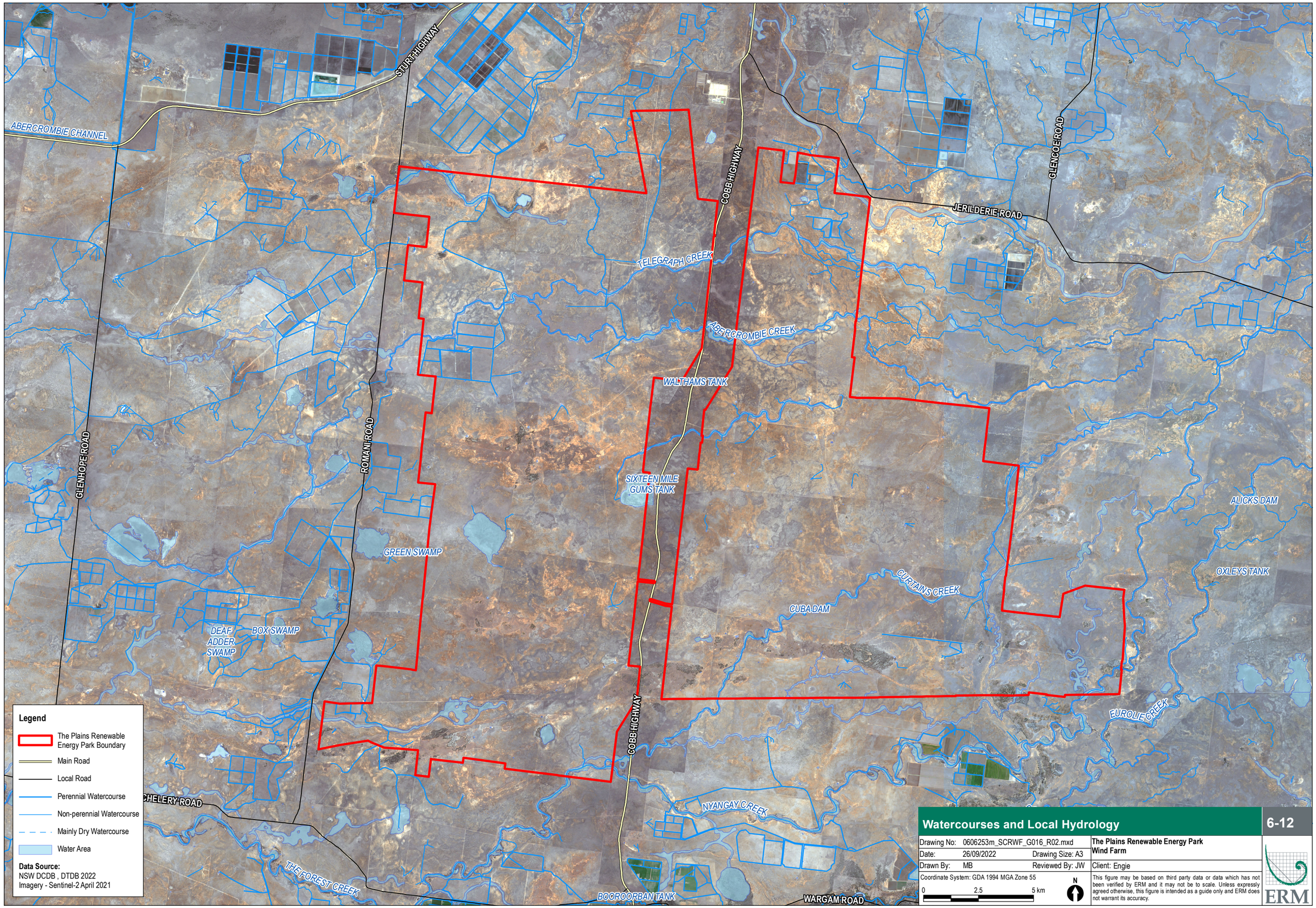
A Level 1 Basic Assessment is therefore required and will include:

- Land and soil capability mapping;
- Include consultation with neighbouring landholders to identify potential project impacts (if any) on immediately adjacent agricultural land;
- Describe project impacts (if any) on immediately adjacent land;
- Describe consultation undertaken; and
- Consider measures to reduce impacts on neighbouring agricultural land.

A soil assessment (forming a ‘Soils and Water Assessment’) will also be undertaken for the EIS, which will primarily focus on assessing the impacts of soil disturbance from vegetation clearing and erosion from excavation works. The assessment will also propose appropriate mitigation measures during construction and operation of the Project.

The soil and landform impact assessment will generally consider the following guidelines:

- Soil and Landscape Issues in Environmental Impact Assessment (OEH, 2000);
- Landslide Risk Management Guidelines (AGS, No Date); and
- Site Investigations for Urban Salinity (OEH, 2002).



Watercourses and Local Hydrology

6-12

Drawing No:	0606253m_SCRWF_G016_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2.5 5 km

N

ERM

STURT HIGHWAY

COBB HIGHWAY

COBB HIGHWAY

Legend

- The Plains Renewable Energy Park Boundary
- Turbine Location
- Site Road
- Substation and O & M
- 220kV Transmission Line
- Main Road

Most Limiting LSC Class

- 4 - Moderate to severe limitations
- 5 - Severe limitations
- 6 - Very severe limitations

Data Source:
Layout - Client Provided
(WTGLayout_Rev10.shp)
NSW DCDB , DTDB 2022
Land and Soil Capability - LSC v4

Land and Soil Capability Classes

6-13

Drawing No:	0606253m_SCRWF_G017_R02.mxd		**The Plains Renewable Energy Park Wind Farm**
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

6.11 Air Quality

6.11.1 Existing Environment

Land uses surrounding the Project Area are predominantly agricultural, and this is likely to influence the local air quality. Air quality in the region is generally expected to be of good quality and typical of what is expected in a rural setting, due to factors including low population density and low traffic volumes.

Existing sources of air pollution are likely sourced from dust, vehicle, and machinery from agricultural production, and vehicle exhaust emissions from traffic along the Sturt Highway and Cobb Highway. There may be a small increase in air contaminants during the colder months, due to smoke emissions sourced from soil fuel heating operations.

The nearest climate station to the Project Area is located at Hay Airport (Station No. 075019), which lies at an elevation of 92 metres above sea level. A review of the Australian Bureau of Meteorology (BOM) climatic records from 2007-2021 indicate a mean summer maximum temperature of 35.1°C in January, and a mean winter minimum temperature of 3.4°C in July. Additionally, rainfall records from this same station indicate a mean annual rainfall of 340.1 mm, with the highest monthly maximum occurring in November (31.0 mm) and the lowest monthly maximum occurring in March (13.0 mm).

The Project is not expected to have significant impacts on air quality in the region. Impacts during construction will generally relate to dust generation from construction works, while impacts during operation are expected to be minimal. More broadly, the Project will also have a positive impact on air quality by contributing to the overall reduction of greenhouse gas emissions.

6.11.2 Assessment Approach

The EIS will consider the potential impacts to air quality, and propose appropriate management and mitigation measures during the construction and operational phases of the Project. Air quality and dust management will generally be assessed in accordance with relevant guidelines and policies including:

- National Greenhouse Accounts Factors (Australian Government, 2021); and
- NSW Climate Change Policy Framework (OEH, 2016).

6.12 Cumulative Impacts

The Cumulative Impact Assessment Guidelines for State Significant Projects (DPIE, 2021c) provides a framework for assessing and managing project-level cumulative impacts. The guideline defines six key steps in cumulative impact assessment, as detailed in Figure 6-14.

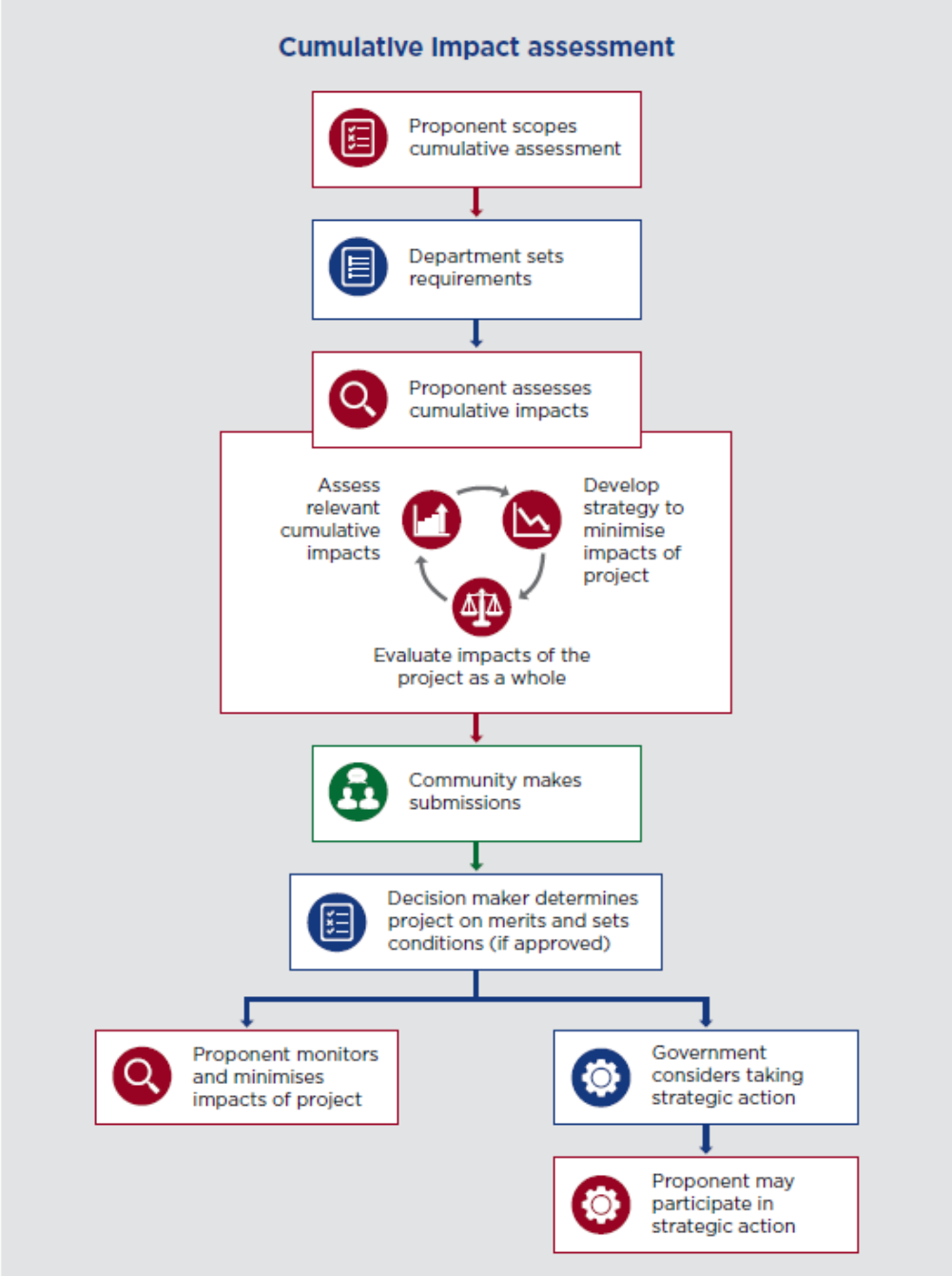


Figure 6-14 Key Steps in cumulative impact assessment

Source: (DPIE, 2021c)

The cumulative impact assessment to be undertaken as part of the EIS is scoped during the Scoping Report phase, and is to include consideration of key questions, as detailed herein.

Table 6-16 Scoping Cumulative Impacts – Key Questions

Scoping Questions	Considerations	Commentary
What to assess	Government strategic planning framework for the area having regard to any relevant legislation, plans, policies or guidelines The Project and other potentially relevant future projects that may be developed over the same time period or similar timeframes as the Project Potentially material impacts on features including National Parks and other protected areas, environmentally sensitive areas, threatened species and ecological communities, important natural resources, culturally significant resources, key infrastructure and industries, sensitive landuse zones, population centres, settlements and residential areas. The likely scale and nature of the cumulative impact of these projects.	Consideration of key legislation, plans, policies or guidelines is provided in **Section 4**. Site setting and features from a regional and local context are discussed in **Section 2.1**, which notes: ■ The key land uses and economic activities within the region are centred around agriculture and food production. ■ The closest population centre is the town of Hay, NSW, which is located immediately north east of the Project Area. ■ The Project Area is situated near Project EnergyConnect, which is a proposed 330 kV transmission line. ■ There are a number of proposed, approved or operational renewable energy projects located in proximity to the Project Area and the broader Riverina region as detailed in Figure 2-1. ■ There is potential for the impacts of these proposed projects to combine with the potential visual and environmental impacts of the Project, generating cumulative impacts that are greater than the impact of each project individually.
What study area	Study area selected for the cumulative impact assessment of each matter will vary depending on the specific characteristics of the assessment matter and the scale and nature of the potential impacts on the matter resulting from the project with other relevant future projects.	The study area for matter subject to cumulative assessment will be guided by the relevant technical assessments and locality features. Cumulative visual impacts for example will include, as a minimum, an 8 km radius around the WTGs and is subject to further assessment during the EIS phase, including consideration of topography and vegetation features.
Over what time period	Like the study area, the time period selected for the cumulative impact assessment on each matter will vary depending on the characteristics of the matter and the scale and nature of the potential impacts on the matter. In most cases, the period selected is likely to match the life of the project (e.g. 25 years). However, in some cases the period selected may be much shorter than this and cover a single phase of the project, or much longer.	The proposed timeframe for the development of the Project is: ■ Planning and Approvals: completion late 2023 ■ Construction: 2024 (two years) ■ Operation: from 2026 (30 years) Various levels of cumulative impacts may occur during the various Project phases, as detailed in **Table 6-17**.
What projects to include	Build upon past and current operating project assessments by considering the cumulative impacts of the proposed project on key matters when other future proposed projects are included in the assessment.	There are a number of proposed, approved or operational renewable energy projects located in proximity to the Project Area and the broader Riverina region, including Limondale Solar Farm, Sunraysia Solar Farm (both operational), Lang's Crossing Solar Farm, Hay Solar Farm, Burrawaong Wind Farm, Keri Keri Solar Farm, and Keri Keri Wind Farm (all proposed), as detailed in Table 2-1.

Table 6-17 Cumulative Impacts and Timeframes

Project Phase	Estimated Timeframe	Likely Scale of Impact	Duration of Impact	Potential Cumulative Impacts
Assessment	2022	Minor	Temporary	Social – community health and wellbeing
Approval	2023	Minor	Temporary	Social – community health and wellbeing
Construction	2024 - 2026	Moderate to Major	Temporary	Social – community health and wellbeing Amenity – visual Amenity – noise Transport and traffic Other environmental (biodiversity, heritage)
Operation	2026 - 2056	Minor to Moderate	Ongoing during operations	Amenity – visual Amenity – noise
Decommissioning	Post 2056	Moderate	Temporary	Social – community health and wellbeing Amenity – visual Amenity – noise Transport and traffic

They may also be cumulative benefits to local communities from these projects, through the creation of new employment opportunities and through their contribution to the local and regional economies.

Consideration of cumulative impact is provided in the Scoping Summary Table (Appendix B). A cumulative assessment will be undertaken as a component of the EIS in accordance with the Cumulative Impact Assessment Guidelines for State Significant Projects (DPIE, 2021c). As per the DPIE Cumulative Impact Assessment Guidelines, Appendix E provides a summary of the cumulative impacts to be assessed.

7. CONCLUSION

A preliminary environmental assessment was undertaken to identify the potential matters associated with the proposed construction and operation of the Project. This considered:

- The scale and nature of the likely impacts of the Project and the sensitivity of the receiving environment;
- Whether the Project is likely to generate cumulative impacts with other relevant future projects in the area;
- The ability to avoid, minimise and/or offset the impacts of the Project, to the extent known at the scoping stage; and
- The complexity of the technical assessment of the Project.

Detailed assessments will be undertaken for environmental aspects that present a potential high constraint to the development, and other aspects which require detailed assessment, but do not pose a high risk constraint. The assessments will include:

Table 7-1 Proposed Assessment

Level of Assessment	Aspect
Detailed (potential high constraint)	Amenity – Landscape and Visual Amenity – Noise and Vibration Aviation Biodiversity Heritage - Aboriginal Cultural
Detailed (potential constraint)	Access - Traffic and Transport Telecommunications
Standard	Air Quality and Greenhouse Gas Hazards and Risks – Blade Throw Hazards and Risks – Bushfire Hazards and Risks – Electromagnetic Field Hazards and Risks – Preliminary Hazard Analysis Heritage – Historic Land Resources Social Waste Management Water Resources

The EIS will be prepared in accordance with the SEARs to be issued by DPE in response to this Scoping Report. All assessments (including specialist assessments) will be completed by taking into consideration consultation with stakeholders, industry best practice guidelines, and the experiences from other wind farm projects.

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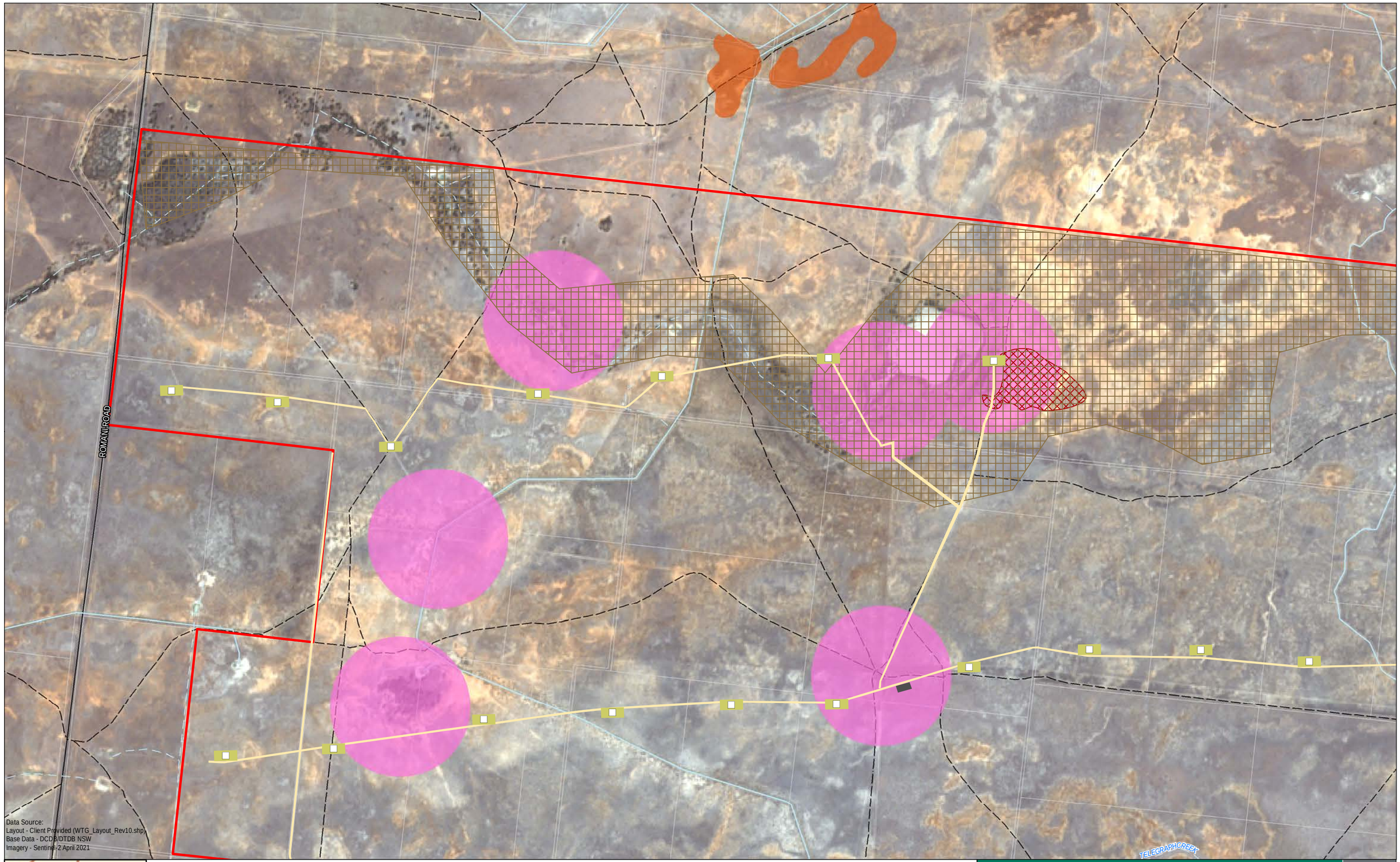
APPENDIX A PROJECT LAYOUT FIGURES



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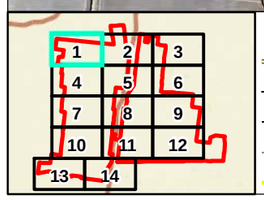

- Non-Associated Dwelling
- Main Road
- Minor Road
- Track-Vehicular
- Path
- 220kV Transmission Line
- Perennial Watercourse
- Non-perennial Watercourse
- Mainly dry Watercourse
- LGA Boundary
- Cadastre (Lot)
- The Plains Renewable Energy Park Boundary

Preliminary Layout:

- Turbine Location
- Indicative site access (to be confirmed in EIS)
- Substation
- Ancillary Infrastructure Compound
- Accommodation Compound
- Batch Plant
- Hardstand
- Access Road
- Laydown

Constraints:

- PCT 26, Weeping Myall Woodland TEC
- PCT 28, White Cypress Pine Open Woodland TEC
- Revegetation Areas
- 500m Threatened Plant Buffer
- 500m Raptor Nest Buffer
- Plains-wanderer Important Area Mapping
- Plains-wanderer PCT Habitat Mapping (PCT44 and PCT46)
- High Archeological Sensitivity Area

Project Layout

Drawing No:	0606253m_SCRWF_G018_R0.mxd		The Plains Renewable Energy Park Wind Farm
Date:	04/11/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 0.5 1Km

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ERM

COBB HIGHWAY

TELEGRAPH CREEK

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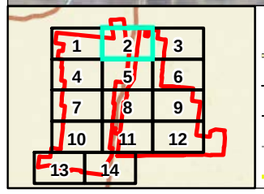
Imagery - Sentinel-2 April 2021



- Non-Associated Dwelling
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Project Layout

2

Drawing No:	0606253m_SCRWF_G018_R0.mxd		The Plains Renewable Energy Park Wind Farm
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Coordinate System: GDA 1994 MGA Zone 55

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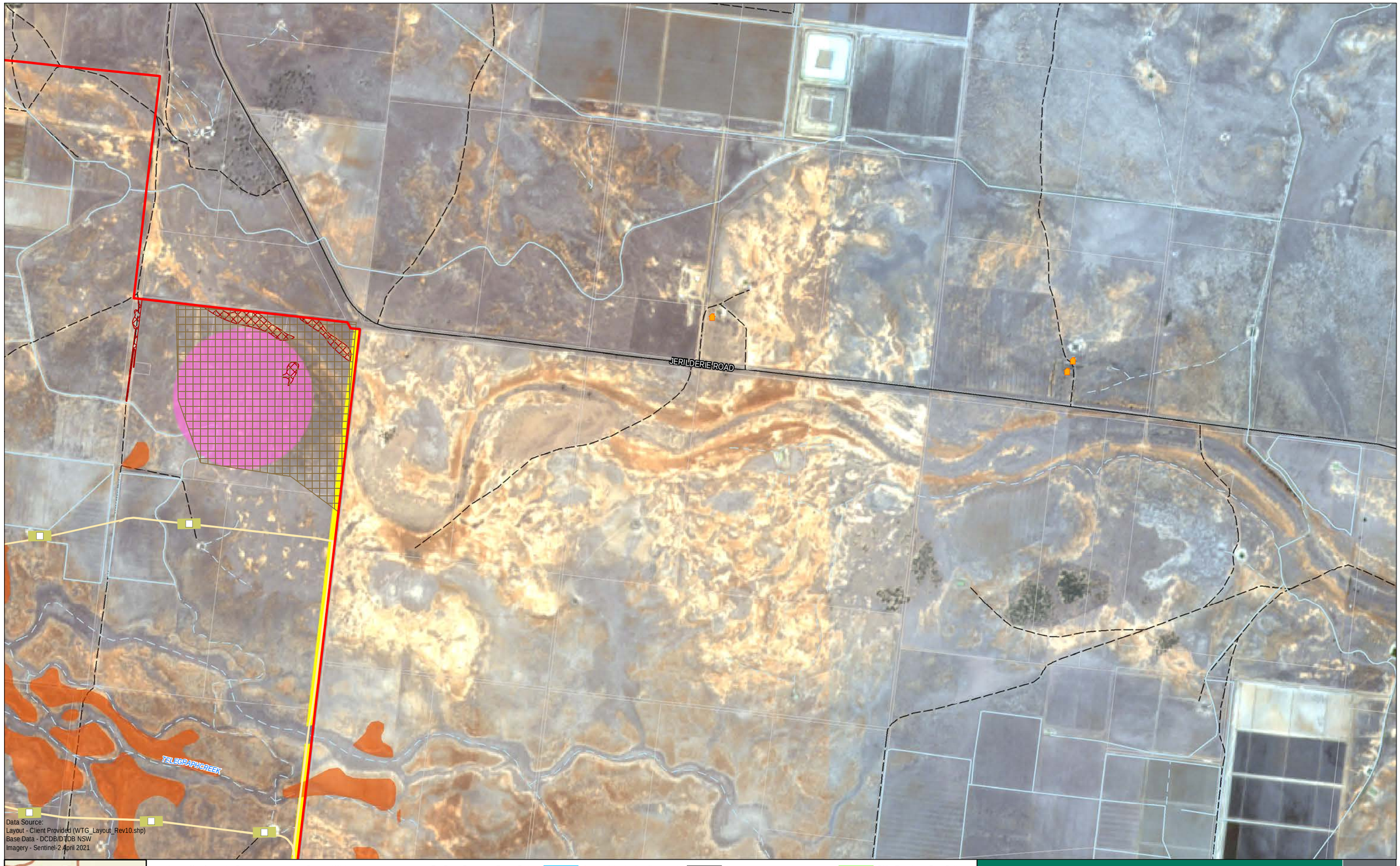

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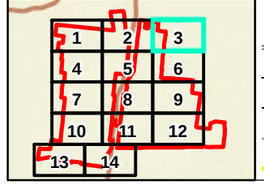

- Non-Associated Dwelling
- Main Road
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- Track-Vehicular
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- 220kV Transmission Line
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Preliminary Layout:

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Project Layout

3

Drawing No:	0606253m_SCRWF_G018_R0.mxd		The Plains Renewable Energy Park Wind Farm
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Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

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ROMANI ROAD

ABERCROMBIE CREEK

TELEGRAPH CREEK

TELEGRAPH CREEK

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Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

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- Non-Associated Dwelling
- Main Road
- Minor Road
- Track-Vehicular
- Path
- 220kV Transmission Line
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- Laydown

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- Plains-wanderer PCT Habitat Mapping (PCT44 and PCT46)
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Project Layout

4

Drawing No:	0606253m_SCRWF_G018_R0.mxd		The Plains Renewable Energy Park Wind Farm
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Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

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TELEGRAPH CREEK

COBB HIGHWAY

ABERCROMBIE CREEK

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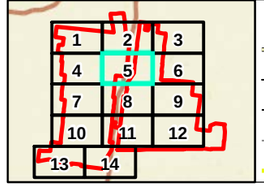

- Non-Associated Dwelling
- Main Road
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- Track-Vehicular
- Path
- 220kV Transmission Line
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Preliminary Layout:

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- Access Road
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- Plains-wanderer PCT Habitat Mapping (PCT44 and PCT46)
- High Archeological Sensitivity Area

Project Layout

5

Drawing No:	0606253m_SCRWF_G018_R0.mxd	The Plains Renewable Energy Park Wind Farm
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Drawn By:	MB Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

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ABERCROMBIE CREEK

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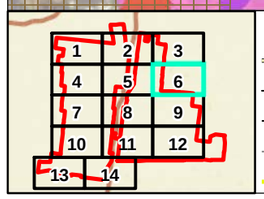

- Non-Associated Dwelling
- Main Road
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- 220kV Transmission Line
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Preliminary Layout:

- Turbine Location
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Project Layout

6

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Coordinate System: GDA 1994 MGA Zone 55

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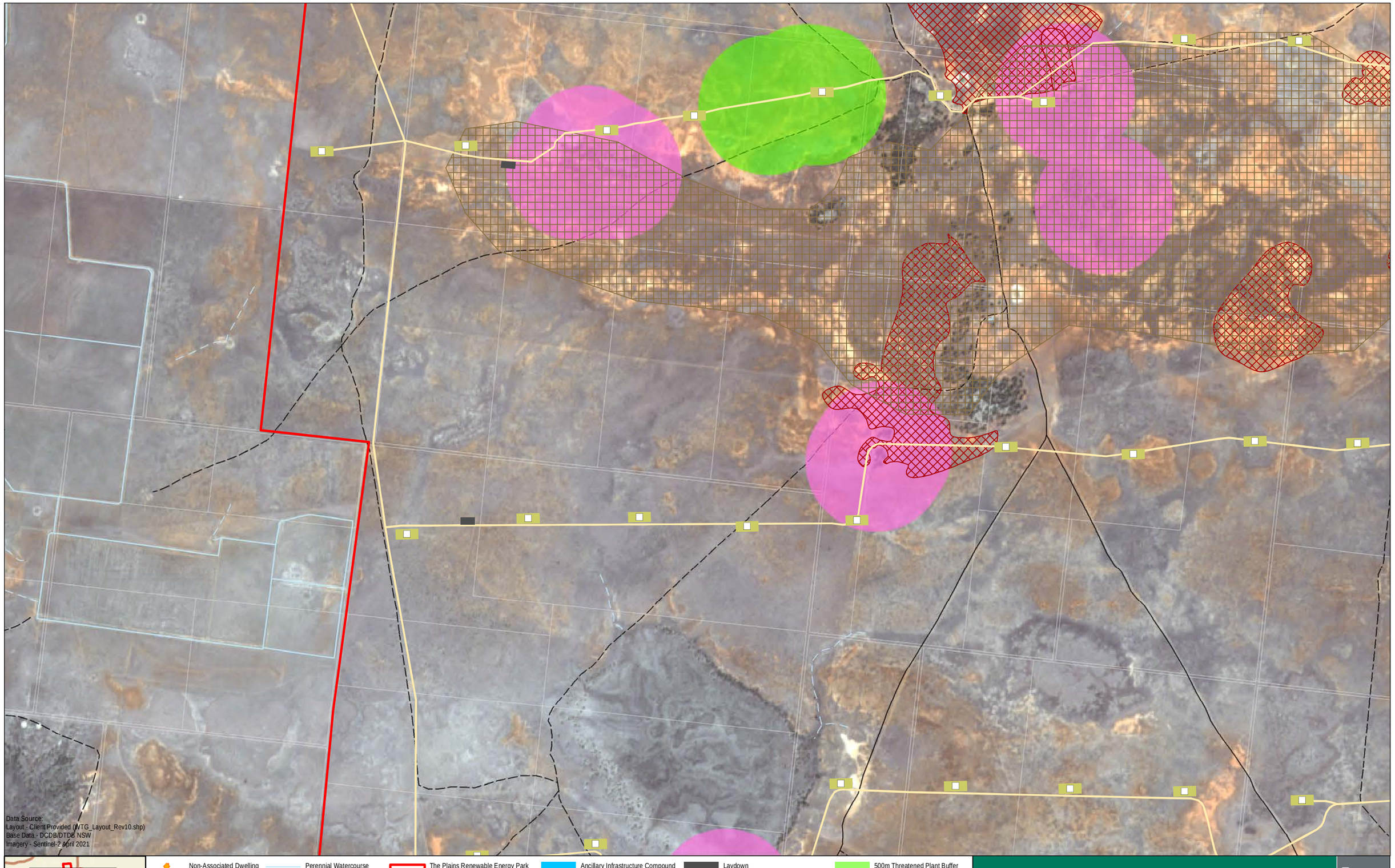

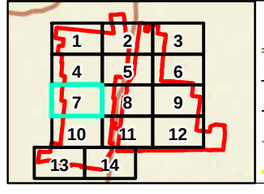

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- Main Road
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Project Layout

7

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Coordinate System: GDA 1994 MGA Zone 55

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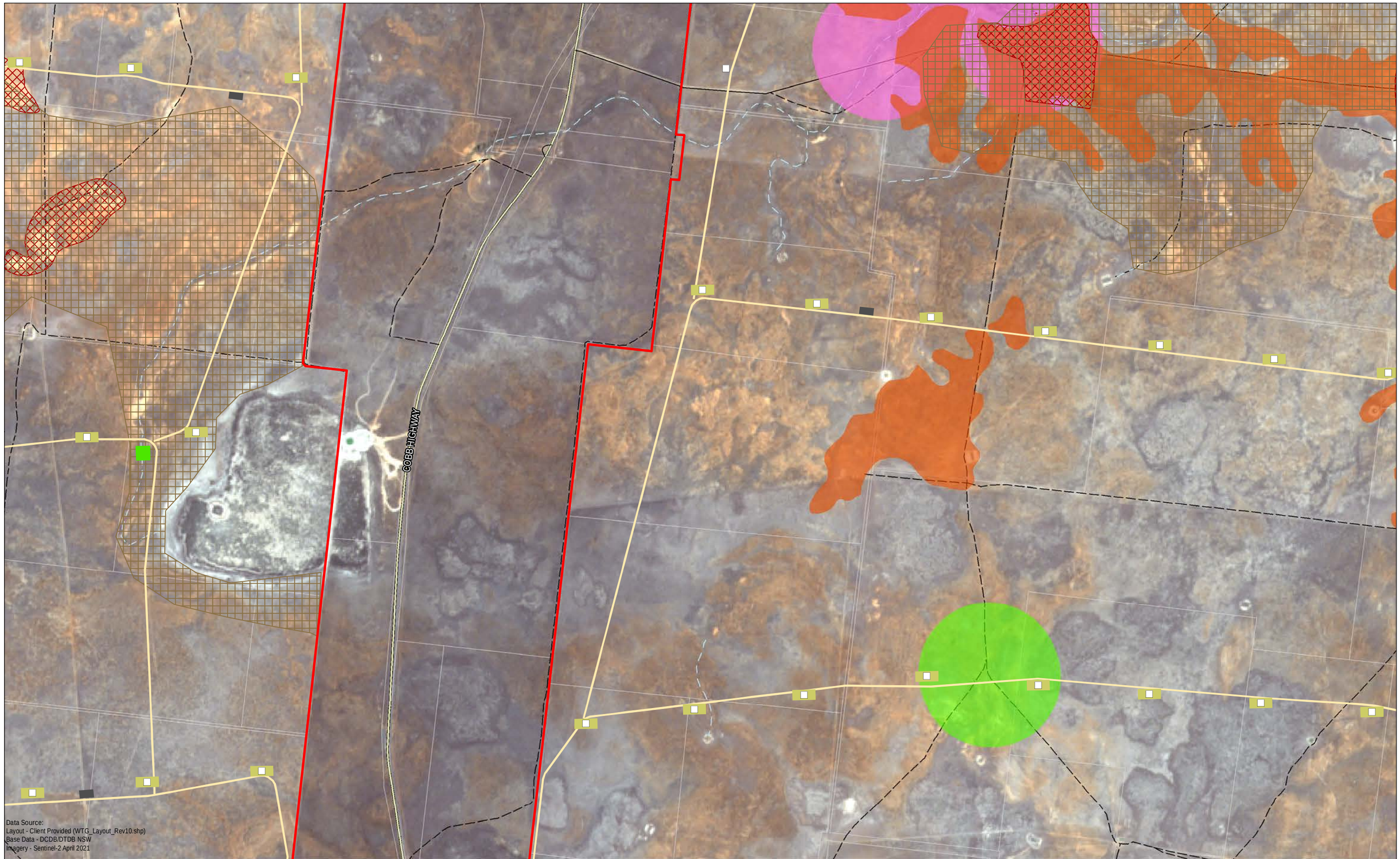

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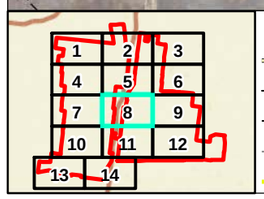

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- Main Road
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Project Layout

8

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Coordinate System: GDA 1994 MGA Zone 55

0 0.5 1Km

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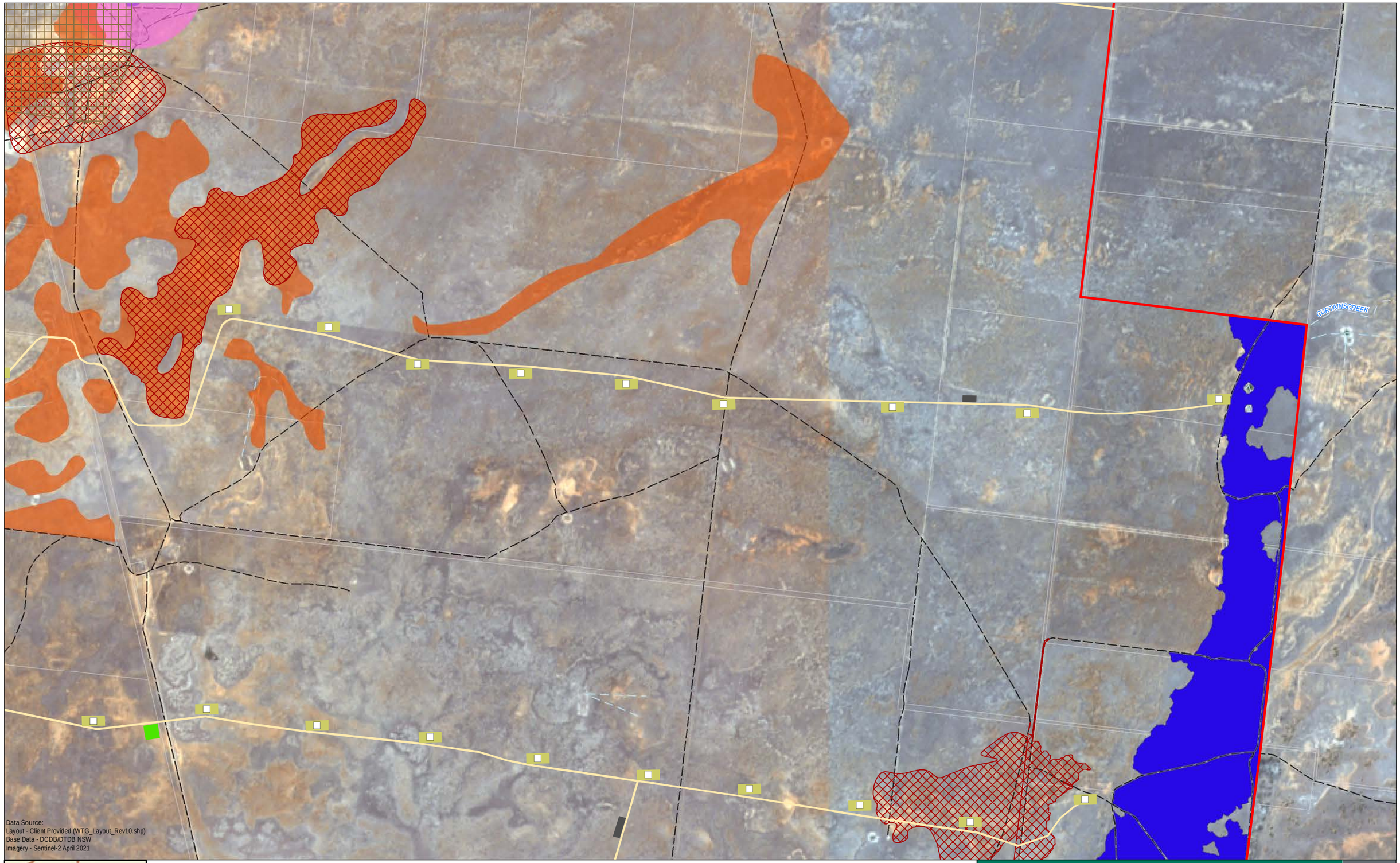

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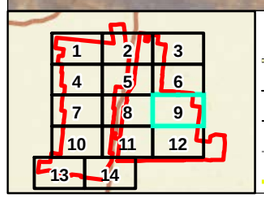

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9

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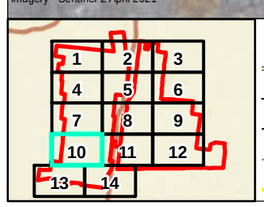

- Non-Associated Dwelling
- Main Road
- Minor Road
- Track-Vehicular
- Path
- 220kV Transmission Line
- Perennial Watercourse
- Non-perennial Watercourse
- Mainly dry Watercourse
- LGA Boundary
- Cadastre (Lot)
- The Plains Renewable Energy Park Boundary

Preliminary Layout:

- Turbine Location
- Indicative site access (to be confirmed in EIS)
- Substation
- Ancillary Infrastructure Compound
- Accommodation Compound
- Batch Plant
- Hardstand
- Access Road
- Laydown

Constraints:

- PCT 26, Weeping Myall Woodland TEC
- PCT 28, White Cypress Pine Open Woodland TEC
- Revegetation Areas
- 500m Threatened Plant Buffer
- 500m Raptor Nest Buffer
- Plains-wanderer Important Area Mapping
- Plains-wanderer PCT Habitat Mapping (PCT44 and PCT46)
- High Archeological Sensitivity Area

Project Layout

Drawing No:	0606253m_SCRWF_G018_R0.mxd		The Plains Renewable Energy Park Wind Farm
Date:	04/11/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 0.5 1Km

N

10

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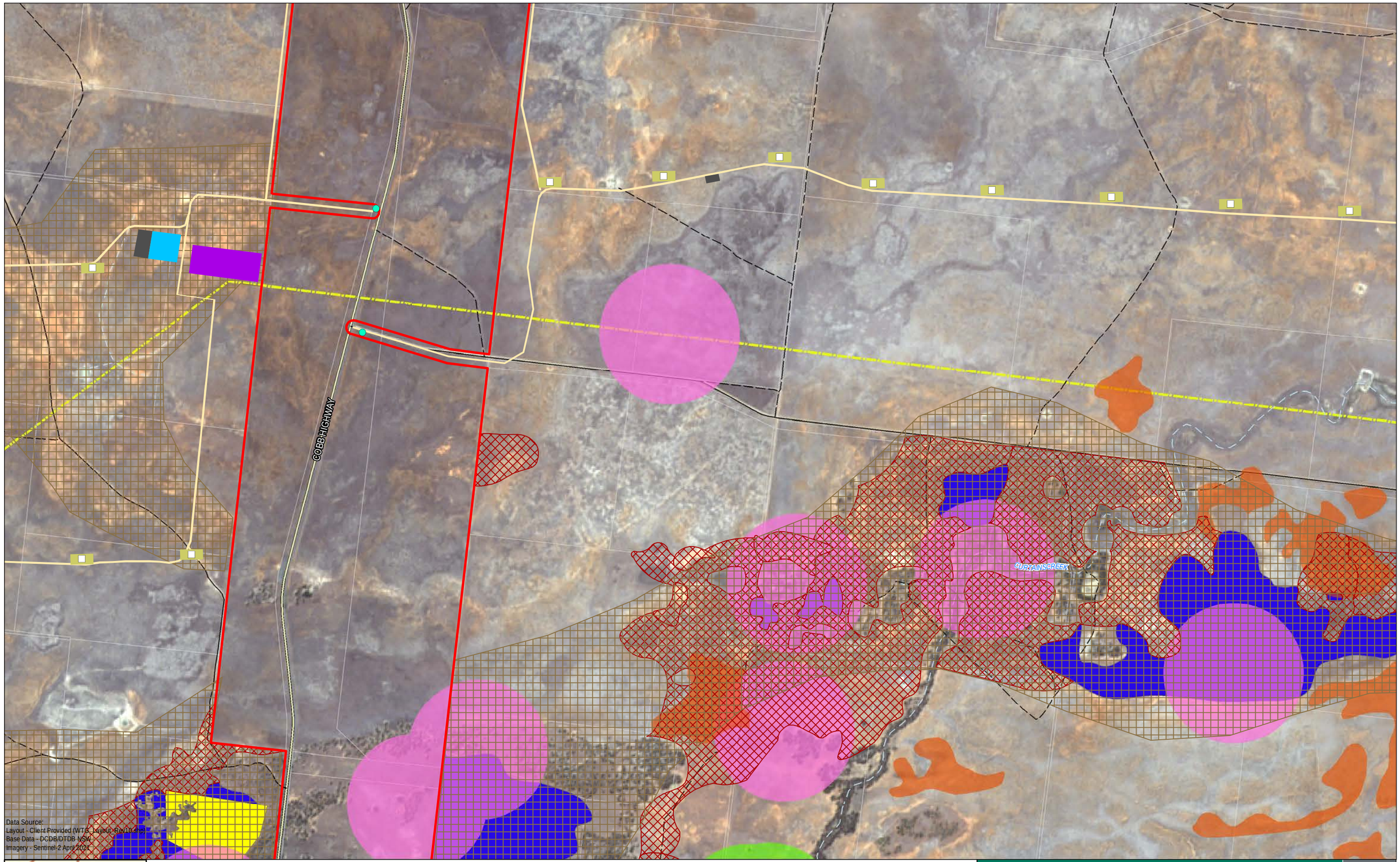

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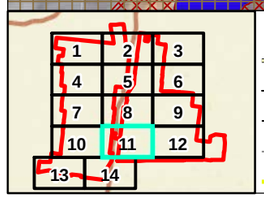

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11

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Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

N

0 0.5 1Km

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CURTAINS CREEK

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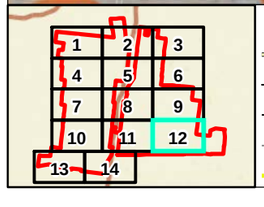
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021



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Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 0.5 1Km

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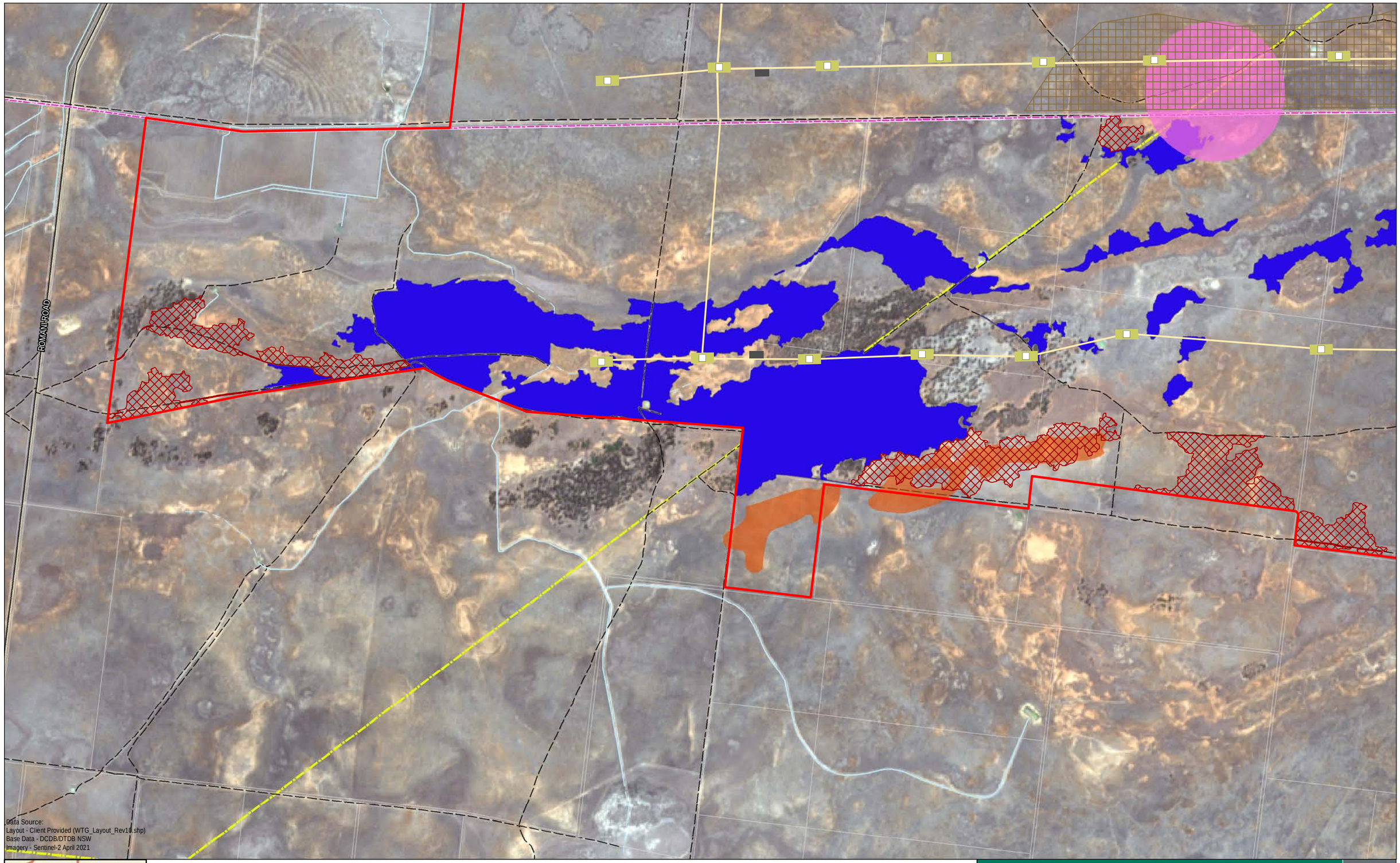

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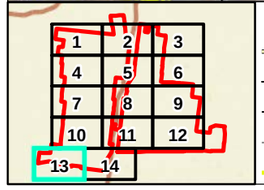

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Date:	04/11/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 0.5 1Km N

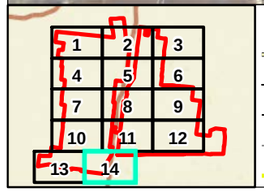
ERM

COBB HIGHWAY

CURTAINS CREEK

NYANGAY CREEK

Data Source:
Layout - Client Provided (WTG_Layout_Rev10.shp)
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021



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14

Drawing No:	0606253m_SCRWF_G018_R0.mxd		The Plains Renewable Energy Park Wind Farm
Date:	04/11/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 0.5 1Km

N

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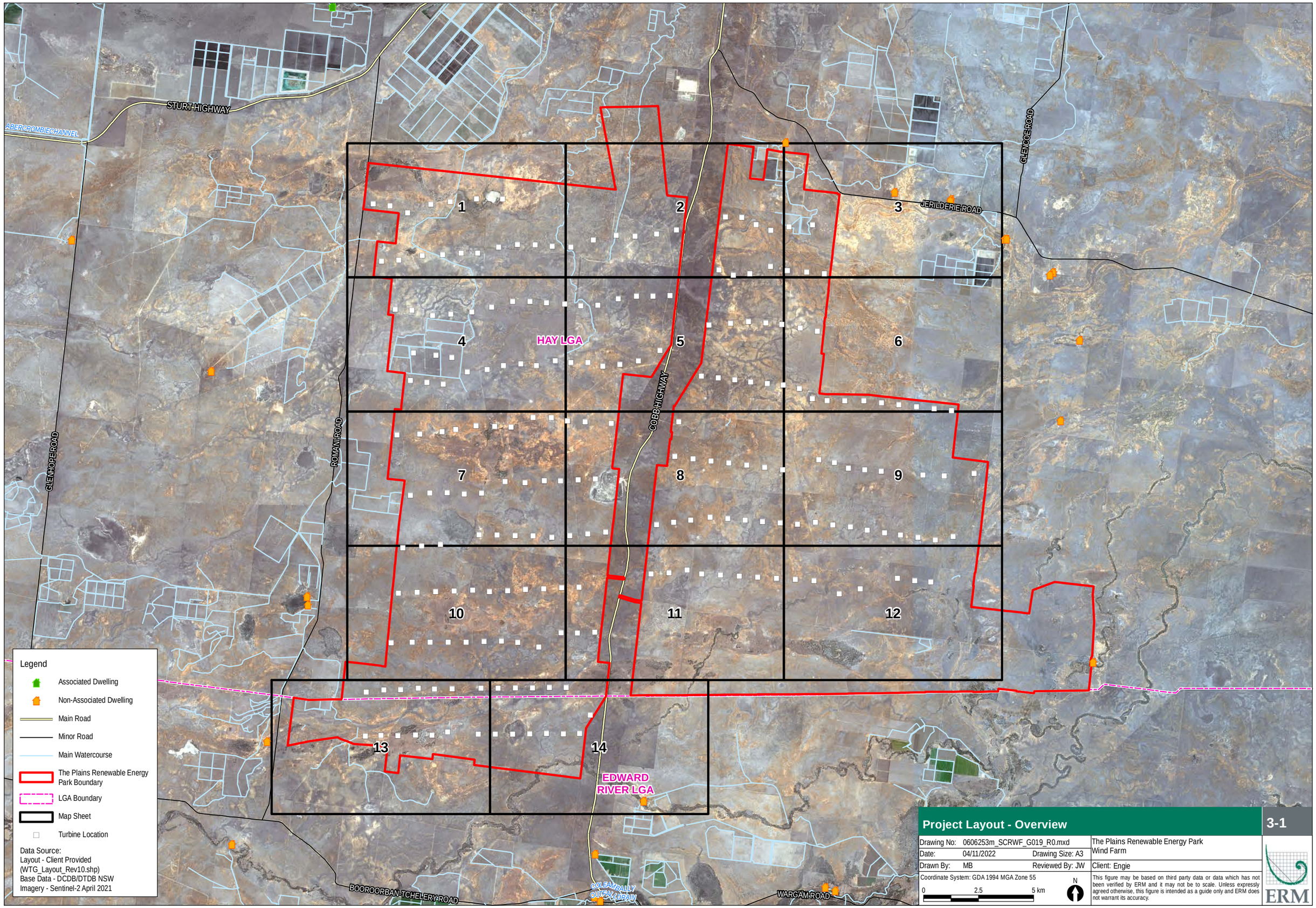

Project Layout - Overview

3-1

Drawing No:	0606253m_SCRWF_G019_R0.mxd		The Plains Renewable Energy Park Wind Farm
Date:	04/11/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2.5 5 km

N

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APPENDIX B SCOPING SUMMARY TABLE

Scoping Summary Table

Level of Assessment	Matter	Scale of Impact [8]	Nature of Impact [9]	Sensitivity of receiving environment[10]	Mitigation Measures Required	Cumulative Impact Assessment	Engagement	Relevant government plans, policies and guidelines	Scoping Report Reference
Detailed	Access - Traffic and Transport	Moderate	Direct Indirect Cumulative	Sensitive (disturbance to other road users)	Likely	Yes	Specific	■ Guide to Traffic Generating Developments (RTA, 2002) ■ Austroads *Guide to Road Design* ■ Austroads Guide to Traffic Management	Section 6.6
Detailed	Amenity – Landscape and Visual	High	Direct Cumulative Perceived	Sensitive (receptors, townships, communities)	Likely	Yes	Specific	■ Wind Energy: Visual Assessment Bulletin 2016 (NSW Government) ■ Scottish Natural Heritage Visual Representation of Wind Farms – Good Practice Guidance (2017) ■ Environment Protection and Heritage Council, Draft National Wind Farm Development Guidelines (2010) ■ Landscape Institute and Institute of Environmental Management and Assessment, Guidelines for Landscape and Visual Impact Assessment Third Edition (2013) ■ Clean Energy Council, Best Practice Guidelines and Wind Energy Development (2018)	Section 6.2.1
Detailed	Amenity – Noise and Vibration	High	Direct Cumulative Perceived	Sensitive (receptors)	Likely	Yes	General	■ Wind Energy: Noise Assessment Bulletin 2016 (NSW Government) ■ Noise Policy for Industry (2017) (NSW Environment Protection Authority) ■ Interim Construction Noise Guidelines 2009 (Department of Environment, Climate Change) ■ NSW Road Noise Policy 2011 (Department of Environment, Climate Change and Water) ■ Assessing Vibration: A Technical Guideline 2006	Section 6.2.2
Detailed	Aviation	Moderate	Direct	Sensitive (impacts to aviation and agricultural activities)	Likely	No	Specific	■ The Civil Aviation Regulation 1988; ■ The Civil Aviation Safety Regulations 1998; and ■ National Airports Safeguarding Framework Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation (DITRDC, 2019).	Section 6.7
Detailed	Biodiversity	High	Direct Indirect Cumulative	Sensitive (high ecological values of species / biodiversity present)	Likely	Yes	General	■ Biodiversity Assessment Methodology (DPIE 2020) ■ Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013) ■ Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various)	Section 6.3
Detailed	Heritage - Aboriginal Cultural	High	Direct Indirect Cumulative Perceived	Sensitive (cultural values)	Likely	Yes	Specific	■ Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011) ■ Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010) ■ Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, 2010) ■ Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010)	Section 6.4
Detailed	Telecommunications (Electromagnetic interference)	Moderate	Direct	Sensitive (safety)	Likely	No	General	■ Australian Radio and Communications Act *1992;* ■ NSW Wind Energy Guideline for State Significant Wind Development (DPIE, 2016a); and ■ The Clean Energy Council Best Practice Guidelines (CEC, 2018).	Section 6.5.4
Standard	Air Quality	Low	Direct Indirect	Sensitive (local air quality)	Likely	No	General	■ National Greenhouse Accounts Factors (Australian Government, 2021); and ■ NSW Climate Change Policy Framework (Office of Environment and Heritage, 2016).	Section 0

[8] Scale of Impacts – based on the severity of the impact, the geographical location and the duration of the impact as detailed in Appendix C of State Significant Development Guidelines – Preparing a Scoping Report (DPIE, 2021).

[9] Nature of Impact - type of impact, i.e. direct, indirect, cumulative, perceived, as detailed in Appendix C of State Significant Development Guidelines – Preparing a Scoping Report (DPIE, 2021).

[10] Sensitivity of the receiving environment – expressed in legislation, societal values, or vulnerability to change, as detailed in Appendix C of State Significant Development Guidelines – Preparing a Scoping Report (DPIE, 2021).

Level of Assessment	Matter	Scale of Impact [8]	Nature of Impact [9]	Sensitivity of receiving environment[10]	Mitigation Measures Required	Cumulative Impact Assessment	Engagement	Relevant government plans, policies and guidelines	Scoping Report Reference
Standard	Hazards and Risks – Blade Throw	Low	Direct	Sensitive (safety)	Likely	No	General	■ Relevant international studies and standards for design of wind turbine components and blade throw risk	Section 6.5.3
Standard	Hazards and Risks – Bushfire	Low	Direct Indirect	Sensitive (safety)	Likely	No	General	■ Planning for Bushfire Protection 2019 – NSW Rural Fire Service (RFS, 2019)	Section 6.5.2
Standard	Hazards and Risks – Health - Electromagnetic Field	Low	Direct Perceived	Sensitive (safety)	Likely	No	General	■ National Health and Medical Research Council advice	Section 6.5.5
Standard	Heritage – Historic	Low	Direct Indirect	Sensitive (heritage values)	Likely	No	Specific	■ Historical Archaeology Code of Practice (Heritage Council, 2006)	Section 6.4.2
Standard	Land Resources (agriculture and soils)	Low	Direct Indirect	Sensitive (agricultural landuse)	Likely	No	General	■ Soil and Landscape Issues in Environmental Impact Assessment (OEH, 2000); ■ Landslide Risk Management Guidelines (AGS, No Date); and ■ Site Investigations for Urban Salinity (OEH, 2002).	Section 6.5
Standard	Resilience and Hazards SEPP Screening	Moderate	Direct Indirect Perceived	Sensitive (safety)	Likely	No	General	■ Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011) ■ Assessment Guideline: Multi-level Risk Assessment (Department of Planning and Infrastructure, 2011) ■ Hazardous Industry Planning Advisory Paper No 6: Hazard Analysis (Department of Planning, 2011)	Section 6.5
Standard	Social	Moderate	Direct Indirect Cumulative Perceived	Sensitive (social, environmental and economic values)	Likely	Yes	Specific	■ Social Impact Assessment Guideline for State Significant Projects (DPIE, 2021b) ■ Technical Supplement: Social Impact Assessment Guideline for State Significant Projects (Technical Supplement) (DPIE, 2021e)	Section 6.8
Standard	Waste Management	Low	Direct Indirect	Sensitive (environmental values, safety)	Likely	No	General	■ Waste Classification Guidelines (DECCW, 2009)	
Standard	Water Resources (flooding and hydrology)	Low	Direct Indirect	Sensitive (local hydrology and water quality)	Likely	No	General	■ Managing Urban Stormwater; Soils & Construction (Landcom, 2004); ■ Guidelines for Controlled Activities on Waterfront Land (DPI Water, 2018); ■ Relevant Water Sharing Plans (DPI Water); and ■ Guidelines for Watercourse Crossings on Waterfront Land (DPI Water, 2012) ■ Floodplain Risk Management Guidelines (Department of Environment and Climate Change, 2016) ■ Floodplain Development Manual: The management of flood liable land (NSW Government, 2005)	

APPENDIX C PRELIMINARY VISUAL IMPACT ASSESSMENT

moir
landscape architecture

The Plains Renewable Energy Park

Preliminary Visual Impact Assessment

The Plains Renewable Energy Park

Preliminary Visual Impact Assessment

Prepared for
ERM Pty Ltd

Issue
E

Date
09.11.2022

Project Number
2094

Revision	Date	Author	Checked	Comment
A	28.02.2022	AL	AR	For review
B	12.09.2022	SB	AR	For review
C	21.09.2022	SB	-	For review
D	21.10.2022	SB	-	Final for Submission
E	09.11.2022	SB	-	Final for Submission

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PO Box 111, Islington NSW 2296
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ACN: 097 558 908
ABN: 48 097 558 908

Contents

Figures:

1.0 Introduction

1.1 Introduction

Moir Landscape Architecture (Moir LA) has been commissioned by ERM Pty Ltd on behalf of Engie Group (the Proponent) to prepare a Preliminary Visual Impact Assessment (PVIA) for The Plains Renewable Energy Park. This report addresses the potential visual impacts of the The Plains Renewable Energy Park Wind Farm (the Project).

The PVIA for the Project has been prepared in accordance with the *Wind Energy: Visual Assessment Bulletin December 2016* (referred to hereafter as 'the Bulletin'). The PVIA will form part of the Scoping Report seeking the Secretary's Environmental Assessment Requirements (SEARs).

1.2 Relevant Experience

The Bulletin states: *the proponent is expected to engage professionals from relevant natural resource management and design professions (for example environmental planners, geographers, landscape architects, or other visual resource specialists), with demonstrated experience and capabilities in visual assessment to carry out a wind energy project visual assessment*.

Moir LA is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact. Our team has extensive experience in undertaking Landscape and Visual Impact Assessments for wind energy projects. In the context of our experience and with guidance from the Visual Assessment Bulletin we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project.

Relevant experience includes the preparation of PVIAs and LVIAs for the following Wind Energy Projects:

- *Uungula Wind Farm LVIA (Wellington, NSW)*
- *Hills of Gold Wind Farm LVIA (Nundle, NSW)*
- *Thunderbolt Energy Hub Stage 1 (Kentucky, NSW)*
- *Valley of the Winds Wind Farm LVIA (Coolah, NSW)*
- *Jeremiah Wind Farm PVIA (Gundagai, NSW)*
- *Barneys Reef Wind Farm PVIA (Gulgong, NSW)*
- *Winterbourne Wind Farm LVIA (Walcha, NSW)*
- *Paling Yards Wind Farm PVIA (Paling Yards, NSW)*
- *Burrawong Wind Farm PVIA (Balranald, NSW)*
- *Keri Keri Wind Farm PVIA (Keri Keri, NSW)*

1.3 Overview of Preliminary Visual Impact Assessment

The purpose of this PVIA is to provide a preliminary assessment of the potential visual impacts of the Project and has been prepared in accordance with the Bulletin.

The visual assessment process is broken into two main stages (see **Figure 1**):

Phase 1: Preliminary Environmental Assessment and
Phase 2: Environmental Impact Statement

This PVIA forms apart of *Phase 1: Preliminary Environmental Assessment* to be submitted to DPE together with the Scoping Report for the request for SEARs.

The requirements of Stage 1: Preliminary Environmental Assessment are as follows:

At the Preliminary Environmental Assessment stage, a process consisting of community consultation regarding key landscape values and application of preliminary assessment tools has been developed. The tools include consideration of the potential impact of the proposals on dwellings and key public viewpoints.

The preliminary assessment tools have been designed to assist proponents to drive better outcomes. They will assist in identifying early in the process the locations where wind turbines may have impacts that warrant further consideration. This in turn provides an opportunity to refine the proposed wind turbine layout to avoid or minimise impacts or justify the proposed design prior to lodgement of the application.

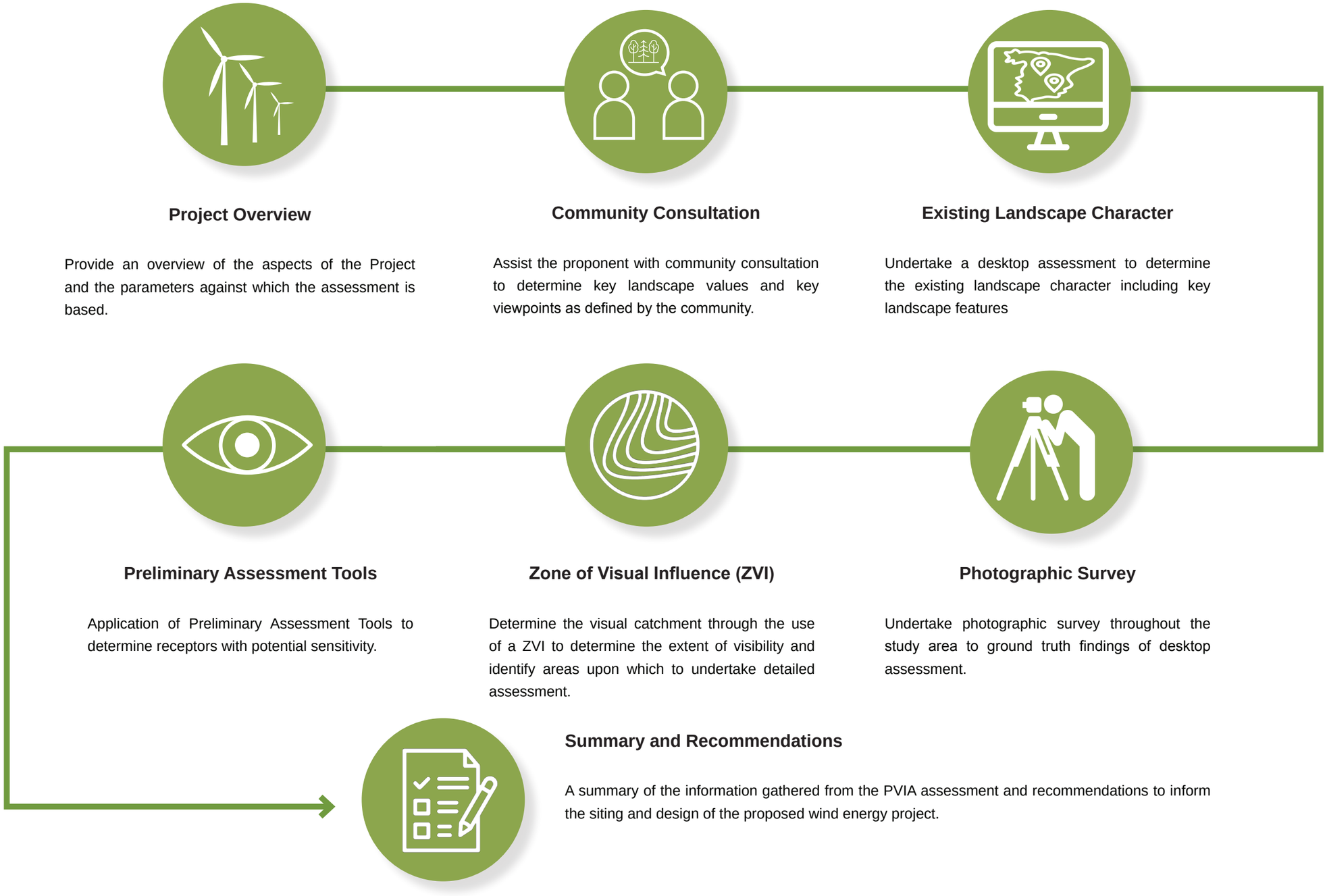
Proponents will be required to submit, with the request for SEARs, a Preliminary Environmental Assessment that includes a map with key information, results of community consultation and the application of the preliminary assessment tools. This will form the basis for the issue of the SEARs that will identify the matters that must be addressed in the EIS.

Figure 1 Steps in Visual Impact Assessment
(Source: Wind Energy: Visual Assessment Bulletin, 2016)

2.0 Study Method

2.1 Study Method

The following has been undertaken to develop the PVIA:



The following has been undertaken to develop the PVIA:

Desktop Assessment:

- Application of Preliminary Assessment Tools to determine receptors with potential sensitivity.
- Preparation of a preliminary Zone of Visual Influence (ZVI) to establish a theoretical zone of visibility of the Project.
- Identification of key viewpoints and landscape features using available mapping and background documents.

Site Inspection:

Photographic survey work for the assessment was undertaken in November 2021 to carry out a preliminary assessment of the existing landscape character from publicly accessible land within the Study Area (as defined in **Section 3.3**). The findings of the site inspection have been included in the PVIA and will form the basis for discussion with the community in the EIS Phase of the Project.

Community Consultation:

Community consultation has been undertaken through the scoping phase of the Project. Results of the community consultation have also been utilised to gain perspective on the landscape values held by the community to inform the PVIA.

Community consultation will be continued through the EIS phase of the Project.

2.2 Report Structure

The following table provides an overview of the requirements of the Visual Assessment Bulletin and where these have been addressed in the PVIA:

Preliminary Visual Impact Assessment Report Structure:	
PVIA Report:	**Bulletin Requirements:**
Refer to Section 3.0: Project Overview	
Refer to Section 4.0: Community Consultation	*Undertake community consultation to establish key landscape features valued by the community, key viewpoints in the area (both public and private) along with information about the relative scenic quality of the area.*
Section 5.0 : Existing Landscape Character	*Production of a map detailing key landscape features (informed by community consultation and any ground-truthing undertaken), the preliminary wind turbine layout, the location of dwellings and key public viewpoints, and an overlay of the wind resource.*
Section 6.0: Preliminary Assessment Tools	*Results of the preliminary assessment tools for both the visual magnitude and multiple wind turbine parameters.*
Section 7.0: Preliminary Dwelling and Viewpoint Assessment	*The visual assessment will involve the combination of desktop and field evaluations of the proposed wind energy project and its various components, turbines and ancillary facilities. The visual performance objectives form the principal framework and guide for assessing the proposed wind energy project when applied to individual viewpoints. All key public viewpoints and individual dwellings within the visual catchment should be identified and assessed.*
Section 8.0: Cumulative Visual Impacts	*Address potential cumulative impacts of wind energy projects in the region (the proposed wind energy project, as well as existing and approved projects)*
Section 9.0: Preliminary Zone of Visual Influence	*The use of Geographic Information Systems (GIS) to facilitate the application of the tools will streamline the evaluation phase of a project during the pre-lodgement stage. Most GIS systems can establish the theoretical 'zone of visual influence' of the proposal (the area from which the proposal is theoretically visible or the 'visual catchment').*
Section 10.0: Summary and Recommendations	

Table 1 Overview of Report Structure

3.0 Project Overview

3.1 Regional Context

The Project is located approximately 15 km south of Hay in south-west NSW. Majority of the Project is located within the extents of the Hay Shire Council LGA and a small part of the Project is located within the Edward River Council LGA. The Project can be accessed via Sturt Highway, Cobb Highway, Jerilderie Road and Booroorban-Tchelery Road (refer to **Figure 2**).

The Project is located within the South-West Renewable Energy Zone (REZ). The NSW Government has finalized the geographical extent of this REZ and has highlighted that an abundance of high quality wind and solar resources are available in the area. The intended transmission capacity for this REZ is 2.5 GW (EnergyCo, 2022). The Project is therefore strategically located in a broad area identified as suitable for renewable energy project.

The development of this REZ will also involve an upgrade to the existing 220kV transmission line to a 330 kV transmission line (Energy NSW, 2022). The existing 220kV transmission line currently runs east-west with majority of the Project on the northern side of this transmission line (refer to **Figure 2**). It is anticipated that a new 330kV electrical transmission line will be built as a part of Project EnergyConnect to upgrade the transmission capacity of the region (EnergyCo, 2022).

3.2 The Project Area

The Project Area encompasses an area of approximately 59,239 ha. It is defined by the land encompassed by the Project Area boundary shown in **Figures 2 and 3**. These properties are primarily utilised for sheep and cattle grazing activities.

3.3 The Study Area

Referred to in this report, the Study Area is generally defined as the Project Area and surrounding land which requires assessment. The Study Area is generally defined as the land up to 15 kilometres (km) from the nearest turbine. Closest landmarks include the towns of Hay and Booroorban, the Auscott Limited Warehouse and Oolambeyan National Park. The Project Area is located on either side of the 16 Mile Gum Rest Area (refer to **Figure 3**).

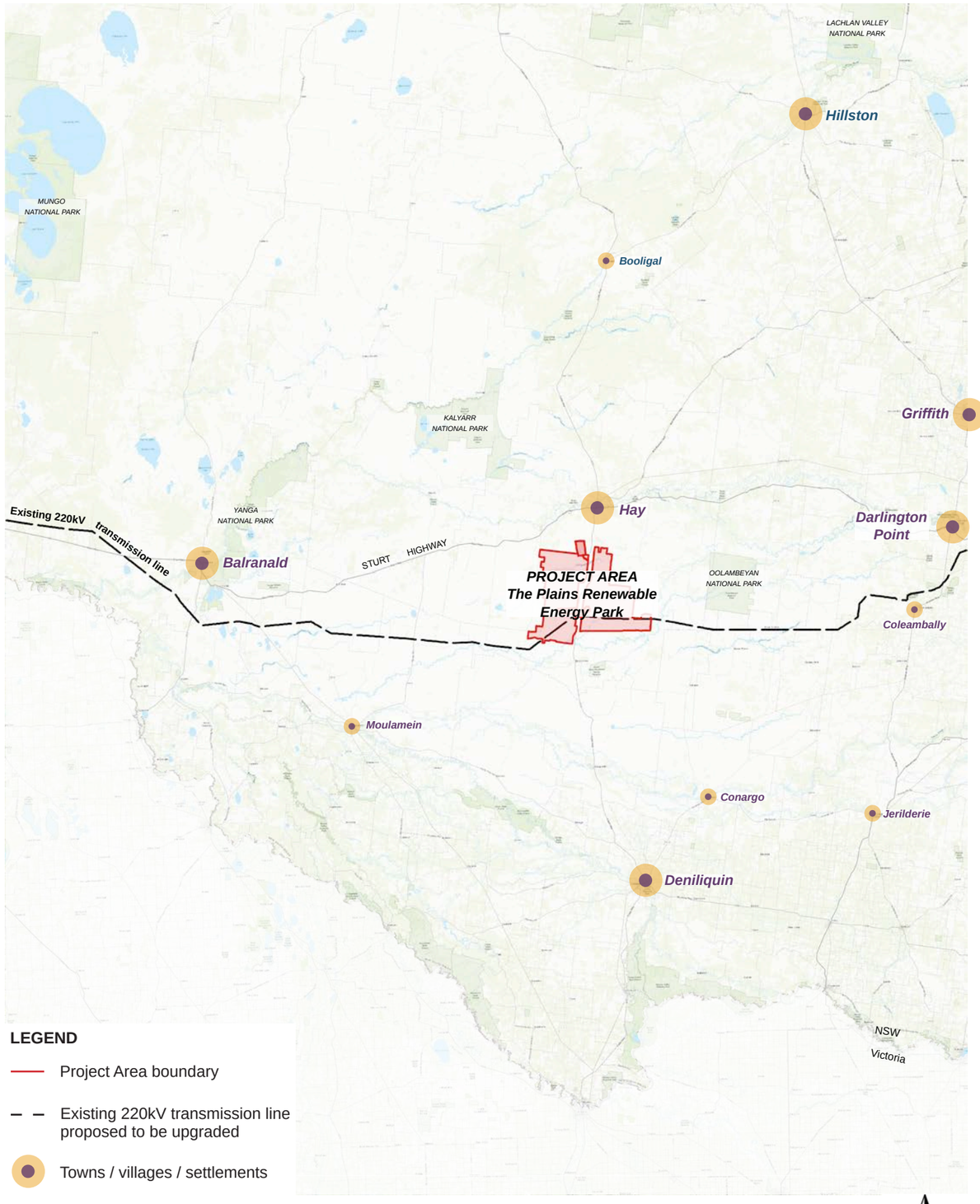


Figure 2 Regional Context (Map Source: ESRI Topographic Map, 2022)

3.4 The Project

The Project includes the construction and operation of approximately 226 wind turbines spread across an area of up to 59,239 ha. Associated infrastructure includes operation and maintenance (O & M) facilities, battery storage, internal access roads, civil works and electrical infrastructure (including on-site substations/switching stations) required to connect to the existing electricity transmission network.

The Project will have a maximum capacity of approximately 1,800 megawatt (MW) and will use turbines with a generator capacity between 6 - 8 MW. The Project also includes the potential installation of a battery energy storage system (BESS) with a capacity of up to 400 MW / 1.6 GWh to allow for the capture and storage of dispatchable energy.

Additionally, within the central region of the Plains Renewable Energy Park, a solar farm is proposed across an area of 2,156 ha. The Plains Renewable Energy Park Solar Farm is subject to a separate State Significant Development (SSD) application. Both the projects (wind and solar) may share ancillary infrastructure such as substations and operations and maintenance facilities.

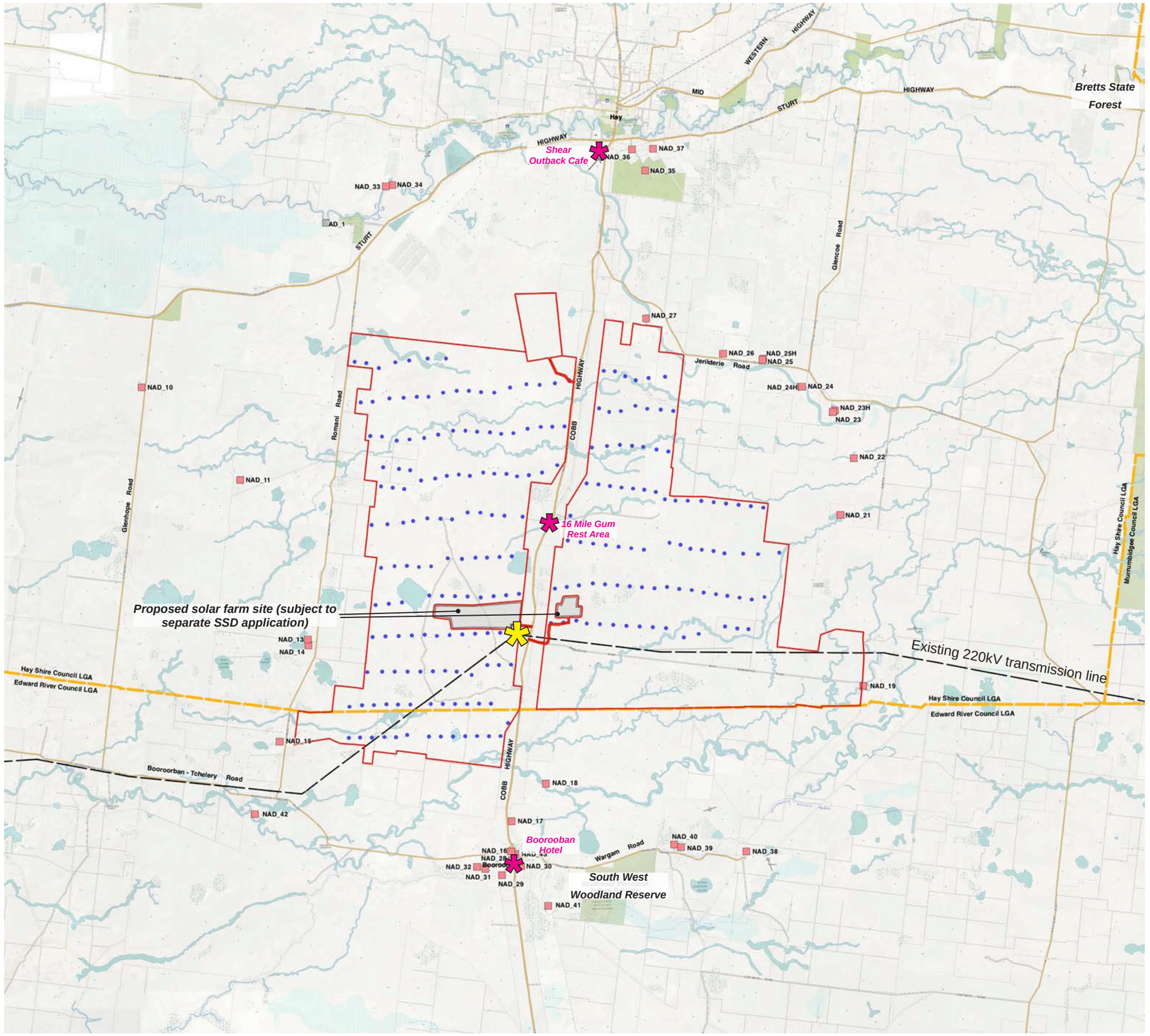
The point of connection into the grid is expected to be via the existing 220 kV electricity transmission line which is proposed to be upgraded to a 330 kV transmission line (EnergyCo, 2022). The preliminary layout for the Project (refer to **Figure 3**) has been prepared to locate the turbines within areas identified as having high wind resources.

This preliminary layout will be progressively refined during the EIS phase of the Project, having regard to the physical and environmental constraints of the site and the key landscape values of the Study Area. **Figure 3** also includes the locations of associated and non-associated dwellings mapped from aerial photographs. These locations are subject to further ground-truthing.

Key components of the Project include:

- approximately 226 (3 blade steel) wind turbines with a total maximum height (tip height) of 280m AGL.
- Power infrastructure providing connection to the proposed 330 kV transmission line, i.e., atleast one (1) on-site 330kV substation with switch and two (2) 132 kV collector substations.
- Internal electrical reticulation network, access roads and upgrades to existing access roads and access points from public roads.
- Temporary and permanent meteorological monitoring masts.
- Temporary infrastructure including construction compound and site office buildings, storage areas and concrete batching plants.
- Hardstand and laydown areas used for wind turbine installation and storage of wind turbine components.
- Operation and maintenance building
- A single grid-scale BESS.

The proposed infrastructure would be contained within the Project Area including all turbine rotor sweep paths. The proposed disturbance footprint will be confirmed during EIS phase. The Project is in the preliminary stages of design and Moir LA will provide input and recommendations in regard to visual impacts to assist in refining of the design layout.



Project Layout

The Plains Renewable Energy Park

LEGEND

- Project Area boundary
- Proposed 280 m Turbine Location
- Proposed solar farm (subject to separate SSD application)
- Proposed BESS and O&M facility location
- Associated dwellings
- Non-associated dwellings
- Existing 220kV transmission line
- Main Road
- Minor Road
- National Park / Nature Reserve
- LGA Boundary
- Key Viewpoints

N

0 4 8 12 16km

Figure 3 Project Layout (Map Source: Six Maps, 2018)

4.0 Community Consultation

4.1 Overview of Community Consultation Process

In accordance with the Bulletin: *community consultation at this early stage may be broad, but should include discussions about the proposed project area, likely corridors of development, or preliminary turbine layouts and must involve people from the visual catchment.*

The purpose of community consultation undertaken in the preparation of the PVIA is to:

- Establish key landscape features
- Defined areas of scenic quality; and
- Identify key public viewpoints valued by that community.

Community engagement will continue through the EIS Phase and provide the community with further opportunities to provide input into the Visual Baseline Study of the LVIA. The Proponent has met with majority of residences within 10 km of the Project and is working on including feedback to optimise the design to ensure that visual amenity concerns are addressed.

4.2 Results of Community Consultation

Understanding of the community perception towards the proposed development is an intrinsic component of the Landscape and Visual Impact Assessment process. A CSIRO study published in 2012: *Exploring community acceptance of rural wind farms in Australia* provides a snapshot of community acceptance levels regarding Australian wind farms from a variety of stakeholder perspectives. It found levels of acceptance among the public are highly subjective and can differ depending on location, local context and place attachment.

In accordance with the Bulletin ongoing community consultation has been undertaken by the Proponent through an online survey that could be accessed via the Project website. The survey was distributed to both associated and non-associated landholders and interest groups between November 2021 and September 2022.

As of September 2022, a total of nine (9) surveys had been completed.

4.2.1 Landscape Features and Values

In addition to a review of existing landscape maps and detailed field work undertaken by Moir LA (see **Section 5.0**) the community consultation questionnaire asked respondents to identify key landscape features of importance to them. There were nine (9) responses to the question: ***"In your opinion, what are the key landscape features of the area?"***

Key landscape features identified by the community include:

- "*Open Native Grassland Plains*"
- "*Wide, flat plains*" and "*flat, open spaces*"
- "*Open Plain landscape with world renowned sunsets*"
- "*The Murrumbidgee River and the view across the plains and amazing sunsets*"

4.2.2 Key Public Viewpoints

Nine (9) responses were given to the question: ***"What are the best lookouts / public viewing locations in the area?"***

Key public viewing locations identified by the community include:

- "*16 Mile Gums on Cobb Hwy from Hay"*
- *"There is no "one" best viewing location in this area"*
- "*The open plains"*

Where possible, key viewpoints have been mapped in **Section 5.0** of this PVIA. Additional consultation and further detailed assessment of these features and viewpoints will be undertaken during the EIS phase.

4.2.3 Landscape Scenic Values

As part of the questionnaire, the respondents were asked to rate the value they associate with landscape features such as bushland areas, grazing land, hills, ridgelines rivers and creeks, townships and vegetation. Nine (9) people responded to the question: ***"What would you rate the scenic value of the following local landscape features?"***

The respondents gave moderate to high ratings to the scenic value of most landscape options (see **Figure 4**). The results identify that majority of the community values bushland areas. Further responses will be gathered during the EIS phase to assist in informing the Scenic Quality Rating of Landscape Character Units.

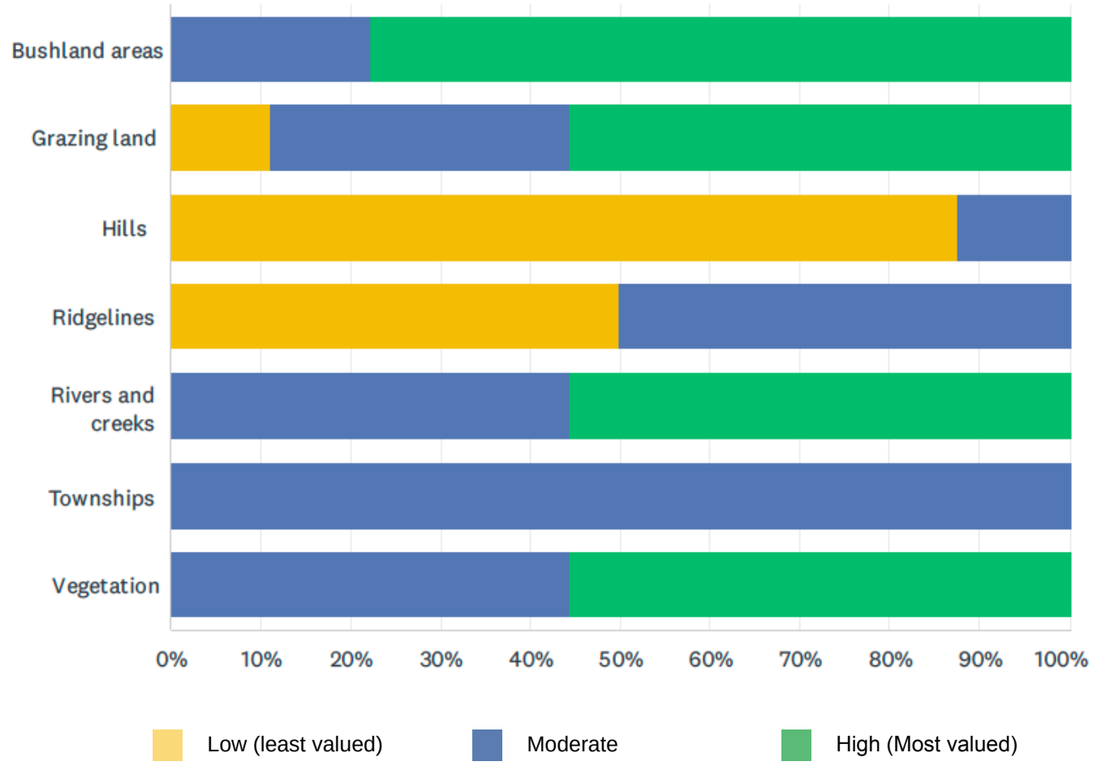


Figure 4 Landscape Scenic Values - Questionnaire responses

4.2.4 Community Values

Community values are highly subjective and can differ depending on location, local context and place attachment. The results of specific questions will assist in the identifying key areas of concern and ensuring the LVIA prepared in the EIS Phase provides a comprehensive assessment taking into account landscape values held by the community.

A total of nine (9) responses were received towards the question: ***"What do you value the most about your local area?".*** The purpose of this question is to gain an understanding of the respondents connection to the local area. The majority of respondents identified 'farming' and 'environment (flora and fauna)' as key values, followed by 'community / family' (see **Figure 5**).

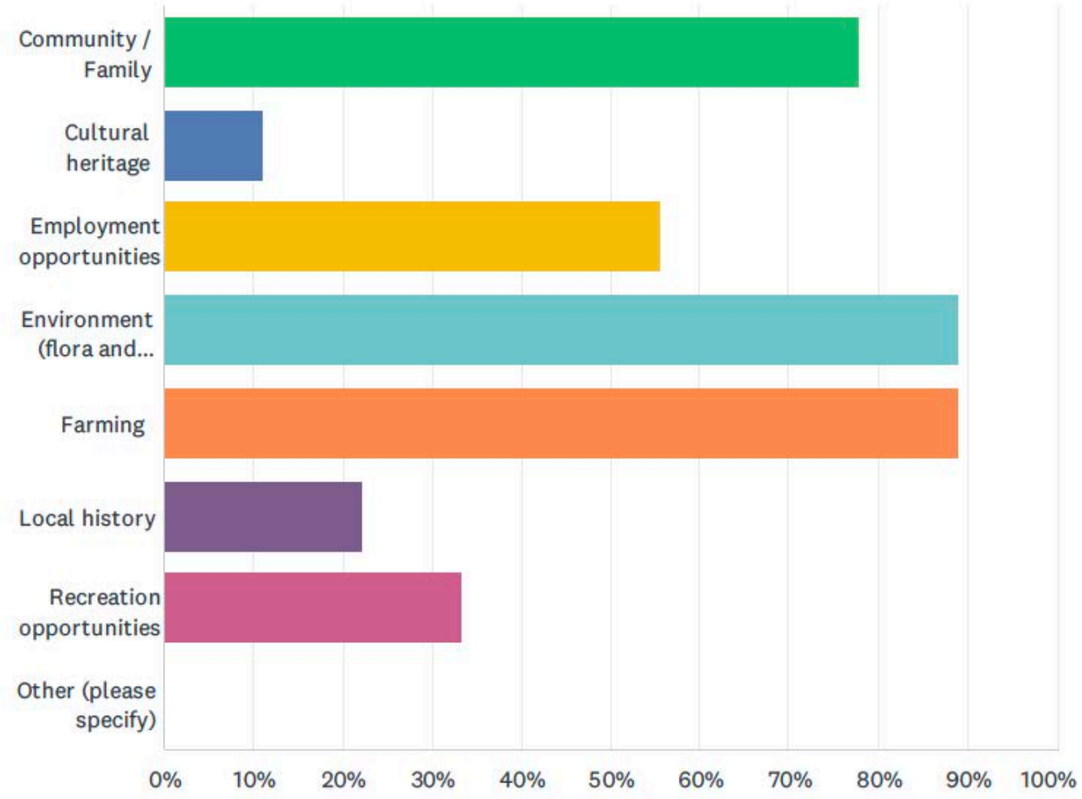


Figure 5 Community Values - Questionnaire responses

4.2.5 Community Concerns

The respondents were asked to provide feedback on their main concerns and if there were any additional comments. Nine (9) people responded to the question: ***"Based on your understanding of renewable energy, what are your main concerns?"***

The purpose of this question is to gain an understanding of the concerns respondents would have towards various aspects of the Project. An understanding on the results assists in identifying the community's general perception towards renewable energy projects. The majority of respondents identified 'noise' as a concern, followed by 'visual' and 'effects on land use' (see **Figure 6**).

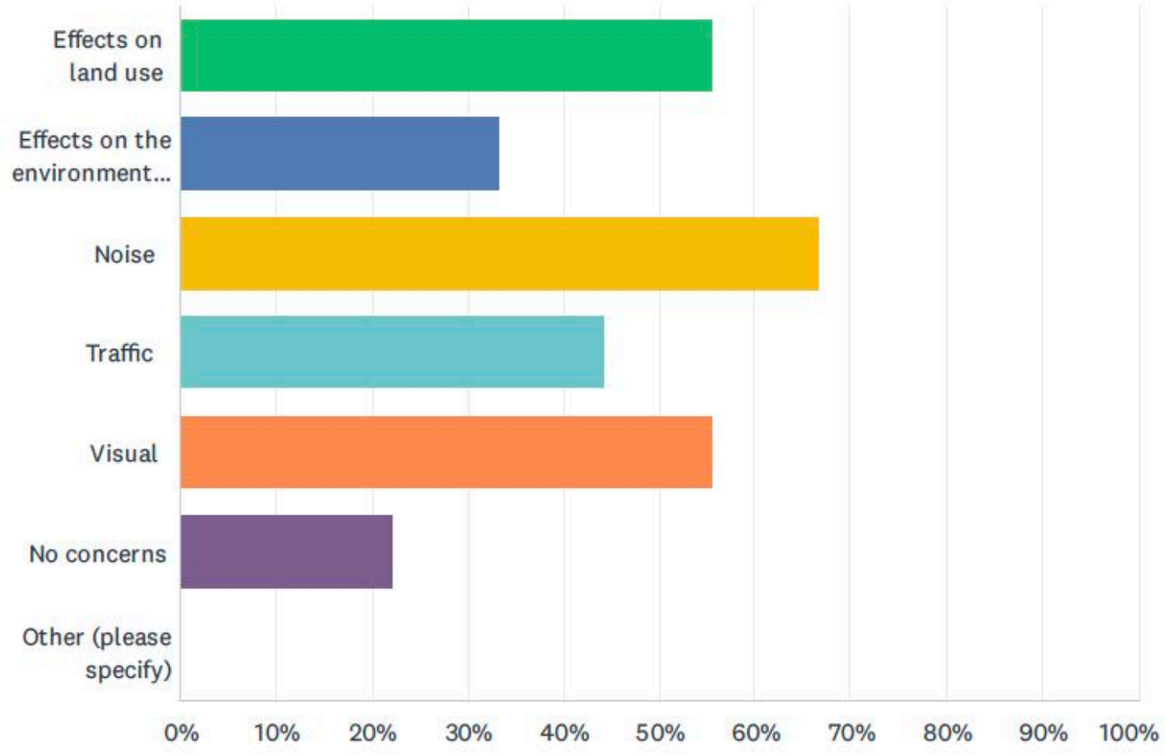


Figure 6 Community Concerns - Questionnaire responses

5.0 Existing Landscape Character

5.1 Overview of Bioregion

The Project sits within the Riverina Bioregion (see **Figure 7**) in southwest NSW. The area is characterised by extensive saltbush plain with small depressions and isolated low rises.

Topography is generally flat with very minor and isolated rises of coarse-textured aeolian material (land system, 2016). Grey cracking clays, red brown earths and compact brown clays are predominant in the region (NPWS, 2003). The plains are dominated by saltbush and bluebush with old man saltbush, cottonbush, myall and grasses. Vegetation communities on channels and swamps include black box (*Eucalyptus largiflorens*) and lignum (*Muehlenbeckia florulenta*). **Images 1 - 2** illustrate the typical character of the landscape within the Study Area.

Image 1 *Typical character of Riverina saltbush and bluebush plains*

Image 2 *The Hay plains are typically characterised by intermittent stands of Black box and Lignum trees with saltbush and grasses.*

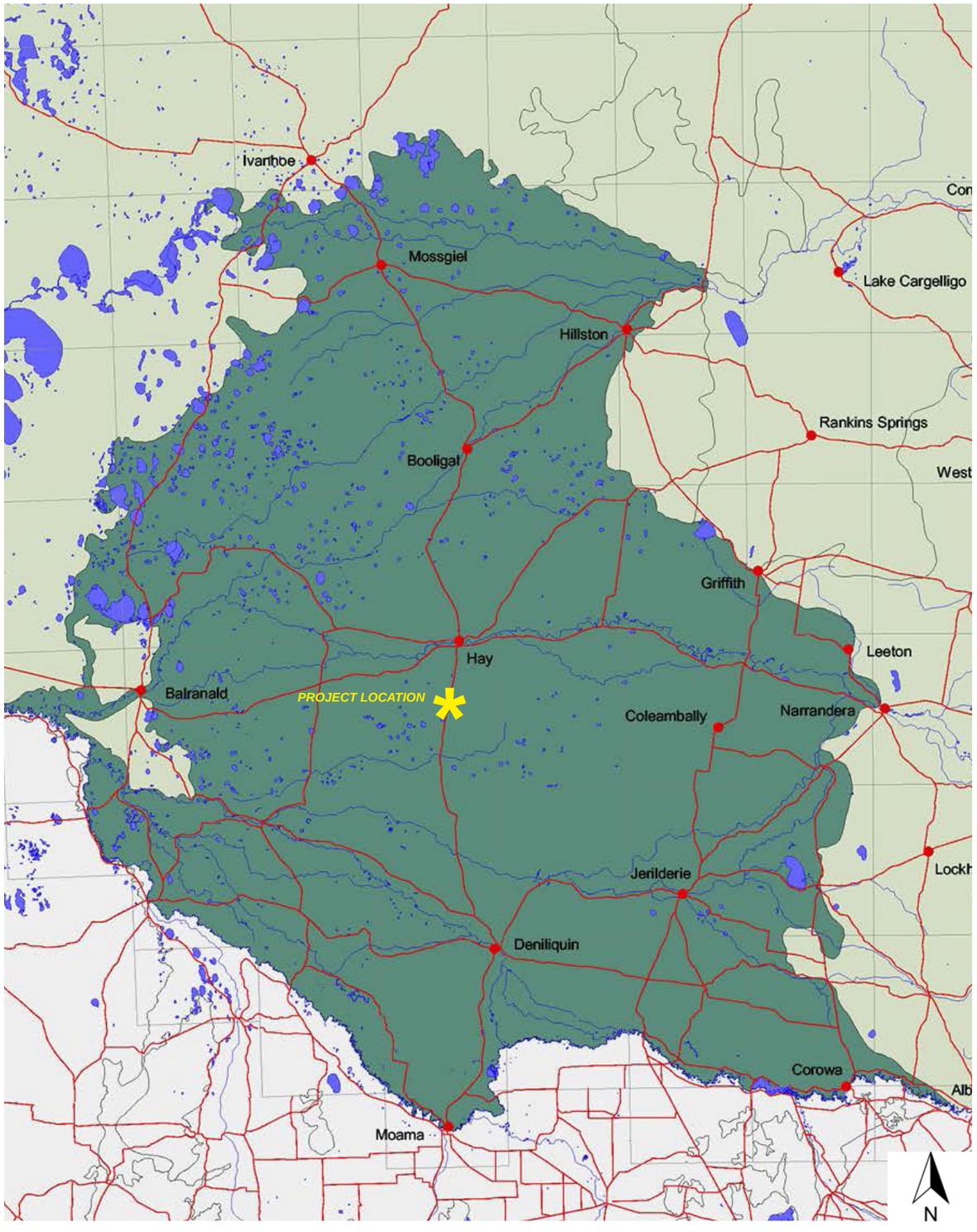


Figure 7 NSW Riverina Bioregion (Not to scale, Source: NPWS, 2016)

5.2 Land Use

5.2.1 Land Use Zoning

The Project is located within the extents of Hay Shire Council. The southern-most boundary of the Project Area sits on the LGA boundary. To the south lies Edward River LGA and to the east is Murrumbidgee Council LGA. The following gives an overview of the main land use zoning within the Study Area (see **Figure 8**):

RU1 - Primary Production

The Project and majority of the surrounding land is zoned *RU1 - Primary Production*. The Hay Shire LEP 2011 states the following objectives of the RU1 zoning relevant to the visual impact assessment:

- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*

C1 - National Parks and Nature Reserves

South West Woodland Nature Reserve is located to the south of the Project Area and is classified as *C1- National Parks and Nature Reserves.* It is spread over parcels of land south of Wargam Road.

According to the South West Woodland Nature Reserve Statement of Management Intent, the area is *'reserved under the NPW Act to protect and conserve areas that have outstanding, unique or representative ecosystems, species, communities or natural phenomena'* and is classed as a Nature Reserve (NPWS, 2014). The Nature Reserve's landscape, biological, cultural and educational values are as follows:

- *South West Woodland Nature Reserve provides habitat for the endangered swift parrot (Lathamus discolor) and vulnerable little eagle (Hieraaetus morphnoides)...*

- *The reserve protects a number of endangered ecological communities listed under the TSC Act including Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions; and Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray–Darling Depression, Riverina and NSW South Western Slopes Bioregions.*

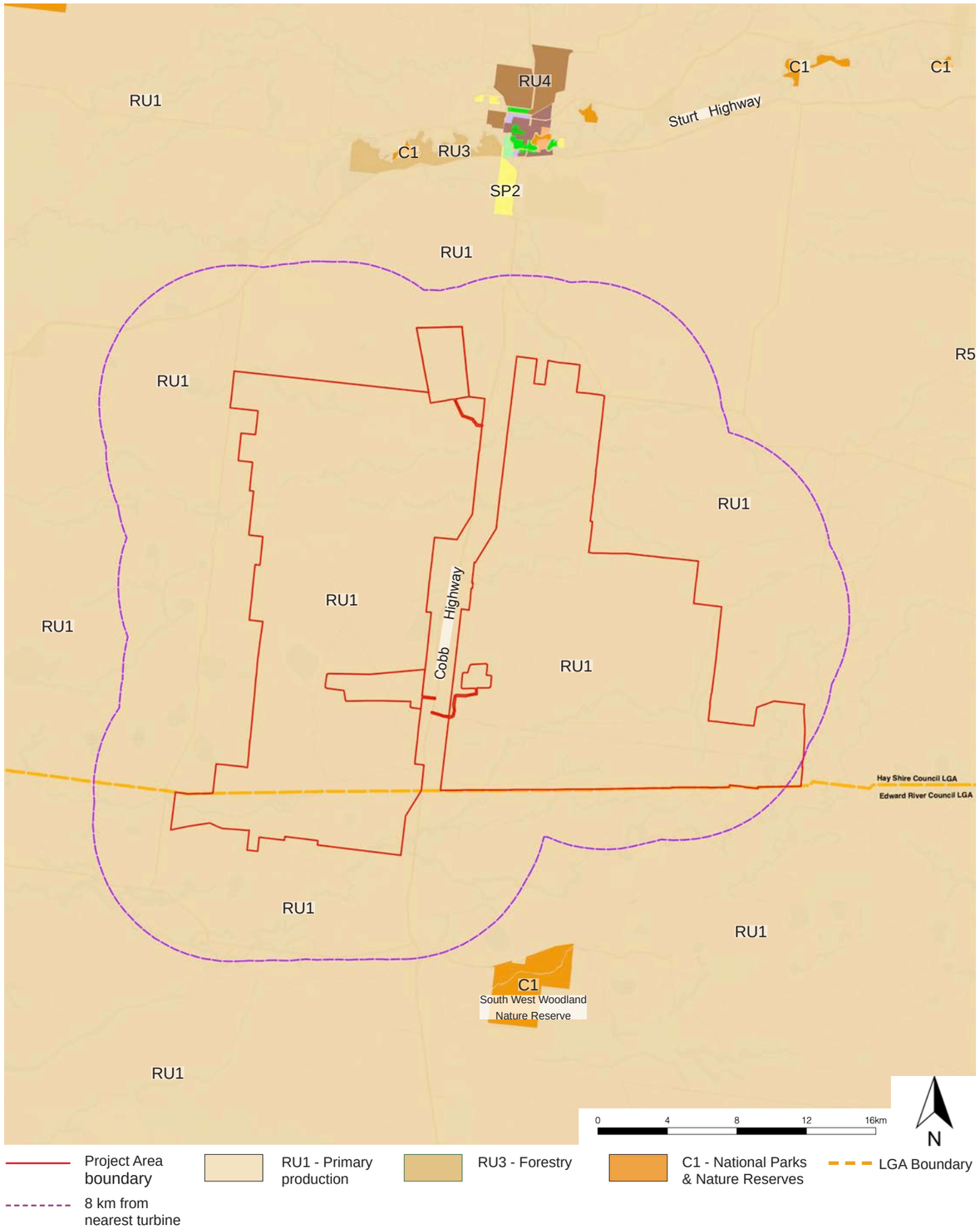


Figure 8 Land Use Zoning (Source: Hay Shire LEP 2011, Edward River LEP 2013)

• Precincts of the South West Woodland Nature Reserve form an important part of Country for the Wiradjuri and Ngiyampaa Aboriginal people.

• The reserve is a known field trip destination for conservation groups, providing areas for bushwalking, birdwatching and research.

• The region provides immense opportunity for environmental restoration, education and continuing research into recovery processes.

5.2.2 Land Use

Land use within and around the Project Area predominantly comprises agricultural production activities. The Project will be situated in areas that are currently dedicated largely to native grazing pastures (see **Figure 9**). South West Woodland Nature Reserve and Kalyarr National Park are subjected to minimal use due to their significant natural, landscape, cultural and educational values. It's immediate surrounds consist of natural or improved pastures, dryland and irrigated cropping.

Traces of irrigated cropping and pastures are also prevalent on the outer edges of the Project Area, surrounding the township of Hay. These areas are flat and open. Creeklines and dry lakes create floodplains that are fertile and suitable for agricultural activities. All water channels remain dry and exhibit vegetation characteristics that are unique to the Riverina region.

Sturt Highway and Cobb Highway serve as important commuting corridors as they provide connection to the towns of Balranald, Hay, Wagga Wagga, Deniliquin and others. Minor road connections are provided by Booroorban-Tchelery Road, Glenhope Road, Maude Road and Romani Road.

Industrial sites in proximity of the Project include the AUSCOTT Hay Cotton Gin which is located along the Cobb Highway on the northern side of the Project Area.

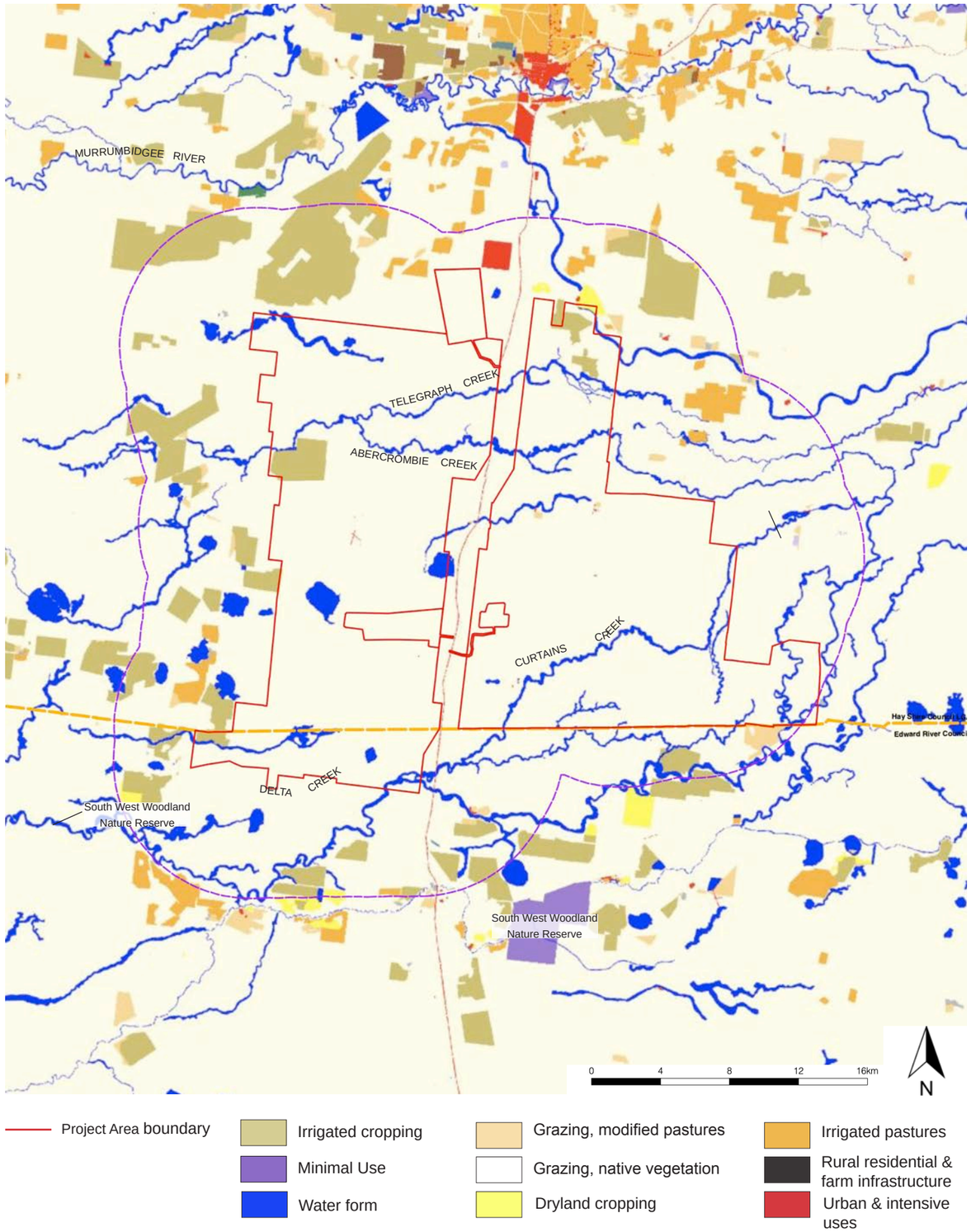


Figure 9 Land Use (Source: eSpade 2022)

5.3 Key Landscape Features & Viewpoints

The Bulletin states: *proponents must identify key landscape features, dwelling locations and key public viewpoints*. The following section provides an overview of the key features identified within and around the Study Area. Refer to **Figure 10.**

Geology and landform

The region is made up of Quaternary alluvial sediments with shallow and small depressions that are as deep as 2 m (Environment NSW, 2011). These depressions form a number of dry lakes studded in the landscape. In some areas these depressions form large scale swamps. The landform is also characterised by isolated low rises formed by aeolian processes, i.e., through wind action (Environment NSW, 2011). Landform is generally flat with dry distributary channels and floodplains (NPWS, 2003).

Vegetation character

Lack of water and dry, arid conditions support scattered stands of belah trees, saltbush and speargrass communities (NPWS, 2003). A number of saltbush and cottonbush varieties dominate the region with very sparse tree communities, thus yielding clear, open views of the expanse. The lack of tall canopy species allows higher wind speeds with continual wind actions on the landscape. Mid-canopy species such as lignum and nitre goosefoot are occasionally visible in the landscape and are favoured for emu grazing. Predominance of low-storey vegetation allows easier grazing opportunities for sheep, thus rendering the area favourable for livestock grazing. Most canopy cover is prominent within the extents of the South West Woodlands Nature Reserve and Kalyarr National Park extents.

Creeks, swamps and dry lakes

Given the dry and arid conditions of the region, the lakes and creeklines remain dry through most of the year. The most significant hydrological features in close proximity of the Project Area include Abercrombie Creek, The Forest Creek, Murrumbidgee River, Deaf Adder Swamp and Box Swamp.

Lakes or depressions are generally shallow and defined by low-storey, scrubby vegetation such as saltbush and canegrass species (Environment NSW, 2011). These areas have the capacity to hold water and are generally favoured for sheep and emu grazing. Creek floodplains, on the other hand, are defined by a denser vegetation character with scattered clumps of belah trees, saltbush, speargrass and forbs (Environment NSW, 2011). The region also presents swamps and pans with dillon bush, canegrass and nitre goosefoot spread across extensive gray clays (Environment NSW, 2011).

Lack of availability of fresh water sources has led to the prominence of native grazing pastures with occasional modified pastures and dryland cropping.

Nature Reserves, State Conservation Area and National Park

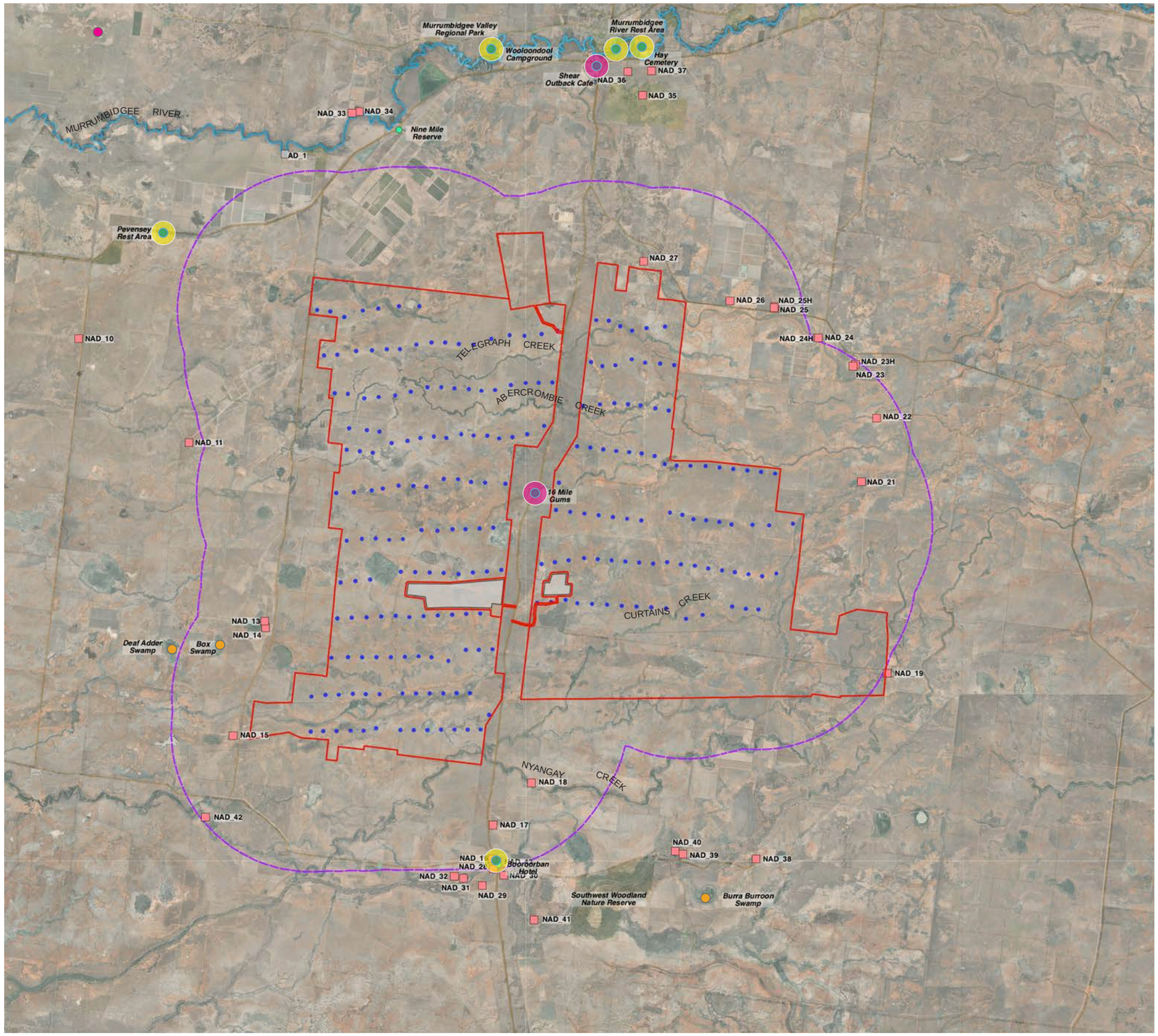
South West Woodlands Nature Reserve is located to the immediate south of the Project Area. The Nature Reserve exhibits characteristics of the Riverina Bioregion's Murrumbidgee subregion. The Nature Reserve is one of the examples of undisturbed patch of dense belah, mallee, rosewood and sugarwood communities with abundant grasses and dillon bush (NPWS, 2003). A combination of these remnant native vegetation patches forms the Murrumbidgee Valley Parks that are a testimony to the endemic landscape characteristics of the western Riverina region. The region also has significant historic and cultural associations such as Aboriginal burial sites, middens, spiritual sites, woolsheds and other structures established during colonial settlement. The parks also host biologically diverse areas that provide habitat for 24 threatened species (NPWS, 2020).

Campgrounds and Points of Interest

Recreational associations occur mostly within the extents of Hay and along the Murrumbidgee River to the north of the Project Area. Wooloondool Campground offers opportunities for riverside camping, fishing, birdwatching and swimming. Groves of black box trees and river red gums dominate the riverside. A sunset lookout providing panoramic views of the surrounding landscape is located 16 kilometres north of Hay. Yanga Lake and Homestead are located further about 30 km west of the Project Area.

Hay also presents opportunities for recreation with its racecourse, small open spaces and Bidgee Riverside Trail and the Shear Outback Cafe which is located near the air strip. Hay boasts a strong heritage character is appealing to tourists for its historic buildings and heritage trail.

Key Public Viewpoints identified within the Study Area include the 16 Mile Gums Rest Area. Other key points of interest identified in the Study Area include the Booroorban Pub/Hotel.



Existing Landscape Features

The Plains Renewable Energy Park

LEGEND

- Project Area boundary
- Proposed 280 m Turbine Location
- Associated dwellings
- Non-associated dwellings
- Main Road
- 8,000 m from nearest turbine
- Key Public Viewpoints
- Other Key Points of Interest
- Swamps and Lagoons
- Dams
- Rivers, creeks and channels

N

0 4 8 12 16km

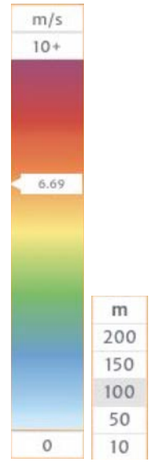
Figure 10 Existing Landscape Features (Map Source: ESRI Aerial Imagery, 2022)

Relative Wind Resource

The Plains Renewable Energy Park

LEGEND

- Project Area boundary
- Proposed 280 m Turbine Location
- 8,000 m from nearest turbine
- Rivers, creeks and channels



Relative ranges of average wind strength in metres per second

Figure 11 Wind Resource (Map Source: Badger et al. 2019)

5.4 Preliminary Landscape Character Units and Scenic Quality Rating

The Bulletin states: *the baseline study inputs, including key landscape features and sensitive land use designations, should lead to the identification of Scenic Quality Classes. Scenic quality refers to the relative scenic or aesthetic value of the landscape based on the relative presence or absence of key landscape features known to be associated with community perceptions of high, moderate or low scenic quality. It is both a subjective and complex process undertaken by experts in visual impact assessment, taking into account community values identified in early community consultation*.

In accordance with the Bulletin, a Scenic Quality 'frame of reference' has been formulated by Moir Landscape Architecture (**Table 2**) utilising *An approach to landscape sensitivity assessment* by Natural England. The preliminary frame of reference developed for the Project is in keeping with the example frame of reference provided in the Bulletin.

Each category of the 'frame of reference' has been quantified for each Landscape Character Unit to determine a Scenic Quality Rating of **low**, **moderate** or **high.** The resulting *Scenic Quality Rating* is used during the EIS phase to assist in defining the Visual Influence Zones in accordance with the Bulletin.

SCENIC QUALITY RATING		
Description	**LOW** ⟷	**MODERATE** ⟷ **HIGH**
Landform	- Flat Topography - Absence of Landscape Features - Open, broad extents of spaces	- Diversity in Topographical Range - Unique Landscape Features - Intimate spaces
Waterforms	- Absence of Water	- Presence of Water - Visually prominent lakes, reservoirs, rivers streams and swamps.
Vegetation	- Absence of vegetation - Lack of diversity - Land cleared of endemic vegetation - Low level of connection between vegetation and landscape / topography	- Abundant vegetation - High diversity - High retention of endemic vegetation. - High level of connectivity between natural landscape and landforms.
Human Influence	- High population. - High density in settlement - High presence of Infrastructure - High levels of landscape modification	- Low / dispersed population - No settlement - Absence of infrastructure - Landscape in natural state
Activity	- High levels of traffic movement - Presence of freight and passenger transport networks - Presence of production or industry.	- Low traffic movement - Absence of freight and passenger transport - Absence of production or industry
Rarity	- Typical landscape within a local and regional context	- Unique combination of landscape features in a local and regional context
Relationship with Adjoining Landscapes	- Low visible connection with adjoining landscapes - Low variability between adjoining landscapes. - Landscape features do not contribute to amenity from adjoining landscapes	- High visibility with adjoining landscapes. - High variability and contrast with adjoining landscapes - Landscape features contribute significantly to amenity of adjoining landscapes

Table 2 Scenic Quality Class Frame of Reference

5.4.1 Preliminary Landscape Character Unit Assessment

An assessment of existing land use and landscape features suggests that the Project Area and its surrounds exhibit a strong agricultural history of grazing and cropping along with ecological associations of Nyangay Creek, Telegraph Creek and Abercrombie Creek. A number of Landscape Character typologies exist within the Study Area (refer to **Figure 12**). As part of the Preliminary Landscape Character Assessment, a total of five (5) Landscape Character Units (hereafter referred to as 'LCUs') have been identified.

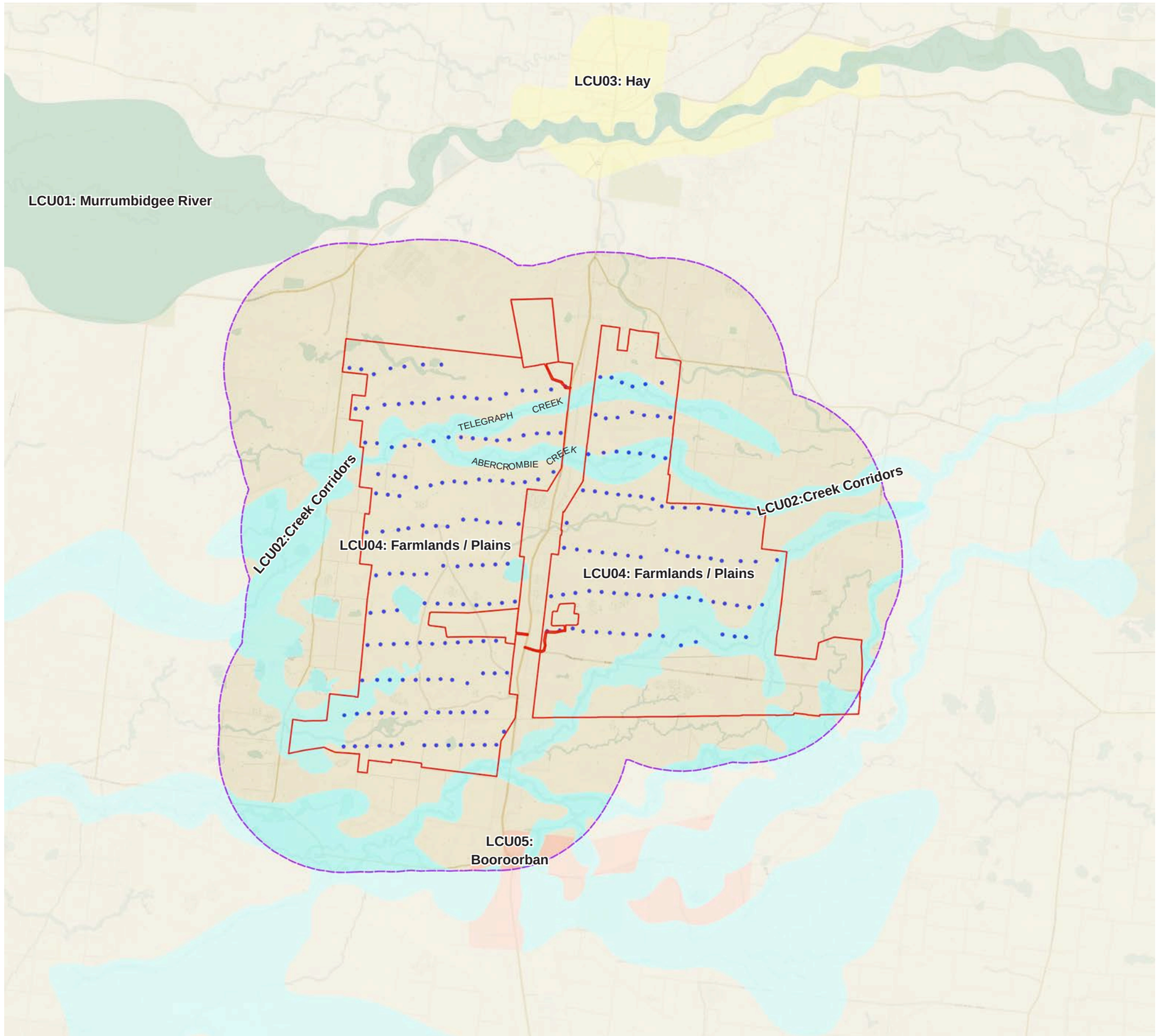
Table 3 provides an overview of the LCUs and preliminary Scenic Quality Ratings applied. These ratings have been developed using a standard frame of reference provided in the Bulletin. The LCUs and Scenic Quality Ratings will be refined in the EIS Phase of the Project to reflect input provided by the community during ongoing consultation.

Table 4 provides a brief overview of the potential visibility of the Project from each of the LCUs.

Landscape Character Units

LCU:	Name:	General Character:	Preliminary Scenic Quality Rating:
LCU01	**Murrumbidgee River**	*Vegetated riparian corridor of Murrumbidgee River that exhibits deeper embankments. Located north of the Project Area.*	**Moderate**
LCU02	**Creek corridors**	*Moderately vegetated but dry creek and drainage channels that run across intermittently. Very shallow embankments, almost minor depressions in some areas.*	**Low**
LCU03	**Hay**	*Low density rural township of Hay and rural surrounds, largely driven by agricultural activity.*	**Low**
LCU04	**Farmlands/Plains**	*Clear, flat and open areas used for grazing or cropping. Most prominent character of the region with minor to no elevation changes.*	**Low**
LCU05	**Booroorban**	*Low density rural village of Booroorban and rural surrounds, largely driven by agricultural activity.*	**Low**

Table 3 Overview of Preliminary Landscape Character Units



Preliminary Landscape Character Units

The Plains Renewable Energy Park

LEGEND

- Project Area boundary
- Main Road
- Minor Road
- 8,000 m from nearest turbine
- LCU01: Murrumbidgee River
- LCU02: Creek Corridors
- LCU03: Hay
- LCU04: Farmlands/Plains
- LCU05: Booroorban

N

0 4 8 12 16km

Figure 12 Preliminary Landscape Character Units (Map Source: Six Maps, 2022)

LCU01: Murrumbidgee River

The LCU consists of the Murrumbidgee River which is an important water channel in the region. The Murrumbidgee is one of largest rivers in southwest NSW and has immense cultural, recreational and ecological associations. Prominent species include River red gums and black box along river channels and belah, lignum, black box in floodplains.

Scenic quality rating: Moderate

See Images 3 and 4.

Image 3

Banks of the Murrumbidgee River near Hay.

Image 4

General character of the Murrumbidgee River and vegetated embankments.

LCU02: Creek Corridors

The Creek Corridors LCU is defined by generally flat vegetation corridors. Most creek and drain channels remain dry and are characterised by shallow depressions or elevation changes that are covered with speargrass and saltbush, and moderately dense black box woodland. The density of trees varies in different locations. The Nyangay Creek also represents similar character and is defined by denser vegetation corridors.

Scenic quality rating: Low

See Images 5 and 6.

Image 5

Typical view of the Nyangay Creek bed - minor elevation changes lined with grasses and saltbush along with scattered to moderately dense stands of black box communities.

Image 6

View of vegetation corridor associated with the Nyangay Creek as seen in close proximity of the Project Area.

LCU03: Hay

The LCU comprises of the small township of Hay and rural surrounds. Hay lies adjacent to the banks of the Murrumbidgee River and is defined by the historic buildings, low density residential dwellings and agricultural heritage.
The LCU is defined by generally flat land and the landscape is highly modified.

Scenic quality rating: Low

See Images 7 and 8.

Image 7

Typical character of Hay along the Sturt Highway.

Image 8

Character of Sturt Highway leading to Hay

LCU04: Farmlands/Plains

The Farmlands LCU is defined by vast, open land parcels that are utilised for sheep and cattle grazing. The LCU portrays the most dominant character in the region. It comprises of open plains with scattered or no tree cover and vast extents of saltbushes, speargrass, and forbs. Common land uses include native grazing pastures, dryland cropping, modified and irrigated pastures.

Scenic quality rating: Low

See Images 9 and 10.

Image 9

Large, open expanses of saltbush communities over flat land parcels with no water define the LCU's typical character.

Image 10

Character of farmlands south of Hay - open, grassy and scrubby grazing lands.

LCU05: Booroorban

The LCU comprises of the small rural village of Booroorban and surrounds. Booroorban is located to the south of the Project Area and consists of a small number of rural dwellings, a hotel and public hall. The LCU is characterised by vast, open land parcels that are utilised for sheep and cattle grazing.

Scenic quality rating: Low

***See Images 11 and 12*.**

Image 11

Typical character of Booroorban along the Cobb Highway.

Image 12

Saltbush communities over flat land parcels typical of this LCU.

Landscape Character Units		
LCU:	**Name:**	**Preliminary Visual Impact Assessment**
LCU01	**Murrumbidgee River**	Views from this LCU are often contained by the unique vegetation that defines this LCU. Despite the flat topography, dense vegetation will help reduce and mitigate views towards the Project. Recreational camp sites such as the Woolondool campground are likely to have fragmented views of the Project due to vegetation in the foreground.
LCU02	**Creek Corridors**	Views towards the Project will be available within this LCU because of the relatively flat topographic character and elevated position of the turbines. Patches of vegetation, however, along the creek channel may help screen views in certain areas.
LCU03	**Hay**	Views of the Project from the Hay LCU may be available within this LCU due to the flat, mostly cleared character of the rural surrounds. However, views from the township will likely be contained by the riparian vegetation associated with the Murrumbidgee River.
LCU04	**Farmlands /Plains**	The Project is located within the Farmlands LCU which is also the most prominent character of the region. Isolated dwellings are scattered across the farmlands. Agricultural activities include grazing pastures and dryland cropping.
LCU05	**Booroorban**	Located to the south the Project Area, views from this LCU will likely be available due to the flat terrain and cleared lands which allows for open views. Vegetation associated with the creeks and corridors surrounding may reduce the visual impact in certain areas.

Table 4 Overview of Preliminary Visual Impact Assessment of LCUs

6.0 Preliminary Assessment Tools

6.1 Overview of Preliminary Assessment Tools

To assist in defining the visual catchment, preliminary assessment tools have been developed in the Bulletin. In accordance with the Bulletin, the purpose of the preliminary assessment tools are: *to provide an early indication of where turbines require careful consideration because of potential visual impacts. The tools apply to both dwellings and key public viewpoints in the study area. The tools provide an early indication of where placement of turbines will require further assessment and justification, and where consultation with potentially affected landowners needs to be focused – including discussions for landholder agreements.*

The Bulletin also states: *Further assessment and justification for placement of turbines located in these sensitive areas in the EIS will be required, along with a description of mitigation and management measures being employed to reduce impacts. This assessment may identify that factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the project.*

The preliminary assessment tools involve analysis of two key visual parameters:

1. Visual Magnitude (**Refer to Section 6.2**)
2. Multiple Wind Turbine Tool (**Refer to Section 6.4**)

Dwellings identified through the application of the Preliminary Assessment tools have been assessed in detail in **Appendix A** of this PVIA.

6.2 Preliminary Assessment Tool 1: Visual Magnitude

The Visual Magnitude Threshold is based on the height of the proposed wind turbines to the tip of the blade and distance from dwellings or key public viewpoints as shown in **Figure 13.**

In accordance with the Bulletin: *proposed turbines below the black line must be identified along with the dwellings or key public viewpoints as part of the request for SEARs.* The proposed wind turbines are based on a worst case scenario with a tip height of *280 metres*. The 'black line' intersects at a distance of *3,750 metres* and the 'blue line' intersects at *5,500 metres*.

For the purpose of the Preliminary Assessment, the Visual Magnitude thresholds are based on a 2D assessment of the Project alone. Further assessment indicates factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the Project from residences.

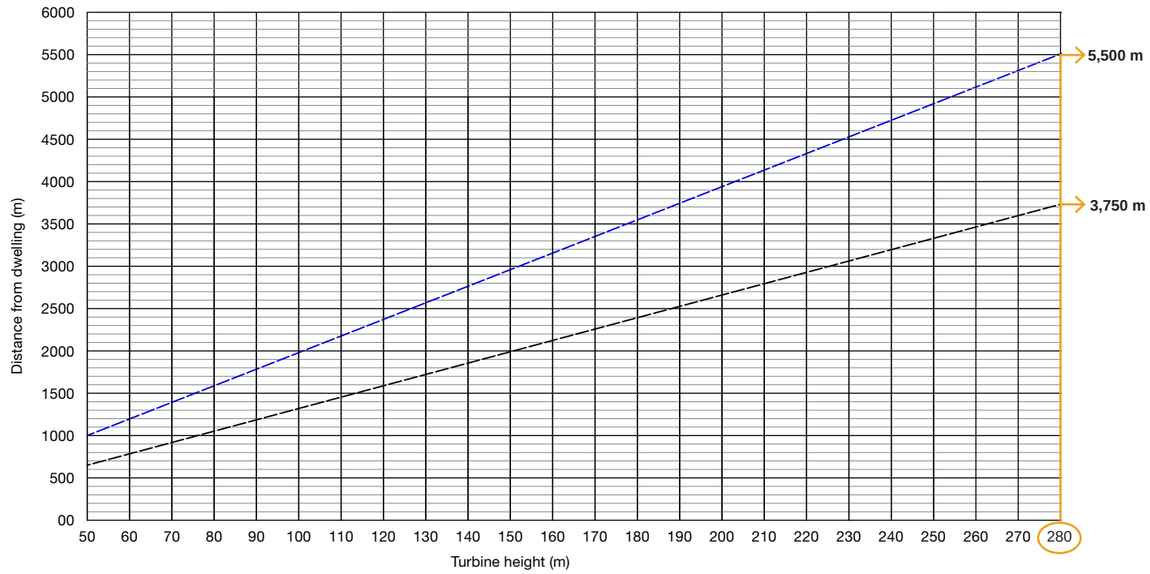
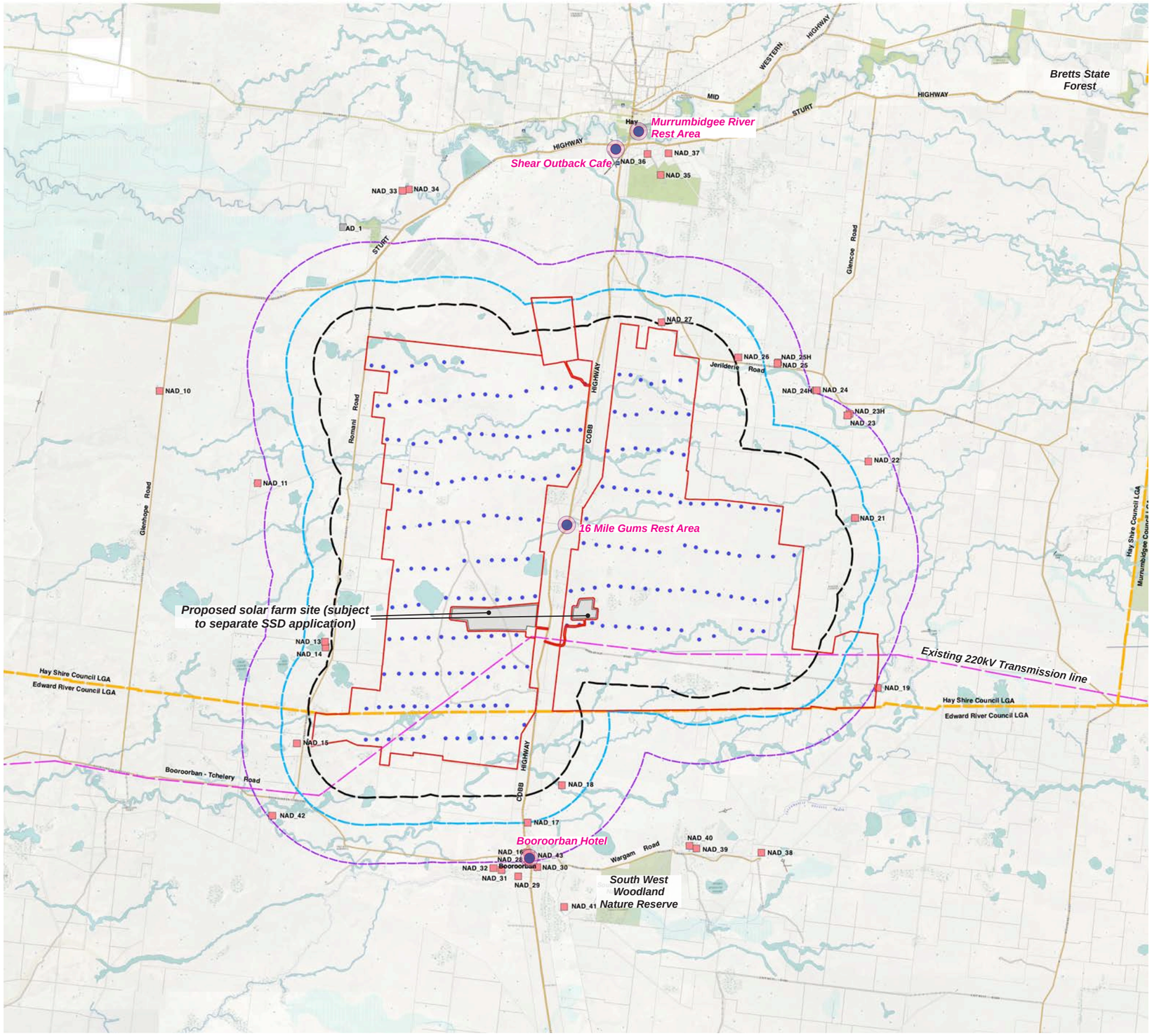


Figure 13 Visual Magnitude Thresholds for The Plains Renewable Energy Park
(Adapted from Visual Assessment Bulletin)

6.3 Results of Preliminary Assessment Tool 1: Visual Magnitude

Application of the Preliminary Assessment Tools to the Project identified dwellings which require further assessment in accordance with the Bulletin. Non-associated dwellings identified within the Study Area are shown on **Figure 14.**

- Eight (8) non-associated dwellings have been identified within 5,500 metres of the proposed wind turbine locations (within blue line of visual magnitude). These are NAD_27, NAD_26, NAD_21, NAD_18, NAD_17, NAD_15, NAD_13 and NAD_14.
- Preliminary assessment of eight (8) representative sensitive receptors within 5,500 m of the proposed turbines have been included in **Appendix A**. These assessments illustrate that existing intervening vegetation that surrounds majority of these non-associated dwellings is likely to reduce views to the Project.
- Of the eight (8) dwellings that were assessed, three (3) dwellings are identified as being surrounded by scattered vegetation and this may allow views of the Project. The remaining five (5) dwellings are surrounded by existing intervening elements such as vegetation or structures. Further detailed assessment and site inspections of sensitive receptors to ground-truth this analysis will be undertaken during the EIS phase.



Visual Magnitude

The Plains Renewable Energy Park

LEGEND

- Project Area boundary
- Proposed 280 m Turbine Location
- Non-associated dwellings
- Associated dwellings
- Proposed solar farm (subject to separate SSD application)
- Key public viewpoint
- Main Road
- Minor Road
- 3,750 m from nearest turbine
- 5,500 m from nearest turbine
- 8,000 m from nearest turbine
- LGA Boundary
- Existing 220kV transmission line
- National Park / Nature Reserves

Note:

Preliminary Assessment Tool 1: Visual Magnitude is based on a 2D Assessment alone and does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing turbines.

N

0 4 8 12 16km

Figure 14 Preliminary Assessment Tool 1: Visual Magnitude (Map Source: Six Maps, 2022)

6.4 Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

The Multiple Wind Turbine Tool provides a preliminary indication of potential cumulative impacts arising from the proposed Project. To establish whether the degree to which dwellings or key public viewpoints may be impacted by multiple wind turbines, the proponent must map into six sectors of 60° any proposed turbines, and any existing or approved turbines within eight (8) kilometres of each dwelling or key public viewpoint. One (1) key public viewpoint was identified within 8,000 m of the nearest turbine which is the 16 Mile Gums Rest Area. Turbines associated with the Project are proposed on either side of the Rest Area (refer to **Figure 16 and Figure 17**). **Figure 15** provides examples of where a dwelling or key public viewpoint may have views to turbines in multiple 60° sectors.

In accordance with the Bulletin: *Where wind turbines are visible within the horizontal views of the dwelling or key public viewpoints in three or more 60° sectors, the proponents must identify the turbines, relative dwelling and key public viewpoint, along with the relative distance and submit these to the Department as part of the request for SEARs.* These turbines will become a focus for assessment in the EIS.

Figure 17 provides an overview of the number of 60º sectors visible from each of the dwellings identified within eight (8) kilometres.

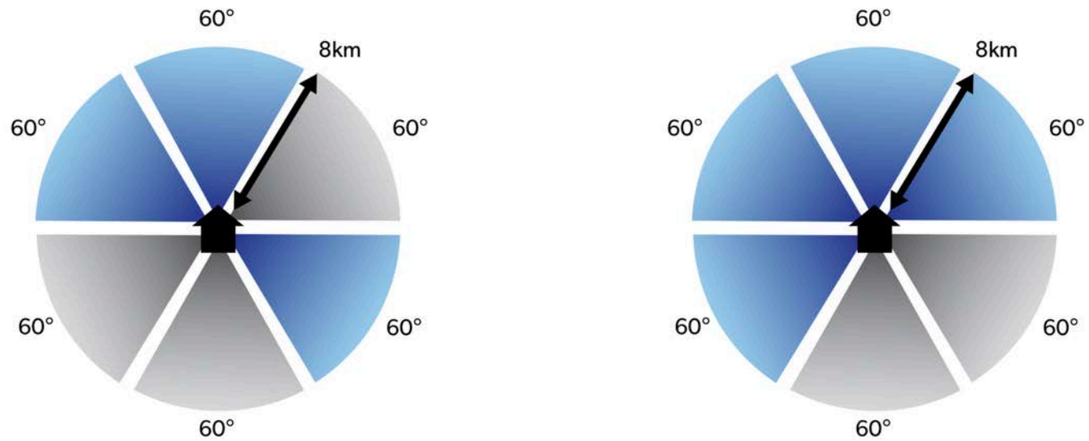


Figure 15 Multiple Wind Turbine Tool
(Source: Visual Assessment Bulletin)

6.5 Results of Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

When applied to the Project, the 2D Multiple Wind Turbine Tool (see **Figure 14**) identified a total of 16 dwellings that will view turbines associated with the Project. Of these, three (3) non-associated dwellings will have views in up to two (2) 60 degree sectors and the remaining 13 non-associated dwellings will view the turbines within one (1) 60 degree sector which is deemed an acceptable level in accordance with the Bulletin (see **Table 5**).

Two (2) key public viewpoints were identified within 8,000 m of the nearest turbine. These include the Booroorban Hotel and the 16 Mile Gums Rest Area located on Cobb Highway. A summary of findings is stated below:

- Views of the turbines from Booroorban Hotel will be available in one (1) 60 degree sector which is deemed an acceptable level in accordance with the Bulletin.

- The 16 Mile Gums Rest Area is located near the centre of the Project Area, and therefore, the viewpoint will have views of the Project in all six (6) 60 degree sectors. As a part of the Project, additional education information on wind turbines and renewable energy could be introduced at this location. This could serve as an initiative to diversify the rest area's current use. A preliminary assessment for this location is presented further in this report (see **FIgure 16**).

- In addition, two (2) key public viewpoints were identified in Hay: the Murrumbidgee River Rest Area and the Shear Outback Cafe. Theoretically, these viewpoints will not have views of the Project in any 60 degree sector since they are located more than 8,000m away from the nearest turbine.

An assessment of the potential visual impacts on these viewpoints has been discussed in **Appendix B**.

Dwellings located on the eastern side of the Study Area have the potential to view turbines associated with the Project and the Bullawah Wind Farm (BWF). BWF is in its preliminary planning stages. Based on the information available in the public domain, the BWF project boundary is located approximately 5 km west of the Project. However, the layout of BWF is currently unknown (BayWa r.e., 2022). A preliminary assessment of the cumulative impacts of these projects has been discussed in **Section 9.0** of this report.

Further assessment of all dwellings using 3D topographic mapping has delivered the same results. Existing screening factors (including vegetation and structures) may reduce visibility of the turbines. This has been discussed further in **Appendix A**.

Dwelling ID	Distance to nearest WTG:	Number of 60º Sectors (Based on a 2D Assessment):	Number of 60º Sectors associated with the Project (Based on a 3D Assessment):	Screening Factors:
Non-associated dwellings with turbines in up to one (1) or two (2) 60º Sectors (up to 60º and 120º):				
NAD_27	**3.92 km**	Two (2) 60º Sectors (up to 120º)	Two (2) 60º Sectors (up to 120º)	*Existing intervening vegetation. Refer to Appendix A.1.*
NAD_26	**4.00 km**	One (1) 60º Sector (up to 60º)	One (1) 60º Sector (up to 60º)	*Existing scattered vegetation. Refer to Appendix A.2.*
NAD_21	**4.59 km**	One (1) 60º Sector (up to 60º)	One (1) 60º Sector (up to 60º)	*Existing intervening vegetation. Refer to Appendix A.3.*
NAD_18	**4.21 km**	One (1) 60º Sector (up to 60º)	One (1) 60º Sector (up to 60º)	*Existing structure and intervening vegetation. Refer to Appendix A.4.*
NAD_17	**5.50 km**	One (1) 60º Sector (up to 60º)	One (1) 60º Sector (up to 60º)	*Lack of intervening vegetation. Refer to Appendix A.5.*
NAD_15	**4.46 km**	One (1) 60º Sector (up to 60º)	One (1) 60º Sector (up to 60º)	*Existing intervening vegetation. Refer to Appendix A.6.*
NAD_14	**4.13 km**	Two (2) 60º Sectors (up to 120º)	Two (2) 60º Sectors (up to 120º)	*Existing intervening vegetation. Refer to Appendix A.7.*
NAD_13	**4.15 km**	Two (2) 60º Sectors (up to 120º)	Two (2) 60º Sectors (up to 120º)	*Lack of intervening vegetation. Refer to Appendix A.8.*

Table 5 Overview of results of Multiple Wind Turbine Tool on non-associated dwellings

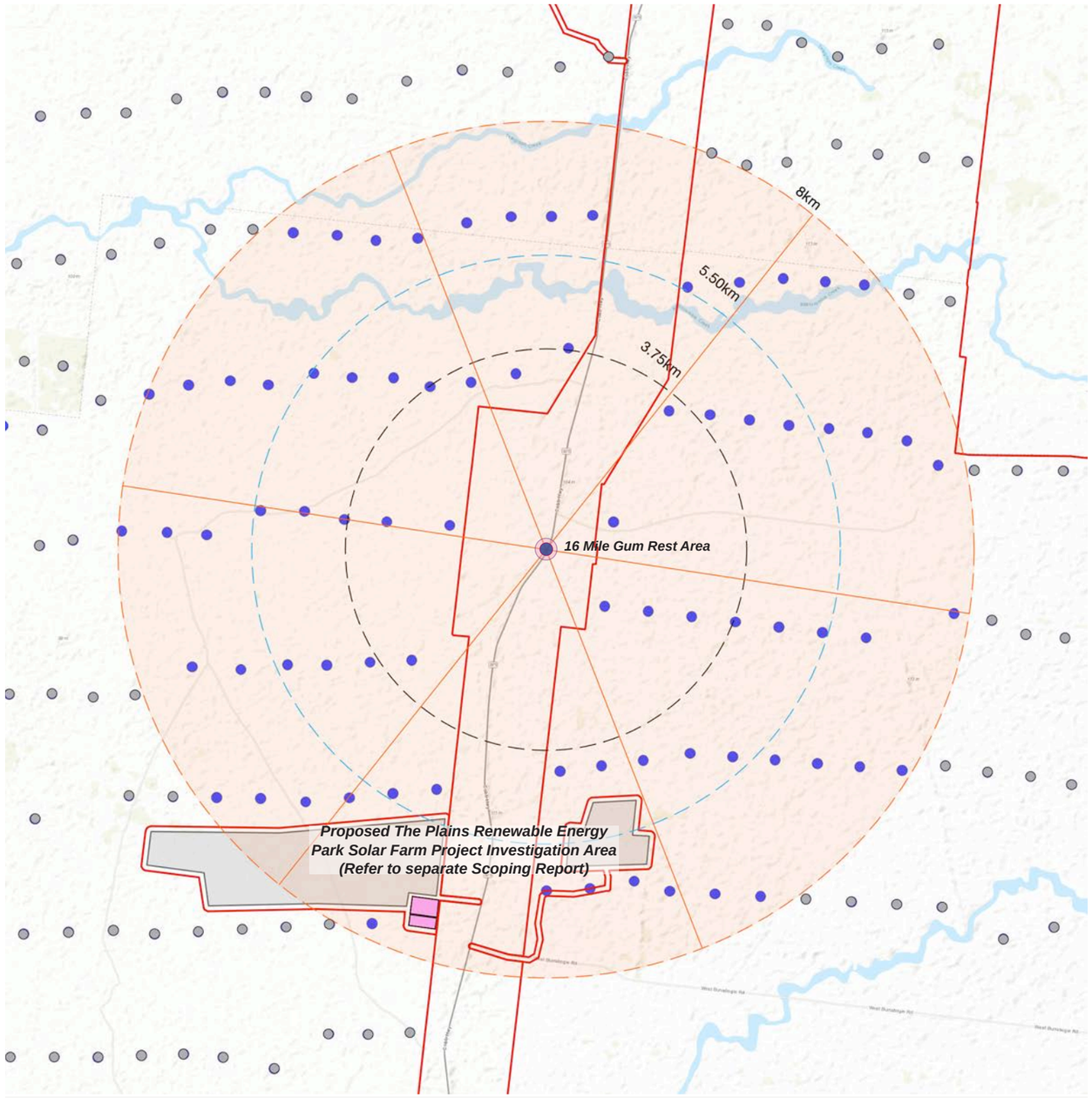


Figure 16 Preliminary Assessment: Key Public Viewpoint (Map Source: Six Maps, 2022)

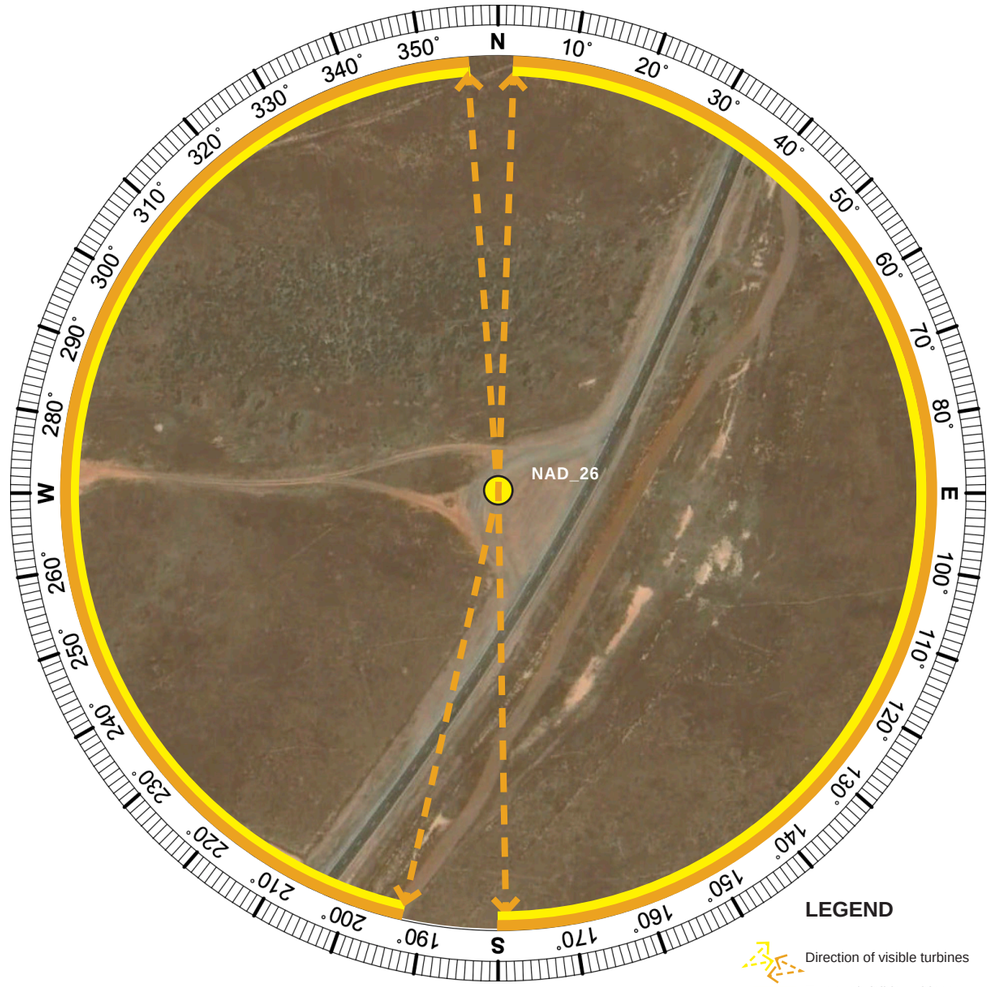
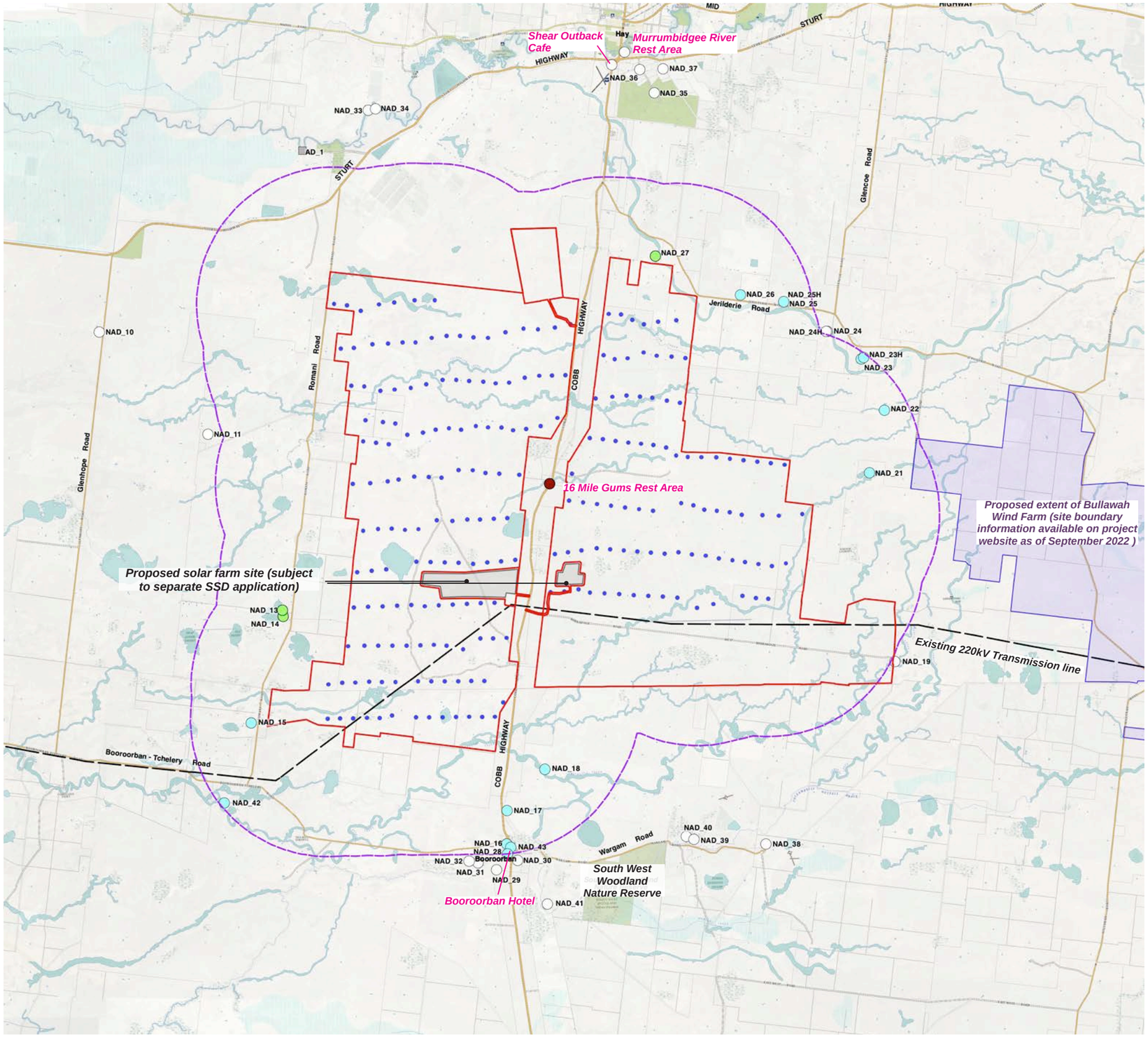


Figure A.2 Aerial Image 16 Mile Gum Rest Area

(Aerial Image Source: Google Earth, Nov 2020)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**1.42 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**34**
Number of theoretical 60º sectors (Based on 2D assessment):	**Six (6) sectors**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of location character:	**Open and flat farmlands define the character of this location. Majority of the Project will be visible due to open, clear views and close proximity.**



Multiple Wind Turbine Tool

The Plains Renewable Energy Park

LEGEND

- Project Area boundary
- Bullawah Wind Farm (BWF) boundary (refer to **Section 9.0** for cumulative impact assessment)
- 280 m The Plains Renewable Energy Park (DEH) Turbine Location
- Associated dwellings
- Proposed solar farm (subject to separate SSD application)
- 8000 m from proposed turbines
- Existing 220kV electrical transmission line
- National Park / Nature Reserves

MWTT Results for Non-associated Dwellings & key viewpoints:

- Dwellings or viewpoints in excess of 8,000 m
- One (1) 60º Sector (60º)
- Up to two (2) 60º Sectors (120º)
- Up to three (3) 60º Sectors (180º)
- Up to four (4) 60º Sectors (180º)
- Up to five (5) 60º Sectors (180º)
- Up to six (6) 60º Sectors (180º)

Note:

Preliminary Assessment Tool 2: Multiple Wind Turbine Tool is based on a 2D Assessment alone and does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing multiple turbines.

N

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Figure 17 Preliminary Assessment Tool 2: Multiple Wind Turbine Tool (Map Source: Six Maps, 2022)

7.0 Preliminary Zone of Visual Influence

7.1 Overview of Preliminary Zone of Visual Influence

The Bulletin states *'the use of Geographic Information Systems (GIS) to facilitate the application of the tools will streamline the evaluation phase of the evaluation phase of a project during the pre-lodgement stage. This can also assist in refining the number of turbines and viewpoints that will ultimately need more detailed assessment.'*

A Zone of Visual Influence (ZVI) diagram has been prepared for the Project to illustrate the theoretical visibility of the proposed turbines from the blade tip height. **Figure 18** depicts the areas of land from which the proposed development may be visible and provides an indicative number of wind turbines based on the blade tip height of 280 metres.

The ZVI (also known as a Zone of Theoretical Influence Model) represents the area over which a development can theoretically be seen and is based on a Digital Terrain Model (DTM). The ZVI usually presents a bare ground scenario - ie. a landscape without screening, structures or vegetation, and is usually presented on a base map (Scottish Natural Heritage, 2017).

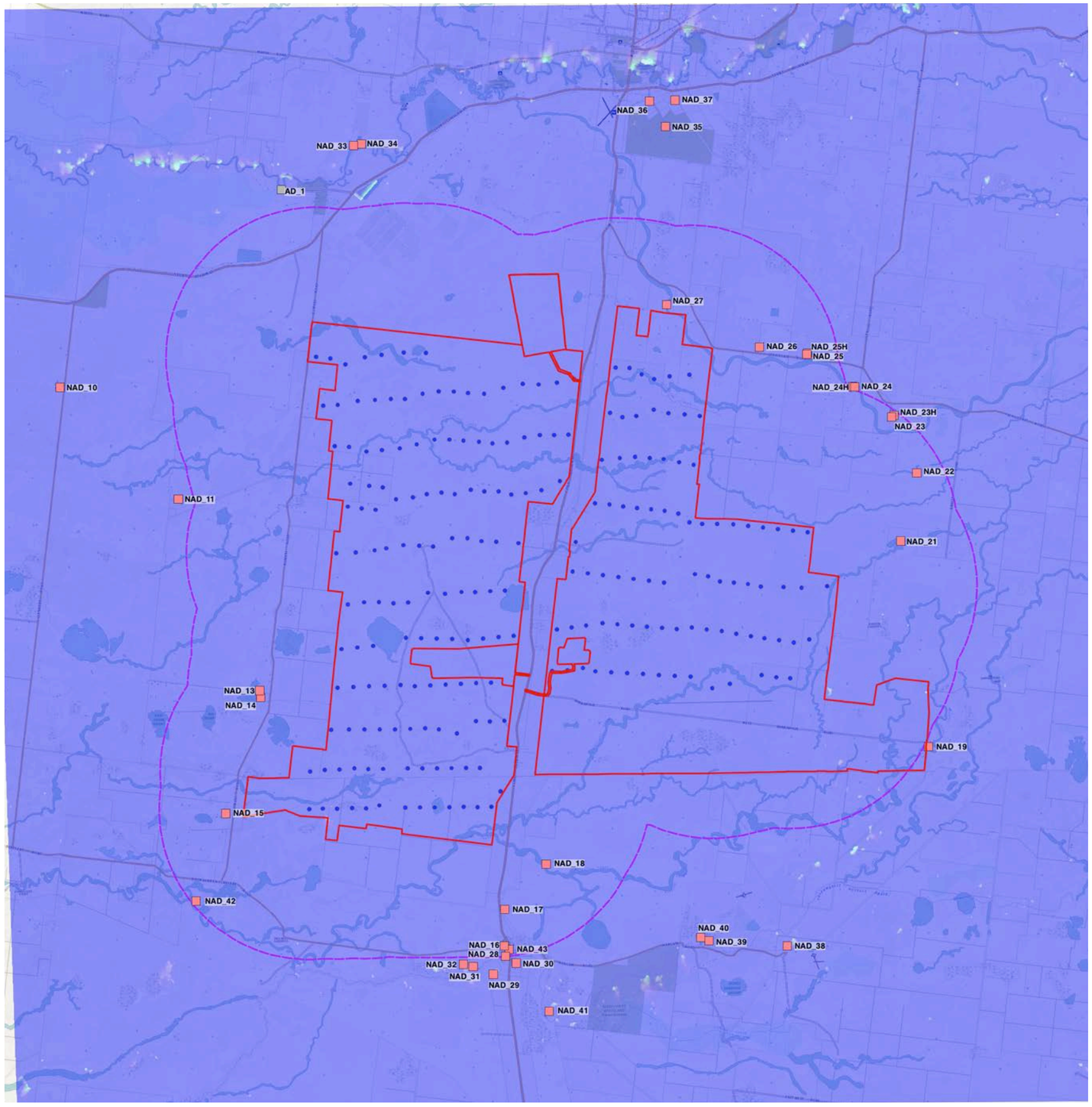
The ZVI has been determined through the use of digital topographic information and 3D modelling software *WindPro*. The ZVI has been assessed to approximately 30 km from the Project Area.

7.2 Summary of Preliminary Zone of Visual Influence

The following provides a summary of the ZVI diagrams prepared for the Preliminary Layout of the Project.

- Due to the relatively flat topography that characterises this landscape, the majority of turbines associated with the Project are likely to be visible from most areas around the Project Area.
- Certain areas such as the parts of the Murrumbidgee River that are located generally north of the Project Area have been identified in the ZVI as land parcels with views screened by topographical differences between them and the Project Area.
- Views to the majority of turbines associated with the Project are likely to be available for all dwellings within eight (8) kilometres of the wind turbines. This assessment is based on a consideration of topography alone and does not consider intervening elements such as vegetation and existing structures.
- Following the development of the ZVI, detailed site investigations (in the form of a viewpoint analysis inventory and dwelling assessments) have been undertaken to ground-truth the findings (see **Appendix B**). Preliminary viewpoint analysis (from 14 public locations) and assessment of eight (8) representative sensitive receptors have been included in **Appendix A** and **Appendix B**.
- Further detailed assessment from areas identified in the ZVI will be undertaken in the EIS Phase of the assessment.

It is important to reiterate that this is a preliminary assessment based on worst case scenario that does not consider the impact of vegetation or structures. Ground-truthing during field work will ascertain potential visibility taking into account structures and vegetation, however, based on the preliminary assessments in **Appendix A** and **Appendix B**, it is likely that existing intervening vegetation surrounding non-associated dwellings is likely to reduce views of turbines from a number of locations.



Zone of Visual Influence Blade Tip Height 280 m

The Plains Renewable Energy Park

LEGEND

- Project Area boundary
- Proposed 280 m Turbine Location
- Associated dwelling
- Non-associated dwellings
- 8,000 m from nearest turbine

Number of visible turbines (at tip height)
(Based on topography alone):

- 0
- 1 - <75
- 75 - < 150
- 150 and above

Note:

The ZVI is a preliminary assessment tool that represents a bare ground scenario - ie. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the ZVI is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.

N

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Figure 18 Zone of Visual Influence (Blade Tip 280 m) (Map Source: Six Maps, 2022)

8.0 Preliminary Dwelling & Viewpoint Assessment

8.1 Preliminary Assessment of Dwellings

Examples of the preliminary assessment tools applied to eight (8) representative non-associated dwellings (as shown on **Figure 18**) within 8,000 m of the nearest turbine have been included in **Appendix A.**

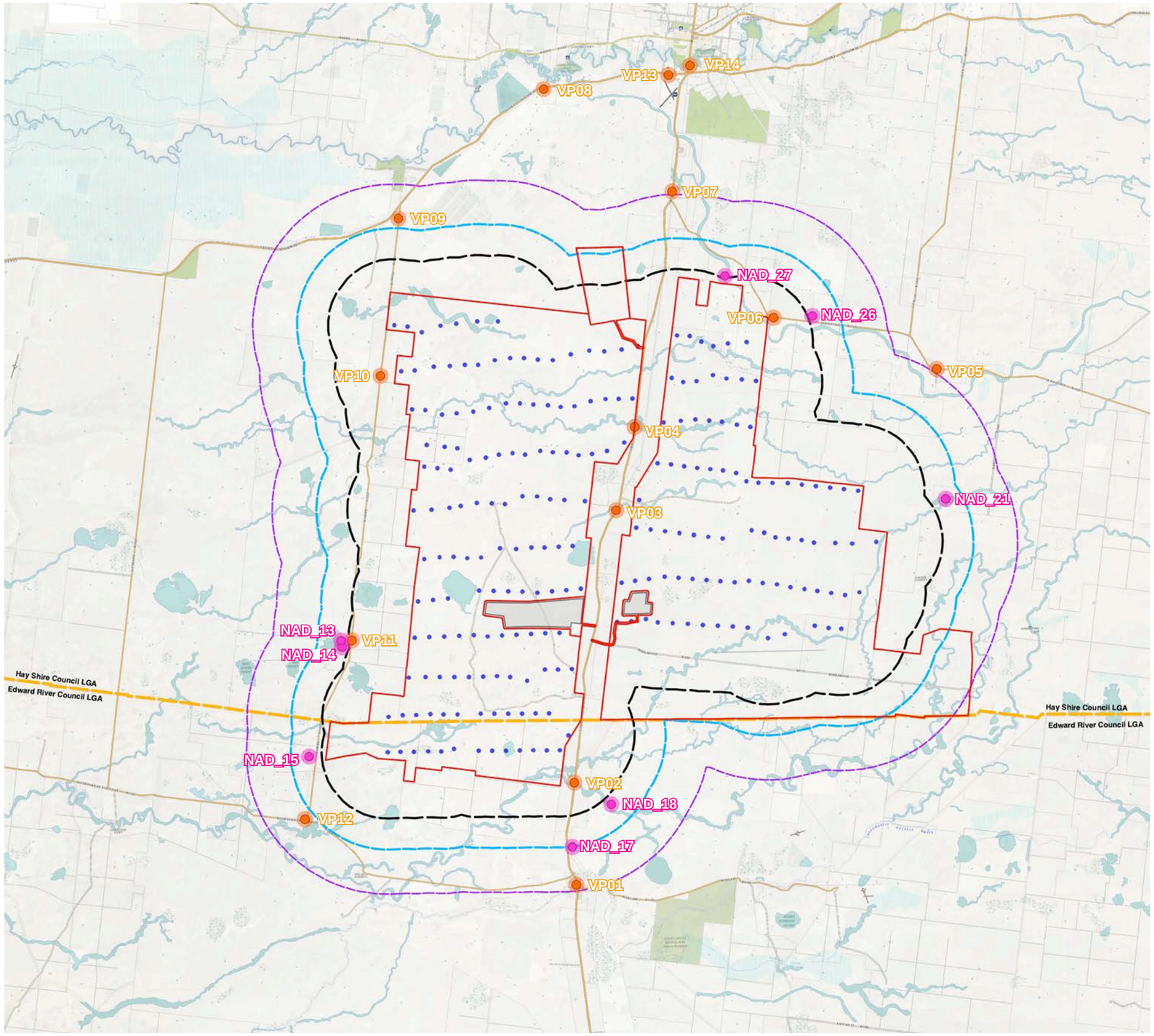
The preliminary assessment identifies existing structures and dense vegetation surrounding majority of the dwellings which would reduce the potential visual impacts identified by the preliminary assessment tools and Zone of Visual Influence. Lack of intervening elements was identified for three (3) non-associated dwellings. Further detailed assessment and site inspections of sensitive receptors to ground-truth this analysis will be undertaken during the EIS phase.

8.2 Preliminary Assessment of Public Viewpoints

Appendix B provides preliminary assessments from public viewpoints. **Table 6** provides an overview of the location of these viewpoints and their distance to the nearest wind turbine. A total of 14 preliminary public viewpoints have been selected to illustrate the varying landscape character typologies throughout the Study Area and provide a preliminary assessment of the potential visibility of the Project (as shown on **Figure 17**).

Viewpoint Number	Location	Distance to Nearest Turbine	Number of 60º Sectors (Based on a 2D Assessment):
VP01	Cobb Highway, Booroorban	7.66 km	No turbines within 8,000 m
VP02	Cobb Highway, Booroorban	2.00 km	Three (3) 60º Sectors (up to 180º)
VP03	16 Mile Gums Rest Area, Cobb Highway, Booroorban	1.43 km	Six (6) 60º Sectors (up to 360º)
VP04	Cobb Highway, Booroorban	1.05 km	Six (6) 60º Sectors (up to 360º)
VP05	Jerilderie Road, Hay South	8.19 km	No turbines within 8,000 m
VP06	Jerilderie Road, Hay South	2.05 km	Two (2) 60º Sectors (up to 120º)
VP07	Cobb Highway, Hay South	8.14 km	No turbines within 8,000 m
VP08	Sturt Highway, Hay	13.39 km	No turbines within 8,000 m
VP09	Romani Road, Hay South	6.03 km	One (1) 60º Sector (up to 60º)
VP10	Romani Road, Hay South	1.19 km	Three (3) 60º Sectors (up to 180º)
VP11	Romani Road, Hay South	3.55 km	Two (2) 60º Sectors (up to 120º)
VP12	Intersection of Booroorban - Tchelery Road and Romani Road, Hay South	6.02 km	One (1) 60º Sector (up to 60º)
VP13	Sturt Highway, Hay	14.72 km	No turbines within 8,000 m
VP14	Murrumbidgee River Rest Area, Hay	15.27 km	No turbines within 8,000 m

Table 6 Overview of viewpoint assessment locations



Preliminary Dwelling and Viewpoint Assessment Locations

The Plains Renewable Energy Park

LEGEND

- Project Area boundary
- Proposed 280 m Turbine Location
- Main Road
- Minor Road
- 3,750 m from nearest turbine
- 5,500 m from nearest turbine
- 8,000 m from nearest turbine
- National Parks / Nature Reserves
- Preliminary Dwelling Assessment locations **Refer to Appendix A.**
- Preliminary Viewpoint Assessment locations **Refer to Appendix B.**

N

0 4 8 12 16km

Figure 19 Preliminary Dwelling and Viewpoint Assessment Locations (Map Source: Six Maps, 2022)

9.0 Cumulative Visual Impact Assessment

9.1 Overview of Cumulative Visual Impacts

The Project is located within the central region of the South West Renewable Energy Zone (REZ). The REZ has been identified by the NSW Governments Electricity Strategy (refer **Figure 20**). The REZ is expected to play a vital role in delivery of affordable energy to the community across NSW (Energy NSW, 2021).

The existing landscape character of the region allows for optimum harvest of wind energy due to the flat terrain and large expanses of uninhabited land with minimal obstructions in the landscape. These characteristics are beneficial to the output of wind energy and as such, it is highly likely that over time this will be utilised for the development of wind farm projects. **Figure 20** shows the wind farms that are currently proposed within the extents of the REZ. Majority of these projects are in the central and eastern parts of the REZ near the towns of Hay, Balranald and Coleambally.

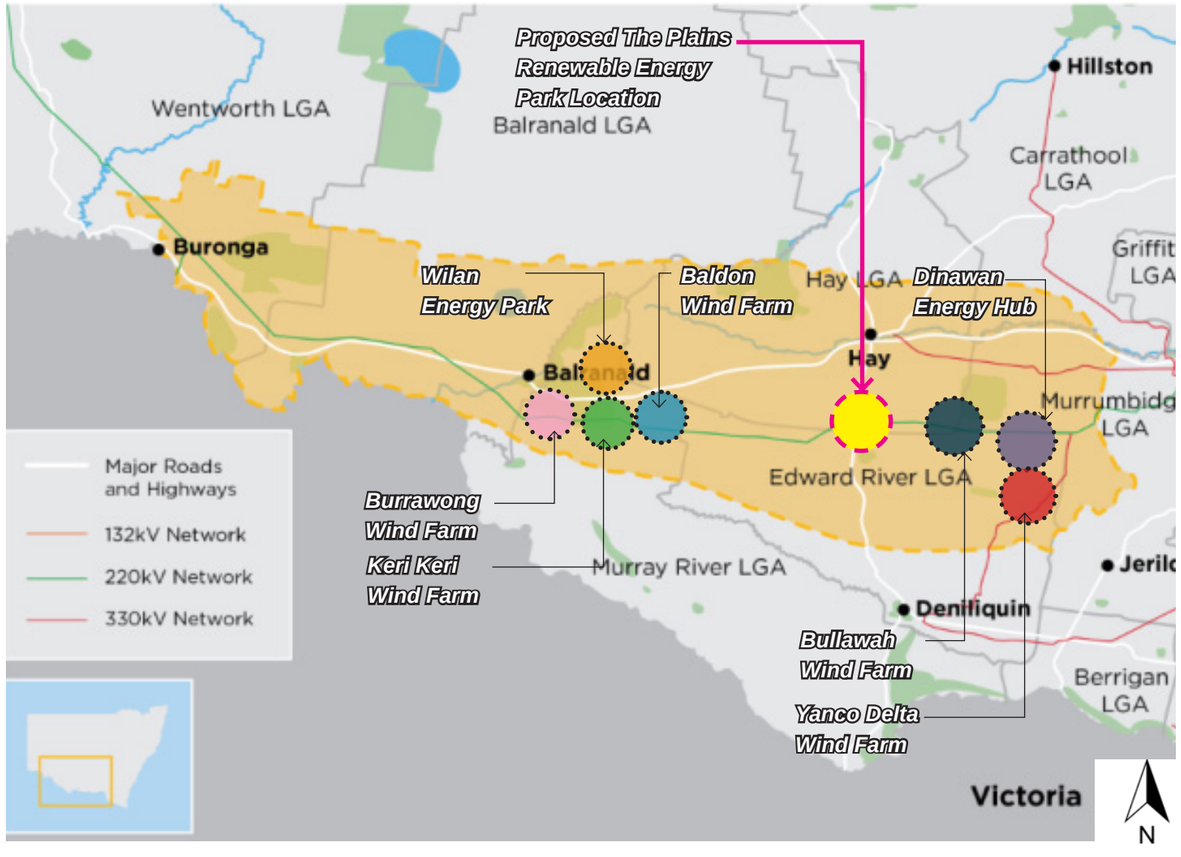


Figure 20 South West Energy Zone (Source: Energy NSW, 2022)

9.2 Nearby Wind Farm Projects

To date, seven (7) other wind farm projects have been proposed in the REZ (refer **Figure 20**):

- Yanco Delta Wind Farm ((SEARs issued in May 2022)
- Burrawong Wind Farm (SEARs issued in December 2021)
- Baldon Wind Farm (SEARs issued July 2022)
- Keri Keri Wind Farm (SEARs issued in April 2022)
- Bullawah Wind Farm (Preliminary planning phase)
- Dinawan Energy Hub (Preliminary planning phase)
- Wilan Energy Park (Preliminary planning phase)

Of these, one (1) wind farm project is located 5.5 km east of the Project (refer to **Figure 21**). Other wind farm projects are located approximately 30 km or beyond of TPREP. Consideration of cumulative impacts of Bullawah Wind Farm (BWF) is therefore, critical for the Project.

Bullawah Wind Farm (BWF):

BWF is in its preliminary planning stages and comprises of up to 170 turbines with a maximum blade-tip height of up to 300m (BayWa r.e., 2022). The Project would be potentially located 5.5 km east of the Project. Based on information on the project website (as of September 2022), the BWF Project is in the preliminary stages and no scoping report has been issued. The potential to view BWF and the Project simultaneously exists and will be assessed and detailed during the EIS Phase.

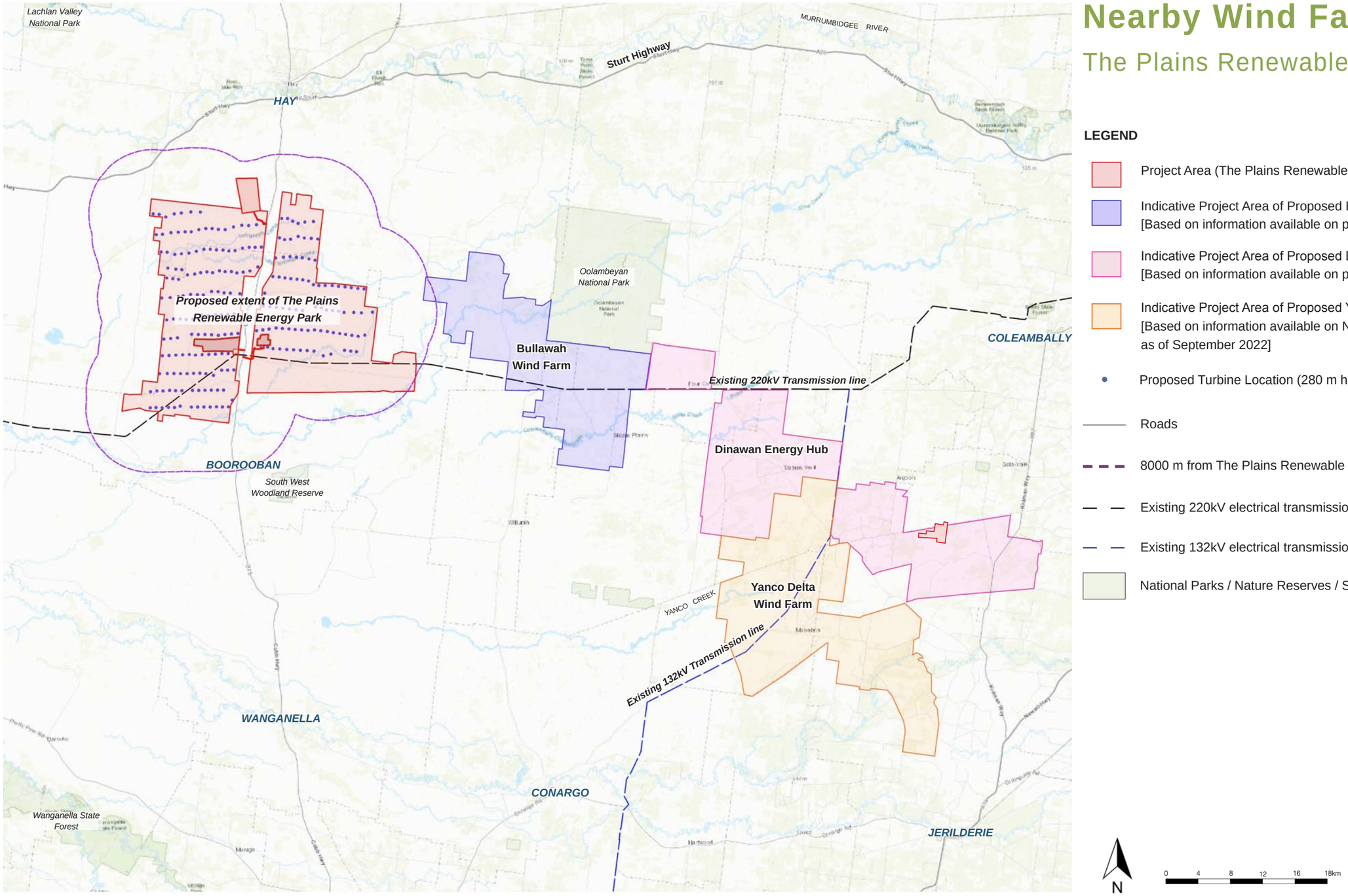
Other wind farm projects:

Other wind farm projects in the area that are currently preparing EIS's include the Yanco Delta Wind Farm, Burrawong Wind Farm, Baldon Wind Farm and Keri Keri Wind Farm. These are located on either sides of the Project and are approximately 40 km away. The potential to view these wind farms simultaneously is likely to be limited, however due to the flat topography in the area, assessment of the potential cumulative impacts of these projects will be assessed in the EIS Phase.

9.3 Cumulative Impact on Broader Landscape Character

The re-occurrence of wind farms within a region has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed. It is important to determine whether the effect of multiple wind farms and other major infrastructure within the region would combine to become the dominant visual element, altering the perception of the general landscape character.

The Project is located on a flat terrain and is surrounded by scattered rural dwellings. Due to the flat topography of the region and lack of obtrusive elements, it is likely that there will be areas from which multiple Projects will be visible simultaneously. Further assessment of the cumulative visual impact will be detailed in the EIS, along with a description of the mitigation and management measures being employed to reduce impacts.



Nearby Wind Farm Projects

The Plains Renewable Energy Park

LEGEND

- Project Area (The Plains Renewable Energy Park)
- Indicative Project Area of Proposed Bullawah Wind Farm (BWF) [Based on information available on project website as of September 2022]
- Indicative Project Area of Proposed Dinawan Energy Hub [Based on information available on project website as of September 2022]
- Indicative Project Area of Proposed Yanco Delta Wind Farm [Based on information available on NSW Major Projects website as of September 2022]
- Proposed Turbine Location (280 m high)
- Roads
- 8000 m from The Plains Renewable Energy Park turbine
- Existing 220kV electrical transmission line (proposed to be upgraded to 330kV)
- Existing 132kV electrical transmission line
- National Parks / Nature Reserves / SCA

Figure 21 Nearby Wind Farm Projects (Map Source: ESRI Topographic Map, 2022)

10.0 Summary and Recommendations

10.1 Summary of Preliminary Visual Impact Assessment

This PVIA report has been undertaken in accordance with the Bulletin, and will be submitted with the Scoping Report in the request for SEARs. The following provides a brief summary of the PVIA and outlines the steps that will be undertaken in the EIS Phase of the Project.

10.1.1 Community Consultation

The report outlined the findings of community consultation to date which assisted in establishing the following:

- Key landscape features
- Defined areas of scenic quality and
- Identify key public viewpoints valued by that community.

Next Steps:

Community consultation will be ongoing through the Project. Ongoing input from the community will assist the preparation of the LVIA.

10.1.2 Existing Landscape Character

This PVIA provided a detailed assessment of the existing landscape character of the Study Area through the following:

- Identified land uses, key landscape features and key viewpoints,
- Categorisation of five (5) preliminary Landscape Character Units (LCUs),
- Application of preliminary scenic quality ratings to each of the LCUs ranging from Low - Moderate,
- A brief preliminary overview of the potential visual impacts has been provided for each LCU.

Next Steps:

- Utilise the landscape character assessment to prepare a detailed Visual Baseline Study.
- Identify any additional key features, key viewpoints valued by the community through ongoing consultation.
- Refine the Landscape Character Units and allow the community to provide feedback on the relative scenic quality ratings of LCUs.
- Determine the Visual Influence Zone of key viewpoints and assess against the objectives outlined in the Visual Assessment Bulletin.

10.1.3 Application of the Preliminary Assessment Tools

The purpose of the Preliminary Assessment Tools in the PVIA is to identify ‘sensitive receptors’ for further assessment in the EIS Phase of the Project.

- The Multiple Wind Turbine Tool (MWTT) was applied to all non-associated dwellings within 8000 m of the nearest proposed turbine.
- The MWTT identified that all non-associated dwellings within 8,000 m of the Project have the potential to view the Project in up to two (2) 60 degree sectors, which is deemed acceptable.
- 16 Mile Gums Rest Area located on Cobb Highway was identified as a key public viewpoint within 8,000 m of the Project Area. The Project is located on either sides of the rest area, and therefore, views of the Project will be available in up to six (6) 60 degree sectors. An assessment of the potential visual impact on a representative viewpoints is discussed in **Appendix B.**
- Other key viewpoints located in the area include the Murrumbidgee River Rest Area and the Shear Outback Cafe. However, these two (2) viewpoints are located approximately 10 km north of the Project. An assessment of the potential visual impact on a representative viewpoints is discussed in **Appendix B**.

Next Steps:

- Ground-truthing of all identified non-associated dwellings.
- Undertake site inspection and detailed dwelling assessment at sensitive non-associated dwellings.
- The LVIA will assess each ‘sensitive receptor’ in detail to take into account topography, vegetation and other screening factors. It will also include photomontages and wire frame diagrams to represent the impact on visual amenity at sensitive non-associated dwellings.
- Prepare photomontages for sensitive public viewing locations.
- Determine the potential visual impact of each sensitive receptor and provide mitigation methods to reduce potential visual impacts.
- Undertake assessment of proposed mitigation methods at sensitive receivers.

10.1.4 Zone of Visual Influence

A ZVI diagram has been prepared to illustrate the theoretical visibility of the Project and to assist in defining the visual catchment.

Next Steps:

- The LVIA will require further detailed assessment from areas identified as having potential visibility in the Preliminary ZVIs.
- Graphic representations of the Project using GIS technology including wire frame diagrams and photomontages will be provided in the EIS phase.

10.1.5 Cumulative Visual Impacts of Surrounding Wind Farms

The Project is located within the NSW South West REZ and is potentially located in close proximity to one (1) other wind farm (Bullawah Wind Farm). The Bullawah Wind Farm is in its preliminary planning stages. It is important that the Project considers potential cumulative effects on the immediate and broader regional context that it forms a part of.

Next Steps:

Further assessment and justification for placement of turbines in multiple sectors will need to be detailed in the EIS, along with a description of the mitigation and management measures being employed to reduce impacts. Such further assessment may identify that factors such as topography, relative distance and existing vegetation may minimise the impacts of the Project. Further assessment of the cumulative visual impact will be detailed in the EIS, along with a description of the mitigation and management measures being employed to reduce impacts.

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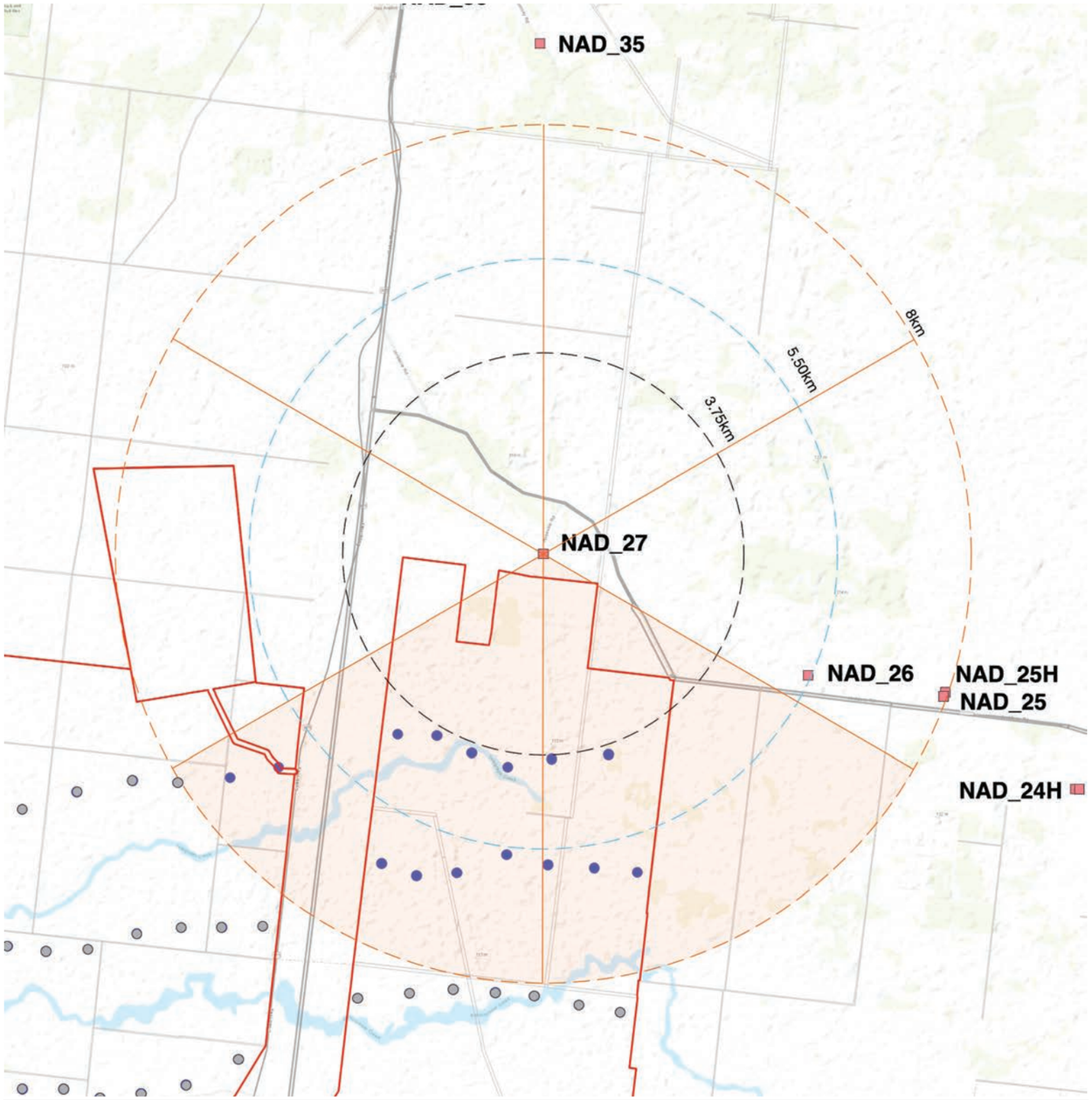
A

Preliminary Dwelling Assessments

A.1 Dwelling **NAD_27**



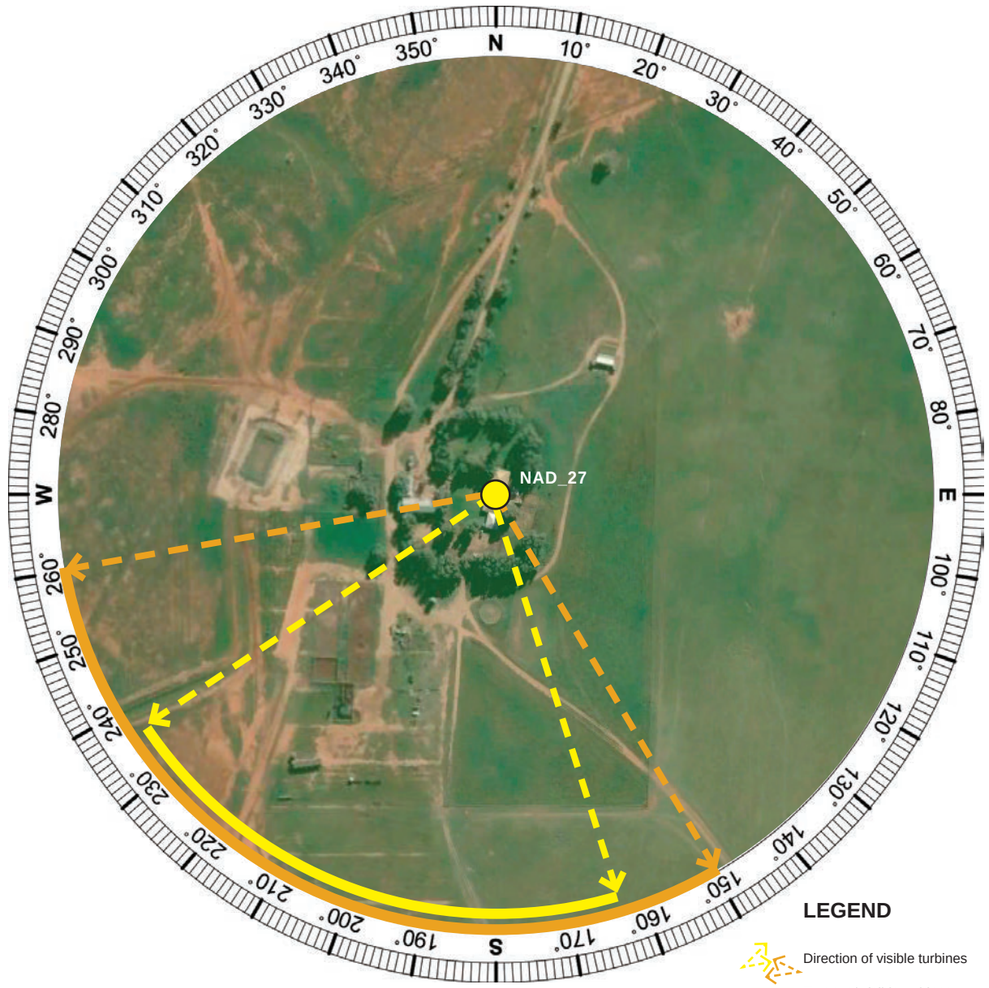
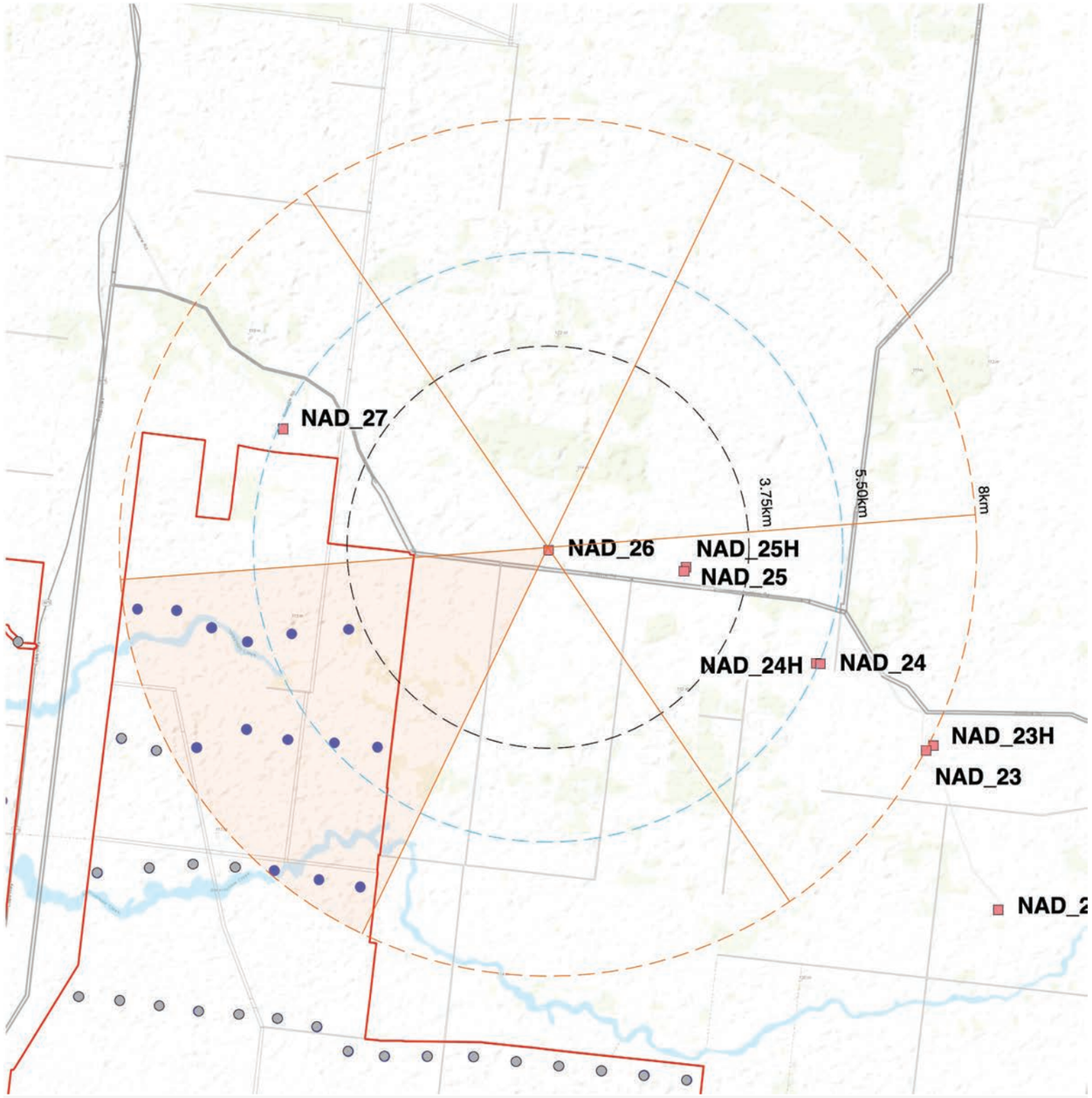


Figure A.1 Aerial Image NAD_27

(Aerial Image Source: Google Earth, Oct 2018)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**3.92 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**6**
Number of theoretical 60º sectors (Based on 2D assessment):	**Two (2) sectors**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of dwelling character:	**Majority of dwelling's openings are orientated east-west. Aerial imagery also indicates that it is predominantly surrounded by dense vegetation. Views of Project are likely to be available in the south/southwest.**

A.2 Dwelling **NAD_26**



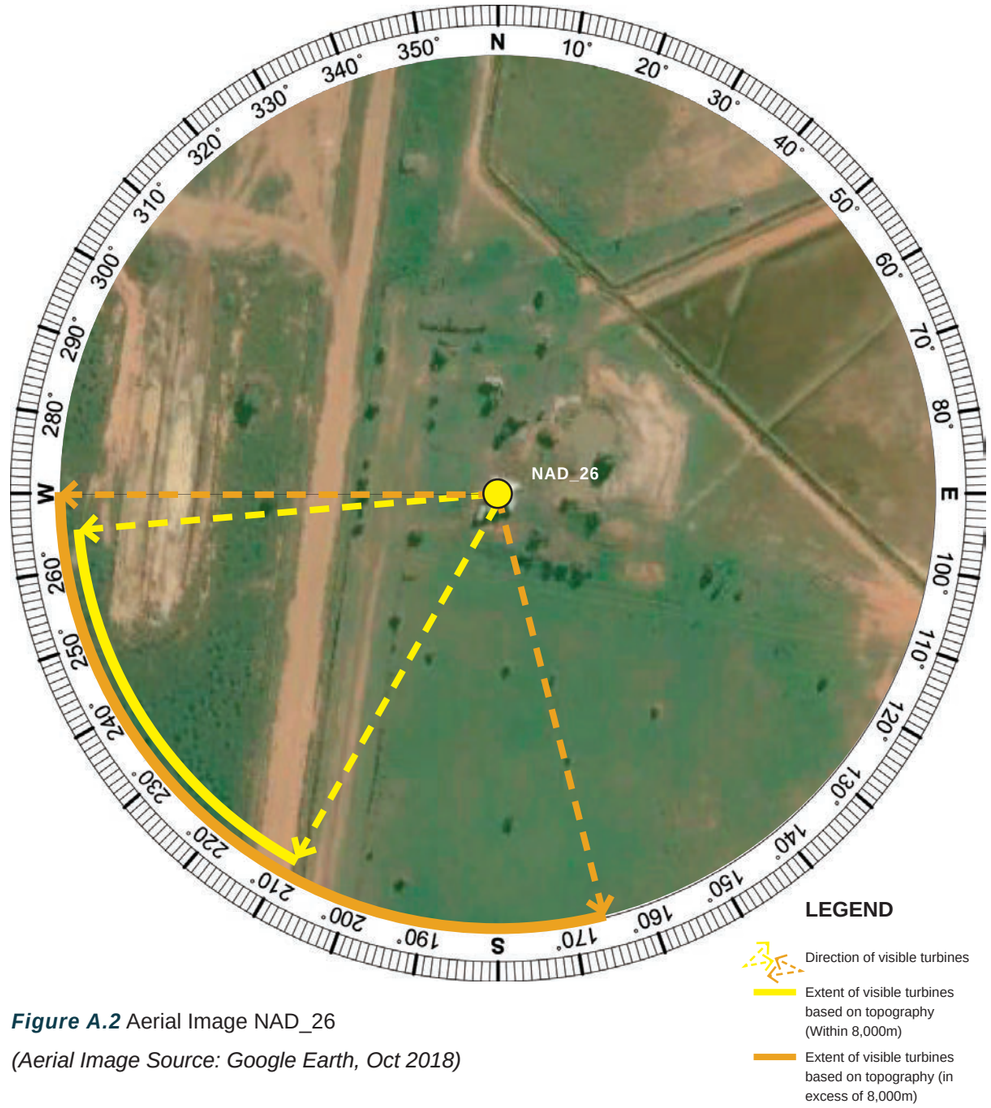
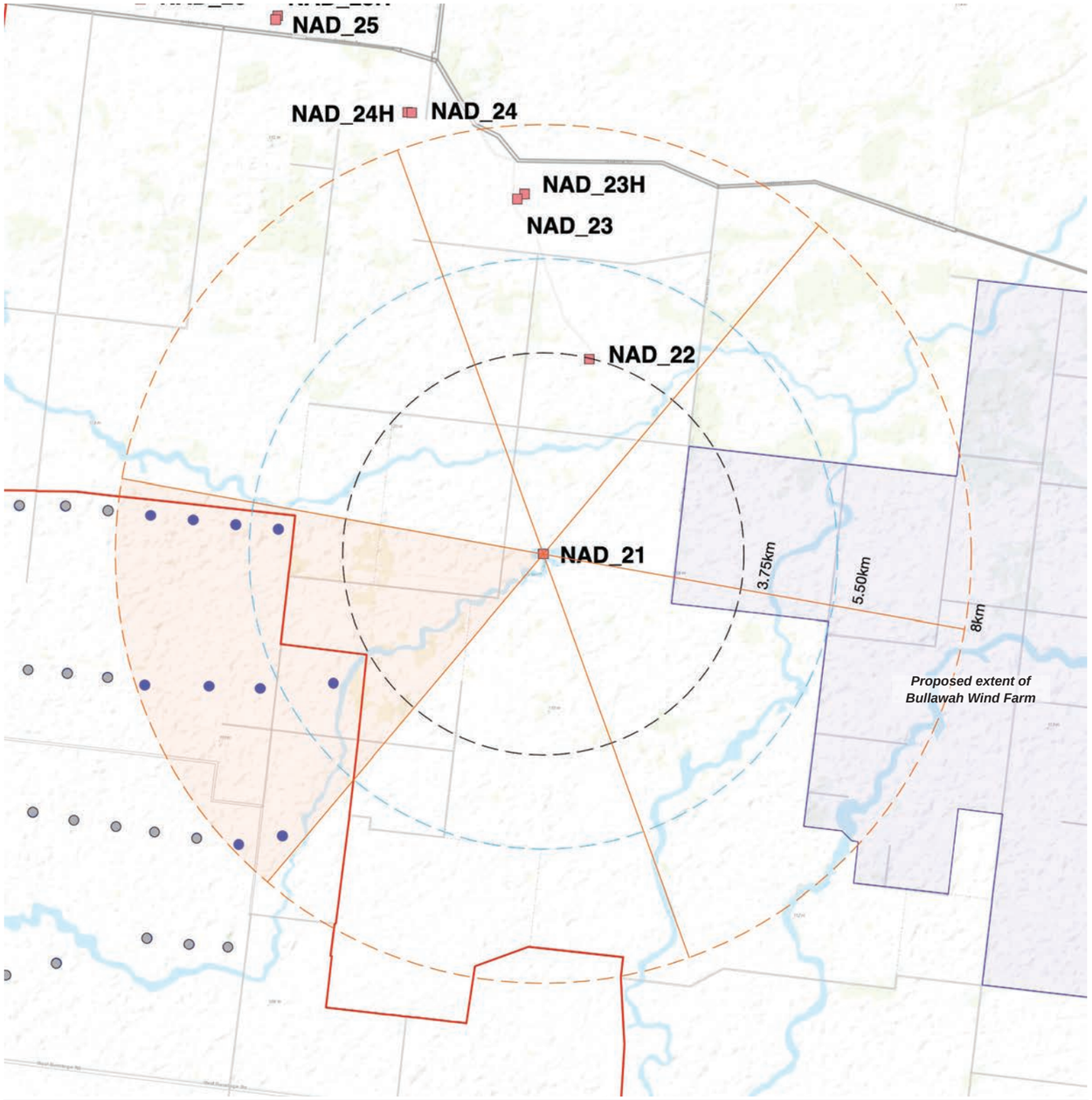


Figure A.2 Aerial Image NAD_26

(Aerial Image Source: Google Earth, Oct 2018)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**4.00 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**4**
Number of theoretical 60º sectors (Based on 2D assessment):	**One (1) sector**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of dwelling character:	**Dwelling's openings are orientated to the south. Aerial imagery indicates dwelling is surrounded by scattered vegetation and structures. Views of Project are likely to be available in the south/southwest.**

A.3 Dwelling **NAD_21**



LEGEND

- Project Area (The Plains Renewable Energy Park)
- Project Area (Bullawah Wind Farm)
- Proposed Turbine Location
- Proposed Turbine in excess of 8,000 m from dwelling
- Non-Associated Dwelling
- 60º sector
- 3,750 m from nearest turbine (Black Line)
- 5,500 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector with turbines

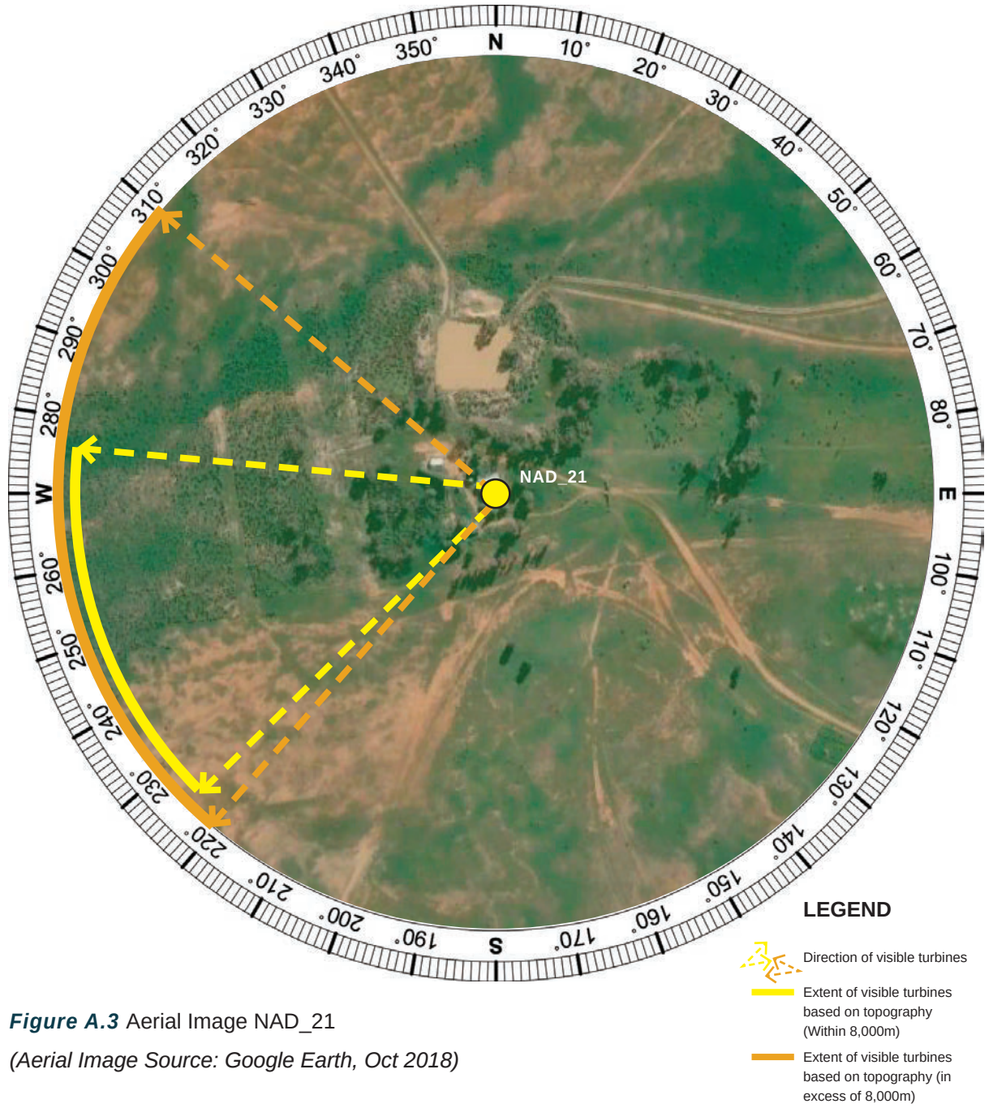
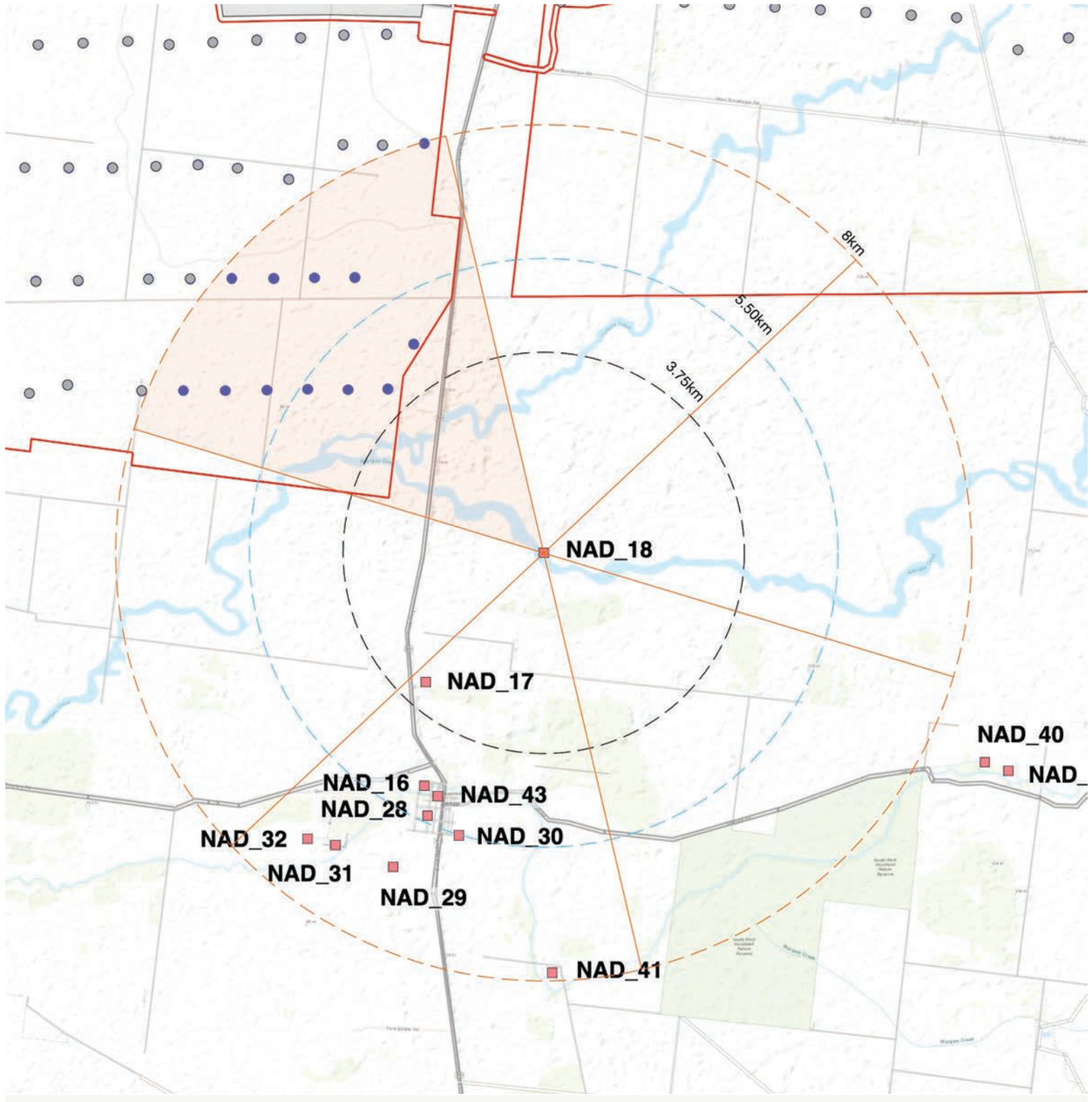


Figure A.3 Aerial Image NAD_21

(Aerial Image Source: Google Earth, Oct 2018)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**4.59 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**2**
Number of theoretical 60º sectors (Based on 2D assessment):	**One (1) sector**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of dwelling character:	**Majority of dwelling's openings are orientated east-west. Aerial imagery also indicates that the dwelling is surrounded by dense vegetation in all directions. Views of Project are likely to be available in the west.**

A.4 Dwelling **NAD_18**



LEGEND

- Project Area
- Proposed Turbine Location
- Proposed Turbine in excess of 8,000 m from dwelling
- Non-Associated Dwelling
- 60º sector
- 3,750 m from nearest turbine (Black Line)
- 5,500 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector with turbines

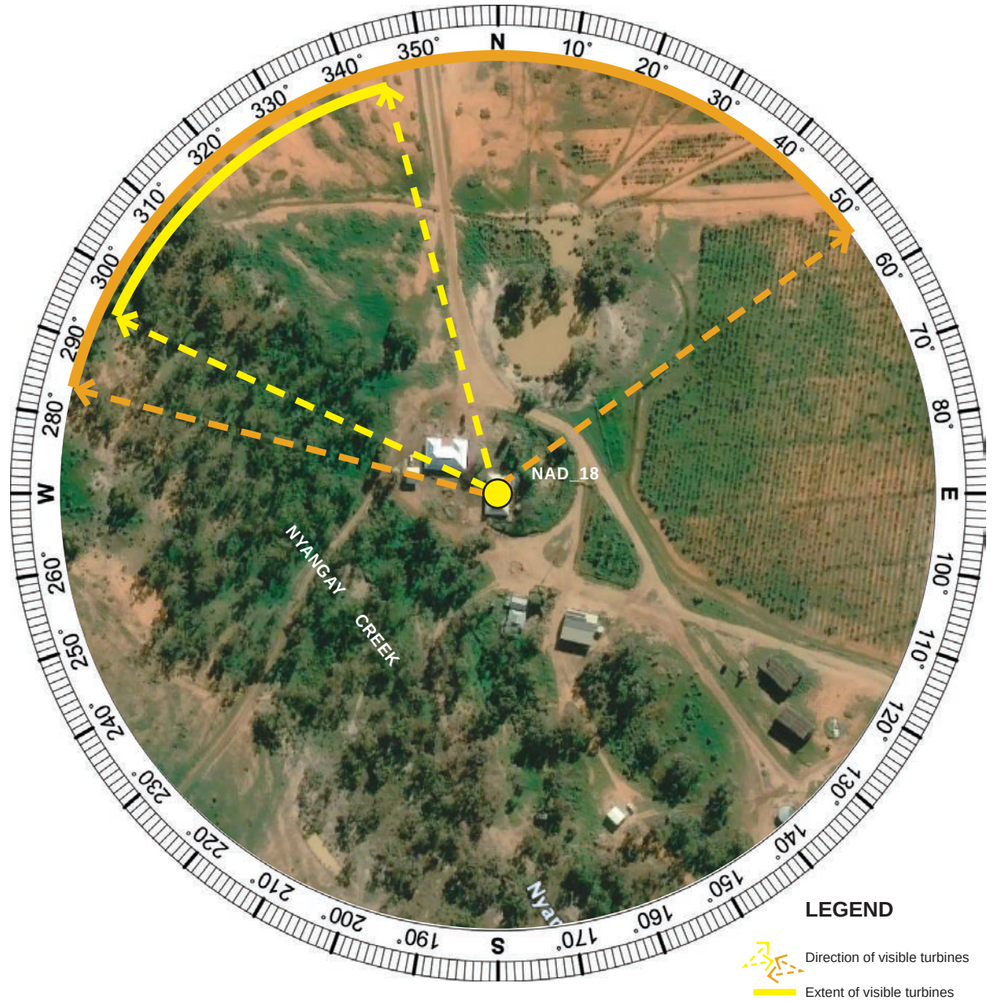
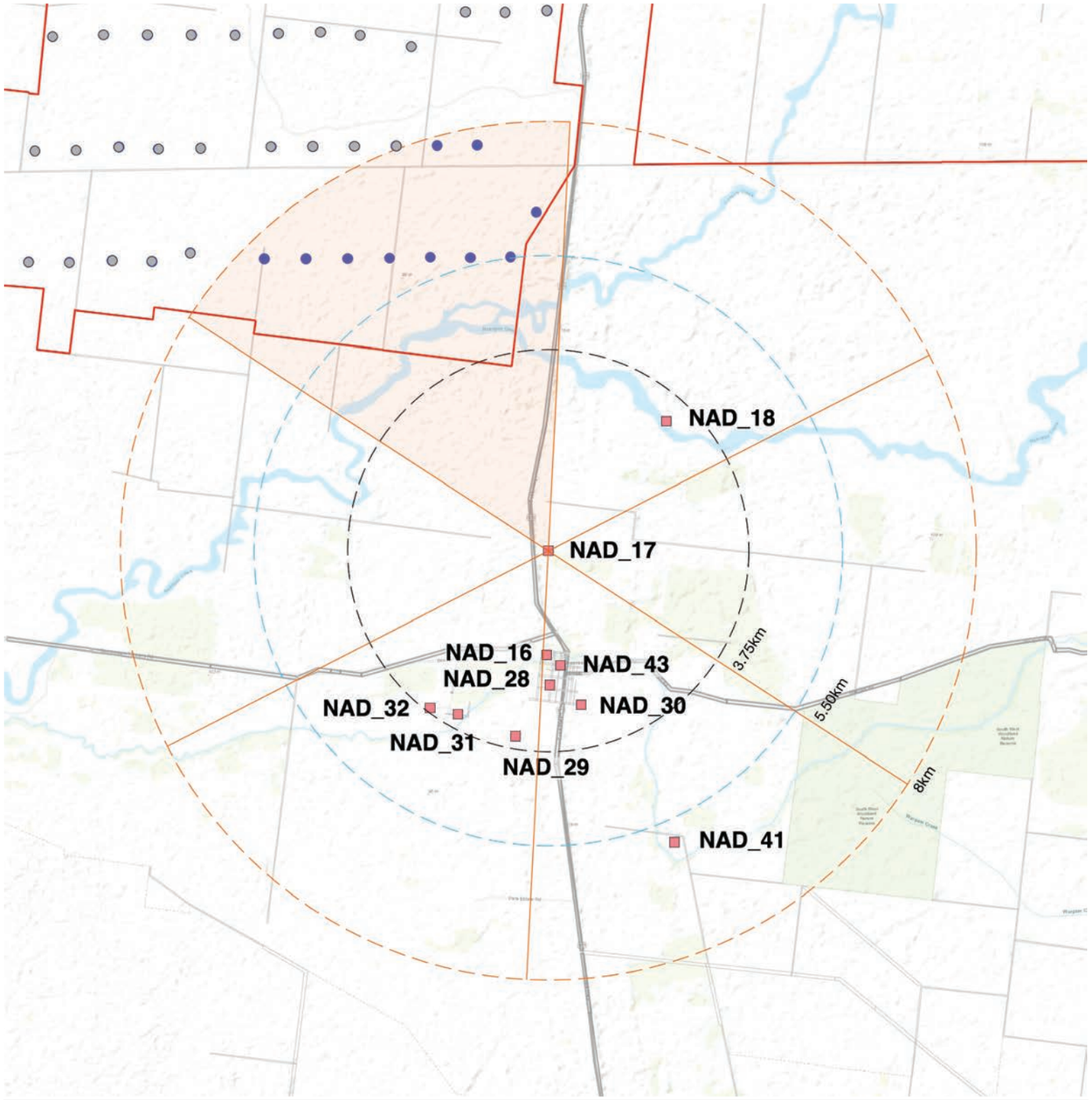


Figure A.4 Aerial Image NAD_18

(Aerial Image Source: Google Earth, Oct 2018)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**4.21 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**4**
Number of theoretical 60º sectors (Based on 2D assessment):	**One (1) sector**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of dwelling character:	**Dwelling's openings are orientated east-west. Aerial imagery indicates dwelling is surrounded by dense vegetation. Views of Project are likely to be available in the northwest/north.**

A.5 Dwelling **NAD_17**



LEGEND

- Project Area
- Proposed Turbine Location
- Proposed Turbine in excess of 8,000 m from dwelling
- Non-Associated Dwelling
- 60º sector
- 3,750 m from nearest turbine (Black Line)
- 5,500 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector with turbines

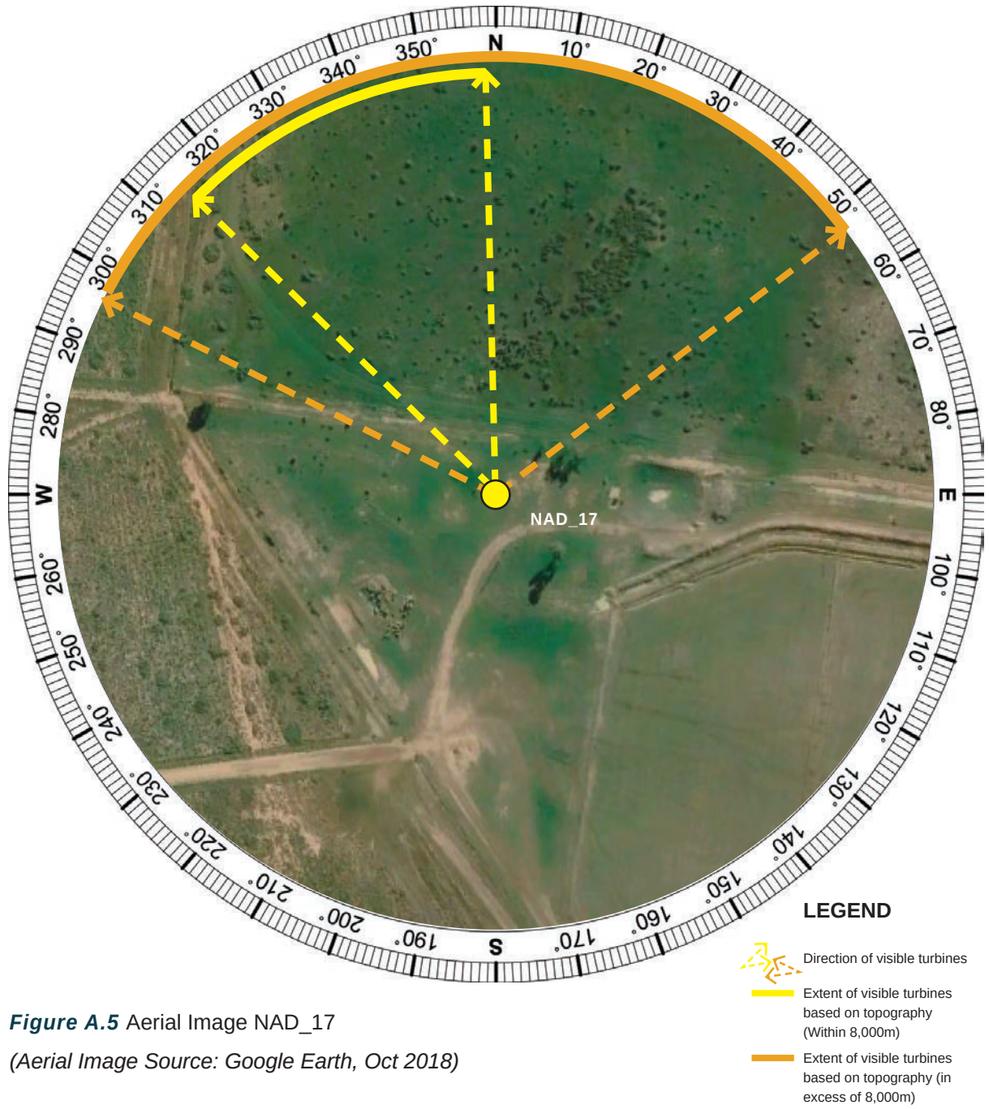
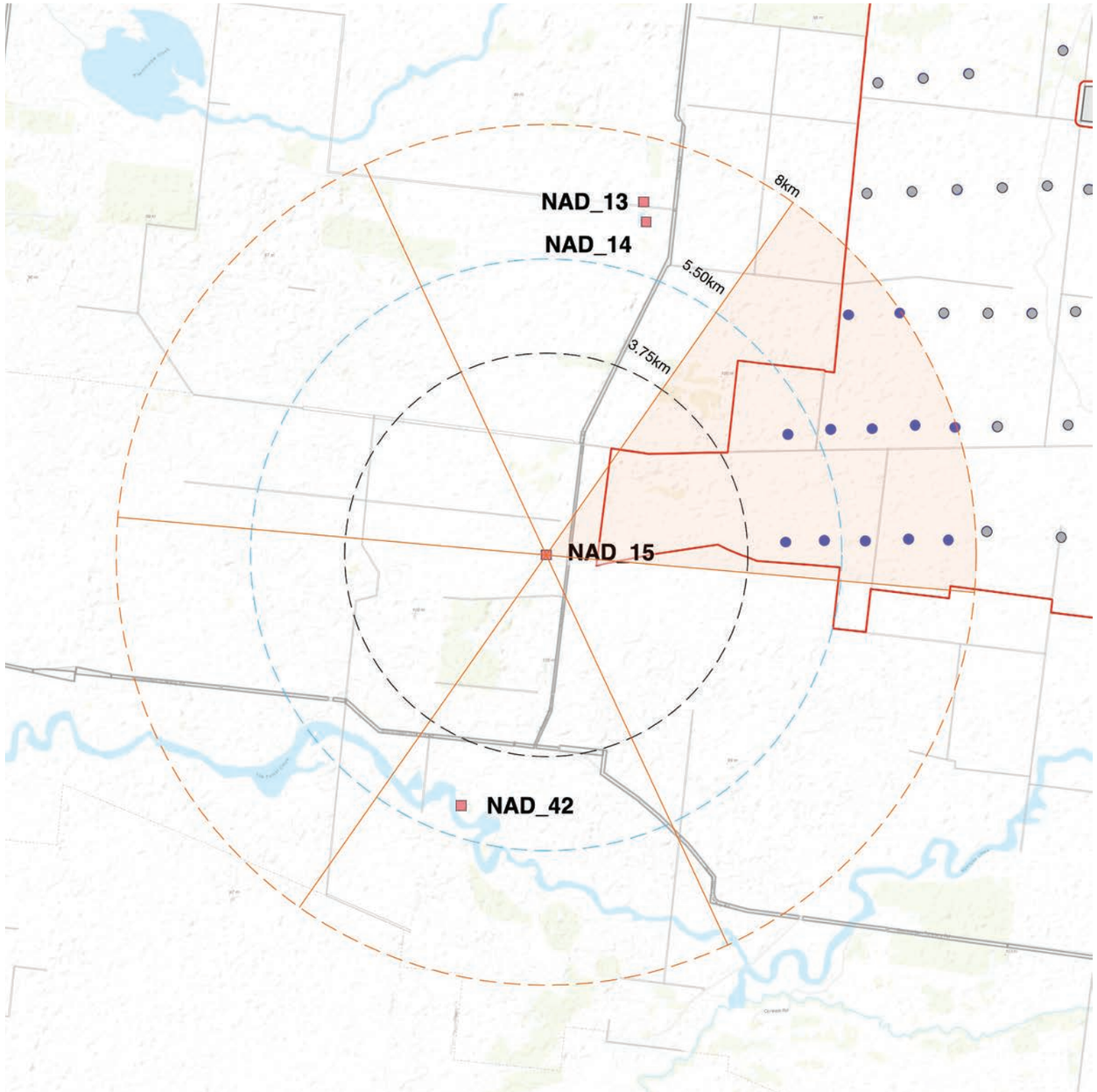


Figure A.5 Aerial Image NAD_17

(Aerial Image Source: Google Earth, Oct 2018)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**5.50 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**1**
Number of theoretical 60º sectors (Based on 2D assessment):	**One (1) sector**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of dwelling character:	**Majority of openings are orientated east-west. Views of Project will be available in the north/norhwest.**

A.6 Dwelling **NAD_15**



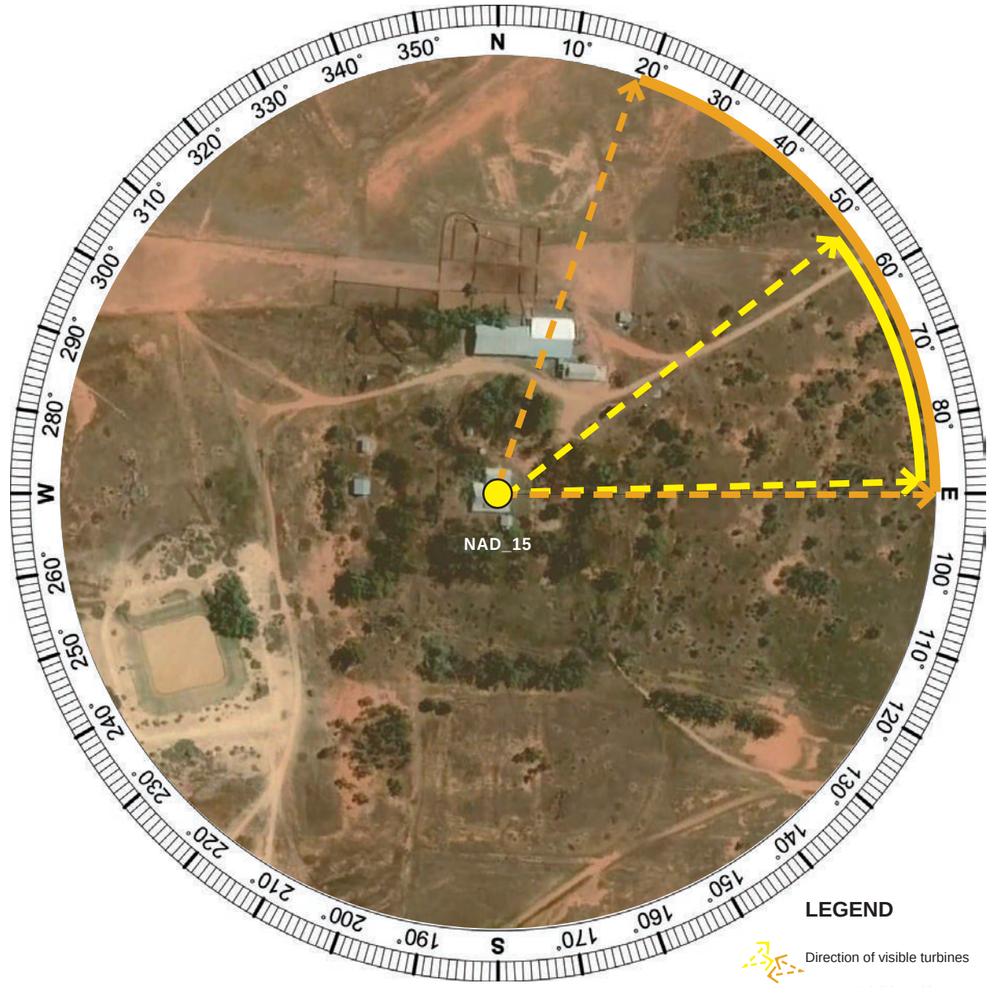
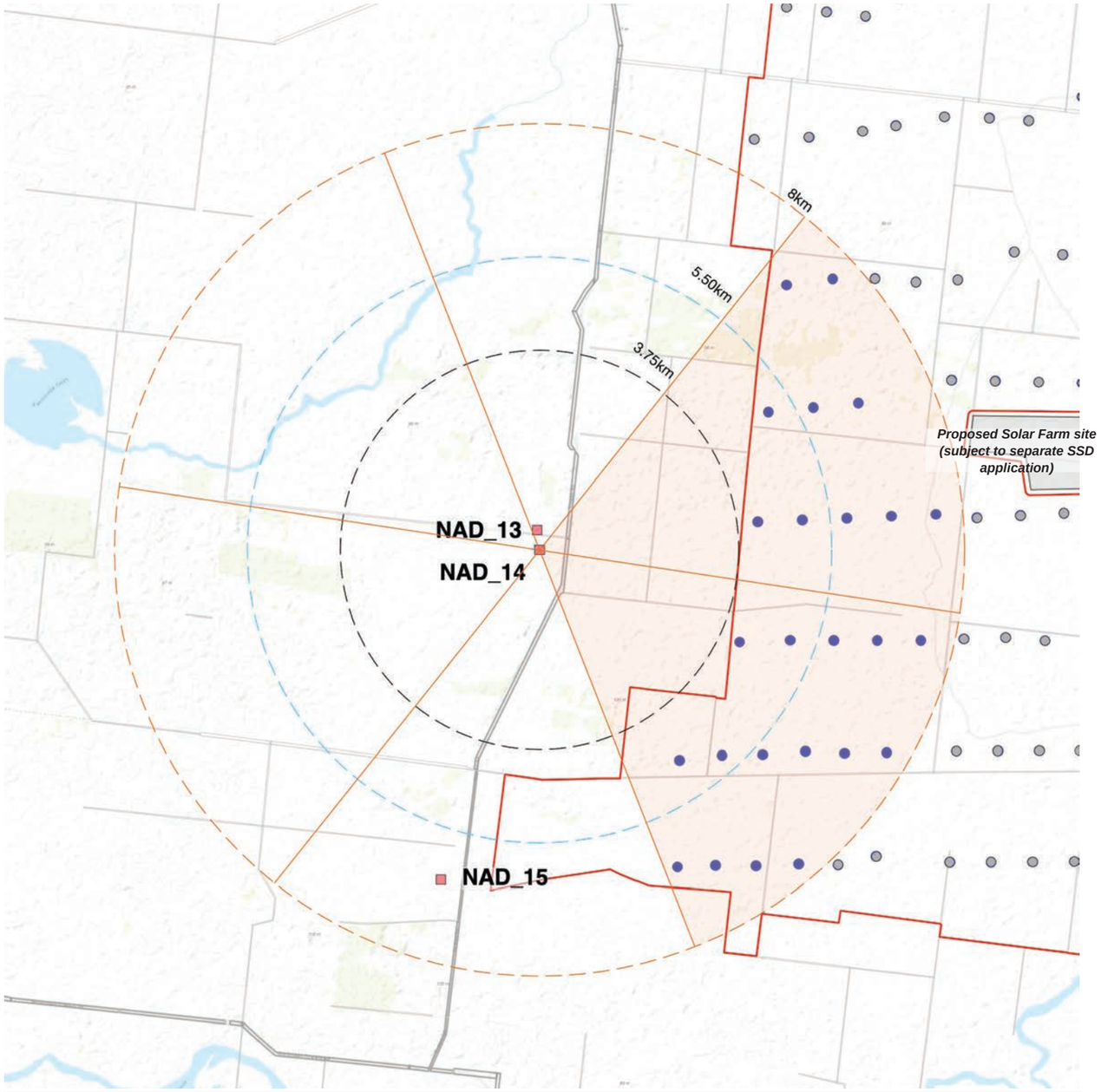


Figure A.6 Aerial Image NAD_15

(Aerial Image Source: Google Earth, Oct 2018)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**4.46 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**3**
Number of theoretical 60º sectors (Based on 2D assessment):	**One (1) sector**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of dwelling character:	**Majority of the openings are lcoated on the northern and eastern facades. Aerial imagery indicates dwelling is surrounded by dense vegetation in both these directions. Views of Project likely to be available in the northeast.**

A.7 Dwelling **NAD_14**



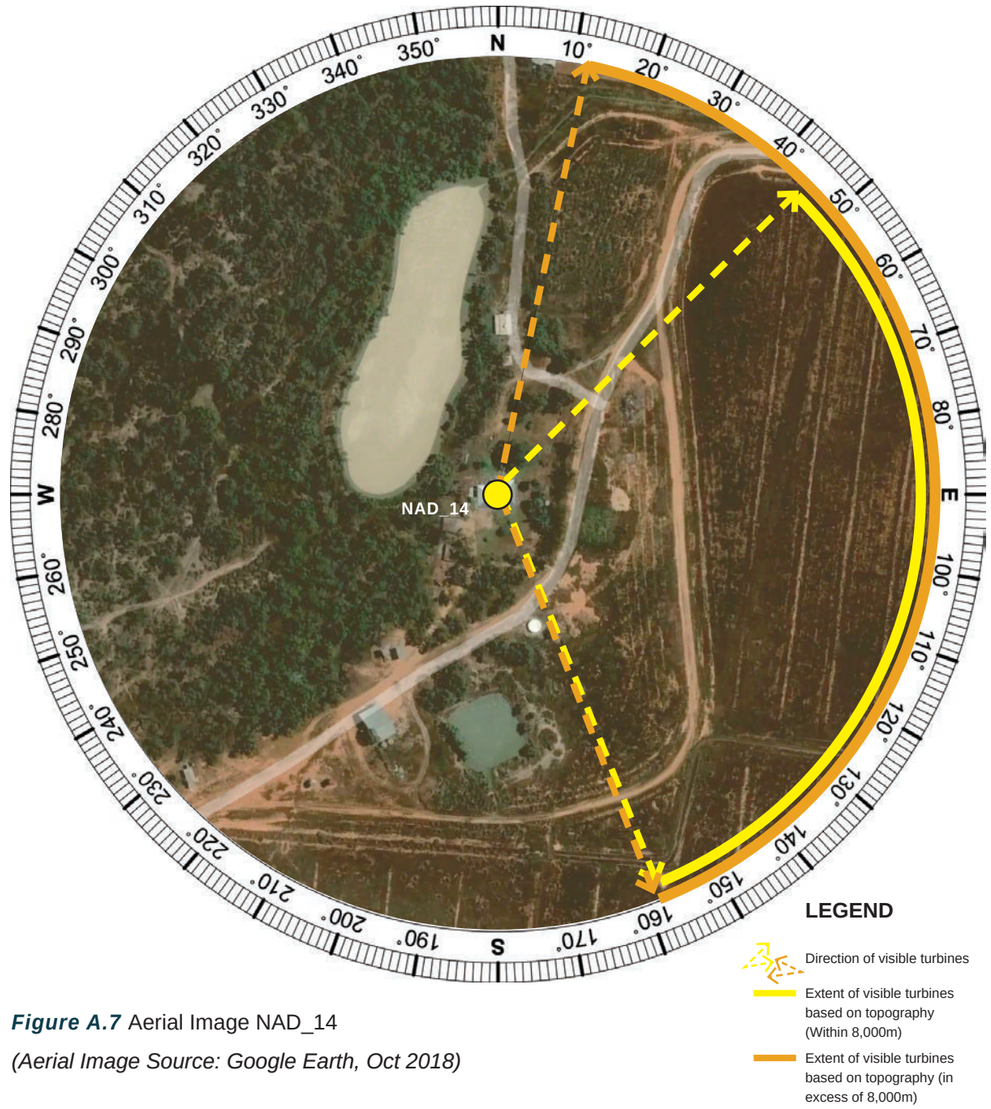
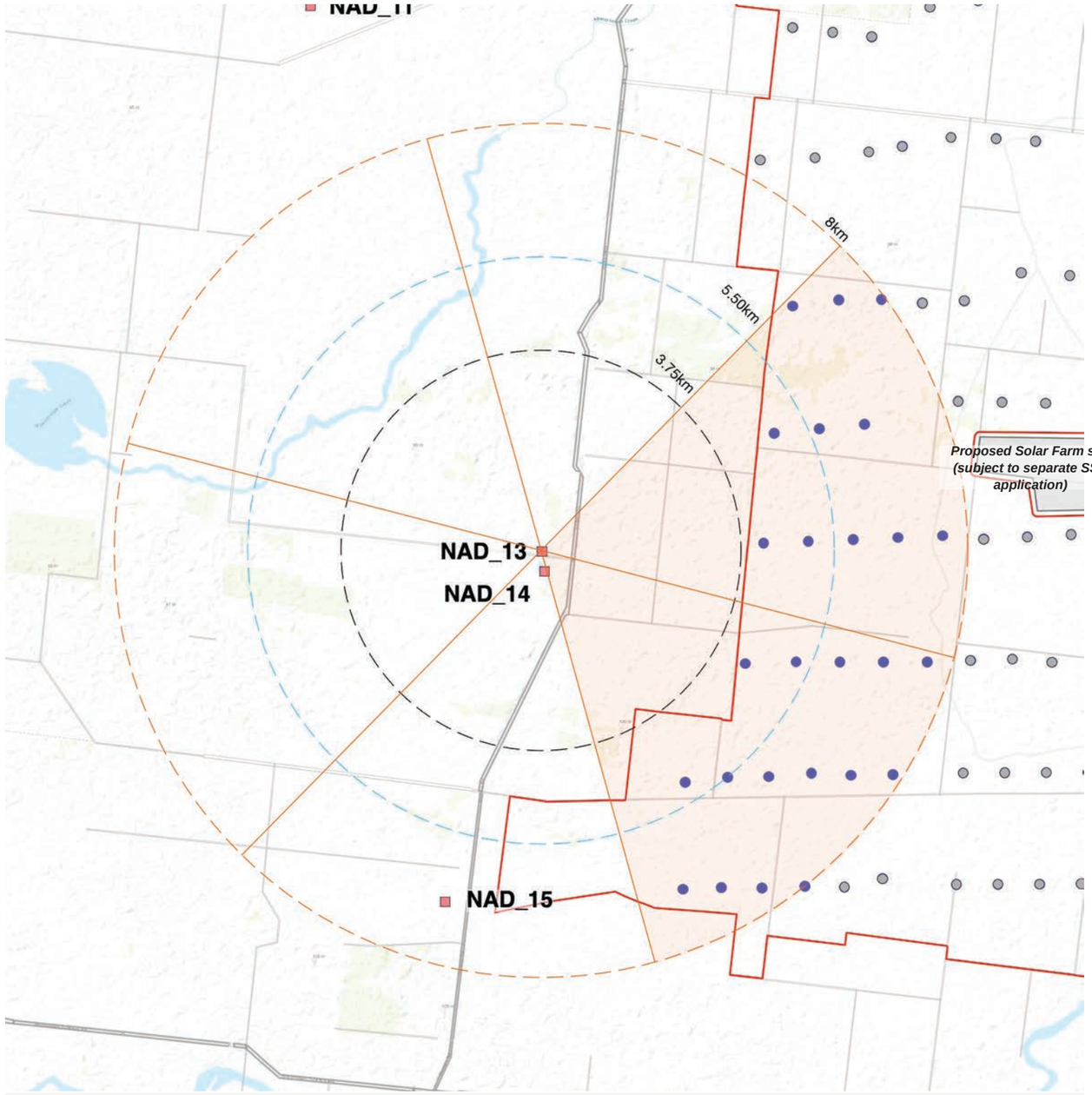


Figure A.7 Aerial Image NAD_14

(Aerial Image Source: Google Earth, Oct 2018)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**4.13 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**7**
Number of theoretical 60º sectors (Based on 2D assessment):	**Two (2) sectors**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of dwelling character:	**Views of Project likely to be available in the east. Most openings located on the northern and southern facades. Aerial imagery indicates that dwelling is surrounded by dense vegetation in all directions.**

A.8 Dwelling **NAD_13**



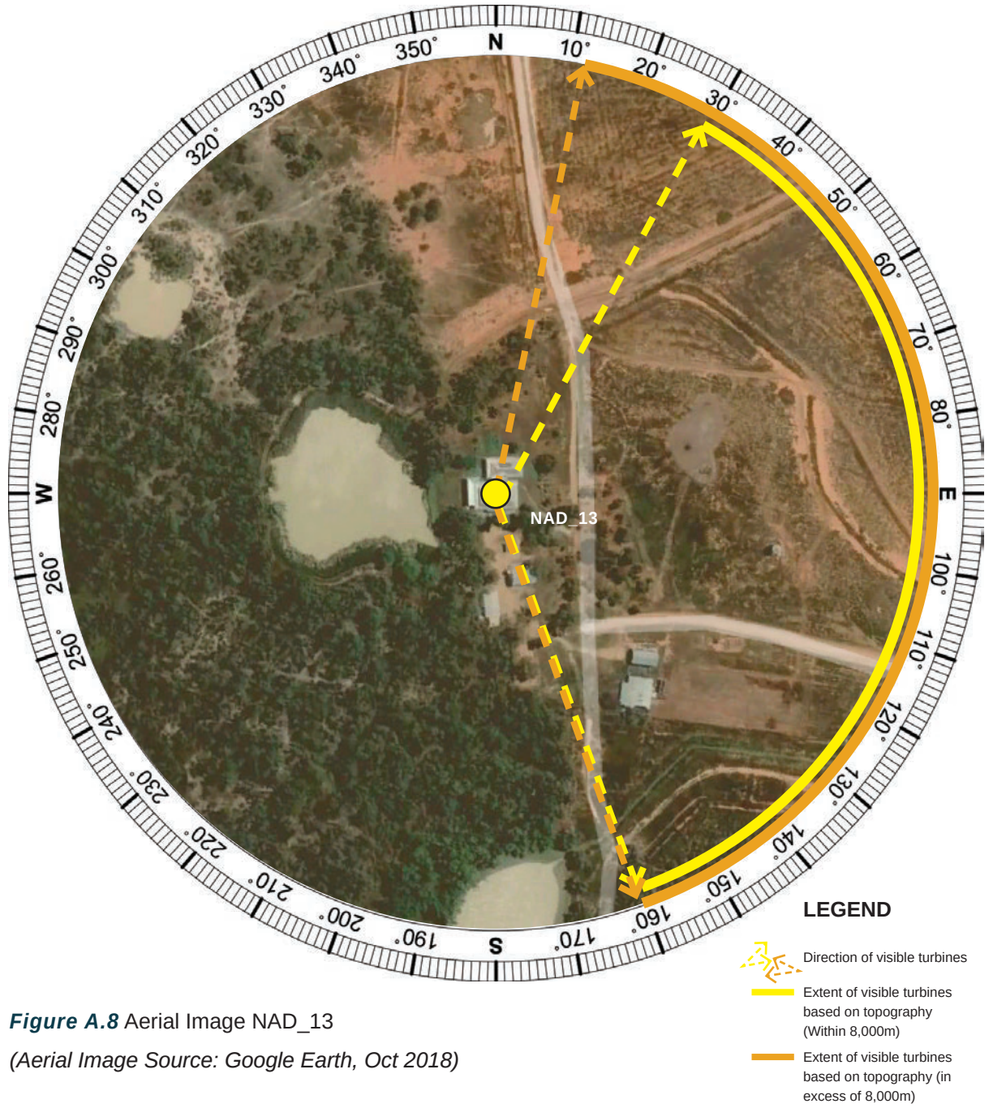


Figure A.8 Aerial Image NAD_13

(Aerial Image Source: Google Earth, Oct 2018)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**4.15 km**
Number of proposed turbines within the blue line (5,500 m) of visual magnitude:	**7**
Number of theoretical 60º sectors (Based on 2D assessment):	**Two (2) sectors**
Number of potentially visible turbines (based on topography alone):	**226 (all at hub height)**
Description of dwelling character:	**Dwelling is orientated with majority of the openings on east-west sides of the house. Views of Project likely to be available in east which is characterized by scattered stands of vegetation.**

B

Public Viewpoint Analysis

VP01 Cobb Highway, Booroorban

Approximate extent of potentially visible turbines

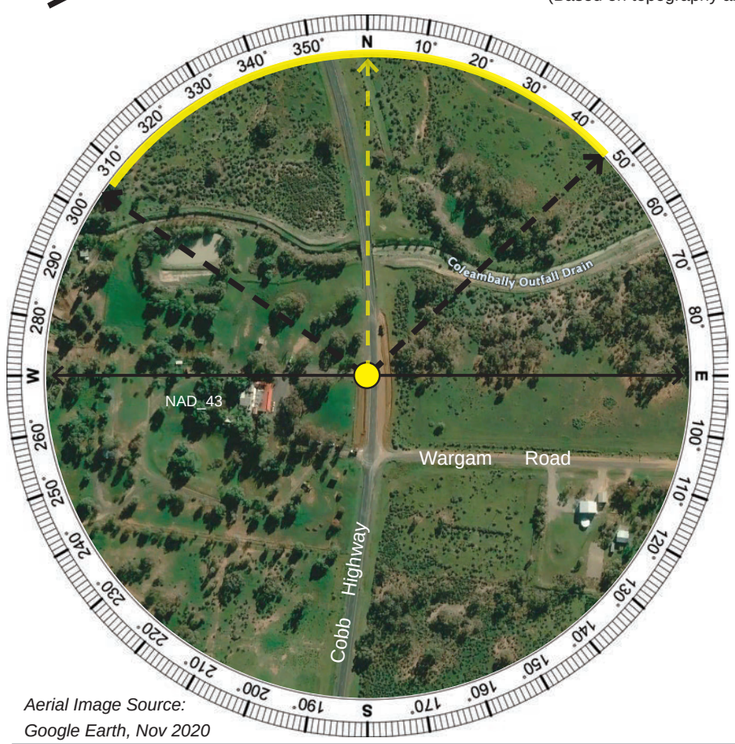
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP01

Viewpoint Summary:	
Location:	Elevation:
Cobb Hwy, Booroorban	84 m
Coordinates:	Viewing Direction:
34°55'53.24"S 144°45'46.42"E	North
Distance to nearest WTG:	Visibility Distance Zone:
7.66 km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU05: Booroorban	**Moderate**

Multiple Wind Turbine Tool:

No turbines within 8000 m.

Existing Landscape Character Description:

The viewpoint was taken from Cobb Highway within the small rural township of Booroorban, near NAD_43 and the Royal Mail Hotel. It is a representation of views from public viewpoints located in the town. Surrounding lands are associated with these rural dwellings and utilised as grazing lands with minimal activity. Patches of riparian vegetation associated with Coleambally Outfall Drain is visible to the north, east and west. The terrain is generally flat with very minor undulations. It offers open, clear views.

Potential Visual Impact:

Turbines will be visible from this location to the north, however, it is likely that riparian vegetation will partially screen views of the Project.

VP02 Cobb Highway, Booroorban

Approximate extent of potentially visible turbines

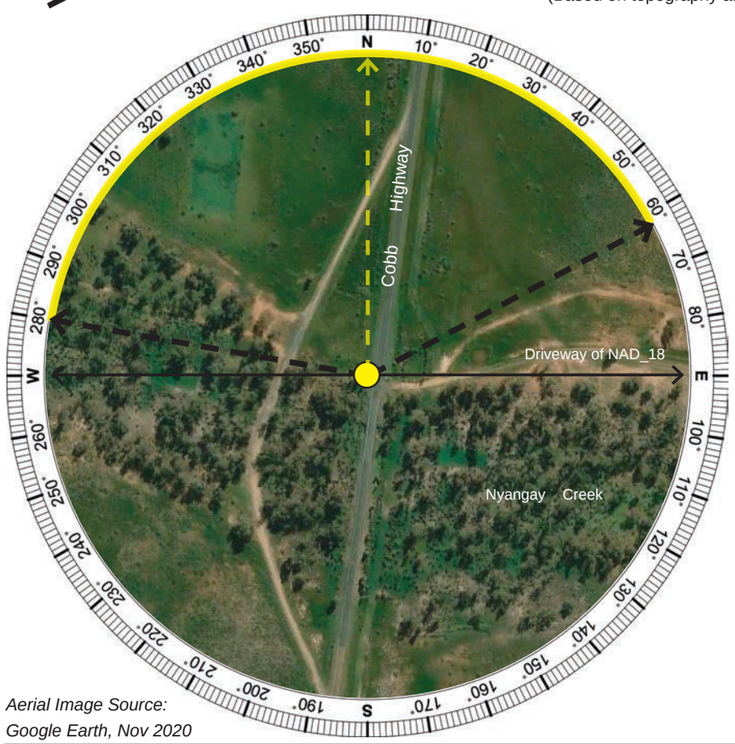
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP02

Viewpoint Summary:	
Location:	Elevation:
Cobb Highway, Booroorban	86 m
Coordinates:	Viewing Direction:
34°52’47.23”S 144°45’43.85”E	North
Distance to nearest WTG:	Visibility Distance Zone:
2.00 km	**Near Middleground (NM)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU02: Creek Corridors	**Low**

Multiple Wind Turbine Tool:

Three (3) 60º Sectors with turbines within 8000 m.

Existing Landscape Character Description:

The viewpoint is located on Cobb Highway near the entrance gate of ‘Nyangay, East Loddon Merino Stud’ (NAD_18). Adjacent land is classified as grazing lands with native vegetation. Surrounding terrain is generally flat with open views. Stands of tree cover associated with Nyangay Creek are visible in the foreground to the east and west. Vegetation character is defined by saltbush and scrubby groundcovers or low-growing bushes. Scattered trees dot the foreground and moderately dense clumps of trees can be seen on the horizon.

Potential Visual Impact:

Open and flat farmlands define the character from this viewpoint. Turbines would be visible in the landscape, however partially screened particularly to the north-west.

VP03a 16 Mile Gums Rest Area, Cobb Highway, Booroorban

Approximate extent of potentially visible turbines

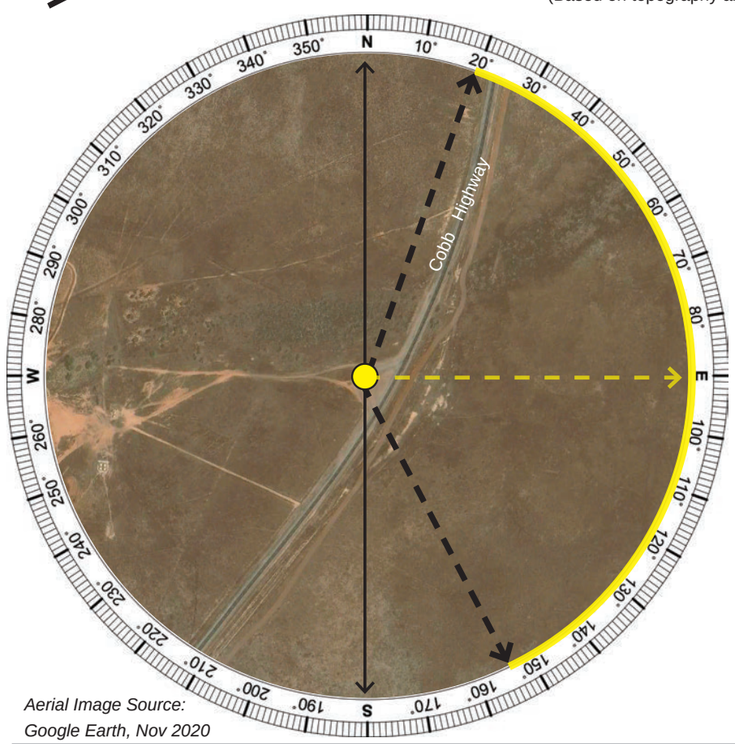
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP03a

Viewpoint Summary:	
Location:	Elevation:
16 Mile Gums, Cobb Highway, Booroorban	88 m
Coordinates:	Viewing Direction:
34°44'30.02"S 144°47'30.21"E	East
Distance to nearest WTG:	Visibility Distance Zone:
1.43 km	**Far Foreground (FF)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Moderate**
LCU:	Scenic Quality Rating:
LCU04: Farmlands/Plains	**Low**

Multiple Wind Turbine Tool:

Six (6) 60º Sectors with turbines within 8000 m.

Existing Landscape Character Description:

This photograph was taken from '16 Mile Gums' stopping area, which is part of 'The Long Paddock' touring route. This is a frequently used rest stop for motorists travelling between the towns of Hay and Deniliquin on the Cobb Highway. This viewpoint is looking in a easterly direction. Adjacent lands are classified as grazing lands with native vegetation. The terrain is generally flat with open, expansive views, due to a local of canopy cover. The flat land parcels present occasional and intermittent stands of shrubs. Refer to VP03b for views towards the south.

Potential Visual Impact:

Open and flat farmlands define the character of this location. Majority of the Project will be visible due to open, clear views and close proximity.

VP03b 16 Mile Gums Rest Area, Cobb Highway, Booroorban

Approximate extent of potentially visible turbines

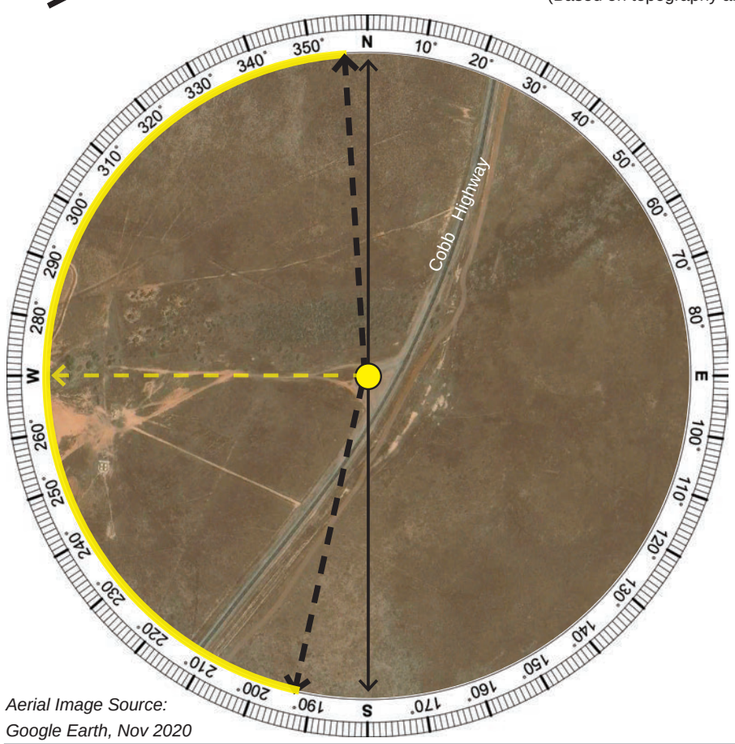
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP03b

Viewpoint Summary:	
Location:	Elevation:
16 Mile Gums, Cobb Highway, Booroorban	88 m
Coordinates:	Viewing Direction:
34°44'30.02"S 144°47'30.21"E	East
Distance to nearest WTG:	Visibility Distance Zone:
1.43 km	**Far Foreground (FF)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Moderate**
LCU:	Scenic Quality Rating:
LCU04: Farmlands/Plains	**Low**

Multiple Wind Turbine Tool:

Six (6) 60º Sectors with turbines within 8000 m.

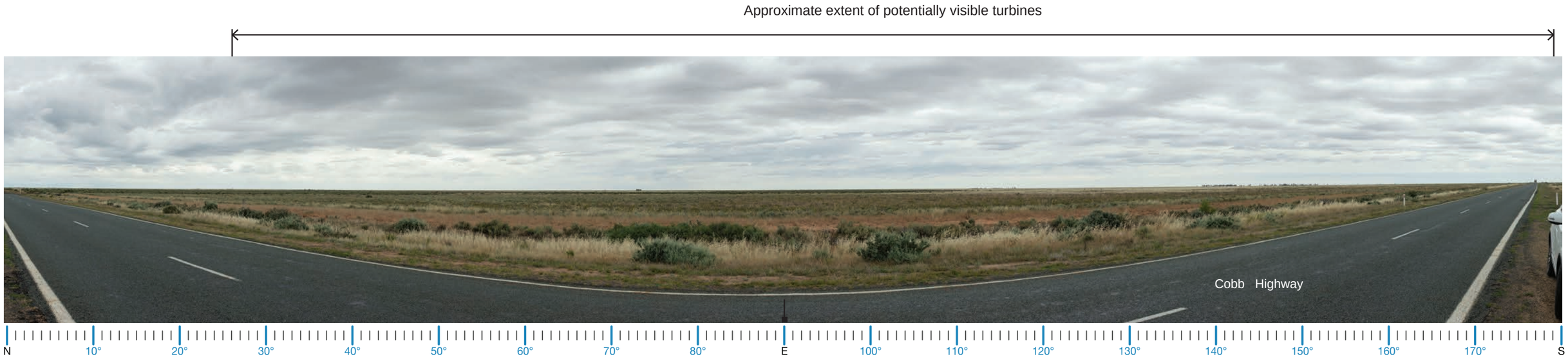
Existing Landscape Character Description:

This photograph was taken from '16 Mile Gums' stopping area, which is part of 'The Long Paddock' touring route. This is a frequently used rest stop for motorists travelling between the towns of Hay and Deniliquin on the Cobb Highway. This viewpoint is looking in a easterly direction. Adjacent lands are classified as grazing lands with native vegetation. The terrain is generally flat with open, expansive views, due to a local of canopy cover. The flat land parcels present occasional and intermittent stands of shrubs. Refer to VP03a for views towards the north.

Potential Visual Impact:

Views of the Project will be visible in the west due to open, clear views and close proximity.

VP04a Cobb Highway, Booroorban



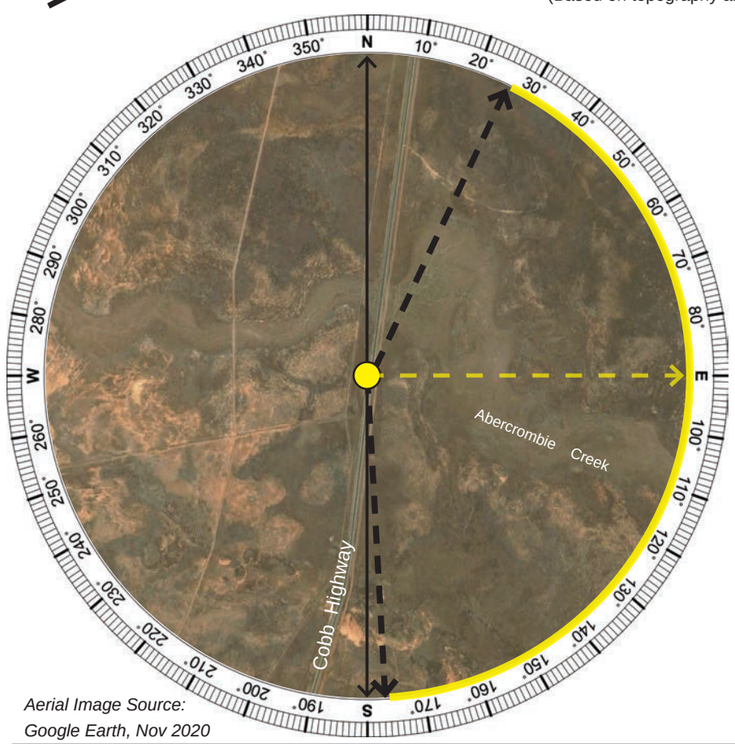
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



Aerial Image Source: Google Earth, Nov 2020

VIEWPOINT VP04a

Viewpoint Summary:	
Location:	Elevation:
Cobb Highway, Booroorban	90 m
Coordinates:	Viewing Direction:
34°41'58.28"S 144°48'15.55"E	East
Distance to nearest WTG:	Visibility Distance Zone:
1.05 km	**Far Foreground (FF)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU02: Creek Corridors	**Low**

Multiple Wind Turbine Tool:

Six (6) 60º Sectors with turbines within 8000 m.

Existing Landscape Character Description:

This photograph was taken from Cobb Highway, looking in an easterly direction. Surrounding lands are flat and utilised for grazing. The terrain is generally flat with open, expansive views. Patchy riparian vegetation can be seen towards the north and east, associated with Abercrombie Creekbed which remains dry through most of the year. Prominent vegetation species include saltbush and scrubby groundcovers or low-growing bushes. Views are open, expansive and unhindered. Refer to VP04b for views towards the west.

Potential Visual Impact:

The majority of the Project will be visible from this location due to open views, flat topography and lack of vegetation.

VP04b Cobb Highway, Booroorban

Approximate extent of potentially visible turbines

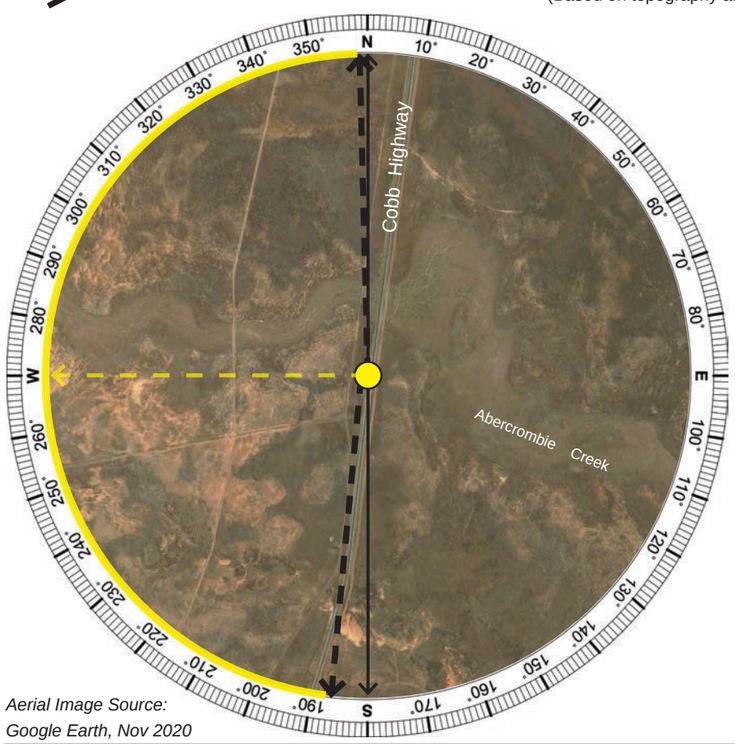
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP04b

Viewpoint Summary:	
Location:	Elevation:
Cobb Highway, Booroorban	90 m
Coordinates:	Viewing Direction:
34°41'58.28"S 144°48'15.55"E	East
Distance to nearest WTG:	Visibility Distance Zone:
1.05 km	**Far Foreground (FF)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU02: Creek Corridors	**Low**

Multiple Wind Turbine Tool:

Six (6) 60º Sectors with turbines within 8000 m.

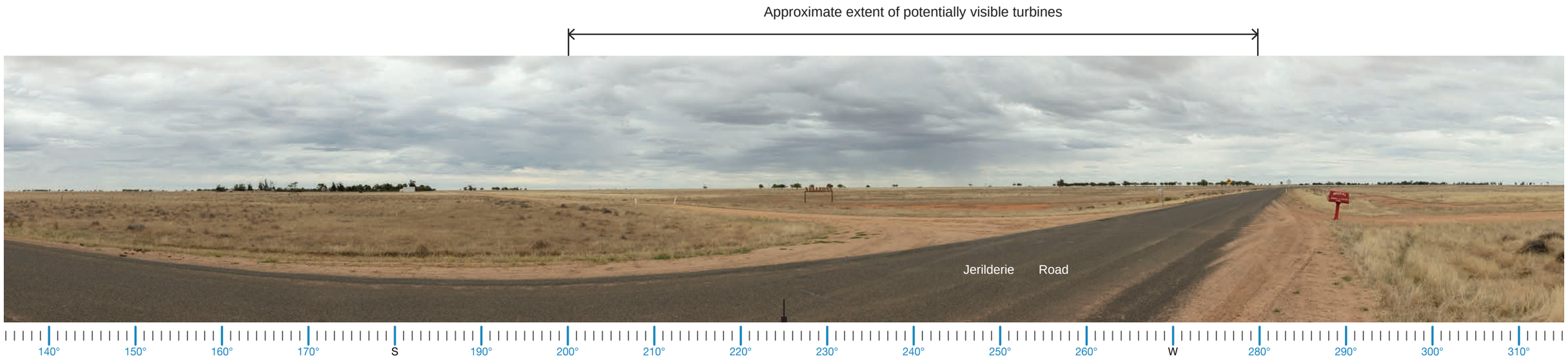
Existing Landscape Character Description:

This photograph was taken from Cobb Highway, looking in an easterly direction. Surrounding lands are flat and utilised for grazing. The terrain is generally flat with open, expansive views. Patchy riparian vegetation can be seen towards the north and east, associated with Abercrombie Creekbed which remains dry through most of the year. Prominent vegetation species include saltbush and scrubby groundcovers or low-growing bushes. Views are open, expansive and unhindered. Refer to VP04a for views towards the east.

Potential Visual Impact:

Cleared, open farmlands define the character of this viewpoint. The terrain and vast openness offer clear views to all turbines associated with the Project.

VP05 Jerilderie Road, Hay South



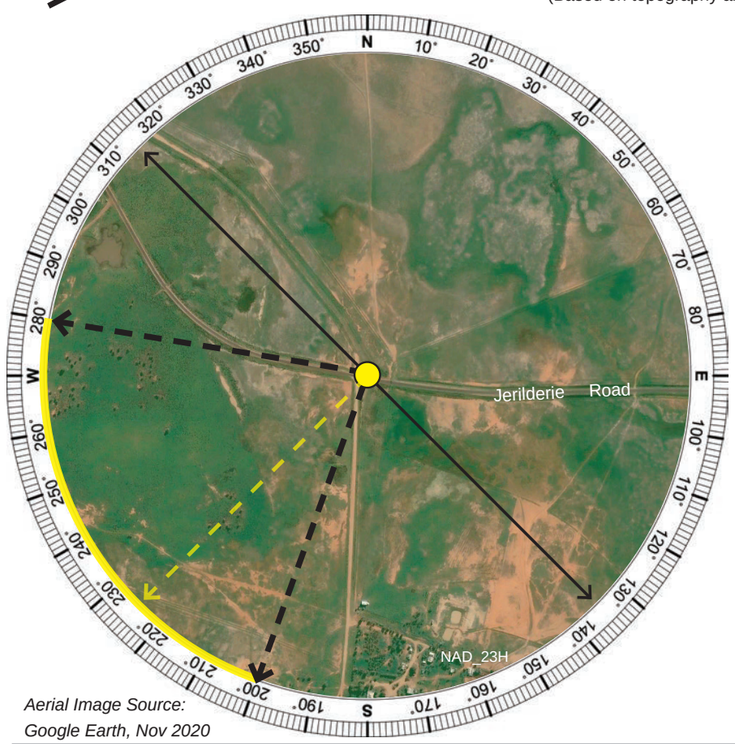
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP05

Viewpoint Summary:	
Location:	Elevation:
Jerilderie Road, Hay South	94 m
Coordinates:	Viewing Direction:
34°39'19.31"S 144°58'20.54"E	Southwest
Distance to nearest WTG:	Visibility Distance Zone:
8.19 km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands / Plains	**Low**

Multiple Wind Turbine Tool:

No turbines within 8000 m

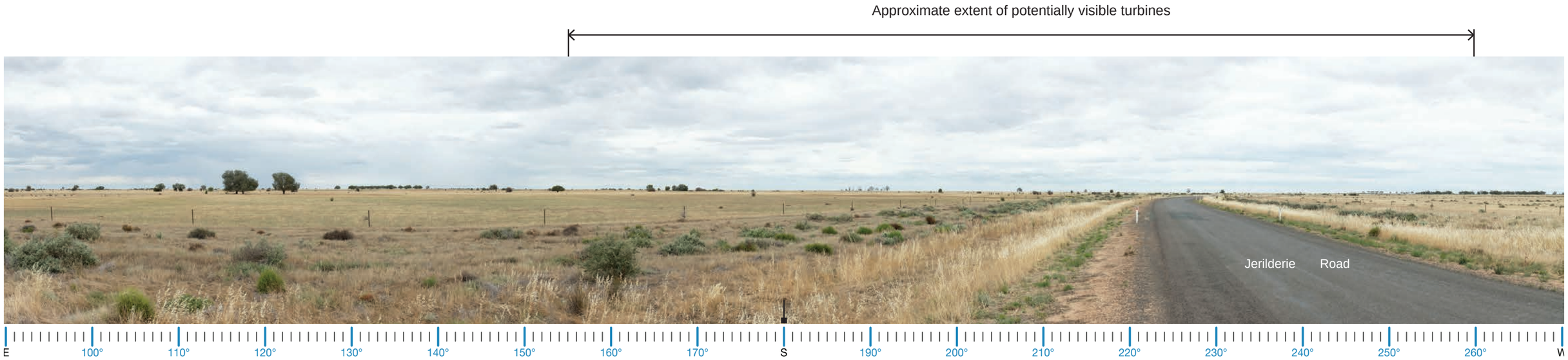
Existing Landscape Character Description:

The viewpoint is located on Jerilderie Road near the entrance gate of 'Walgrove' (dwelling 24). Jerilderie Road is a low use road that provides access to low density rural residential lots. Adjacent lands are classified as grazing lands with native vegetation and some areas of dryland and irrigated cropping. Surrounding terrain is generally flat with open, unhindered views. Vegetation is characterised by flat expanses of native scrubby vegetation which is typical of the Riverina Bioregion. Stands of tree cover associated with the dwelling to the south are visible in the middleground.

Potential Visual Impact:

The majority of the Project will be visible from this location to the south-west, due to open views, flat topography and lack of vegetation.

VP06 Jerilderie Road, Hay South



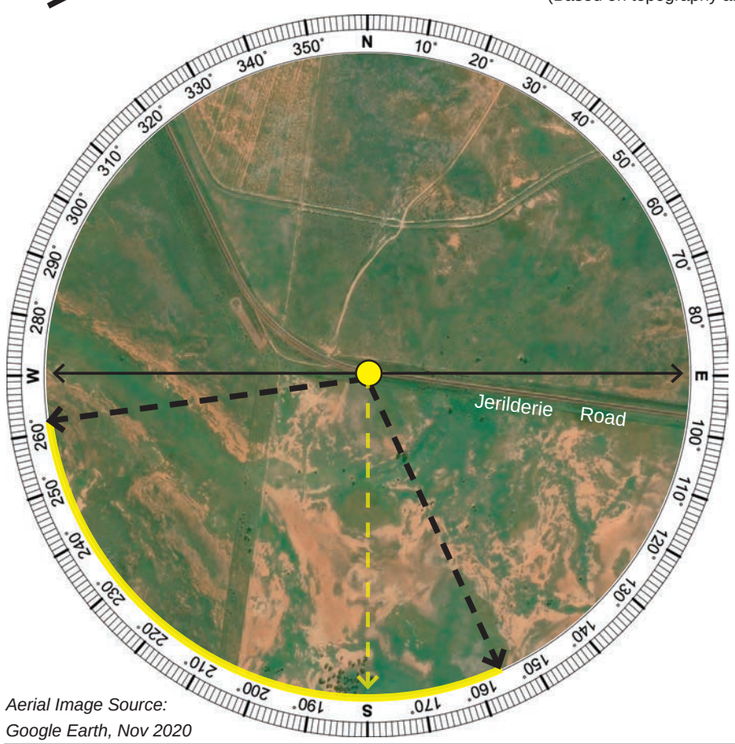
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP06

Viewpoint Summary:	
Location:	Elevation:
Jerilderie Rd, Hay South	94 m
Coordinates:	Viewing Direction:
34°39'19.31"S 144°58'20.54"E	Southwest
Distance to nearest WTG:	Visibility Distance Zone:
2.05 km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands / Plains	**Low**

Multiple Wind Turbine Tool:

Two (2) 60º Sectors with turbines within 8000 m.

Existing Landscape Character Description:

The viewpoint is located on Jerilderie Road near the entrance gate of 'Walgrove' (dwelling 24). Jerilderie Road is a low use road that provides access to low density rural residential lots. Adjacent lands are classified as grazing lands with native vegetation and some areas of dryland and irrigated cropping. Surrounding terrain is generally flat with open, unhindered views. Vegetation is characterised by flat expanses of native scrubby vegetation which is typical of the Riverina Bioregion. Stands of tree cover associated with the dwelling to the south are visible in the middleground.

Potential Visual Impact:

The majority of the Project will be visible from this location to the south-west, due to open views, flat topography and lack of vegetation.

VP07 Cobb Highway, Hay South

Approximate extent of potentially visible turbines

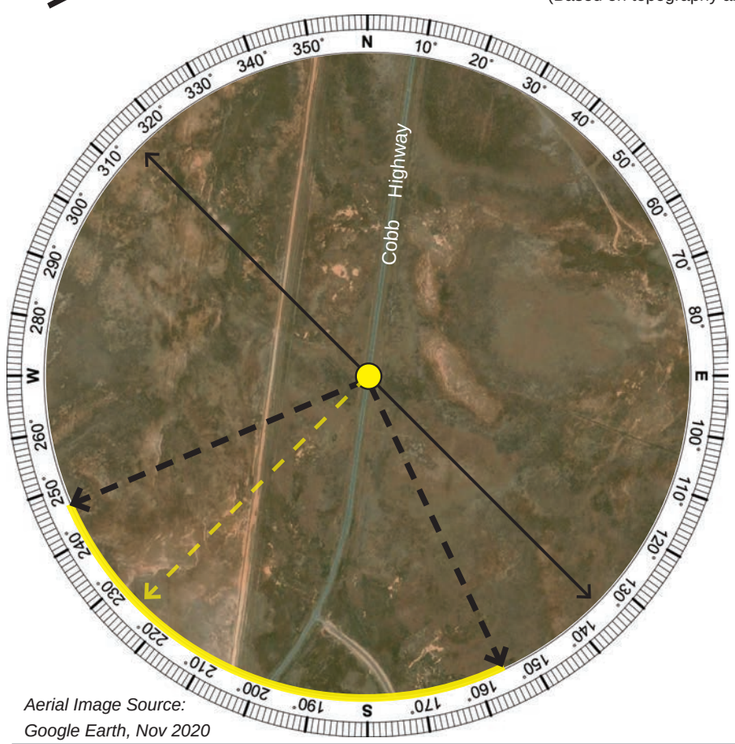
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP07

Viewpoint Summary:	
Location:	Elevation:
Cobb Hwy, Hay South	92 m
Coordinates:	Viewing Direction:
34°34'47.47"S 144°49'50.24"E	South
Distance to nearest WTG:	Visibility Distance Zone:
8.14 km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands / Plains	**Low**

Multiple Wind Turbine Tool:

No turbines within 8000 m.

Existing Landscape Character Description:

This photograph was taken from Cobb Highway looking in a southerly direction. The farmlands are used for sheep and cattle grazing. The viewpoint's surroundings are characterised by a generally flat terrain with saltbush and scrubby groundcovers or low-growing bushes. Lack of canopy cover offers clear, open views. Visible infrastructure include powerlines and buildings associated with the cotton gin located to the south-west.

Potential Visual Impact:

The viewpoint is located just outside of the 8 km extent from the wind turbines. Given that the terrain is flat and there are no significant intervening visual elements, the turbines will be visible from this location.

VP08 Sturt Highway, Hay

Approximate extent of potentially visible turbines

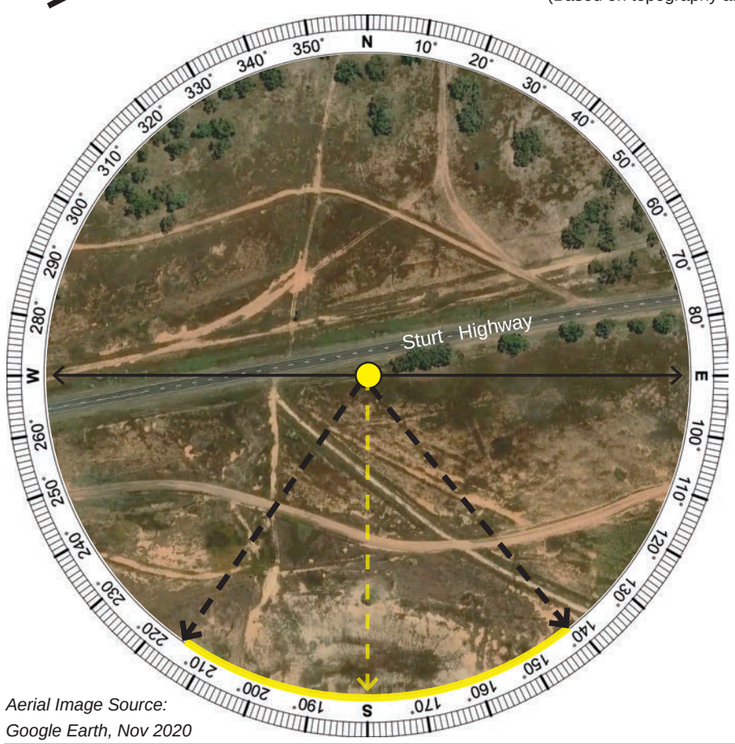
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP08

Viewpoint Summary:	
Location:	Elevation:
Sturt Highway, Hay	90 m
Coordinates:	Viewing Direction:
34°31'34.71"S 144°45'10.03"E	South
Distance to nearest WTG:	Visibility Distance Zone:
13.39 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands / Plains	**Moderate**

Multiple Wind Turbine Tool:

No turbines within 8000 m.

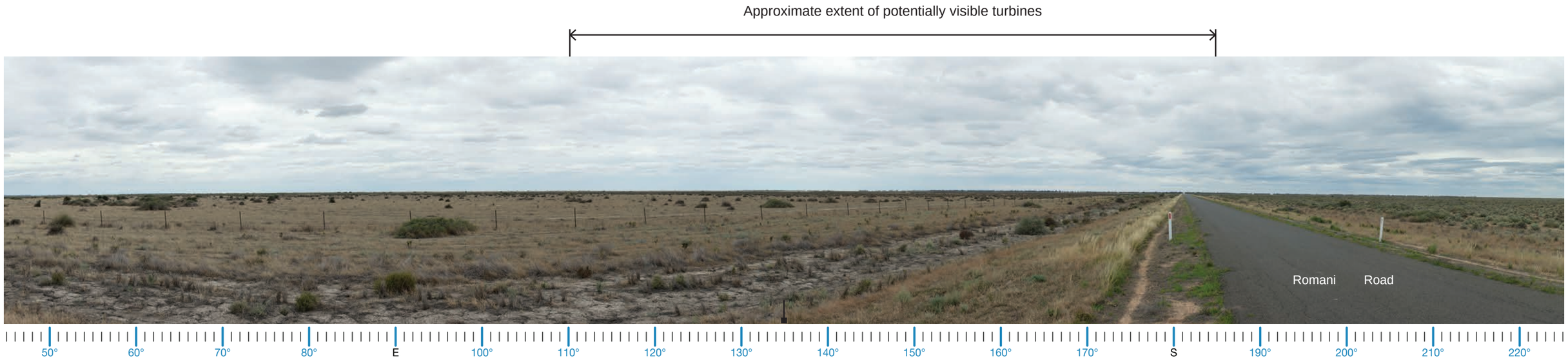
Existing Landscape Character Description:

This photograph was taken from Sturt Highway to the south of the Murrumbidgee River, near Murrumbidgee Regional Park and Nature Reserve. Surrounding land is predominantly used for livestock grazing and some areas are dedicated to irrigated cropping. The road runs in a generally east - west direction and provides access to scattered rural dwellings in the area. The terrain is flat with intermittent stands of tree cover scattered groups of shrubs. Views are generally open, expansive and unhindered.

Potential Visual Impact:

The viewpoint is located beyond the 8 km extent from the wind turbines. Turbines would be partially visible as distant objects in the landscape.

VP09 Romani Road, Hay South



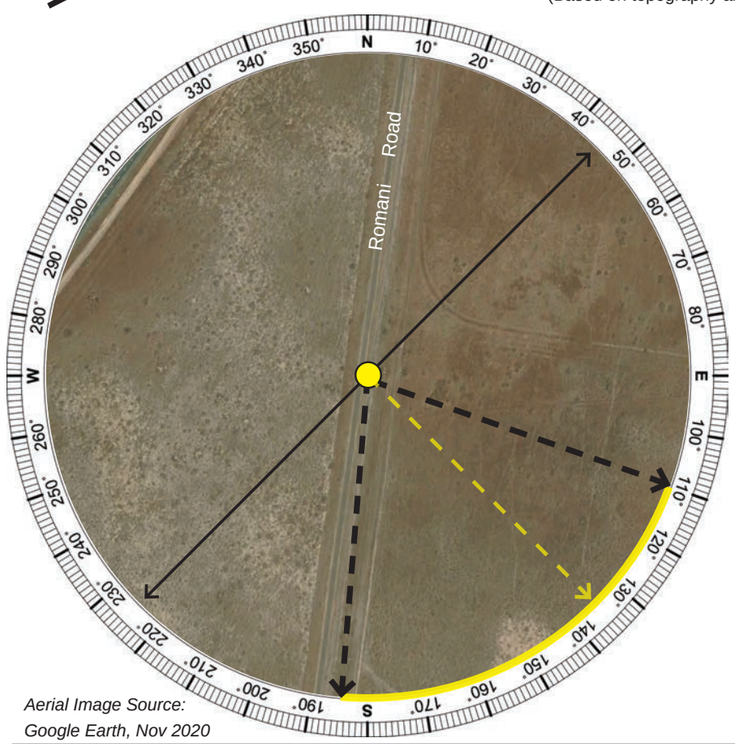
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP09

Viewpoint Summary:	
Location:	Elevation:
Romani Rd, Hay South	85 m
Coordinates:	Viewing Direction:
34°35'26.11"S 144°39'41.45"E	Southeast
Distance to nearest WTG:	Visibility Distance Zone:
6.03 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands / Plains	**Low**

Multiple Wind Turbine Tool:

One (1) 60º Sector with turbines within 8000m

Existing Landscape Character Description:

This viewpoint is located on Romani Road which is a low use road that emerges from the Sturt Highway. The road provides access to farmlands and isolated rural dwellings north-west of the Project Area. The terrain is generally flat with open, expansive views that are unhindered with very few limiting factors. Surrounding land is characterised by scrubby, low growing saltbush species that are typical of the Riverina Bioregion. The lands are utilised for livestock grazing and irrigated cropping.

Potential Visual Impact:

Lack of tree cover and flat topography contribute to clear, open views of surroundings. The wind turbines will be visible but distant from the viewpoint.

VP10 Romani Road, Hay South

Approximate extent of potentially visible turbines

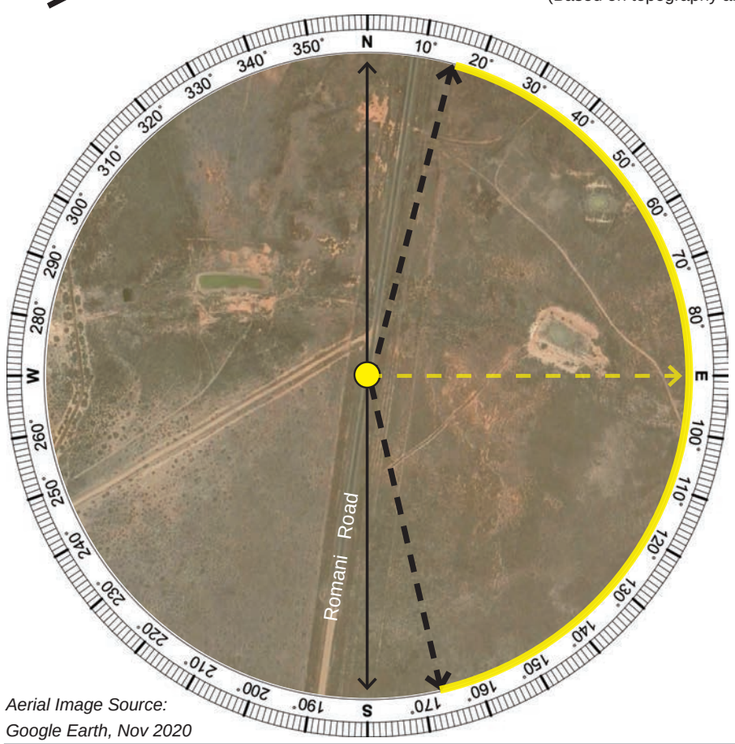
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP10

Viewpoint Summary:	
Location:	Elevation:
Romani Rd, Hay South	85 m
Coordinates:	Viewing Direction:
34°40'13.73"S 144°38'53.33"E	East
Distance to nearest WTG:	Visibility Distance Zone:
1.19 km	**Far Foreground (FF)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands / Plains	**Low**

Multiple Wind Turbine Tool:

Three (3) 60º Sectors with turbines within 8000 m

Existing Landscape Character Description:

This viewpoint is located on Romani Road looking in an easterly direction. The land is characterised by flat plains that are extensively cleared with trees along the horizon to the north and a dense pocket of trees in the far middleground to the north-east. The lands are utilised for livestock grazing and irrigated cropping.

Potential Visual Impact:

Lack of tree cover and flat topography contribute to clear, open views of the Project in its entirety.

VP11 Romani Road, Hay South

Approximate extent of potentially visible turbines

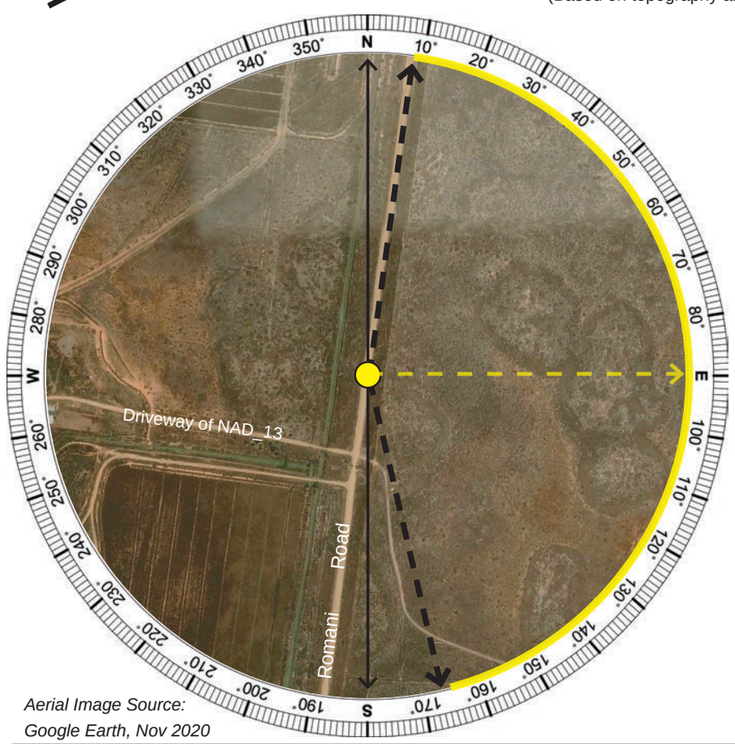
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP11

Viewpoint Summary:	
Location:	Elevation:
Romani Rd, Hay South	84 m
Coordinates:	Viewing Direction:
34°48'17.10"S 144°37'35.69"E	East
Distance to nearest WTG:	Visibility Distance Zone:
3.55 km	**Near Middleground (NM)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands / Plains	**Low**

Multiple Wind Turbine Tool:

Two (2) 60º Sectors with turbines within 8000 m.

Existing Landscape Character Description:

This photograph was taken from Romani Road looking in an easterly direction, near the entrance gate of the 'Narringa' and 'Romani' dwellings (dwellings 13 and 14). Adjacent lands are classified as grazing lands with native vegetation, irrigated pastures and irrigated cropping. The terrain is flat with open, unhindered and expansive views. Vegetation associated with a waterbody to the south-east is visible in the far middleground.

Potential Visual Impact:

Lack of tree cover and flat topography contribute to clear, open views of all wind turbines.

VP12 Intersection of Booroorban - Tchelery road and Romani Road, Hay South

Approximate extent of potentially visible turbines

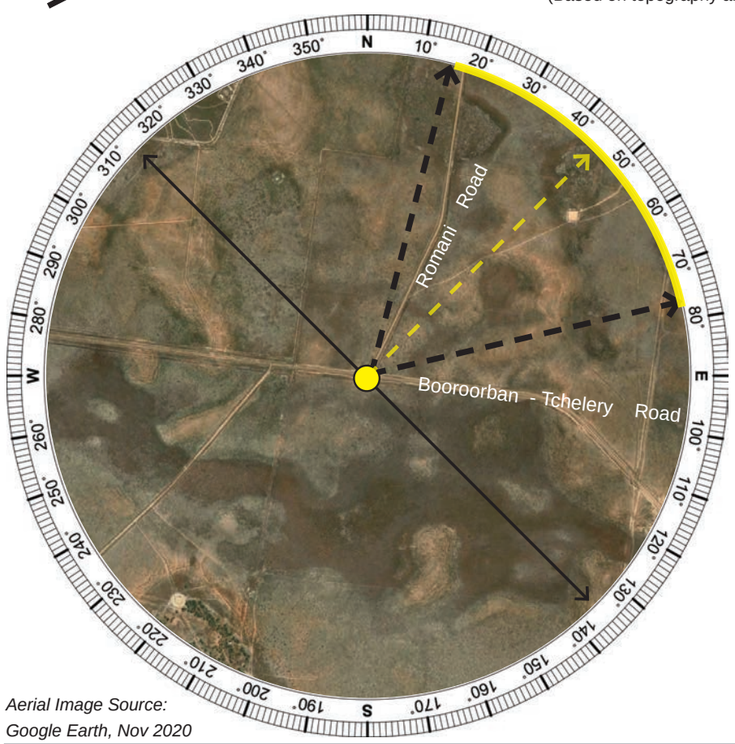
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP12

Viewpoint Summary:	
Location:	Elevation:
Intersection of Booroorban - Tchelery Rd & Romani Rd, Hay South	78 m
Coordinates:	Viewing Direction:
34°53'43.06"S 144°35'42.25"E	Northeast
Distance to nearest WTG:	Visibility Distance Zone:
6.02 km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU02: Creek Corridors	**Low**

Multiple Wind Turbine Tool:

One (1) 60º Sector with turbines within 8000 m.

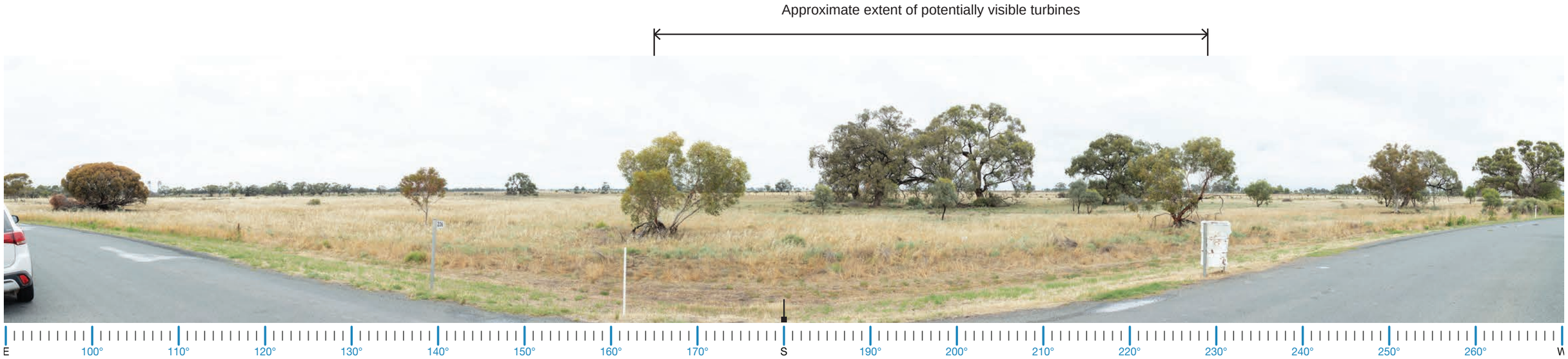
Existing Landscape Character Description:

This photograph was taken at the intersection of Booroorban-Tchelery Road and Romani Road, located to the south-west of the Project Area. The surrounding land is characterised by flat plains with open views. Vegetation is typical to the Riverina Bioregion and consists of lignum and saltbush grasses spread across the planar topography. The existing 330 kV transmission lines run through the landscape, visible in the middleground in the north-east.

Potential Visual Impact:

The viewpoint is located just outside of the 8 km extent from the wind turbines. Given that the terrain is flat and there are no significant intervening visual elements, the turbines will be visible from this location.

VP13 Sturt Highway, Hay South



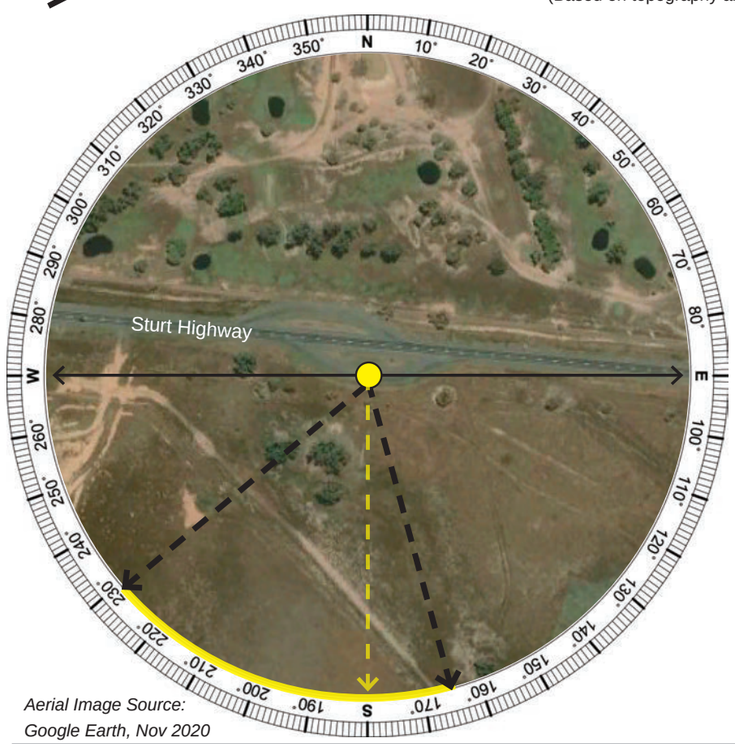
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP13

Viewpoint Summary:	
Location:	Elevation:
Sturt Hwy, Hay South	91 m
Coordinates:	Viewing Direction:
34°31'14.17"S 144°49'47.05"E	South
Distance to nearest WTG:	Visibility Distance Zone:
14.72 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU03: Hay	**Low**

Multiple Wind Turbine Tool:

No turbines within 8000m

Existing Landscape Character Description:

The viewpoint is located at a rest area on Sturt Highway near Hay Golf Club to the north and Hay Airport to the south. Sturt Highway is a major road that is an important conveyor for traffic between towns such as Wagga Wagga, Hay and Mildura. The surrounding landscape is characterised by flat plains that have been cleared to support agricultural activity. Scattered trees are visible in the foreground and along the horizon. Views are generally open and expansive but the trees visible in the southern direction will help fragment views of the Project. Visible structures include infrastructure associated with the airport to the south.

Potential Visual Impact:

The viewpoint is located beyond the 8 km extent from the wind turbines. Turbines would be partially visible as distant objects in the landscape.

VP14 Murrumbidgee River Rest Area, Hay

Approximate extent of potentially visible turbines

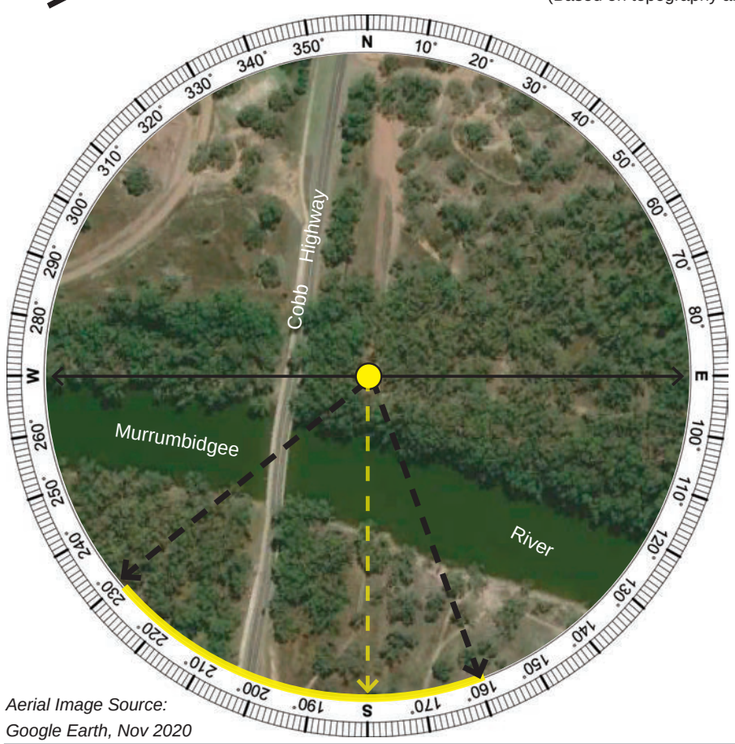
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



Aerial Image Source:
Google Earth, Nov 2020

VIEWPOINT VP14

Viewpoint Summary:	
Location:	Elevation:
Murrumbidgee River Rest Area, Hay	97 m
Coordinates:	Viewing Direction:
34°30'57.26"S 144°50'35.24"E	South
Distance to nearest WTG:	Visibility Distance Zone:
15.27 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Recreation Site	**High**
LCU:	Scenic Quality Rating:
LCU01: Murrumbidgee River	**High**

Multiple Wind Turbine Tool:

No turbines within 8000m

Existing Landscape Character Description:

This viewpoint was taken from a Picnic Area located on the banks of Murrumbidgee River. It is a significant recreation site located in the Murrumbidgee Valley, to the south of the Hay township. The viewpoint's surroundings are characterised by a generally flat terrain with very undulations associated with the banks of the river. The riparian vegetation associated with the river is extensively wooded with river red gum trees that are typical to this area of Murrumbidgee Valley Parks. Views are, therefore, limited by the dense rows of vegetation that are visible in the photograph's middleground and the foreground. All views around the picnic area are limited by existing vegetation.

Potential Visual Impact:

Existing vegetation limits all views. Even though the terrain is flat, intervening vegetation and distance of the recreation site from the Project will limit any potential visual impact.

APPENDIX D PRELIMINARY BIODIVERSITY ASSESSMENT

The Plains Wind Farm

Preliminary Biodiversity Assessment

29 September 2022

Project No.: 0606253

The business of sustainability

ERM

Document details	
Document title	The Plains Wind Farm
Document subtitle	Preliminary Biodiversity Assessment
Project No.	0606253
Date	29 September 2022
Version	01
Author	Lorena Boyle, Joanne Woodhouse
Client Name	ENGIE

Document history

				ERM approval to issue		
Version	Revision	Author	Reviewed by	Name	Date	Comments
Draft	00	Lorena Boyle	Matt Davis	Karie Bradfield	09.09.2022	Draft for Engie Review
Final Draft	01	Lorena Boyle	Joanne Woodhouse	Karie Bradfield	23.09.2022	Final draft for Engie Review
Final	1.0	Lorena Boyle	Joanne Woodhouse	Karie Bradfield	29.09.2022	Final for Submission

Signature Page

29 September 2022

The Plains Wind Farm

Preliminary Biodiversity Assessment

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Ecologist

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Acronyms and Abbreviations

Name	Description
ALA	Atlas of Living Australia
AOBV	Areas of Outstanding Biodiversity Value
BAM	Biodiversity Assessment Method
BAM-C	BAM Calculator
BC Act	NSW Biodiversity Conservation Act 2016
BDAR	Biodiversity development assessment report
BESS	Battery Energy Storage System
BOS	Biodiversity Offsets Scheme
BOSET	Biodiversity Offsets Scheme Entry Threshold
CCEEW	Department of Climate Change, Energy, the Environment and Water
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ERM	Environmental Resources Management
IBRA	Interim Biographic Regionalisation of Australia
LGA	Local Government Area
LLS Act	Local Land Services Act 2013
MNES	Matters of National Environmental Significance
NSW	New South Wales
ºC	Degrees Celsius
PCT	Plant Community Types
PMST	Protected Matters Search Tool
Project Area	The term Project Area refers to all affected lots where the Project may be located.
PV	Photovoltaic
SAII	serious and irreversible impacts
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental
SSD	State Significant Development
Study Area	Areas within the Project Area subject to biodiversity field surveys.
Subject Land	The biodiversity study area targeted during the ERM field surveys, defined as a 100m buffer to turbines, and 50m to all remaining project infrastructure, including access tracks, overhead transmission line, substation and crane hard stands. It is the area in which Stage 1 of the BAM has been applied.
TBDC	Threatened Biodiversity Data Collection
TECs	threatened ecological communities
The Project	In this report, the Project refers to the proposal by the proponent (ENGIE) to construct and operate The Plains Wind Farm as described in this Scoping report.
The Proponent	ENGIE
VIS	Vegetation Information System
WoNS	Weeds of National Significance

1. INTRODUCTION

ENGIE (The Proponent) proposes to construct and operate The Plains Wind Farm (the Project) as part of the Plains Renewable Energy Park Project, a renewable energy development located south of Hay in the Riverina Murray region of New South Wales (NSW). The Project is a proposed wind farm that will include up to 226 wind turbines with a total capacity of up to approximately 1800 MW. The Proponent is seeking State Significant Development (SSD) Consent for the Project under Division 4.7, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The initial Project area covered four sites for closer investigation. Landcover modelling and field surveys were completed by ERM to verify vegetation communities to identify areas of high biodiversity constraint. As a result, the Project area was reduced to two properties, Mungadal West and Mungadal East (also known as 'Rosevale'). The Project area and indicative Project layout for the wind farm turbines are identified in Figure 1.1.

A Preliminary Constraints assessment was completed in 2019 by NGH, assessing the four original Project area sites. The NGH (2019) assessment was based on desktop analysis of publicly available datasets and information. This Preliminary Biodiversity Assessment will refine the biodiversity constraints within the current Project area through updated desktop analysis and field surveys conducted by ERM.

This Preliminary Biodiversity Assessment Report will be appended to the Scoping Report to support an application of the Secretary of the NSW Department of Planning and Environment (DPE) for Secretary's Environmental Assessment Requirements (SEARs). The SEARs will guide the preparation of an Environmental Impact Statement (EIS) for the Project as part of a broader Development Application (DA). The information gained from all survey efforts would support the development of a Biodiversity Development Assessment Report (BDAR).

Due to the early stage of design development, it is not possible to assess impacts based on a development footprint or clearing footprint for this assessment. Biodiversity values have been identified across a broader Project Area, consisting of the landholding boundaries and a more defined area referred to as the subject land. The subject land consists of the preliminary Project layout, with a 100m buffer applied. This subject land has been the area across which detailed ecological fieldwork has been completed. For the purpose of this biodiversity assessment report, it has been assumed that up to 20% of the subject land will be directly impacted as a result of a development footprint associated with the Project.

1.1 Project Overview

ENGIE proposes to develop The Plains Wind Farm near the town of Hay, in the Riverina Murray Region of NSW. The Project Area covers a total area of 59,275 hectares and is situated on Mungadal Station and neighbouring properties to the east and west of the Cobb Highway.

The Project is a proposed wind farm that will consist of up to 226 wind turbine generators (WTGs) after consultation with boundary neighbours identified opportunity for 6 additional landowners to host infrastructure. The project has an estimated maximum installed capacity of up to approximately 1,800 MW. The wind turbines will have a proposed hub height of 165 m and tip height of up to 280 m.

In addition, the Project will include the following Project infrastructure and associated works:

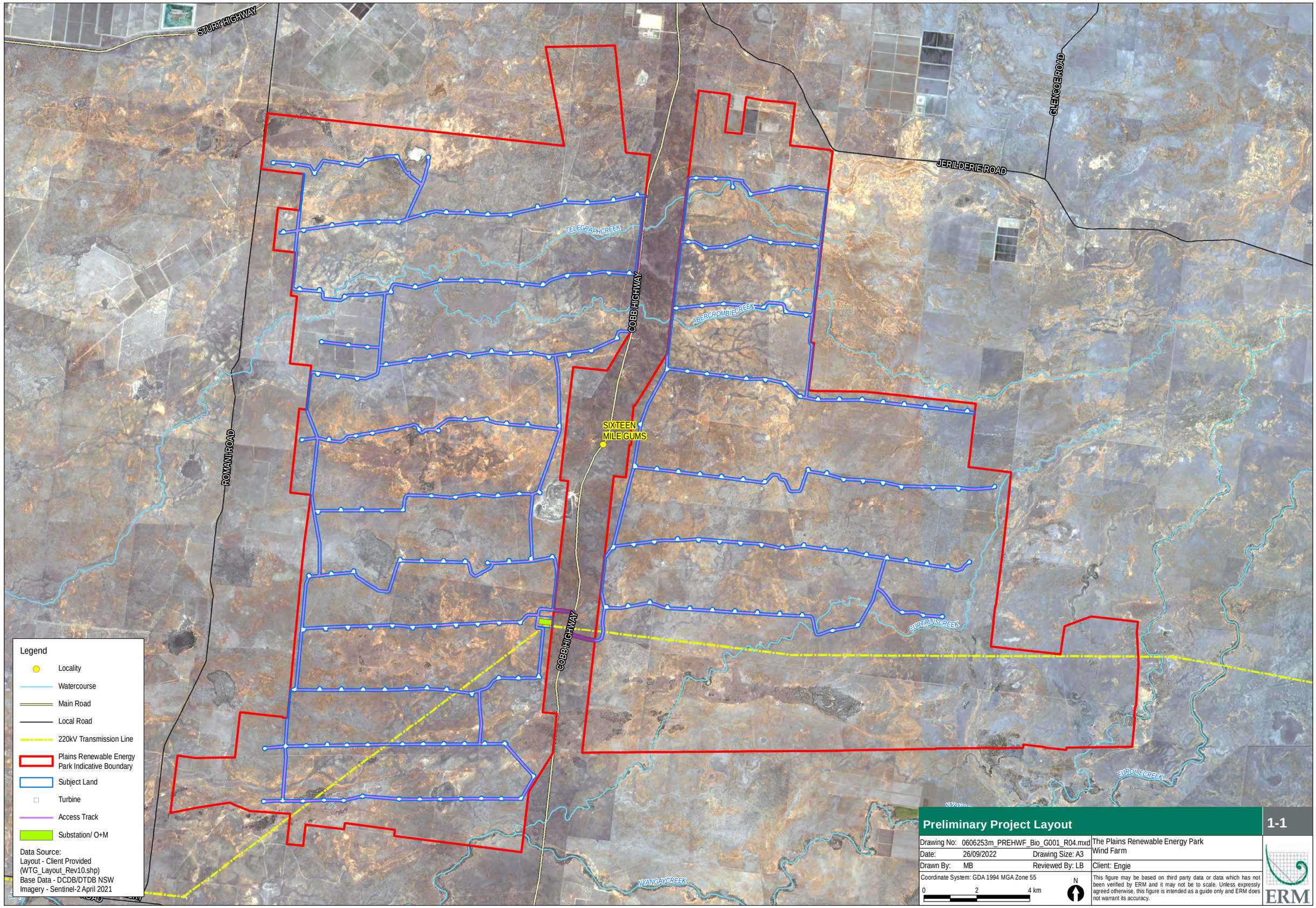
- One (1) Operations and Maintenance Building;
- One (1) primary 330 kV substation including a control room and switchyard facilitating connection to the National Electricity Market (NEM) includes transformers, voltage controls, storage units and potentially power quality controls;

- At least two (2) 132 kV collector substations including a control room within each, located at selected locations within the wind farm. Collector groups will be connected with predominately 33kV underground cabling;
- At least two (2) permanent Meteorological Masts;
- High-voltage overhead lines connecting collector groups, main substation and connection to the NEM infrastructure;
- A construction compound and temporary construction infrastructure including concrete batching facilities;
- Electrical connections between wind turbines and site substations. The grid (a tee-connection within the Project Area is assumed), which will primarily be underground though may include overhead lines;
- Internal access tracks and upgrades to existing access roads where required;
- Upgrades to existing minor roads along the haulage route to the Project Area:
- Wind turbine hardstands;
- Installing maintenance and environmental managements processes and equipment;
- On-site quarries, security fencing and landscaping;
- Ancillary activities including gravel pits, water sourcing, visual screening (as required); and
- Temporary workers accommodation.

The broader Plains Renewable Energy Park project also includes a proposed 400 MWn (ac)/500 MWp (dc) solar farm, and Battery Energy Storage System (BESS) with a capacity of up to 400 MW located in the south of the Project Area. The Plains Solar Farm and BESS is subject to a separate SSD application, however it may share ancillary infrastructure to be constructed and operated collectively under Plains Renewable Energy Park Project. Subject to the timing of the construction of the Project, the Project may utilise shared infrastructure proposed as part of The Plains Solar Farm including:

- Internal access roads to connect the solar panels and ancillary infrastructure;
- Operations and Maintenance (O&M) Building;
- Substations;
- Switchyard; and
- Access to the Project Area off the Cobb Highway to the east and west.

The indicative preliminary Project layout is shown in Figure 1.1. The layout and development footprint will be further refined and assessed during EIS preparation.


STURT HIGHWAY
CLENCOE ROAD
JERILDERIE ROAD
TELEGRAPH CREEK
COBB HIGHWAY
ABERCROMBIE CREEK
SIXTEEN MILE GUMS
ROMANI ROAD
COBB HIGHWAY
CURTAWS CREEK
EUROLIE CREEK
NYANGAY CREEK
Legend
Locality
Watercourse
Main Road
Local Road
220kV Transmission Line
Plains Renewable Energy Park Indicative Boundary
Subject Land
Turbine
Access Track
Substation/ O+M
Data Source:
Layout - Client Provided (WTG_Layout_Rev10.shp)
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
Preliminary Project Layout
1-1
Drawing No: 0606253m_PREHWF_Bio_G001_R04.mxd
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: LB
The Plains Renewable Energy Park Wind Farm
Client: Engie
Coordinate System: GDA 1994 MGA Zone 55
0
2
4 km
N
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.
ERM

1.2 Objectives

The objective of this assessment is to describe the biodiversity constraints that are known or may occur within the Project Area. The results of this assessment will build upon updated desktop reviews, field surveys undertaken in Spring 2021, Summer 2022, Autumn 2022 and Winter 2022 completed by ERM, and the preliminary constraints assessment completed by NGH on behalf of ENGIE in 2019 (NGH 2019). This assessment allows for the identification of significant biodiversity values associated with the Project Area and preliminary recommendations to be provided in terms of avoidance, mitigation and/or additional assessment for biodiversity values.

For the purpose of this preliminary assessment, biodiversity values include:

- Native species and communities with a particular focus on those listed as migratory, vulnerable, endangered or critically endangered under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and the NSW Biodiversity Conservation Act 2016 (BC Act);
- Fauna species susceptible to turbine strikes (e.g. raptors); and
- Important habitat components (e.g. hollow-bearing trees) and landscape features.

The preliminary assessment includes:

- Identification and mapping of threatened flora and fauna species records, important habitat components and landscape features, and fauna species susceptible to turbine strikes;
- Preliminary mapping of the extent and type of native Plant Community Types (PCT) and Threatened Ecological Communities (TEC);
- Preliminary survey design including likely target species and seasonal survey techniques;
- Identification of potential for an EPBC Referral submission; and
- A description of outcomes and recommendations to support the ongoing project design and assessment process.

This preliminary biodiversity assessment will be presented as an Annex to the Scoping Report to facilitate the issue of the Secretary's Environmental Assessment Requirements (SEARs), a critical requirement prior to the development of the Environmental Impact Statement (EIS).

2. LEGISLATION

Table 2.1 below provides a description of the relevant legislative context. This report addresses the objectives and requirements of the legislation as it relates to the identification of biodiversity and ecological values. Impacts to these values will be addressed separately if required as part of the EIS to be prepared.

Table 2.1 Legislation applicable to this Preliminary Biodiversity Assessment

Commonwealth Legislation
Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
The EPBC Act requires approval of the Commonwealth Minister for the Environment for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES) as assessed in accordance with the EPBC Significant Impact Guidelines 1.1. The EPBC Act is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (CCEEW) and lists threatened species, ecological communities and other MNES. Any proposed action that is expected to have an impact on MNES must be referred to the Minister for assessment under the EPBC Act, or assessed under the existing bilateral agreement, or accredited process between the Commonwealth and the State of New South Wales (NSW). The ecological desktop review and field studies undertaken to date have determined the presence of MNES within the Project Area. A Significant Impact Assessment has been undertaken for MNES known or likely to be present (Appendix E), and will be further assessed within the EIS. The Project will need to be referred to the Australian Government Minister for the Environment.
NSW Statutory Legislation and Guidelines
Biodiversity Conservation Act 2016 (BC Act)
The BC Act came into effect on 25 August 2017. The BC Act replaced the NSW *Threatened Species Conservation Act 1995*, the NSW *Nature Conservation Trust Act 2001* and parts of the NSW *National Parks and Wildlife Act 1974*. The BC Act establishes mechanisms for: The management and protection of listed threatened species of native flora and fauna (excluding fish and marine vegetation) and threatened ecological communities (TECs). ■ The listing of threatened species, TECs and 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 ■ Biodiversity Offsets Scheme (BOS), including the Biodiversity Values Map and Biodiversity Assessment Method (BAM) to identify serious and irreversible impacts (SAII). The BC Act establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments. Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the Biodiversity Assessment Method (BAM). A Biodiversity Values Map and Biodiversity Offsets Scheme Entry Threshold (BOSET) tool are available to identify the presence of mapped biodiversity values within land proposed for development as well as the clearing thresholds that would trigger application of the BAM. A review of the BOSET was undertaken on 31st August 2022 and determined that areas within the Project area are mapped as Areas of Biodiversity Values. These areas are associated with creek lines across both Sites, and Plains Wanderer habitat within the Mungadal East Site. The Biodiversity Offsets Scheme applies to state significant development and state significant infrastructure projects, unless the Secretary of the Department of Planning, Industry and Environment determines that the Proposal is not likely to have a significant impact. As this is an SSD development and there are recorded

biodiversity values within the Project Area, application of the BAM and the preparation of a Biodiversity development assessment report (BDAR) will be required.

Local Land Services Act 2013

The Local Land Services Act 2013 (LLS Act) regulates the management of vegetation on rural land. The amendments to the LLS Act have resulted in a change to the criteria for native vegetation clearing. There are now three different land categories for clearing on rural land:

- Category 1 – 'Exempt land' which will not be subject to clearing approval;
- Category 2 – 'Regulated Land' on which clearing of native vegetation may be carried out with or without approval in accordance with an 'allowable activity' or 'code' under the LLS Act, and
- 'Excluded Land' – Land not categorised in the Regulatory Maps and to which the LLS Act does not apply.

A review of the Native Vegetation Regulatory Map (Regulatory Map) confirms that the areas of Category 2 - Regulated Land and Category 2 – Sensitive Land exist within the Project area. This will be further explored as part of the EIS process.

Biosecurity Act 2015

The NSW *Biosecurity Act 2015* came into effect on 1 July 2017, effectively replacing the *Noxious Weeds Act 1993*, and 13 other Acts, with a single Act. Under the Noxious Weeds Act all landowners had a responsibility to control noxious weeds on their property. Under the Biosecurity Act broadly the same responsibility will apply and will be known as a General Biosecurity Duty.

The General Biosecurity Duty states "*Any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised*." The general biosecurity duty applies to all weeds listed in Schedule 3 of the Biosecurity Act. Primary weeds have been identified in different Local Government Areas (LGA) due to the level of threat infestation they represent, some of the Weeds of National Significance (WoNS) are also listed as Primary Weeds in LGAs.

A strategic plan for each weed will be required at each site to define responsibilities and identify strategies and actions to control the weed species. These can be downloaded from: http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html

Fisheries Management Act 1994

The *Fisheries Management Act 1994* provides for the conservation, protection and management of fisheries, aquatic systems and habitats in NSW. Similar to the BC Act, the *Fisheries Management Act 1994* lists threatened species, populations and ecological communities of fish and marine vegetation. Consideration of likely occurrence of threatened fish in the waterways in the Project Area will be provided within the EIS although it is noted that the Abercrombie Creek running through the Project Area provides habitat for the threatened Flathead Galaxias and Silver Perch.

Schedule 6 of the *Fisheries Management Act 1994* also lists the following key threatening process that may be relevant to this Proposal and will be addressed within the EIS:

- Degradation of native riparian vegetation along New South Wales water courses;
- Human-caused climate change; and
- Removal of large woody debris from New South Wales Rivers and streams.

Any waterway crossings will need to consider an appropriately designed structure that does not obstruct fish passage and will be designed in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management and the Policy and Guidelines for Fish Friendly Waterway Crossings. Notwithstanding this, it is noted that a permit under section 219 would not be required for waterway crossings as Section 5.23 of the EP&A Act excludes SSD projects from requiring "a permit under section 201, 205 or 219 of the Fisheries Management Act 1994".

3. METHODOLOGY

3.1 Desktop Review

The desktop review included the following resources:

- Online Threatened Biodiversity Data Collection (TBDC), including NSW BioNet Atlas, Vegetation Information System (VIS) Database and threatened biodiversity profiles. Accessed 27th July 2021 and 31 August 2022;
- Commonwealth Department of Climate Change, Energy, the Environment and Water (CCEEW) Protected Matters Search Tool (PMST) identifying threatened species and communities with potential to occur within the locality (10 km buffer around the Project Area). Accessed 20th July 2021;
- NSW SEED Portal to identify Plant Community Types (PCT), threatened species or communities known or likely to occur; Mitchell Landscapes, map of Interim Biographic Regionalisation of Australia (IBRA) version 7;
- NSW eSPADE Soils and Land Mapping;
- NSW DPI Fisheries key fish habitat mapping;
- Bureau of Meteorology Groundwater Dependent Ecosystem Atlas;
- Weeds of National Significance and Priority Weeds within the LGA;
- NGH (2019) Preliminary Biodiversity Constraints assessment. Report Prepared for ENGIE;
- Atlas of Living Australia (ALA) Database; and
- Local government databases.

The results of the Protected Matters Search Tool database search is included in Appendix A.

3.2 ERM Field Surveys

For the Preliminary Biodiversity Assessment, the areas targeted during the ERM field surveys has been defined as a 100m buffer to turbines, and 50m to all remaining project infrastructure, including access tracks, overhead transmission line, substation and crane hard stands. This area is defined as the 'Subject Land' in accordance with the definition in the Biodiversity Assessment Method (BAM) 2020, which includes land that is subject to a development, activity or clearing. It is noted that the Study Area presented on Figure 3.1, Figure 3.2, Figure 3.3 and Figure 3.4 was subject to field surveys. Areas outside of this boundary were not visited or targeted during survey events. This is a result of recent Project Area boundary changes, providing further landowners and properties to the Project.

The Biodiversity Assessment Method (BAM) requires targeted surveys to be completed when suitable habitat is identified for species credit species to inform the BDAR. These are species whose presence cannot be reliably predicted through PCTs or habitat types, and their presence or absence on a site must be confirmed through field survey.

A summary of the ERM field survey effort undertaken in Spring 2021, Summer 2022, Autumn 2022 and Winter 2022 is provided Table 3.5, with the location of field survey efforts undertaken shown in Figure 3.1, Figure 3.2, Figure 3.3 and Figure 3.4. It is noted that the Subject Land was updated as a result of the field survey efforts to date. This has resulted in survey efforts presented in the aforementioned figures being completed in areas that are now excluded from the current Subject Land. Further surveys efforts are scheduled to continue to inform the EIS.

3.2.1 Spring 2021 Field Survey

Spring biodiversity field surveys were completed from Tuesday 26th October to Friday 12th November 2021 by six (6) ecologists. During the survey event, the following was undertaken:

- Rapid data points for Plant Community Types (PCTs) / Threatened Ecological Communities (TECs) and vegetation zone mapping;
- Vegetation integrity plots (BAM plots);
- Targeted threatened flora surveys;
- Targeted threatened fauna surveys; and
- Bird Utilisation Surveys (BUS).

The survey period was at the end of the spring survey period and majority of the small paper daisy, yellow heads and other herbaceous species, were reduced in cover due to being at the end of the dry season. These species, while dominant on most BAM plot sites, did not record high cover estimates or abundance scores, simply because they were technically 'dead'.

Table 3.1 details the daily weather observations that were recorded for the Hay Airport weather station (located approx. 10 km north of the Project) during the field survey.

Conditions were fine for the majority of the survey period, temperatures ranged from a minimum of 3.2ºC to a maximum of 33.2ºC. These were optimal conditions for the detection of targeted fauna species. Winds were generally low and conditions clear, optimal for bird surveys and spotlighting.

Rainfall occurred on site on the 4th November and 7th November, resulting in field work being temporarily postponed until conditions cleared.

Table 3.1 Daily Weather Observations for Hay Airport Weather Station (Spring)

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
26/10/2021	3.2	25.9	0
27/10/2021	7.8	32.9	0
28/10/2021	4.4	31.1	0.2
29/10/2021	3.5	22.7	0
30/10/2021	3.5	20.6	0
31/10/2021	3.7	24.6	0
01/11/2021	8.4	28.3	0
02/11/2021	9.7	33.2	0
03/11/2021	21.6	24.2	0
04/11/2021	4.8	28.7	4.2
05/11/2021	4.0	29.7	0
06/112021	17.2	33.1	0
07/11/2021	14.0	29.2	2.8
08/11/2021	0.5	26.4	0.2
09/11/2021	7.2	28.3	0
10/11/2021	17.4	24.6	0
11/11/2021	7.5	19.5	0
12/11/2021	10.7	14.6	24.8

3.2.2 Summer 2022 Field Survey

Summer 2022 biodiversity field surveys were completed from Monday 14th February to Friday 25th February 2022 with four (4) ecologists in the field. During the survey event, the following was undertaken:

- Vegetation integrity plots (BAM plots);
- Targeted threatened fauna surveys;
- Bat detection surveys;
- Koala Spot Assessment Technique (Koala SAT); and
- Bird Utilisation Surveys (BUS).

Threatened fauna targeted during the Summer 2022 survey effort included the Australian Bustard, Glossy Black Cockatoo, Southern Myotis, Koala and Growling Grass Frog. The survey efforts required for these species were met during this survey effort, although Koala call playback surveys are planned to be undertaken in future efforts.

Table 3.2 details the daily weather observations that were recorded for the Hay Airport weather station (located approx. 10 km north of the Project) during the field survey. Prior to field survey efforts the region experienced substantial rainfall, as a result of La Niña weather systems. This increased rainfall provided ideal conditions across the site for the identification of ground cover species.

Conditions remained clear throughout the survey period however, extreme temperatures, around 40ºC, impeded species detectability on three days, particularly during BUS surveys.

Minimal rainfall of 0.6mm occurred on site on the 23rd February, this had no impact on field survey efforts.

Table 3.2 Daily Weather Observations for Hay Weather Station (Summer)

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
14/02/2022	21.9	37.5	0
15/02/2022	20.4	38.9	0
16/02/2022	22.0	39.5	0
17/02/2022	20.7	30.8	0
18/02/2022	14.7	29.1	0
19/02/2022	11.2	31.5	0
20/02/2022	13.9	33.5	0
21/02/2022	13.0	29.0	0
22/02/2022	11.8	34.1	0
23/02/2022	17.7	34.6	0.6
24/02/2022	24.3	32.8	0
25/02/2022	22.6	34.6	0

3.2.3 Autumn 2022 Field Survey

Autumn 2022 biodiversity field surveys were completed from Monday 16th May to Friday 20th May 2022 with two (2) ERM ecologists in the field. During the survey event, the following was undertaken:

- Targeted threatened flora surveys;
- Hollow Bearing Tree search; and
- Bird Utilisation Surveys (BUS).

Threatened flora targeted during the Autumn 2022 survey effort included searches for the Yellow Gum. Hollow Bearing Trees identified within the Subject Land situated higher than 3m above ground and with a diameter of 5cm or greater were recorded.

Table 3.5 details the daily weather observations that were recorded for the Hay Airport weather station (located approx. 10 km north of the Project) during the field survey.

The site experienced rain in the week leading up to the survey event, however minimal rainfall occurred during the survey period. Conditions were mostly clear, however cloud cover was present, and slight to moderate winds occurred.

Table 3.3 Daily Weather Observations for Hay Weather Station (Autumn)

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
16/05/2022	8.7	20.1	0
17/05/2022	5.1	18.3	0
18/05/2022	9.6	17.3	0.2
19/05/2022	1.9	15.5	0
20/05/2022	2.1	15.2	0

3.2.4 Winter 2022 Field Survey

Winter 2022 biodiversity field surveys were undertaken 8th – 18th August 2022 with two (2) ERM ecologists in the field. Surveys undertaken included the following:

- Targeted threatened fauna surveys; and
- BUS Surveys.

Surveys were undertaken to target threatened owl species, the Barking Owl and Masked Owl, in areas where suitable hollow bearing trees were identified during the autumn survey event.

During the field surveys conditions were clear with light to moderate winds occurring, however the site received rainfall prior to and during the survey period. Weather conditions are presented in Table 3.4, noting rainfall is presented as precipitation recorded in the 24 hours to 9am.

On the 15th August, surveys were undertaken until 3:15pm when rainfall resulted in unsafe driving conditions on site, subsequently night surveys were not completed and the site was not accessed on the 16th August. Additionally, rainfall affected surveys on the final survey night, 18th August, surveys were concluded at 7:00pm when conditions resulted in access restrictions.

Table 3.4 Daily Weather Observations for Hay Weather Station (Winter)

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
08/082022	0.5	16.4	4.8
09/08/2022	-1.1	16.3	0.2
10/08/2022	-2.2	17.0	0
11/08/2022	7.4	12.4	0.2
12/08/2022	7.1	18.9	2.6
13/08/2022	8.1	14.9	0.2
14/08/2022	4.1	17.1	0
15/08/2022	4.1	15.0	0
1608/2022	5.0	16.9	7.2
17/08/2022	1.2	18.3	0.6
18/08/2022	8.0	19.9	0
19/08/2022	7.0	15.6	8.6

Table 3.5 Summary of Survey Methods and Effort

Survey Method	Methodology	Effort Required	Effort Completed to date	Targeted species	Season	Timing	Habitat
Fauna							
Targeted Surveys	Targeted area searches for detection of the target species by sight or call conducted in suitable habitat. Observations of signs of species presence (bark stripping, scratches, pellets), suitable roosting and nesting sites recorded within each survey site location.	40 hours across 10 days	40.25 hours across 10 days	Glossy-black Cockatoo	Summer 2022	Morning/ afternoon.	Search for signs of feeding or nests.
		40 hours across 10 days	43 hours across 10 days	Regent Parrot	Spring 2021	Morning/ afternoon.	Hollow bearing trees Living or dead *E. camaldulensis* with hollows greater than 5 cm diameter, greater than 5 m above the ground OR trees with DBH of greater than 40cm, within 1 km of watercourses or billabongs. Trees can be isolated but within 20 km of mallee.
		40 hours across 10 days	43 hours across 10 days	Superb Parrot	Spring 2021	Morning/ afternoon.	Hollow bearing trees Living or dead *E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta* with hollows greater than 5cm diameter greater than 4m above ground or trees with a DBH of greater than 30cm.
Diurnal Area Searches	Diurnal area searches conducted in suitable habitat in and around the survey area for the detection of targeted avian species by sight, call or indirectly by a range of signs (eg. Raptor nests, prey remains, white wash)	40 hours across 10 days in spring 40 hours across 10 days in winter	35 hours across 10 days in Spring	Bush Stone-curlew White-Bellied Sea-eagle Little Eagle Square-tailed Kite Glossy Black-cockatoo Major Mitchell's Cockatoo	Spring 2021	Morning and evening	Alluvial plains and plains
		40 hours across 10 days	26.5 hrs across 10 days	Australian Bustard	Summer 2022	Morning and evening	
Call Playback	At each survey location species call is played for 30 seconds, followed by 4.5 minutes of listening and spotlighting. This is repeated in 5 minute cycles 3 times.	6 sites, each visited a minimum of five times. 15 min per site	13 sites, visited once, 15 minutes at each sites	Bush Stone-curlew	Spring 2021	Dusk/dawn	Fallen/standing dead timber including logs *Not windy or wet evening
	Five-minute listening period, followed by call playback session of five minutes of intermittent calls for each of the targeted species, followed by 20-minute period of listening during which spotlighting is conducted. Sites located at least 1km apart.	6 sites, each visited a minimum of five times. 15 min per site	6 sites, each visited 5 times. 15 min per site	Barking Owl	Winter 2022	Night	Eucalypt forests and woodlands
		40 hours across 10 days	Proposed Spring 2022	Koala	Proposed Spring 2022	Dusk/dawn	Eucalypt forests and woodlands
		6 sites, each visited a minimum of five times. 15 min per site	6 sites: 2 x visited 8 times 4 x visited 7 times 15 min per site	Masked Owl	Winter 2022	Night	Eucalypt forests and woodlands Hollow bearing trees Living or dead trees with hollows greater than 20cm diameter. *Not windy or wet evening
Aural-visual survey	The NSW survey guidelines for threatened frogs (DPE 2020) recommends aural-visual transect surveys be undertaken along the edges of suitable breeding habitat	Two ecologists 8 hours x nine survey efforts	Two ecologists – 4 hours across 4 nights. 2 x sites, 30 minutes at each site per night.	Growling Grass Frog	Summer 2022	Night	Waterbodies with emergent aquatic vegetation and connected vegetation

Survey Method	Methodology	Effort Required	Effort Completed to date	Targeted species	Season	Timing	Habitat
Anabats	Anabats are to be deployed in accordance with the 'Survey Guidelines for Australia's Threatened Bats' (Reardon, 2010). The guidelines require Anabats to be positioned approximately 2 m above ground level and directed toward open areas considered likely flight paths for microcheroptera.	12 detectors for 10 nights	8 detectors: - 7x11 nights - 1x 9 nights	Southern Myotis	Summer 2022, Proposed Spring 2022	Night	Habitat within 200m of a waterbody with pools 3m or wider
		10 detectors for 9 nights	8 detectors: - 7x11 nights - 1x 9 nights	Microcheropteran species	Summer 2021. Proposed Spring 2022	Night	
Night Transect Searches (Spotlighting)	Driven transects undertaken in suitable grassland habitat within the subject area. These surveys are conducted at night from a very slow moving vehicle (<5km/h). Spotlights are used to search for the species.	24 hours across 6 days (in areas less than 50 km)	2 nights of surveys	Plains-wanderer	Spring 2021	Night	Favours grasslands typically with the following conditions: about 50 per cent bare ground and 10 per cent fallen litter, with the remaining 40 per cent made up of short herbs and grasses; grass tussocks spaced 10–20 cm apart; most of the vegetation below 5 cm high but some up to a maximum of 30 cm (important for concealment).
Spot Assessment Technique (SAT)	SAT surveys involve a point-based, tree sampling methodology that utilises the presence/absence of koala faecal pellets at the base of trees within a prescribed search area. Each search area includes thirty trees surrounding a central point, with each tree sampled being one of live woody stem (except palms, cycads, tree ferns and grass trees) of minimum 200mm diameter at breadth height (DBH).	30 SAT sites, with 30 minutes per SAT sampling site	26 SAT sites	Koala	Summer 2022	Daytime	Eucalypt open forest and woodland
BUS Surveys	The methods adopted for the Bird Utilisation Survey (BUS) were consistent with the requirements for a 'Level One' bird risk assessment (AusWEA 2005). This approach has been endorsed in the AusWEA Best Practice Guidelines (2007). The BUS method involved observers stationed at a fixed survey point for 20 minutes, recording abundance of all large bird species observed within 800m and all small birds within 100m. For each observation, flight height was documented. All birds are identified to the species level, either through direct observation or identification of calls	20 minutes per location, allowance for 100 locations across the Project Area	28 BUS in Spring 27 BUS in Summer 28 BUS is Autumn 28 Bus in Winter = Total 111 Completed	All threatened and non-threatened birds	Spring 2021, summer 2022, autumn 2022 and winter 2022	Dusk/dawn	On or nearby wind turbine locations
Flora							
Vegetation Integrity Plots (BAM Plots)	Plot-based floristic surveys were conducted in accordance with s.5.2.1.9 of the BAM. Survey plots were established around a central 50 m transect and each included: A 20 m x 20 m plot sampled for the presence of flora species. The plots were carefully examined to identify all flora species present. This search continued until it was confident that all flora species within the plots were detected. One 1000 m^2 (20 m x 50 m) plot to assess the function attributes: number of large trees, stem size class, tree regeneration and length of logs. Five 1 m^2 sub-plots to assess average litter cover (and other groundcover components).	-	15 x BAM Plots in Spring 2021 80 x BAM Plots in Summer 2022 = Total 95	N/A	N/A	N/A	All PCTs

Survey Method	Methodology	Effort Required	Effort Completed to date	Targeted species	Season	Timing	Habitat
Parallel field traverses	Parallel field traverses involved searching across areas of suitable habitat for each targeted plant species. Transects are walked in high quality habitat, and occasionally driven transects are undertaken in low-moderate habitat.	*Note survey effort will need to be focused on the development footprint to support the BDAR. Additional survey effort will be required utilising the Two-phased Grid Based or transect sampling methodology to supplement locations surveyed in Spring 2021. This survey will inform the BDAR..	Parrellel transects were undertaken over 6 hours	*Austrostipa wakoolica* A spear-grass *Brachyscome muelleroides* Claypan Daisy *Brachyscome papillosa* Mossgiel Daisy *Caladenia arenaria* Sand-hill Spider Orchid *Convolvulus tedmoorei* Bindweed *Diuris tricolor* Pine Donkey Orchid *Eucalyptus leucoxylon* subsp. *pruinosa* Yellow Gum *Lepidium monoplocoides* Winged Peppercress *Leptorhynchos orientalis* Lanky Buttons *Maireana cheelii* Chariot Wheels *Pilularia novae-hollandiae* Austral Pillwort *Sclerolaena napiformis* Turnip Copperburr *Solanum karsense* Menindee Nightshade *Swainsona murrayana* Slender Darling Pea *Swainsona plagiotropis* Red Darling Pea *Swainsona sericea* Silky Swainson-pea	Spring 2021, Proposed Spring 2022	N/A	All PCTs

STURT HIGHWAY
CLENCOE ROAD
JERILDERIE ROAD
COBB HIGHWAY
ROWANTI ROAD
COBB HIGHWAY

CB10 CB12 CB11 T12 D11 T11 BUS02 BUS01 BUS19 BUS18 BUS24 CB01 T10 BUS03 T09 CB02 D01 CB03 T08 CB04 T07 D02 BUS04 BUS05 D03 D04 T14 BUS17 D07 BUS06 D05 BUS16 BUS15 T13 T02 BUS07

BUS27 BUS26 BUS28 BUS25 BUS13 D12 BUS11 T05 T06 D13 BUS12 BUS22 BUS20 BUS21 BUS23 CB08 T01 D08 D09 BUS10 CB07 D06 BUS14 D10 CB09 BUS08 T03 CB06 CB05 T15 BUS09 T04

Legend

- Bird Utilisation Survey
- Call Playback Survey
- Diurnal Bird Survey
- Targeted Bird Survey
- Plains-wanderer Transect
- Threatened Flora Transect
- Plains Renewable Energy Park Indicative Boundary
- Study Area
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Field Survey Locations (Spring 2021)

3-1

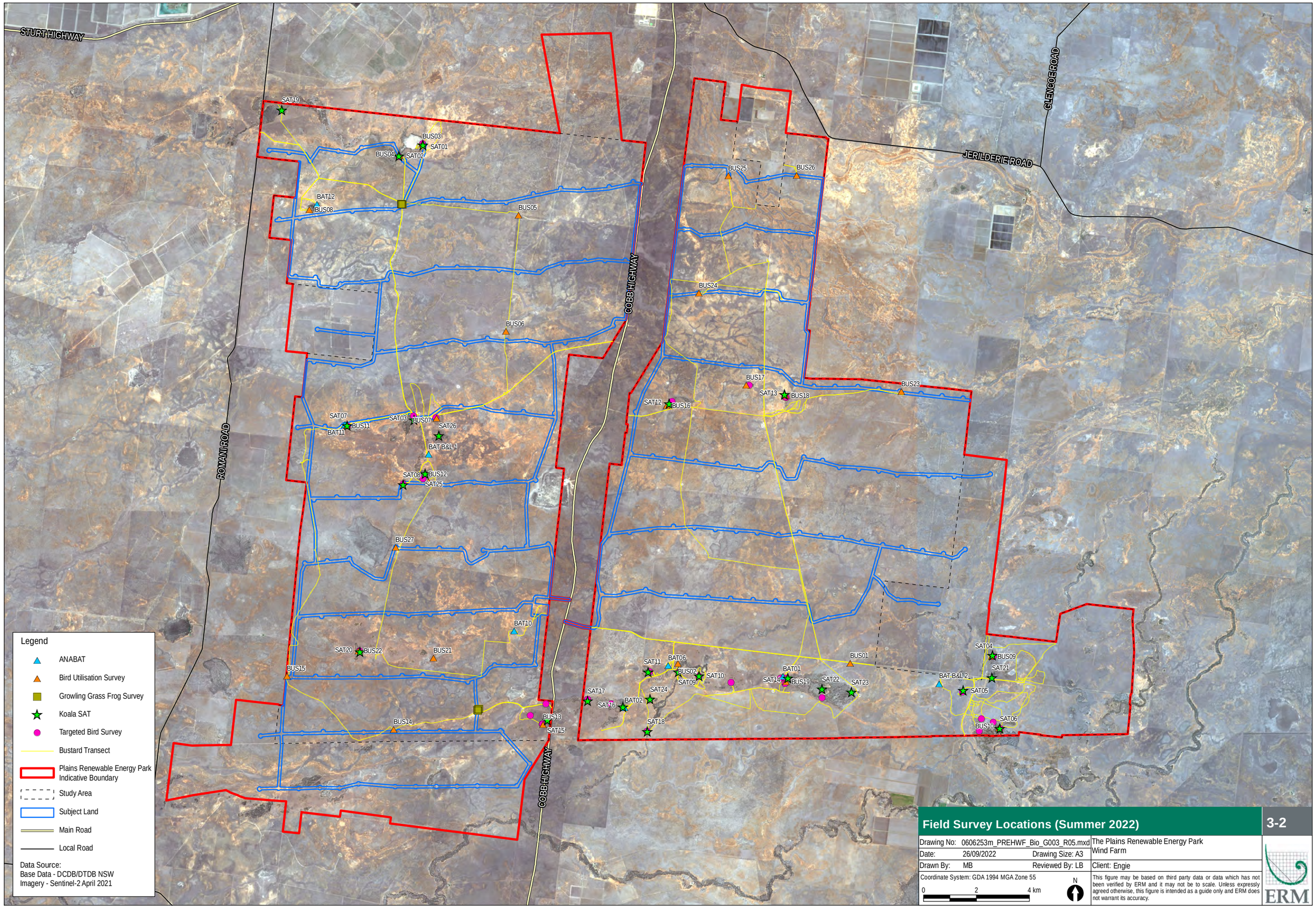
Drawing No:	0606253m_PREHWF_Bio_G002_R05.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM



Field Survey Locations (Summer 2022)

3-2

Drawing No:	0606253m_PREHWF_Bio_G003_R05.mxd	The Plains Renewable Energy Park Wind Farm	
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

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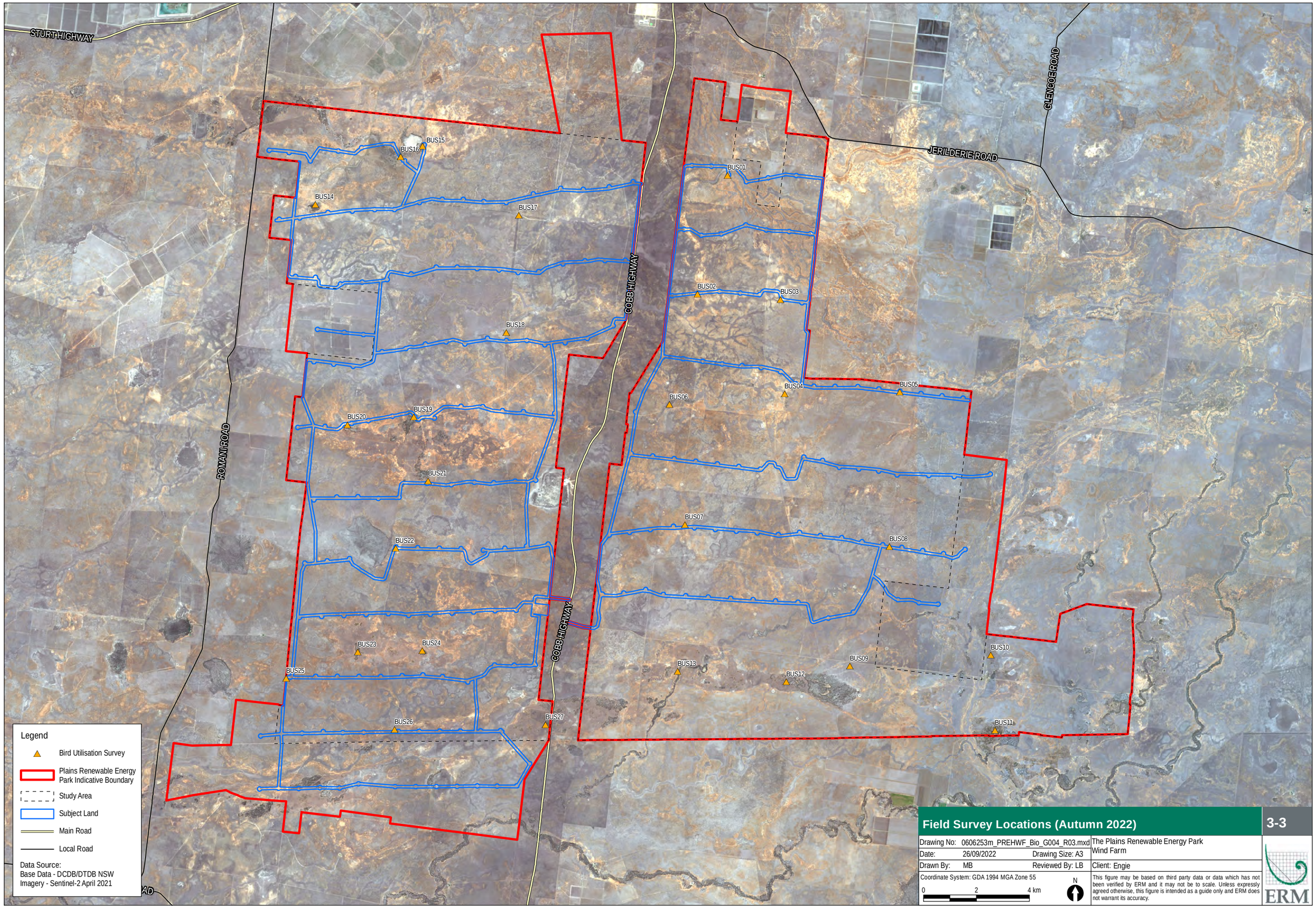
ERM


STURT HIGHWAY
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COBB HIGHWAY
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BUS24
BUS25
BUS26
BUS27
Legend
Bird Utilisation Survey
Plains Renewable Energy Park Indicative Boundary
Study Area
Subject Land
Main Road
Local Road
Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
Field Survey Locations (Autumn 2022)
3-3
Drawing No: 0606253m_PREHWF_Bio_G004_R03.mxd
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: LB
The Plains Renewable Energy Park Wind Farm
Client: Engie
Coordinate System: GDA 1994 MGA Zone 55
0 2 4 km
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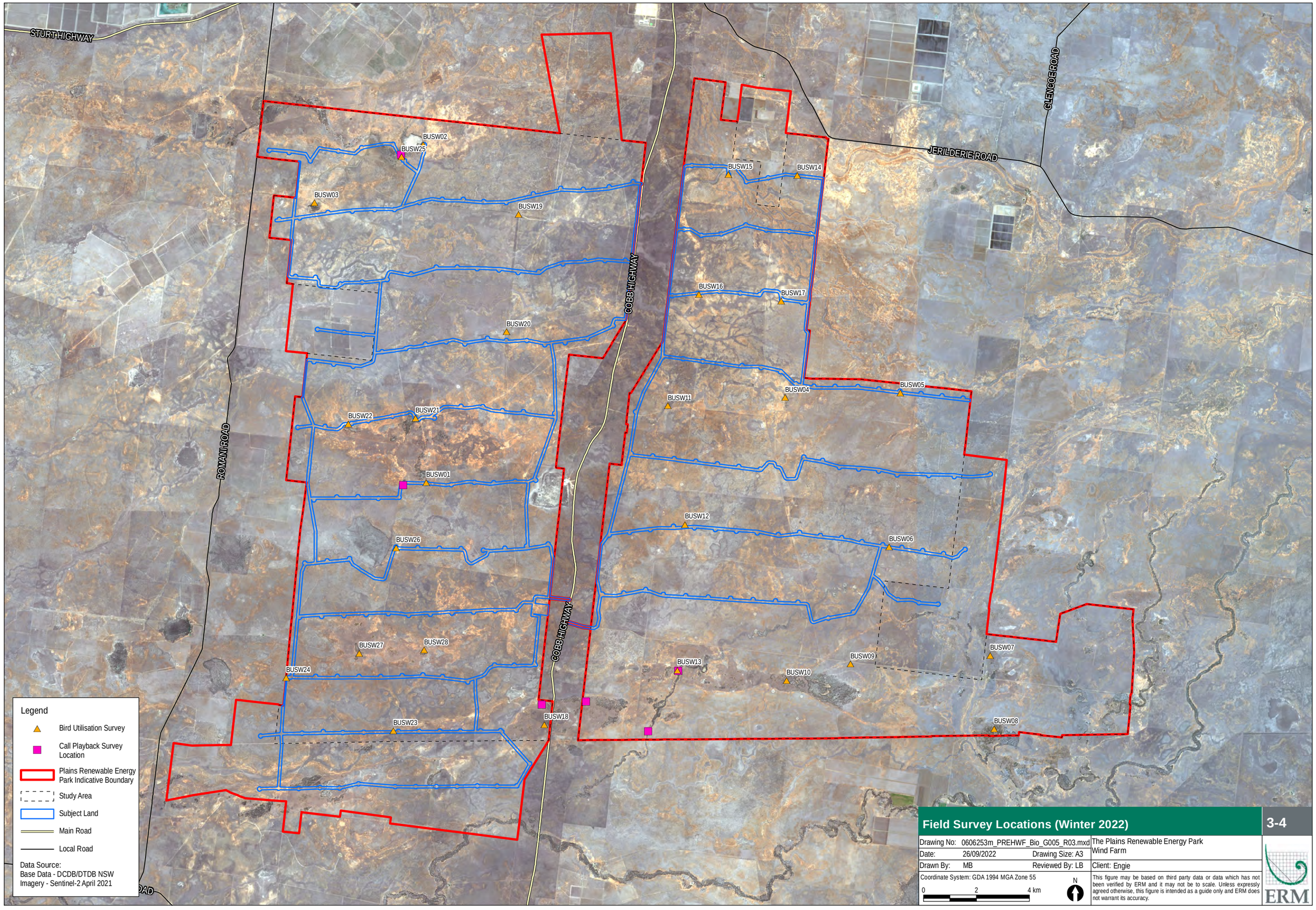
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM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JERILDERIE ROAD
CLENCOE ROAD
ROMANI ROAD
COBB HIGHWAY
COBB HIGHWAY
BUSW01
BUSW02
BUSW03
BUSW04
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BUSW26
BUSW27
BUSW28
Legend
Bird Utilisation Survey
Call Playback Survey Location
Plains Renewable Energy Park Indicative Boundary
Study Area
Subject Land
Main Road
Local Road
Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
Field Survey Locations (Winter 2022)
3-4
Drawing No: 0606253m_PREHWF_Bio_G005_R03.mxd
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: LB
The Plains Renewable Energy Park Wind Farm
Client: Engie
Coordinate System: GDA 1994 MGA Zone 55
0
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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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3.3 Likelihood of Occurrence

A preliminary likelihood of occurrence assessment was undertaken for the Project Area, informed by desktop sources (PMST and BioNet search results within 10 km) and the field survey results. Desktop sources identified a number of fauna and flora species listed under the EPBC Act and BC Act that have been recorded previously or are predicted to occur within a 10 km buffer of the Project Area. The likelihood of occurrence approach refines the desktop generated list using site-specific and species-specific habitat information.

The assessment ranks the likelihood of the species occurring within the Project Area through analysis of species distribution information and the presence of specific habitat attributes as identified through the desktop analysis and field survey.

The criteria applied are outlined in Table 3.6. The preliminary likelihood of occurrence assessment is provided in Appendix C of this report.

Table 3.6 Likelihood of Occurrence Criteria

Factor	Preferred habitat exists	Suitable habitat exists[1]	Habitat does not exist[2]
Records within Project Area	Known	Known	Known
Records in the locality[3]	Likely	Potential	Unlikely
No records in the locality, but Project Area is within known distribution	Potential	Unlikely	Unlikely
No records in the locality, and Project Area is outside of distribution	Unlikely	Unlikely	Unlikely

1. *Habitat may be considered suitable, but not preferred.*
2. *Based on sources reviewed and/or field survey results.*
3. *'Locality' refers to a 10 km buffer of the Project Area.*

3.4 Assumptions and Limitation

The field and desktop assessments provide an overview of the biodiversity values that exist within the Project Area. Surveys were undertaken at discrete locations to gain a general understanding of the types of species and habitat features that occur. Not all portions within the Project Area could be visited during the field survey. It is also noted that wet weather conditions during survey events prevented safe access to the site.

The absence of a species from a database list or observational studies does not confirm its absence within the Project Area. The lack of existing records from databases is more likely to indicate a low historic sampling effort in the region, as opposed to an absence of species. Future targeted biodiversity surveys will be completed to inform the EIS.

To overcome these limitations, the likelihood of occurrence is based on the precautionary approach and identifies species that have the potential to occur rather than relying on species sightings alone.

4. BIODIVERSITY VALUES

This chapter summarises the results of the desktop review and field investigations used to understand and assess the potential biodiversity values present within the Project Area. Key landscape features and a summary of biodiversity values within the Project Area are summarised in Table 4.1.

Table 4.1 Summary of Landscape Features and Biodiversity Features

Landscape feature	Summary notes
IBRA Bioregion IBRA Sub-region	Riverina (RIV) Bioregion Murrumbidgee (RIV02) Sub-region
Landuse and history of disturbance	Areas within the Project Area have been subject to extensive clearing for agricultural purposes including cropping and modified pastures for livestock grazing. Small to medium vegetation patches are present across the site. These include intact and remnant vegetation, and riparian vegetation associated with old creek beds.
Vegetation	The Project Area is characterised by a mix of disturbed and intact shrublands, improved pasture and small to medium intact and remnant patches of grasslands and woodlands. Based on the results of the field surveys, 13 Plant Community Types (PCT) have been recorded within the Subject Land (PCTs 13, 15, 17, 28, 46, 70, 153, 157, 159, 160, 163, 164, and 216). Of these vegetation communities, four (4) have association with BC Act listed TECs (PCTs 28, 153, 160 and 163). During field surveys two (2) TECs were identified as occurring within the Project Area: ■ Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South (Listed as endangered under the BC Act); and ■ Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Listed as endangered under the BC Act and EPBC Act). During the design process, the Myall Woodlands TEC has been completed avoided and is not present within the Subject Land. Large areas of Sandhill Pine Woodland TEC have also been avoided, with the Subject Land only intersecting 19.85 ha of the TEC.
Threatened species	Thirteen threatened species were identified within the Project Area during the field surveys. These include: ■ White-fronted Chat (*Epthianura albifrons*), listed as vulnerable under the BC Act; ■ Spotted Harrier (*Circus assimilis*), listed as vulnerable under the BC Act; ■ Black Falcon (*Falco subniger*), listed as vulnerable under the BC Act; ■ Grey-crowned Babbler (*Pomatostomus temporalis*) listed as vulnerable under the BC Act; ■ Chariot Wheels (*Maireana cheelii*), listed as vulnerable under the BC Act and EPBC Act; ■ Winged Peppercress (*Lepidium monoplocoides),* listed as endangered under the BC Act and EPBC Act; ■ Mossgiel Daisy (*Brachyscome papillosa*), listed as vulnerable under the BC Act and EPBC Act; ■ Slender Darling-pea (*Swainsona murrayana*), listed as vulnerable under the BC Act and EPBC Act; ■ Corben's Long-eared Bat* (*Nyctophilus corbeni*), listed as vulnerable under the BC Act and EPBC Act; ■ Southern Myotis* (*Myotis macropus*), listed as vulnerable under the BC Act; ■ Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Listed as vulnerable under the BC Act;

Landscape feature	Summary notes
	■ Little Eagle (*Hieraaetus morphnoides*), listed as vulnerable under the BC Act; and ■ Plains-wanderer (*Pedionomus torquatus*) listed as endangered under the BC Act and critically endangered under the EPBC Act. **species presence 'possible' from call recording* The following species were identified to be likely to occur within the Project Area based on the Likelihood of Occurrence Assessment: ■ Grey Falcon (*Falco hypoleucos*), listed as endangered under the BC Act; and ■ Growling Grass Frog (*Litoria raniformis*), listed as endangered under the BC Act and vulnerable under the EPBC Act. Further field surveys will be conducted in accordance with the BAM to inform an EIS.
Areas of Geological Significance	There are no karst, caves, crevices, cliffs or other areas of geological significance within the Project Area.
Areas of Outstanding Biodiversity Value (AOBV)	There are Areas of Outstanding Biodiversity Value (AOBV) within the Project Area. These areas are associated with creek lines which run through the Project Area and Plains-wanderer habitat mapped within the Project Area. During Spring 2021 and Summer 2022 field surveys, all creek lines were observed to be dry, despite substantial rainfall during the winter, spring and summer seasons.
Aquatic habitat	NSW Hydrography mapping shows the Project Area consisting of creek lines, drainage lines and natural waterbodies. Farm dams and irrigation drains are also present across the agricultural landscape. Creeks on site include: ■ Telegraph Creek; ■ Abercrombie Creek; and ■ Curtains Creek. During all field surveys it was observed that creek lines were presented only as dried creek beds, despite significant rainfall surrounding all survey seasons due to La Niña experienced during 2021 and 2022. Indirect impacts and sensitive creek crossing designs will be considered as part of the EIS.
Habitat Values	The Project Area consists of patches of remnant treed vegetation which provides important refuge, foraging, and nesting habitat for fauna in an otherwise open landscape. All areas of Black Box and River Red Gum within the Project Area were observed to contain high abundance of mature hollow-bearing trees. The site provides high quality shrub and grassland habitat important for avian and reptile species including the EPBC Act listed critically endangered Plains-wanderer. Artificial watered dams and drainage lines are present across the landscape and provide an important water resource for fauna.

4.1 Vegetation Communities

The Riverina Bioregion is characterised by extensive riverine floodplains, and is often dominated by chenopod shrublands and grasslands. The climate is semiarid with low, winter-dominant rainfall, hot summers and cool winters. Large portions of land within the Project Area have been disturbed, and are characterised by grazed native and modified grasslands resulting from vegetation clearing and livestock grazing.

A review of the state vegetation type mapping (SVTM) for the Riverina region (Version v1.2 - VIS_ID 4469) was undertaken to access existing vegetation mapping information within the Project Area. This mapping was further refined based on the ERM Spring 2021 and Summer 2021 survey observations and BAM plot data recorded within the Project Area.

Vegetation outside the Project Area are yet to be ground-truthed, this is scheduled to be undertaken in the proposed Spring 2022 field survey event. In the interim, the SVTM (Version v1.2 - VIS_ID 4469) has been used for these areas. Field survey data and SVTM has resulted in a total of 16 PCTs being identified across the Project Area, with 14 of these being identified within the Subject Land. Table 4.2 below lists these PCTs and their area (ha), and Figure 4.1 presents vegetation mapping within the total Project Area and 20% of the Subject Land.

During field surveys two (2) areas were observed to be fenced off with revegetation being undertaken, one making up PCT 28 and PCT 15 and the other a mix of planted local native vegetation. These areas are presented in Figure 4.1.

The dominant vegetation type across the Project Area has been identified as PCT 164, 'Cotton Bush open shrubland of the semi-arid (warm) zone', which covers 34463.70 Ha, 58% of the Project Area. The second most dominant community identified is PCT 163, 'Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones' this PCT makes up 19% of the Project Area.

Stands of woodland vegetation across the Project Area and Subject Land provide important refuge, foraging, and nesting habitat for fauna in an otherwise open landscape. All areas of Black Box (*Eucalyptus largiflorens*) and River Red Gums (*Eucalyptus camaldulensis*) were observed to contain high abundance of mature hollow-bearing trees.

Ninety-five vegetation integrity plots (BAM plots) have been completed across the current Project Area (Figure 4.1) to collect floristic data to identify and map PCTs. Further collection of BAM plots will be undertaken to meet the BAM requirements and will be completed in subsequent survey periods to inform the BDAR and EIS to inform the designation of vegetation zones.

4.2 Threatened Ecological Communities

Four (4) EPBC Act Threatened Ecological Communities (TECs) were identified as part of the desktop assessment in the Protected Matters Search Tool as having the potential to occur within the Project Area. These TECs include:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia;
- Weeping Myall Woodlands;
- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions; and
- Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions.

Six (6) TECs listed under either the BC Act and/or EPBC Act have the potential to occur based on their association with PCTs recorded on site, as presented in Table 4.3.

Based on the ERM field surveys, two (2) TECs were confirmed to occur within the Project Area and are presented in Figure 4.3 and Figure 4.4:

- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions, listed as endangered under the BC Act and EPBC Act; and
- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions, listed as endangered under the BC Act.

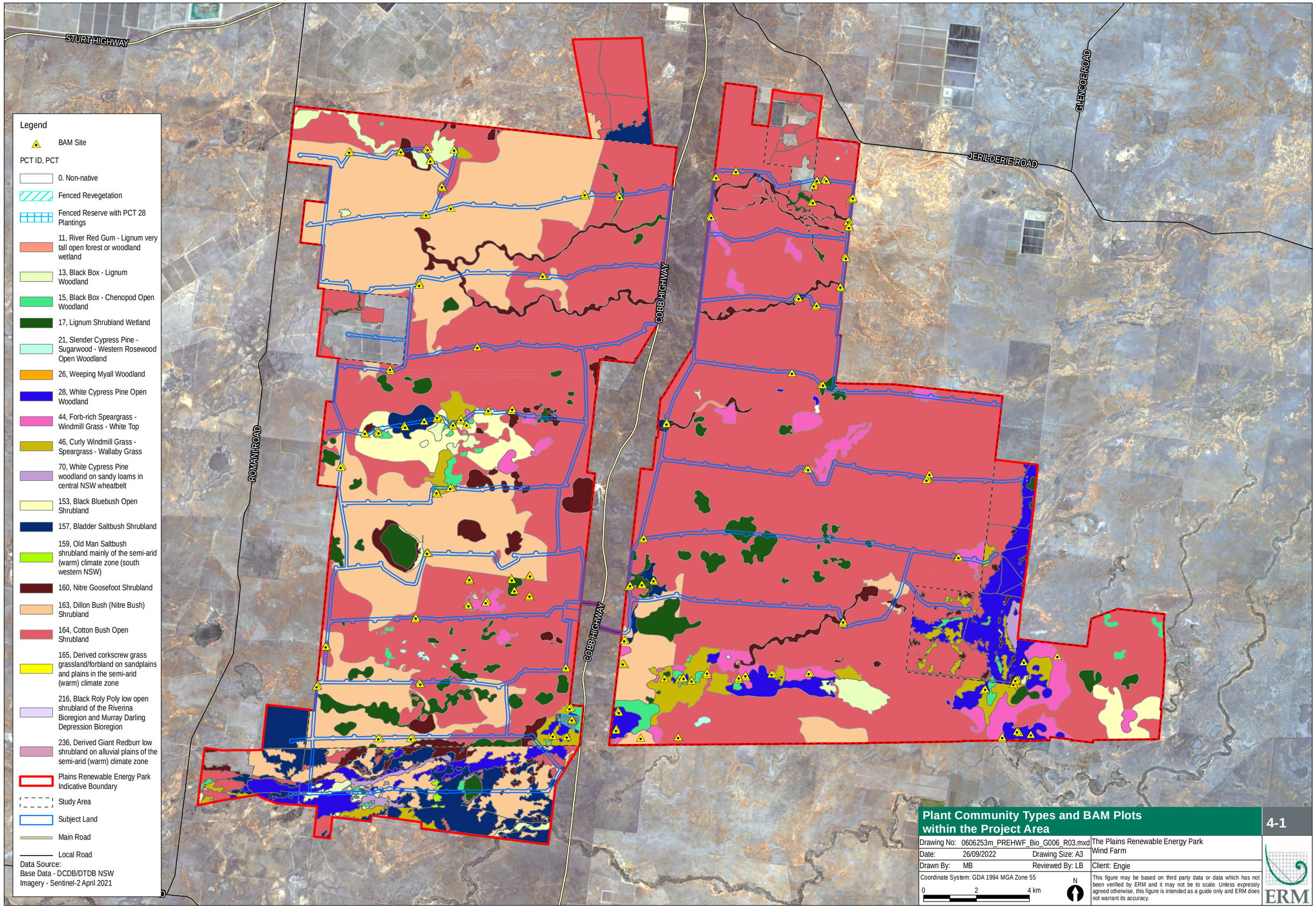
Table 4.2 Plant Community Types within the Project Area and Subject Land

PCT No.	PCT Name	Vegetation Class	BAM Plots completed	Project Area (ha)	20% of Subject Land (ha)
0	Non Native Vegetation	-	0	1018.48	6.10
11	River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Riverine Forest	0	20.26	-
13	Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Woodlands	3	645.04	3.70
15	Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Woodlands	6	407.77	1.26
17	Lignum shrubland wetland of the semi-arid (warm) plains (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Shrublands	6	1904.27	13.05
21	Slender Cypress Pine - Sugarwood - Western Rosewood open woodland on sandy rises mainly in the Riverina Bioregion and Murray Darling Depression Bioregion	Riverine Sandhill Woodlands	0	39.74	-
26	Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Riverine Plain Woodlands	2	15.67	-
28	White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Riverine Sandhill Woodlands	9	2003.57	3.97
44	Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Riverine Plain Grassland	10	1175.11	5.68
46	Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	Riverine Plain Grasslands	7	175.23	4.14
70	White Cypress Pine woodland on sandy loams in central NSW wheatbelt	Floodplain Transition Woodlands	0	1,041.09	0.44

PCT No.	PCT Name	Vegetation Class	BAM Plots completed	Project Area (ha)	20% of Subject Land (ha)
153	Black Bluebush low open shrubland of the alluvial plains and sandplains of the arid and semi-arid zones	Aeolian Chenopod Shrubland	4	1,698.74	7.69
157	Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion	Riverine Chenopod Shrublands	6	18.92	16.41
159	Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	Riverine Chenopod Shrublands	0	1,672.93	0.09
160	Nitre Goosefoot shrubland wetland on clays of the inland floodplains	Inland Floodplain Shrublands	5	11,322.10	10.50
163	Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	Riverine Chenopod Shrubland	13	34,202.61	155.12
164	Cotton Bush open shrubland of the semi-arid (warm) zone	Riverine Chenopod Shrubland	24	1,175.11	329.68
165	Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone	Riverine Plain Grasslands	0	1.48	-
216	Black Roly Poly low open shrubland of the Riverina Bioregion and Murray Darling Depression Bioregion	Riverine Chenopod Shrubland	0	4.48	0.39
236	Derived Giant Redburr low shrubland on alluvial plains of the semi-arid (warm) climate zone	Riverine Chenopod Shrubland	0	0.01	-
Total			**95**	**58,732.79**	**558.22**

Table 4.3 Known and Potential Threatened Ecological Communities

TEC	BC Act	EPBC Act	Associated PCTs	Recorded within the Project Area
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Endangered	Endangered	PCT 26, PCT 159 (Areas of PCT 26 only are confirmed to represent TEC)	✓
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	Endangered	-	PCT 28, PCT 21 (Areas of PCT 28 only are confirmed to represent TEC)	✓
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	Endangered	-	PCT 28	No
Natural Grasslands of the Murray Valley Plains	-	Critically Endangered	PCT 44, PCT 46	No
Acacia loderi shrublands	Endangered	-	PCT 153, PCT 21	No
Artesian Springs Ecological Community in the Great Artesian Basin	Critically Endangered	-	PCT 160, PCT 163	No


STURT HIGHWAY
ROMANI ROAD
COBB HIGHWAY
COBB HIGHWAY
JERILDERIE ROAD
GLENCOE ROAD
Legend
BAM Site
PCT ID, PCT
0. Non-native
Fenced Revegetation
Fenced Reserve with PCT 28 Plantings
11, River Red Gum - Lignum very tall open forest or woodland wetland
13, Black Box - Lignum Woodland
15, Black Box - Chenopod Open Woodland
17, Lignum Shrubland Wetland
21, Slender Cypress Pine - Sugarwood - Western Rosewood Open Woodland
26, Weeping Myall Woodland
28, White Cypress Pine Open Woodland
44, Forb-rich Speargrass - Windmill Grass - White Top
46, Curly Windmill Grass - Speargrass - Wallaby Grass
70, White Cypress Pine woodland on sandy loams in central NSW wheatbelt
153, Black Bluebush Open Shrubland
157, Bladder Saltbush Shrubland
159, Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
160, Nitre Goosefoot Shrubland
163, Dillon Bush (Nitre Bush) Shrubland
164, Cotton Bush Open Shrubland
165, Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone
216, Black Roly Poly low open shrubland of the Riverina Bioregion and Murray Darling Depression Bioregion
236, Derived Giant Redburr low shrubland on alluvial plains of the semi-arid (warm) climate zone
Plains Renewable Energy Park Indicative Boundary
Study Area
Subject Land
Main Road
Local Road
Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
Plant Community Types and BAM Plots within the Project Area
4-1
Drawing No: 0606253m_PREHWF_Bio_G006_R03.mxd
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: LB
The Plains Renewable Energy Park Wind Farm
Client: Engie
Coordinate System: GDA 1994 MGA Zone 55
0
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4 km
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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.
ERM

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

JERILDERIE ROAD

GLENGOE ROAD

Legend

PCT ID, PCT Name

- 26, Weeping Myall Woodland TEC
- 28, White Cypress Pine Open Woodland TEC
- Plains Renewable Energy Park Indicative Boundary
- Study Area
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Known Threatened Ecological Communities within the Project Area

4-2

Drawing No:	0606253m_PREHWF_Bio_G007_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

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4.2.1 Weeping Myall Woodlands TEC

The Weeping Myall Woodlands within the Riverina are listed as 'Endangered' under the BC Act and EPBC Act. The central Riverina district historically supported extensive stands of Weeping Myall Woodlands. It is clear that woody vegetation has declined significantly across the plains, particularly in the eastern Riverina (TSCC 2009). The Weeping Myall Woodlands have declined from an original extent of between 1 900 000 ha and 3 300 000 ha to a current extent of between 190 000 ha and 330 000 ha. This represents a considerable decline of extent within the range 83% to 94% (TSSC 2009).

The vegetation characteristics of the community are detailed in the Listing Advice for the TEC (TSCC 2009) and is provided in Table 4.4.

The Weeping Myall Woodlands TEC was confirmed within the Project Area in association with PCT 26 and covers an area of 15.67 ha within the Project Area and has been avoided in the design process of the project, therefore is not present within the Subject Land. The community present on site is dominated by Weeping Myall (*Acacia pendula*) and contains descriptive species *Rhagodia spinescens, Calotis scabiosifolia, Einadia nutans, Enteropogon acicularis* and *Maireana aphylla*.

Table 4.4 Weeping Myall Woodland Description

TEC	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions
Description	This ecological community is scattered across the eastern parts of the alluvial plains of the Murray-Darling river system. The community is also known as Boree, particularly in the southern part of its distribution. Typically, it occurs on red-brown earths and heavy textured grey and brown alluvial soils within a climatic belt receiving between 375 and 500 mm mean annual rainfall. The structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland, depending on site quality and disturbance history. The tree layer grows up to a height of about 10 metres and invariably includes *Acacia pendula* (Weeping Myall or Boree) as one of the dominant species or the only tree species present. The understorey includes an open layer of chenopod shrubs and other woody plant species and an open to continuous groundcover of grasses and herbs. The structure and composition of the community varies, particularly with latitude, as chenopod shrubs are more prominent south of the Lachlan River district, while other woody species and summer grasses are more common further north. In some areas the shrub and canopy stratum may have been reduced or eliminated by clearing or heavy grazing, leaving derived grassland that may still constitute this community.
Upper Stratum Species:	***Acacia pendula**; Alectryon oleifolius subsp. canescens; Alectryon oleifolius subsp. elongatus; Atalaya hemiglauca; Capparis mitchellii; Casuarina cristata; Eucalyptus camaldulensis subsp. camaldulensis; Eucalyptus largiflorens; Eucalyptus melliodora; Eucalyptus populnea subsp. bimbil.*
Mid Stratum Species:	*Acacia farnesiana; Acacia salicina; Acacia stenophylla; Acacia oswaldii; Amyema quandang var. quandang; Atriplex nummularia; Atriplex versicaria; Chenopodium nitrariaceum; Hakea tephrosperma; Pimelea neo-anglica; **Maireana aphylla**; Maireana decalvans; Maireana pentagona; Muehlenbeckia florulenta; Myoporum montanum; **Rhagodia spinescens**; Santalum lanceolatum; Sclerolaena muricata var. muricata.*

TEC	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions
Ground Stratum Species:	*Alternanthera denticulata; Astrebla lappacea; Astrebla pectinata; Atriplex leptocarpa; Atriplex semibaccata; Atriplex spinibractea; Atriplex stipitata; Aristida leptopoda; Austrodanthonia bipartita; Austrodanthonia caespitosa; Austrodanthonia setacea; Austrostipa aristiglumis; Austrostipa blackii; Austrostipa nodosa; Austrostipa verticillata; Calotis cuneifolia;* ***Calotis scabiosifolia var. integrifolia****; Centipeda cunninghamii; Chloris truncata; Convolvulus clementii; Craspedia variabilis; Crinum flaccidum; Crotalaria dissitiflora subsp. dissitiflora; Cullen tenax; Daucus glochidiatus sens. lat.; Dichanthium sericeum subsp. sericeum;* ***Einadia nutans subsp. nutans****; Enchylaena tomentosa;* ***Enteropogon acicularis****; Eragrostis leptostachya; Eragrostis parviflora; Eriochloa pseudoacrotricha; Eryngium paludosum; Goodenia fascicularis; Goodenia glauca; Iseilema membranaceum; Leiocarpa leptolepis; Leiocarpa panaetioides; Leiocarpa tomentosa; Lepidium pseudohyssopifolium; Marsilea hirsuta; Myriocephalus rhizocephalus; Oxalis perennans; Plantago varia; Pycnosorus thompsonianus; Rhodanthe corymbiflora; Rostellularia adscendens subsp. adscendens; Sclerolaena brachyptera; Sclerolaena limbata; Sida corrugata; Solanum esuriale; Sporobolus actinocladus; Sporobolus caroli; Sclerolaena stelligera; Swainsona galegifolia; Themeda avenacea; Verbena gaudichaudii; Vittadinia cuneata var. cuneata f. cuneata; Vittadinia cuneata var. cuneata f. minor; Wahlenbergia gracilis; Walwhalleya proluta.*
Fauna	The Weeping Myall Woodlands provide important habitat for a range of animals, including the following listed threatened species: • Superb Parrot (*Polytelis swainsonii*); • Painted Honeyeater (*Grantiella picta*); and • Bush Stone-curlew (*Burhinus grallarius*).

*Species in **bold** were recorded in PCT 26 BAM plots.

Figure 4.3 Weeping Myall Woodland community confirmed within Project Area

4.2.2 Sandhill Pine Woodlands TEC

Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions is the name given to the ecological community dominated by White Cypress Pine (*Callitris glaucophylla*). Sandhill Pine Woodland description is provided in Table 4.5 below. The community is characterised by an open tree stratum, which may be reduced to isolated individuals or may be absent as a result of past clearing (NSW OEH, 2022e). The tree layer is dominated by *C. glaucophylla*, either in pure stands or with a range of other less abundant trees or tall shrubs. The structure and species composition of the community varies depending on disturbance history and temporal variability in rainfall (DECCW, 2010).

The Sandhill Pine Woodlands EEC has been confirmed to be present within the Subject Land in association with PCT 28, covering an area of 19.85 ha. Areas of PCT 28 are dominated by *C.glaucophylla*, with many in a disturbed state, with historically cleared stands still visible via remaining stumps (Figure 4.4).

Table 4.5 Sandhill Pine Woodlands Description

TEC	Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions
Description	Sandhill Pine Woodland is an open woodland, or a derived grassland with no or scattered trees, that typically occupies red-brown loamy sands with alkaline sub-soils on prior streams, rises, source-bordering dunes, sandhills and lunettes of the alluvial plain of the Murray River and its tributaries, and on parts of the sandplain in south-western NSW. It is characterised by an open tree canopy up to 15 m high, although it may be less tall or even absent in sites where there has been past clearing or thinning. The dominant tree species, when a tree layer is present, is white cypress pine (*Callitris glaucophylla*), either in pure stands or with a range of other less abundant trees or tall shrubs. It sometimes has scattered to frequent smaller shrubs and a sparse to moderately dense and variable ground layer dominated by grasses and herbs. The structure of the community varies depending on past and current disturbances, particularly clearing, logging/silvicultural practices, grazing and soil erosion, as well as variability in rainfall over time. Sandhill Pine Woodland may occur adjacent to, and mix with, the *Allocasuarina luehmannii* (Buloke) Woodland in the Riverina and Murray–Darling Depression bioregions EEC. Vegetation with characteristics that are intermediate between Sandhill Pine Woodland and Buloke Woodland are covered collectively under the two communities
Upper Stratum Species:	The tree layer, when present, is dominated by **white cypress pine *(Callitris glaucophylla)***, either in pure stands or with a range of other less abundant trees or tall shrubs such as yarran *(Acacia melvillei), Acacia oswaldii,* **buloke *(Allocasuarina luehmannii),*** slender cypress pine *(C. gracilis subsp. murrayensis),* drooping sheoak *(A. verticillata)*, **needlewood *(Hakea leucoptera)***, hooked needlewood *(H. tephrosperma),* sugarwood *(Myoporum platycarpum),* **western rosewood *(Alectryon oleifolius subsp. canescens),*** emu bush *(Eremophila longifolia),* **wilga *(Geijera parviflora)*** and butterbush or **berrigan *(Pittosporum angustifolium).***
Mid Stratum Species:	A scattered shrub layer is sometimes present and may include *Dodonaea viscosa subsp. angustifolia,* **ruby saltbush (*Enchylaena tomentosa***), black rolypoly (*Sclerolaena muricata*) and/or bluebush (*Maireana enchylaenoides*), black bluebush (*M. pyramidata*), **thorny saltbush (*Rhagodia spinescens*),** copperburr (*Sclerolaena diacantha* and *S. obliquicuspis*) *Calytrix tetragona* and *Banksia marginata.*

TEC	Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions
Ground Stratum Species:	The ground cover is highly variable in structure and composition. It may be sparse or more continuous, depending on the history of disturbance, grazing and rainfall events. It comprises grasses, such as ringed wallaby grass (*Austrodanthonia caespitosa*), small-flowered wallaby grass (*A. setacea*), a speargrass (*Austrostipa nodosa*), **rough speargrass (*A. scabra*), curly windmill grass (*Enteropogon acicularis*)**, *Panicum effusum* and ***Paspalidium constrictum***; and forbs including **creeping saltbush (*Atriplex semibaccata*),** climbing saltbush (*Einadia nutans*), blue storksbill (*Erodium crinitum*), *Oxalis perennans*, **corrugated sida (*Sida corrugata*)** and bluebells (*Wahlenbergia* species).
Fauna	The Sandhill Pine Woodlands provide important habitat for a range of animals, including the following listed threatened species: • *Austrostipa metatoris* • Grey Falcon • Major Mitchell's Cockatoo • Western Blue-tongued Lizard

Species in **bold were recorded in PCT 28 BAM plots.*

Figure 4.4 Sandhill Pine Woodland community confirmed within Project Area

4.3 Candidate Threatened Species

In accordance with the requirements of Section 5.2 of the BAM, the BDAR will identify the habitat suitability for threatened species within the Project Area. Species that meet all the relevant criteria will be automatically populated in the BAM-C to be assessed either for ecosystem credits or species credits. No further assessment is required for those species that are unlikely to occur or where the Project Area is considered as unsuitable habitat.

- ecosystem credit species are considered likely to have suitable habitat on the subject land and must be assessed for impacts, including measures taken to avoid, minimise and mitigate impacts. These species are referred to as 'predicted species' in the BAM-C and the assessor must calculate ecosystem credits to offset any residual impacts;
- species credit species are likely to have suitable habitat on the subject land. They are referred to as 'candidate species' in the BAM-C and will require further assessment.

A preliminary list of candidate species is provided in Table 4.6.

Table 4.6 Preliminary List of Candidate Species

Scientific Name	Common Name
Fauna	
Ardeotis australis	Australian Bustard
Burhinus grallarius	Bush Stone-curlew
Calidris ferruginea	Curlew Sandpiper (breeding)
Haliaeetus leucogaster	White-bellied Sea-Eagle (breeding)
Hieraaetus morphnoides	Little Eagle (breeding)
Litoria raniformis	Growling Grass Frog (Southern Bell Frog)
Lophochroa leadbeateri	Major Mitchell's Cockatoo (breeding)
Lophoictinia isura	Square-tailed Kite (breeding)
Phascolarctos cinereus	Koala
Pedionomus torquatus	Plains-wanderer (breeding)
Polytelis anthopeplus monarchoides	Regent Parrot (eastern subspecies) (breeding)
Polytelis swainsonii	Superb Parrot (breeding)
Tyto novaehollandiae	Masked Owl (breeding)
Ninox connivens	Barking Owl (breeding)
Flora	
Austrostipa wakoolica	A spear-grass
Brachyscome muelleroides	Claypan Daisy
Brachyscome papillosa	Mossgiel Daisy
Caladenia arenaria	Sand-hill Spider Orchid
Calotis moorei	A burr-daisy
Convolvulus tedmoorei	Bindweed
Cullen parvum	Small Scurf-pea
Diuris tricolor	Pine Donkey Orchid
Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum
Lepidium monoplocoides	Winged Peppercress

Scientific Name	Common Name
Leptorhynchos orientalis	Lanky Buttons
Maireana cheelii	Chariot Wheels
Pilularia novae-hollandiae	Austral Pillwort
Sclerolaena napiformis	Turnip Copperburr
Solanum karsense	Menindee Nightshade
Swainsona murrayana	Slender Darling Pea
Swainsona plagiotropis	Red Darling Pea
Swainsona sericea	Silky Swainson-pea

Based on the habitat present within the Project Area, a wader species presented in the Candidate Species list has been excluded from further assessment. The habitat on site is not suitable for the Curlew Sandpiper, the species prefers habitat of intertidal mudflats in sheltered coastal areas and is considered unlikely to occur.

The following survey efforts have been undertaken during the Spring 2021, Summer 2022, Autumn 2022 and Winter 2022 field surveys to target the above preliminary Candidate Species.

Table 4.7 Candidate Species Survey Effort

Candidate Species	Survey Effort
Australian Bustard	Survey efforts for the Australian Bustard (*Ardeotis australis*) were met during the Summer 2022 field surveys where ecologists undertook 13.25 hours of targeted driven transects, in addition to the two field teams searching for the species during all driving activity across the Project Area during the 14 day survey period. The species was not recorded.
Bush Stone-curlew	Habitat suitable for the Bush Stone-curlew (*Burhinus grallar*ius) was observed within the Subject Land in the form of fallen dead timber, abundant in Black Box (*E.largiflorens*) vegetation. Nocturnal call playback surveys targeting the Bush Stone-curlew were completed at a suitable effort to detect this species, with no recorded observations made.
White-bellied Sea-Eagle Little Eagle Square-tailed Kite	Area searches were undertaken over 35 hours across 10 days in Spring 2021 targeting the Little Eagle (*Hieraaetus morphnoides*), White Bellied Sea-eagle (*Haliaeetus leucogaster*) and Square-tailed Kite (*Lophoictinia isura*). Bird Utilisation Surveys undertaken to date (111 surveys) also recorded all raptors observed. As a result of these surveys the Little Eagle was confirmed to be present and nesting within the Subject Land, however no White-Bellied Sea-eagles or Square-tailed Kites were recorded.
Growling Grass Frog	Audio visual surveys were undertaken targeting the Growling Grass Frog in accordance with the Survey Guidelines for Australia's Threatened Frogs during the summer 2022 survey effort. Two (2) sites where waterbodies with emergent vegetation was identified were visited 4 nights, for 30 minutes per site. No individuals were recorded.
Major Mitchell's Cockatoo Superb Parrot Regent Parrot	The field survey effort undertaken for Major Mitchell's Cockatoo (*Lophochroa leadbeateri),* Regent Parrot (*Polytelis anthopeplus monarchoides*) and Superb Parrot (*Polytelis swainsonii*) in areas of preferred habitat associated with woodland PCTs was sufficient to meet the required effort in accordance with the BAM. There were no threatened cockatoos or parrots identified during the field surveys, despite potential habitat and abundance of suitable breeding hollows. During targeted searches, other Cockatoo and Parrot species were regularly observed, including Galahs, Red-rumped Parrots and Blue Bonnets. In addition, evidence of bark stripping often caused by cockatoos was observed throughout the site.

Candidate Species	Survey Effort
Koala	Koala (*Phascolarctos cinereus*) surveys were conducted at 26 sites during the Summer 2022 field surveys. A search for Koala scats and markings were undertaken at each site in accordance with the Koala SAT method. No Koala scats or evidence of the species were recorded.
Plains-wanderer	Areas of PCT 44 and PCT 46 that met the structure requirements for the Plains-wanderer and areas mapped as Core Mapping for the species were targeted during the Spring 2021 field surveys with nocturnal spotlighting undertaken from a slow moving vehicle for two nights. As a result, sightings of two Plains-wanderer adults and one offspring were recorded. Further survey effort was not undertaken to reduce disturbance to the breeding species.
Masked Owl Barking Owl	Hollow bearing tree searches were conducted during Autumn 2022 field survey, which identified hollows suitable for the Masked Owl and Barking Owl. Six survey sites were established for the Winter 2022 survey event, with each being visited 5 nights targeting the Barking Owl and Masked Owl. Additional Masked Owl surveys were completed, making up to 7 visits to 4 sites, and 8 visits to 2 sites targeting the species.
Yellow Gum	Searches for Yellow Gum have been undertaken in all suitable habitat and stands of isolated trees across the Project Area. No Yellow Gum has been identified on site.
Spring threatened flora	6 hours of flora transects were undertaken during the Spring 2021 field survey event targeting Spring threatened flora species including the Chariot Wheels, Slender Darling-pea, Winged Pepper-cress, A Speargrass, Claypan Daisy, Mossgiel Daisy, Bindweed, Lanky Buttons, Turnip Copperburr and Menindee Nightshade. Additional surveys are needed to meet the requirements for these and additional species.

Further field surveys will be undertaken in accordance with the BAM to confirm presence or absence of threatened flora and fauna species to inform an EIS.

4.4 Threatened Species

A review of the NSW BioNet records and the ERM Spring 2021, Summer 2022, Autumn 2022, and Winter 2022 field surveys resulted in the known presence of thirteen (13) threatened species within the Project Area, these include:

- White-fronted Chat (Epthianura albifrons), listed as vulnerable under the BC Act;
- Spotted Harrier (Circus assimilis), listed as vulnerable under the BC Act;
- Black Falcon (Falco subniger), listed as vulnerable under the BC Act;
- Grey-crowned Babbler (Pomatostomus temporalis) listed as vulnerable under the BC Act;
- Chariot Wheels (Maireana cheelii), listed as vulnerable under the BC Act and EPBC Act;
- Winged Peppercress (Lepidium monoplocoides), listed as endangered under the BC Act and EPBC Act;
- Mossgiel Daisy (Brachyscome papillosa), listed as vulnerable under the BC Act and EPBC Act;
- Slender Darling-pea (Swainsona murrayana), listed as vulnerable under the BC Act and EPBC Act;
- Corben's Long-eared Bat* (Nyctophilus corbeni), listed as vulnerable under the BC Act and EPBC Act;
- Southern Myotis* (Myotis macropus), listed as vulnerable under the BC Act;
- Yellow-bellied Sheathtail-bat (Saccolaimus flaviventris), Listed as vulnerable under the BC Act;

- Little Eagle (Hieraaetus morphnoides), listed as vulnerable under the BC Act; and
- Plains-wanderer (Pedionomus torquatus) listed as endangered under the BC Act and critically endangered under the EPBC Act.

**species presence 'possible' from call recordings. Assumed presence.*

The location of these records in association with the Subject Land is presented in Figure 4.5.

Based on the Likelihood of Occurrence Assessment presented in Appendix C, the following two (2) threatened species are considered likely to occur within the Project Area:

- Grey Falcon (Falco hypoleucos), listed as endangered under the BC Act and vulnerable under the EPBC Act; and
- Growling Grass Frog (Litoria raniformis), listed as endangered under the BC Act and vulnerable under the EPBC Act.

An Assessment of Significant Impact has been completed for EPBC Act listed species considered known or likely to occur on site and is presented in Appendix E**.**

Further field surveys will be conducted in accordance with the BAM to inform an EIS.

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

Bat Species

- Southern Myotis*
- Southern Myotis*, Corben's Long-eared Bat*
- Southern Myotis*, Yellow-bellied Sheathtail-bat
- Southern Myotis*, Corben's Long-eared Bat*, Yellow-bellied Sheathtail-bat

Significant Raptor

- Black Kite
- Black Kite (nest)
- Brown Falcon (nest)
- Nankeen Kestrel
- Nankeen Kestrel (nest)
- Spotted Harrier
- Wedge-tailed Eagle
- Wedge-tailed Eagle (nest)
- Whistling Kite
- Whistling Kite (nest)
- Raptor (nest)

Ecosystem Credit Species

- Black Falcon
- Black Falcon (dead)
- Grey-crowned Babbler
- White-Fronted Chat

Species Credit Species (Fauna)

- Little Eagle
- Little Eagle (nest)
- Plains-wanderer
- Plains-wanderer (adult and chick)

Species Credit Species (Flora)

- Chariot Wheels
- Mossgiel Daisy
- Slender Darling Pea
- Winged Peppercress
- 500m Threatened Plant Buffer
- Plains-wanderer Important Area Mapping
- Plains-wanderer PCT Habitat Mapping (PCT44 and PCT46)
- Plains Renewable Energy Park Indicative Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

* Species possible based on call recording

Threatened Species known within the Project Area

4-5

Drawing No:	0606253m_PREHWF_Bio_G008_R03.mxd	The Plains Renewable Energy Park Wind Farm	
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

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ERM

4.4.1 Threatened Flora

A review of the NSW BioNet databases identified one (1) threatened flora species within the Project Area, the Winged Pepper-cress (*Lepidium monoplocoides*).

During the ERM Spring 2021 field surveys, field traverses where undertaken targeting Candidate flora species within areas of suitable habitat, as well as during the general traverses and BAM plot survey work.

As a result, the Winged Pepper-cress was observed within the Subject Land, along with three additional threatened flora species. Threatened flora species identified are provided in Table 4.8 below, and presented in Figure 4.5 and Figure 4.6. Additional records of Chariot Wheels were made during the Winter 2022 field survey. All four threatened flora species identified are considered Candidate Species under the BAM and will require additional targeted flora surveys in future survey efforts to cover areas of suitable habitat and to refine species polygon mapping.

Table 4.8 Threatened Flora Identified During Spring Surveys

Common Name	Scientific Name	BC Act Status	EPBC Act Status	Associated PCTs
Chariot Wheels	*Maireana cheelii*	V	V	44, 46, 157, and 164.
Mossgiel Daisy	*Brachyscome papillosa*	V	V	13, 15, 26, 46, 44, 160, and 163.
Slender Darling Pea	*Swainsona murrayana*	V	V	13, 15, 44, 46, 153, 157, 160, 163, and 164.
Winged Pepper-cress	*Lepidium monoplocoides*	E	E	15, 26, 28, 44, 46, 157, and 163

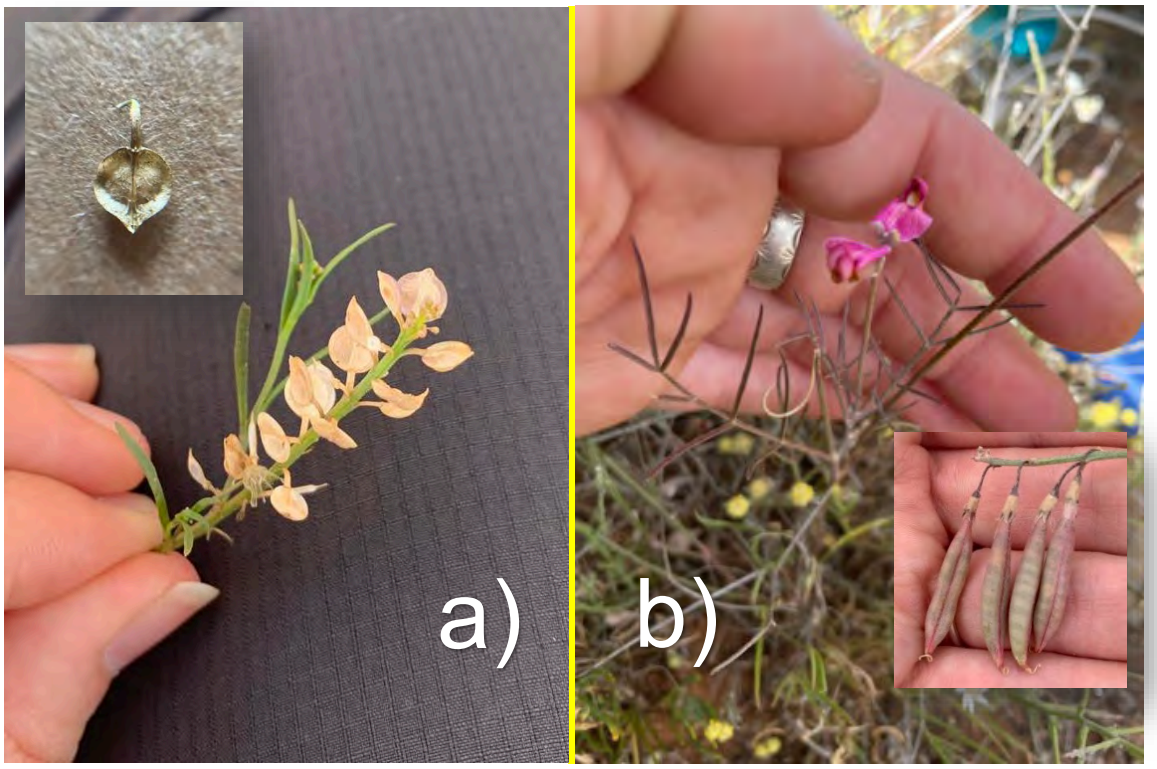


Figure 4.6 Threatened Flora Identified within Subject Land: a) Winged Pepper-cress b) Slender Darling Pea c) Chariot Wheels d) Mossgiel Daisy (large seed)

4.4.2 Threatened Fauna

A review of the NSW BioNet database and results of field surveys identified that two (2) threatened fauna species, the White-fronted Chat and Plains-wanderer have been recorded within the Project Area in the last 50 years. These species were subsequently identified during field surveys. There were multiple BioNet records of additional threatened species within 10 km of the site, these have been considered within the Likelihood of Occurrence Assessment in Appendix C. The Likelihood of Occurrence Assessment identified two (2) fauna species that are considered likely to occur within the Project Area based on records in the locality and the presence of preferred habitat, however these species were not observed during survey efforts. These species are detailed in Table 4.9.

Table 4.9 Threatened Fauna Species Likely to Occur in Project Area

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood to Occur on the Project Area	Recorded during Field Surveys
Falco hypoleucos	Grey Falcon	E	V	Likely	No
Litoria raniformis	Growling Grass Frog	E	V	Likely	No

During the ERM Spring 2021, Summer 2022, Autumn 2022 and Winter 2022 surveys, ecologists undertook targeted fauna surveys and Bird Utilisation Surveys. As a result, direct observations of six (6) threatened bird species were recorded, and call recordings were made of three (3) threatened microbat species. Of these, three (3) are Species Credit Species, which will require habitat polygons to be developed during the preparation of the BDAR. These species are detailed in Table 4.10 and record locations shown in Figure 4.5. Microbat call analysis details are provided in Appendix D and discussed in Section 4.6. Photographs of the Grey-crowned Babbler and White-fronted Chat observed within the Project Area are provided in Figure 4.7.

Table 4.10 Threatened Fauna Identified within Project Area During Field Surveys

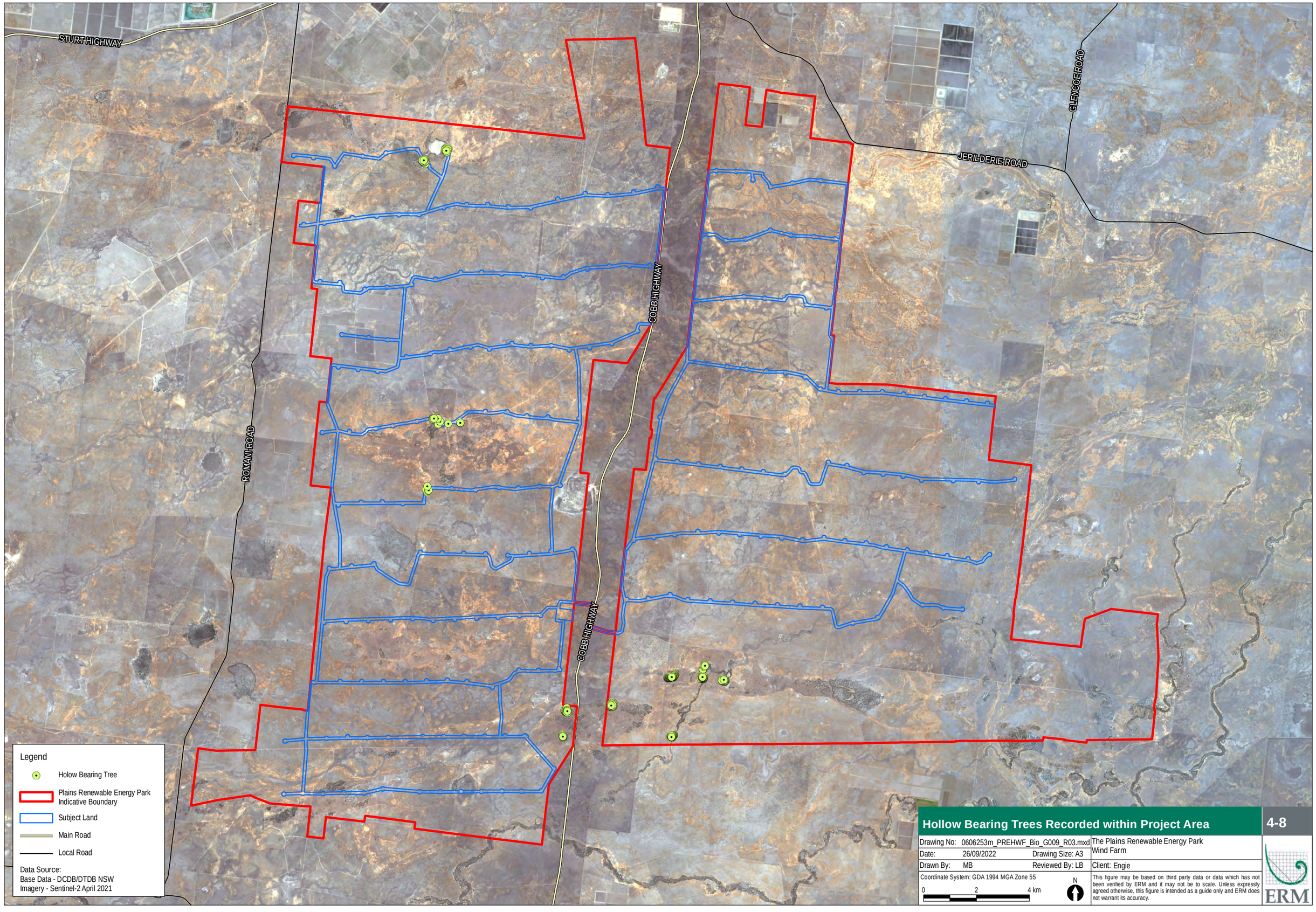
Scientific Name	Common Name	BC Act Status	EPBC Act Status
Species Credit Species			
Pedionomus torquatus	Plains-wanderer	E	CE
Hieraaetus morphnoides	Little Eagle	V	-
*Myotis macropus**	Southern Myotis	V	-
Ecosystem Species			
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V	-
Circus assimilis	Spotted Harrier	V	-
Epthianura albifrons	White-fronted Chat	V	-
Falco subniger	Black Falcon	V	-
*Nyctophilus corbeni**	Corben's Long-eared Bat	V	V
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-

*Species recording possible (The species calls from *Nyctophilus* genus cannot be distinguished from each other. There are 3 species that are known to occur in the project area)

Figure 4.7 Grey-crowned Babblers (Left) and White-fronted Chat (Right)

Hollow bearing tree searches were conducted in areas of Black Box habitat (PCT 13 and PCT 15) within the Subject Land during the Autumn 2022 field survey effort. Due to the change in Subject Land location post surveys, there are areas of vegetation that require additional survey effort. As a result of the original surveys, 305 hollow bearing trees were recorded as presented in Figure 4.8. A point was taken for each tree within the with a hollow higher than 4m above ground and greater than 5cm in diameter with notes made on tree diameter at breast height (DBH), hollow height and hollow diameter. Data recorded is presented in Appendix F. It is noted that majority of Black Box vegetation identified across the Project Area is older than 100 years of age, and present a high proportion of trees containing hollows.

Further field surveys will be undertaken in accordance with the BAM to confirm presence or absence of threatened fauna species.



Hollow Bearing Trees Recorded within Project Area

4-8

Drawing No:	0606253m_PREHWF_Bio_G009_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

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4.4.2.1 Plains-wanderer

The Plains-wanderer is considered Critically Endangered under the EPBC Act and Endangered under the BC Act. The species was once widespread across south-eastern Australia, with declines first observed in the 1960's as a result of overgrazing during droughts and predation by introduced species (DoE, 2015). Increased habitat loss and degradation remain current threats, exacerbated by climate change and small population size. In 2015, there was estimated to be between 250-1000 of these small, ground-dwelling grassland birds left in the wild (DoE, 2015). The vast majority of records of Plains-wanderers in NSW over the last 30 years come from an area of the western Riverina bounded by Hay and Narrandera on the Murrumbidgee River in the north, the Cobb Highway in the west, the Billabong Creek in the south, and Urana in the east (NSW OEH, 2022f).

The National Recovery Plan for the Plains-wanderer (DoE & SA DEWNR, 2016) states that habitat critical to the survival of the species includes any regions where the species is likely to occur and any newly discovered locations that extend the likely range of the Plains-wanderer. The Plains-wanderer is known to associate with the following PCTs mapped within the Project Area:

- PCT 44: Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion; and
- PCT 46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion.

The structure of the grassland is more important than the species composition in determining its suitability for the Plains-wanderer (DoE, 2015). The species inhabits sparse, treeless, species-rich, lowland native grasslands with approximately 50% bare ground, 40% herbs and grasses and 10% fallen litter, with grass tussocks spaced around 10-20 cm apart and most vegetation less than 5 cm in height and some widely-spaced plants up to 30 cm high, which provide shelter and concealment from predators (DoE, 2015). Habitat mapping has been conducted for the species and includes areas within the Project Area (DCEEW, 2010). These habitat areas, as defined through PCT mapping and field verification, for the Plains-wanderer have been mapped in Figure 7.2.

Areas of PCT 44 and PCT 46 that met the structure requirements and areas mapped as Important Areas for the species were targeted during the Spring 2021 field surveys with nocturnal spotlighting undertaken from a slow moving vehicle for two nights. As a result, sightings of two Plains-wanderer adults and one offspring were recorded (Figure 4.5 and Figure 4.9). This confirms the species presence within the Project Area, in addition to the site supporting reproductive efforts for the species. Further survey effort was not undertaken to reduce disturbance to the breeding species.

The BioNet database identifies the species is a dual credit species. Mapped important areas are a species credit, any impact from development could be potentially serious and irreversible and on this basis is unlikely to be approved. These mapped important areas are provided by the NSW Government and are also shown on Figure 4.5.

Figure 4.9 Plains-wanderers (chick left, adult right) observed during Spring 2021 Field Surveys

4.5 Preliminary Bird Utilisation results

Prescribed impacts related to wind farm development apply not only to threatened species but also to any resident raptor species and nomadic or migratory species whose flight paths are likely to cross the subject land (Paragraph 6.7.1.5 of the BAM).

During the field surveys, the following was recorded:

- 57 bird species were recorded from 28 Bird Utilisation Surveys (BUS) in Spring 2021;
- 40 bird species were recorded from 27 BUS in Summer 2022;
- 56 bird species were recorded from 28 BUS in Autumn 2022; and
- 57 bird species were recorded from 28 BUS in Winter 2022.

The most abundant bird species across the survey efforts were the Nankeen Kestral, Galah, Australian Magpie, Crested Pigeon, Little Raven, and Brown Songlark. The majority of birds were observed flying short distances between trees.

Thirteen avian species were observed to utilise the rotor sweep height (RSH) of between 50 m to 250 m. All species are native, with two (2) species, the Little Eagle and Black Falcon, being considered threatened in NSW. Zero (0) species are considered threatened under the EPBC Act. The observed species include:

- Wedge-tailed Eagle (Aquila audax);
- Straw-necked Ibis (Threskiornis spinicollis);
- Little Eagle (Hieraaetus morphnoides);
- Black Kite (Milvus migrans);
- Brown Falcon (Falco berigora);
- Black Falcon (Falco subniger);
- Nankeen Kestrel (Falco cenchroides);
- Spotted Harrier (Circus assimilis);

- Little Raven (Corvus mellori);
- Australian Magpie (Gymnorhina tibicen);
- Fairy Martin (Petrochelidon ariel);
- White-necked Heron (Ardea pacifica); and
- Masked Woodswallow (Artamus personatus).

During the field survey, opportunistic observations were made of large flocks of up to 100 Banded Lapwings (*Vanellus tricolor*) utilising the RSH (Figure 4.10). No species considered Migratory under the EPBC Act were identified on site.

Figure 4.10 Flock of Banded Lapwings

During the field survey events it was observed that the Project Area supported a very high number of breeding raptors (Figure 4.11 and Figure 4.12), with the following stick nests recorded for resident raptors:

- 21 nests recorded for Wedge-tailed Eagle (*Aquila audax)*;
- three (3) Nankeen Kestrel (*Falco cenchroides)* nest;
- one (1) Little Eagle (*Hieraaetus morphnoides*);
- two (2) unidentified raptor nests; and
- one (1) Whistling Kite (*Haliastur sphenurus)* nest.

One (1) of these resident raptors, the Little Eagle (*Hieraaetus morphnoides),* is considered Vulnerable under the BC Act. A further in flight observation of the Little Eagle was made, flying in the north-west of the Subject Land.

There was a high number of additional large stick nests observed across the site, although vacant at the time of sighting, these nests are likely to support further resident raptor species.

Operational wind farms pose a collision risk to birds and bats where rotor strike can cause injury or death. Fatalities and injuries are usually caused by a collision with the moving blades (blade strike), or with the turbine infrastructure. The EIS and BDAR will assess potential collision risks to both birds and bats.

Figure 4.11 Wedge-tailed Eagle Fledglings Observed During Spring 2021 Field Surveys

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

JERILDERIE ROAD

CLENCOE ROAD

Legend

Significant Raptor

- Black Kite (nest)
- Brown Falcon (nest)
- Little Eagle (nest)
- Nankeen Kestrel (nest)
- Wedge-tailed Eagle (nest)
- Whistling Kite (nest)
- Raptor Nest
- 500m Nest Buffer
- Plains Renewable Energy Park Indicative Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Significant Raptors

4-12

Drawing No:	0606253m_PREHWF_Bio_G010_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

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4.6 Microchiropteran Bat Survey Results

Wind farm developments have potential to impact Microcheropteran bats, due to the risk of mortality by collision, decompression, or pulmonary baratrauma.

Microbat calls were sampled using eight (8) Anabat Swift detectors (Titley Electronics). Passive monitoring was undertaken during the Summer 2022 field survey event. Monitoring commenced at dusk (approximately 1800 hours) and continued until dawn (approximately 0530 hours). The data was analysed by Green Tape Solutions and results are presented in Appendix D.

Based on a total of 91,171 files, thirteen calls sequences were assigned to species or genus. The reliability of identification is as follows:

- **Definite** - one or more calls where there is no doubt about the identification of the species;
- **Probable** - most likely to be the species named, low probability of confusion with species that use similar calls; and,
- **Possible** - call is comparable with the named species, with a moderate to high probability of confusion with species of similar calls.

Table 4.11 Microchiropteran Bat Survey Results

Scientific Name	Common Name	Reliability	BC Act status	EPBC Act Status
Austronomus australis	White-striped free-tailed bat	Definite	-	-
Chalinolobus gouldii	Gould's wattled bat	Definite	-	-
Chalinolobus morio	Chocolate wattled bat	Definite	-	-
Myotis macropus	Southern Myotis	Possible	V	-
Nyctophilus sp	-	Definite	V (*N. Coberni*)	V (*N. Coberni*)
Ozimops planiceps	South-Eastern Free-Tailed Bat	Definite	-	-
Ozimops ridei	Eastern Free-tailed Bat	Definite	-	-
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Definite	V	-
Scotorepens balstoni	Scotorepens balstoni	Definite	-	-
Scotorepens greyi	Little broad-nosed bat	Definite	-	-
Vespadelus darlingtoni	Large forest bat	Definite	-	-
Vespadelus regulus	Southern Forest Bat	Possible	-	-
Vespadelus vulturnus	Little forest bat	Possible	-	-

It is noted that species from genus *Nyctophilus* cannot be distinguished from each other by call. There are three (3) species that are known to occur in the project area; *N.corbeni, N.geoffroyi* and *N. gouldi*. For the purpose of this assessment, the BC Act and EPBC Act listed threatened species, *N. corbeni,* is assumed and known to be present.

5. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Based on the results of the desktop assessment and ERM field surveys undertaken across 2021 and 2022 to date, a preliminary assessment of Matters of National Environmental Significance (MNES) within the Project Area has been provided in Table 5.1.

Table 5.1 Preliminary assessment of Matters of National Environmental Significance (MNES)

MNES	Relevance to the Project Area
World Heritage Properties	Not identified within the Project Area or within 50 km radius
National heritage properties	Not identified within the Project Area or within 50 km radius
Wetlands of international importance	There are no wetlands of international importance within the Project Area. The closest records (as identified within the Protected Matters Search Tool (PMST)) are: ■ Banrock station wetland complex; ■ Hattah-kulkyne Lakes; ■ Riverland; and ■ The Coorong, and Lakes Alexandrina and Albert Wetland. It is unlikely the Project will impact any wetlands of international importance.
Threatened Ecological Communities	The following EPBC Act listed Threatened Ecological Communities are known to occur within the Project Area: ■ Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered) The PMST identified the following Threatened Ecological Communities as likely to occur within the area, however have not been observed: ■ Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions ■ Grey Box (Eucalyptus microcarpa) Grassy Woodland and Derived Native Grasslands of South-eastern Australia ■ White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Further assessment and analysis within the BDAR will confirm areas of TECs within the Project Area.
Threatened species	Six (6) EPBC Act listed species are known to occur within the Project Area based on observations and recordings during field survey efforts: ■ Plains-wanderer (Critically Endangered); ■ Corben's Long-eared Bat* (Vulnerable); ■ Winged Pepper-cress (Endangered); ■ Mossgiel Daisy (Vulnerable); ■ Chariot Wheels (Vulnerable); and ■ Slender Darling Pea (Vulnerable). **call recording* A further two (2) species are considered likely to occur within the Project Area based on records in the locality and the presence of preferred habitat: ■ Grey Falcon (Vulnerable); and ■ Growling Grass Frog (Vulnerable). An Assessment of Significant Impact has been completed for EPBC Act listed species considered known or likely to occur on site and is presented in Appendix E.

MNES	Relevance to the Project Area
	The Assessment of Significant Impact identified the Project as having the potential to cause Significant Impact to the following three (3) EPBC Act listed species: ■ Plains-wanderer (Critically Endangered); ■ Winged Pepper-cress (Endangered); and ■ Chariot Wheels (Vulnerable). Significant impact to the remaining species is considered unlikely.
Migratory species	No birds listed as Migratory under the EPBC Act were identified during the field surveys, or were considered known or likely to occur within the Project Area based on the Likelihood of Occurrence Assessment presented in Appendix C.
Commonwealth marine area	Not identified within the Project Area or within 50 km radius
The Great Barrier Reef Marine Park	Not identified within the Project Area or within 50 km radius
Nuclear actions	Not Applicable
Water resources in relation to Nuclear Power	Not Applicable

Under the EPBC Act a referral is required to the Australian Government CCEEW for projects, or 'actions', that are likely to have a significant impact on a MNES or the environment on Commonwealth land. The Australian Government Minister for the Environment determines whether or not the Proposal will need formal assessment and approval under the EPBC Act. If so, that Proposal is considered a controlled action under the EPBC Act.

The findings of the Preliminary Biodiversity Assessment to date has confirmed the presence of MNES listed under the EPBC Act within the Project Area. Therefore, the proposal will need to be referred to the Australian Government Minister for the Environment and Energy through the preparation of a separate referral.

6. PRELIMINARY IMPACT ASSESSMENT

The construction and operation of the Project has the potential to cause impacts to threatened species, raptors and TECs listed under the BC Act and/or the EPBC Act. These will need to be considered as part of the EIS to be prepared under Part 5 of the NSW EP&A Act. As there are recorded biodiversity values within the Project Area, application of the BAM and the preparation of a BDAR will be required.

Candidate species will be selected for further assessment by considering how they and their habitat might be affected by the project. A preliminary list has been presented in Section 4.3. In this instance, the main potential impacts of the project (during construction and operation) that would need to be assessed include:

- Clearing of TECs;
- Loss of extant native vegetation communities and associated fauna habitat and the subsequent impacts to local population of native species, particularly threatened and migratory species;
- Loss of and impact to resident raptor nesting sites;
- Increased habitat fragmentation;
- Mortality and injury of avian and microchiropteran species from turbine strike;
- Mortality and injury from vehicle strikes and vegetation clearing; and
- Mortality and injury from baratrauma.

Mitigation measures relevant to threatened species, TECs, native vegetation communities, species vulnerable to turbine strikes, hydrology and construction impacts will be addressed within the EIS. There is also a risk that weeds may be transported within and off-site. Mitigation measures to reduce the chance of the spread of weeds will be considered within the EIS.

6.1 Recommendations and Next Steps

The desktop assessment and field surveys undertaken to date have highlighted a range of known and potential biodiversity constraints. The following steps are considered essential in ensuring an adequate assessment of biodiversity values is continued throughout future stages of the project:

- Prepare and submit a BDAR in accordance with the BAM;
- Prepare and submit an EPBC Act referral to the Australian Government CCEEW for projects;
- Prepare a detailed assessment of MNES; and
- Conduct further targeted seasonal fauna and flora surveys in 2022 (Spring) for candidate species considered likely or potentially occurring within the Project Area in accordance with relevant Federal or State survey guidelines.

To effectively avoid and minimise impacts associated with the Project, the following management recommendations have been suggested for each identified impact:

- Loss of existing native vegetation:
  - Areas of remnant and regrowth vegetation to be avoided at the design and micro siting stages, where practicable;
  - Areas of threatened flora and fauna habitat to be avoided at design and micro siting stages, where practicable;
  - If vegetation clearing is required, a Vegetation Management Plan will be implemented to ensure that clearing is undertaken in accordance with legislative standards and requirements; and

- To assist in the preservation of the threatened ecological community identified on site, it is recommended that a buffer zone of at least 30 metres be maintained from the outer edge of an identified patch.

- Weed and pest control:
  - A Pest Management Plan will be developed and implemented for the Project. This will include measures such as vehicle wash downs, weed certification and obligations to stick to access tracks throughout the Project Area;
  - Weed management and control methods will depend upon the location, weed species identified, the degree of the infestation, relevant landholder agreement or conduct and compensation agreements provisions, and local, state and national regulatory requirements;
  - Imported material able to transport weed seed will be assessed to ensure they are free of contamination, disease and invasive weeds; and
  - WONS and Invasive species will be identified and monitored in the Project Area. Appropriate weed monitoring will occur to ensure new weed species are identified, recorded and managed appropriately.
- Mortality or injury to native fauna:
  - No driving will occur in unauthorised areas, and in other areas will be carried out at safe speeds adopted to the road conditions; and
  - If vegetation clearing is required, injured, sick or dead fauna will be recorded and reported during construction. This can be carried out by a fauna spotter-catcher.
- Impacts from turbine collision to bats and birds:
  - Areas of bird habitat including known nests will be avoided in the design and then further avoided when micro siting occurs, where practicable ;
  - Development of a Bird and Bat Management Plan that considers the impacts that will occur to birds and mitigation measures to address these; and
  - Additional measures could include locating turbines away from key bird and bat habitats (waterways and drainage lines) where practicable.

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APPENDIX A PROTECTED MATTERS SEARCH TOOL RESULTS

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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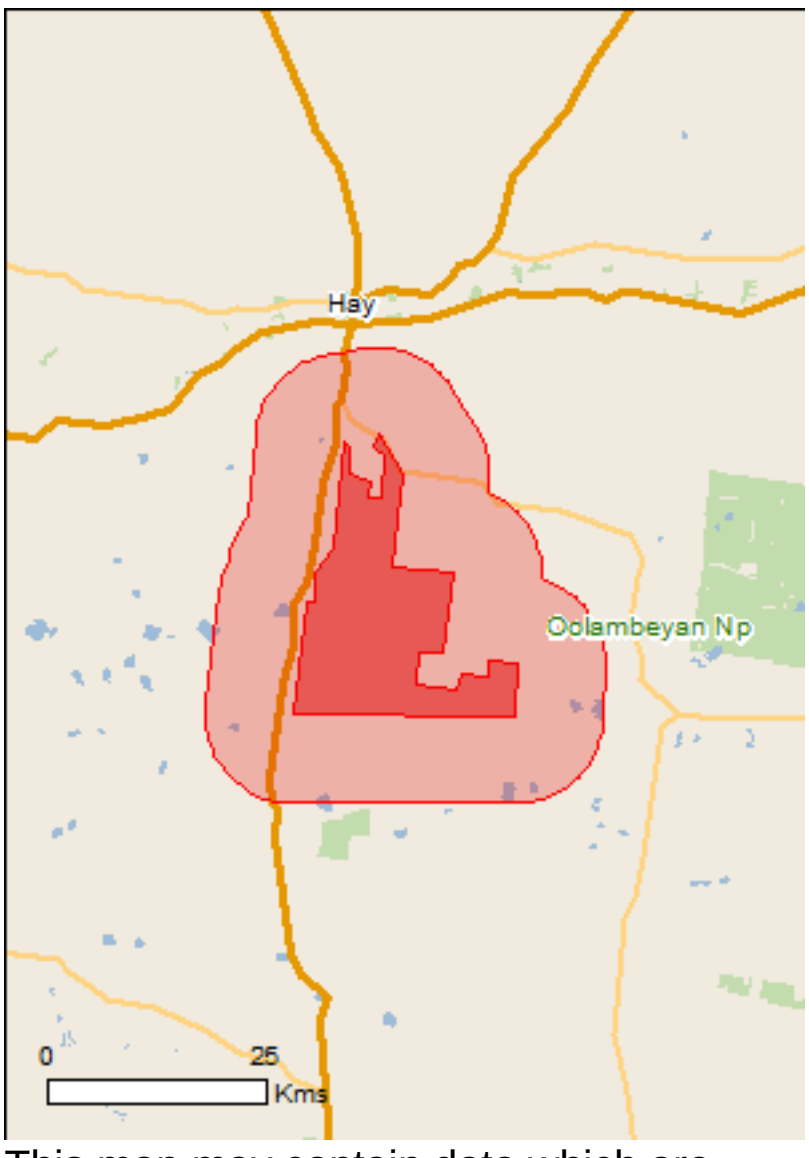

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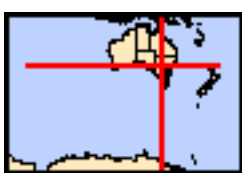

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	21
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	20
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	400 - 500km upstream
Hattah-kulkyne lakes	200 - 300km upstream
Riverland	300 - 400km upstream
The coorong, and lakes alexandrina and albert wetland	400 - 500km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Critically Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Extinct within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur

Name	Status	Type of Presence
		within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Fish		
Galaxias rostratus		
Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella macquariensis		
Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii		
Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Plants		
Austrostipa wakoolica		
[66623]	Endangered	Species or species habitat may occur within area
Brachyscome papillosa		
Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area
Lepidium monoplocoides		
Winged Pepper-cress [9190]	Endangered	Species or species habitat known to occur within area
Maireana cheelii		
Chariot Wheels [8008]	Vulnerable	Species or species habitat likely to occur within area
Swainsona murrayana		
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Telecommunications Corporation

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
South West Woodland	NSW

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area

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Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-34.620031 144.831955,-34.624763 144.839251,-34.647503 144.838135,-34.65301 144.859163,-34.667765 144.85779,-34.668118 144.87015,-34.632108 144.872467,-34.625893 144.863026,-34.614663 144.867146,-34.646655 144.891865,-34.726407 144.880621,-34.731345 144.945852,-34.79847 144.934608,-34.796779 144.908001,-34.825249 144.90534,-34.829547 144.946882,-34.815032 144.951946,-34.818273 144.979498,-34.805518 144.97924,-34.806998 145.010826,-34.85061 145.008595,-34.850328 144.780457,-34.75476 144.794704,-34.754196 144.803288,-34.730922 144.802944,-34.71004 144.820969,-34.620031 144.831955

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-Australian Government, Department of Defence
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-Other groups and individuals

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Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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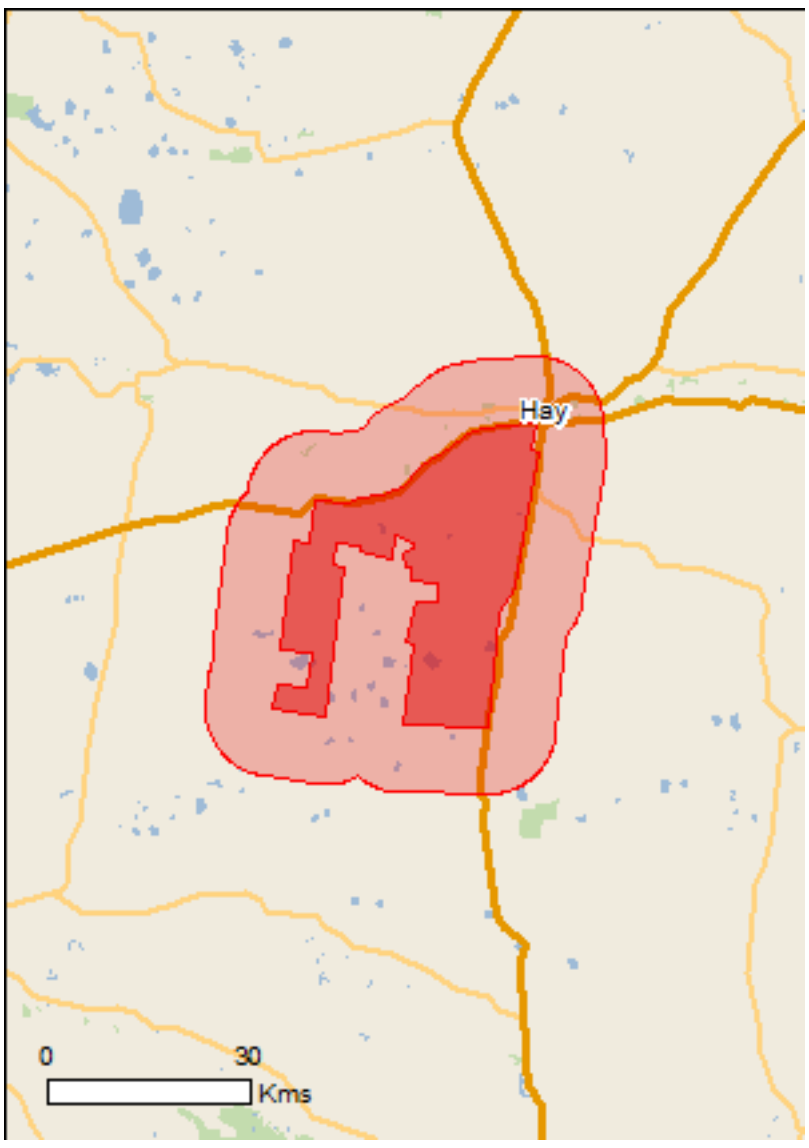
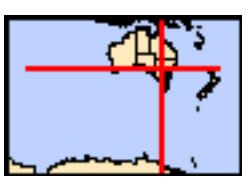


Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	25
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	7
Commonwealth Heritage Places:	1
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	20
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	300 - 400km upstream
Hattah-kulkyne lakes	150 - 200km upstream
Riverland	300 - 400km upstream
The coorong, and lakes alexandrina and albert wetland	400 - 500km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Critically Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Extinct within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur

Name	Status	Type of Presence
		within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Fish		
Galaxias rostratus		
Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella macquariensis		
Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii		
Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Plants		
Austrostipa metatoris		
[66704]	Vulnerable	Species or species habitat may occur within area
Austrostipa wakoolica		
[66623]	Endangered	Species or species habitat may occur within area
Brachyscome papillosa		
Mossgiel Daisy [6625]	Vulnerable	Species or species habitat known to occur within area
Eleocharis obicis		
a spike rush [15320]	Vulnerable	Species or species habitat may occur within area
Lepidium monoplocoides		
Winged Pepper-cress [9190]	Endangered	Species or species habitat known to occur within area
Maireana cheelii		
Chariot Wheels [8008]	Vulnerable	Species or species habitat likely to occur within area
Solanum karsense		
Menindee Nightshade [7776]	Vulnerable	Species or species habitat may occur within area
Swainsona murrayana		
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Delma impar		
Striped Legless Lizard, Striped Snake-lizard	Vulnerable	Species or species

Name	Status	Type of Presence
[1649]		habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Australian Telecommunications Corporation
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Telstra Corporation Limited

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Hay Post Office	NSW	Listed place

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Murrumbidgee Valley	NSW
Toogimbie	NSW

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
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-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
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APPENDIX B OBSERVED FLORA AND FAUNA

Appendix B Observed Flora and Fauna

Common Name	Scientific Name	BC Act Status	EPBC Act Status
Birds			
Australian Magpie	*Gymnorhina tibicen*	-	-
Australian Owlet-nightjar	*Aegotheles cristatus*	-	-
Australasian Grebe	*Tachybaptus novaehollandiae*	-	-
Australian Hobby	*Falco longipennis*	-	-
Australian Ringneck	*Barnadius zonarius var. barnardi*	-	-
Australian Wood Duck	*Chenonetta jubata*	-	-
Banded Lapwing	*Vanellus tricolor*	-	-
Black-eared Cuckoo	*Chrysococcyx osculans*	-	-
Black Falcon	*Falco subniger*	V	-
Black Kite	*Milvus migrans*	-	-
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	-	-
Black-faced Woodswallow	*Artamus cinereus*	-	-
Black-shouldered Kite	*Elanus axillaris*	-	-
Black-tailed Native-hen	*Gallinula ventralis*	-	-
Blue Bonnet	*Northiella haematogaster*	-	-
Brown Falcon	*Falco berigora*	-	-
Brown Songlark	*Cincloramphus cruralis*	-	-
Budgerigar	*Melopsittacus undulatus*	-	-
Chestnut-crowned Babbler	*Pomatostomus ruficeps*	-	-
Chestnut-rumped Thornbill	*Acanthiza uropygialis*	-	-
Cockatiel	*Nymphicus hollandicus*	-	-
Common Bronzewing	*Phaps chalcoptera*	-	-
Common Starling*	*Sturnus vulgaris*	-	-
Crested Pigeon	*Ocyphaps lophotes*	-	-
Eastern Barn Owl	*Tyto javanica*	-	-
Emu	*Dromaius novaehollandiae*	-	-
Galah	*Eolophus roseicapilla*	-	-
Grey Butcherbird	*Cracticus torquatus*	-	-
Grey-crowned Babbler	*Pomatostomus temporalis*	V	-

Common Name	Scientific Name	BC Act Status	EPBC Act Status
Ground Cuckoo-shrike	*Coracina maxima*	-	-
Grey Teal	*Anas gracilis*	-	-
Horsfields Bushlark	*Mirafra javanica*	-	-
Inland Thornbill	*Acanthiza apicalis*	-	-
Little Eagle	*Hieraaetus morphnoides*	V	-
Magpie-lark	*Grallina cyanoleuca*	-	-
Masked Woodswallow	*Artamus personatus*	-	-
Nankeen Kestrel	*Falco cenchroides*	-	-
Noisy Miner	*Manorina melanocephala*	-	-
Pallid Cuckoo	*Cacomantis pallidus*	-	-
Pied Butcherbird	*Cracticus nigrogularis*	-	-
Plains-wanderer	*Pedionomus torquatus*	E	CE
Plum-headed Finch	*Neochmia modesta*	-	-
Rainbow Bee-eater	*Merops ornatus*	-	-
Red-capped Robin	*Petroica goodenovii*	-	-
Red-rumped Parrot	*Psephotus heamatonotus*	-	-
Rufous Whistler	*Pachycephala rufiventrus*	-	-
Sacred Kingfisher	*Todiramphus sanctus*	-	-
Singing Honeyeater	*Lichenostomus virescens*	-	-
Southern Whiteface	*Aphelocephala leucopsis*	-	-
Splendid Fairy-wren	*Malurus splendens*	-	-
Spotted Harrier	*Circus assimilis*	-	-
Straw-necked Ibis	*Threskiornis spinicollis*	-	-
Striated Pardalote	*Pardalotus striatus*	-	-
Superb Fairy-wren	*Malurus cyaneus*	-	-
Tawny Frogmouth	*Podargus strigoides*	-	-
Tree Martin	*Petrochelidon nigricans*	-	-
Variegated Fairy-wren	*Malurus lamberti*	-	-
Wedge-tailed Eagle	*Aquila audux*	-	-
Welcome Swallow	*Hirundo neoxana*	-	-
Whistling Kite	*Haliastur sphenurus*	-	-

Common Name	Scientific Name	BC Act Status	EPBC Act Status
Western Gerygone	*Gerygone fusca*	-	-
White-backed Swallow	*Cheramoeca leucosternus*	-	-
White-breasted Woodswallow	*Artamus leucorynchus*	-	-
White-faced Heron	*Egretta novaehollandiae*	-	-
White-fronted Chat	*Epthianura albifrons*	V	-
White-winged Fairy-wren	*Malurus leucopterus*	-	-
White-winged Chough	*Corcorax melanorhamphos*	-	-
White-winged Triller	*Lalage tricolor*	-	-
Willie Wagtail	*Rhipidura leucophrys*	-	-
Yellow-throated Miner	*Manorina flavigula*	-	-
Zebra Finch	*Taeniopygia guttata*	-	-
Mammals			
Western Grey Kangaroo	*Macropus fuliginosus*	-	-
Red Kangaroo	*Macropus rufus*	-	-
European Rabbit*	*Oryctolagus cuniculus*	-	-
Feral Cat*	*Felis Catus*	-	-
European Red Fox*	*Vulpes vulpes*	-	-
Sheep*	*Ovis aries*	-	-
Cow*	*Bos taurus*	-	-
Reptiles			
Shingleback	*Tiliqua rugosa*	-	-
Eastern Blue-tongue Lizard	*Tiliqua scinoides*	-	-
Brown Snake		-	-
Bearded Dragon		-	-
Amphibians			
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	-	-
Flora			
Sandalwood	*Myoporum platycarpum*	-	-
Emu Bush	*Ereomphila longifolia*	-	-
Weeping Myall	*Acacia pendula*	-	-

Common Name	Scientific Name	BC Act Status	EPBC Act Status
Kurrajong	*Brachychiton populneus*	-	-
Wilga	*Geijera parviflora*	-	-
Western Rosewood	*Alectryon oleifolius*	-	-
Black Box	*Eucalyptus largiflorens*	-	-
River Red Gum	*Eucalyptus camaldulensis*	-	-
White Cypress Pine	*Callitris glaucophylla*	-	-
Mulga	*Acacia aneura*	-	-
Gidgee	*Acacia cambagei*	-	-
Boxthorn	*Lycium ferocissium*	-	-
Dillon Bush	*Nitraria billardierei*	-	-
Nitre Goosefoot	*Chenopodium nitrariaceum*	-	-
Old Man Saltbush	*Atriplex nummularia*	-	-
Bladder Saltbush	*Atriplex versicaria*	-	-
Mealy Saltbush	*Atriplex pseudocampanulata*	-	-
Eastern Flat-top Saltbush	*Atriplex lindleyi*	-	-
Thorny Saltbush	*Rhagodia spinescens*	-	-
Cottony Saltbush	*Rhagodia gaudichichaudiana*	-	-
Climbing Saltbush	*Rhagodia nutans*	-	-
Short-winged Copperburr	*Sclerolaena brachyptera*	-	-
Galvanised Burr	*Sclerolaena birchii*	-	-
Grey Copperburr	*Sclerolaena dicantha*	-	-
Pale Poverty Bush	*Sclerolaena divaricate*	-	-
Streaked Poverty Bush	*Sclerolaena tricuspis*	-	-
Black Roly Poly	*Sclerolaena muricata*	-	-
Silky Copperburr	*Sclerolaena eriacantha*	-	-
Cotton Bush	*Maireana aphylla*	-	-
Slender Fissure Weed	*Maireana pentagona*	-	-
Black Bluebush	*Maireana pyramidata*	-	-
Pearl Bluebush	*Maireana sedifolia*	-	-
Chariot Wheels	*Maireana cheelii*	V	V
Soft Horns	*Malacocera tricornis*	-	-

Common Name	Scientific Name	BC Act Status	EPBC Act Status
Prickly Salwort	*Salsola australis*	-	-
Ruby Saltbush	*Enchylaena tomentosa*	-	-
Water Weed	*Osteocarpum*	-	-
Mossgiel Daisy	*Brachyscome papillosa*	V	V
Grey Sunray	*Helipterum corymbiflorum*	-	-
	Helipterum sp.	-	-
Weak Daisy	*Brachycomb debilis*	-	-
Fern-leaf Cotula	*Cotula sp.*	-	-
Desert Sneeze Weed	*Centipeda thespidioides*	-	-
Bush Minuria	*Minuria cunninghamii*	-	-
Rough Burr Daisy	*Calotis scabiosifolia*	-	-
Fuzz Weed	*Vittadinnia cunneata/triloba*	-	-
Tall Groundsel	*Senecio runcinifolius*	-	-
Pale Beauty Heads	*Calocephalus sonderi*	-	-
Yellow Drumsticks	*Craspedia chrysantha*	-	-
Wooly Heads	*Myriocephalus rhizocephalus*	-	-
Silky Goodenia	*Goodenia fascicularis*	-	-
Common Fringe Lily	*Thysanotus tuberosus*	-	-
Blue Crowsfoot	*Erodium crinitim*	-	-
Blue Bells	*Wahlenbergia sp.*	-	-
Hairy Pod-cress	*Harmsiodoxa blennodioides*	-	-
Winged Peppercress	*Lepidium monoplocoides*	E	E
Wild Mustard	*Sinapis arvensis*	-	-
Sand Twinleaf	*Zygophyllum ammophila*	-	-
Twinleaf	*Zygophyllum sp. (glaucum)*	-	-
Ice Plant	*Mesembryanthemum crystallinum*	-	-
Quena	*Solanum esuriale*	-	-
Paterson's Curse	*Echium plantagineum*	-	-
Caustic Weed	*Euphorbia drummondii*	-	-
Mulla Mulla	*Ptilotus sp.*	-	-
Plains Lantern Bush	*Abutilon halophilum*	-	-

Common Name	Scientific Name	BC Act Status	EPBC Act Status
Sand Sida	*Sida ammophila*	-	-
Ridge Sida	*Sida cunninghamii*	-	-
Hare's Foot Clover	*Trifolium arvense*	-	-
Slender Darling Pea	*Swainsona murrayana*	V	V
Small-leaf Burr Medic	*Medicago praecox*	-	-
Barrel Medic	*Medicago truncatula*	-	-
-	*Plantago sp. (hispidula)*	-	-
Common Nardoo	*Marsilea drummondii*	-	-
-	*Calendrinnia eremaea*	-	-
Lignum	*Duma florulenta*	-	-
Shiny Dock	*Rumex tenax*	-	-
Rye Grass	*Lolium rigidum*	-	-
Barley Grass	*Hordeum leporinim*	-	-
Brome	*Bromus sp.*	-	-
Oats	*Avena sp.*	-	-
Rat's Tail Fescue	*Vulpia myuros*	-	-
Mulga Grass	*Schismus barbatus*	-	-
Paradoxa Grass	*Phalaris paradoxa*	-	-
False Hair Grass	*Pentaschistis airoides*	-	-
Wild Oat	*Avena sp.*	-	-
Golden Top	*Lamarckia aurea*	-	-
Variable Speargrass	*Austrostipa*	-	-
White Top	*Rytidosperma caespitosum*	-	-
Curly Windmill Grass	*Enteropogon acicularis*	-	-
Windmill Grass	*Chloris truncata*	-	-
Cane Grass	*Eragrostis australasica*	-	-
Native Millet	*Panicum decompositum*	-	-
Fairy Grass	*Sporobolus caroli*	-	-
Purple love grass	*Eragrostis lacunaria*	-	-
Knob Sedge	*Carex inversa*	-	-

APPENDIX C LIKELIHOOD OF OCCURRENCE ASSESSMENT

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
Birds					
Botaurus poiciloptilus	Australasian Bittern	E	E	In New South Wales, it occurs along the coast and is also frequently recorded in the Murray Darling Basin, notably in floodplain wetlands of the Murray, Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers. The species occurs mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. *Phragmites, Cyperus*, *Eleocharis, Juncus, Typha, Baumea, Bolboschoenus*) or cutting grass (*Gahnia*) growing over a muddy or peaty substrate.	**Unlikely:** The Project Area is within the known distribution for the species, however there is a lack of suitable habitat of wetlands with tall dense vegetation within the site.
Calidris ferruginea	Curlew Sandpiper	E	CE	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in salt works and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	**Unlikely:** The Project Area is within the distribution for the species and contains suitable habitat in the form of farm dams, however there are no records of the species in the locality
Circus assimilis	Spotted Harrier	V	-	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	**Known:** There are records of this species within the locality from 1979 and more recently 2001. The site contains preferred habitat in the form of native grasslands, shrub steppe, and agricultural land. The species was recorded during the Winter 2022 survey event.
Epthianura albifrons	White-fronted Chat	V	-	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state.	**Known:** Species has been recorded within the Project Area in 2008 and was recorded during the ERM Spring 2021 and Summer 2022 field surveys. The species was observed near farm dams, and within shrub and grassland habitat.

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
Falco hypoleucos	Grey Falcon	E	V	The species occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia. The species frequents timbered lowland plains, particularly acacia shrub lands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter. Eggs are laid in the old nests of other birds, particularly those of other raptors or corvids. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*).	**Likely:** The species has been recorded in the locality of the Project Area, and preferred habitat is present in the form of timbered lowland plains and tussock grasslands.
Falco subniger	Black Falcon	V	-	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993). The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.	**Known:** The Black Falcon was recorded on the Project Area during the ERM Spring 2021 and Summer 2022 field surveys.
Grantiella picta	Painted Honeyeater	V	V	The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower, although it breeds in quite narrow roadside strips if ample mistletoe fruit is available. The species appears to prefer mistletoe as a nest substrate and selects nest sites in habitats where mistletoe prevalence and parasitism rates are high.	**Potential:** the Project Area contains preferred habitat and is inside the distribution for the species. However, there are no records of the species in the locality.
Hirundapus caudacutus	White-throated Needletail	-	V,Mi	White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable. They occur over most types of habitat, however they are recorded more often over wooded areas, including open forest and rainforest.	**Unlikely:** The Project Area is within the distribution for the species and suitable habitat exists, however no records have been made in the locality
Lathamus discolor	Swift Parrot	E	CE	The swift parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia for the winter. Whilst on the mainland the swift parrot disperses widely to forage on flowers and psyllid lerps in Eucalyptus species. In New	**Unlikely:** The Project Area is within the distribution for the species, however preferred habitat

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
				South Wales, swift parrots forage in forests and woodlands throughout the coastal and western slopes regions each year.	is not present and no known records exist in the locality.
Leipoa ocellata	Malleefowl	E	V	The Malleefowl is found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding. Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where habitats tend to be thicker and there is an abundance of food plants. Much of the best habitat for Malleefowl has already been cleared or has been modified by grazing by sheep, cattle, rabbits and goats.	**Unlikely:** The Project Area is outside the distribution for the species and no known records exist in the locality.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees.	**Unlikely:** The Project Area is within the distribution for the species. Preferred habitat is not present, with suitable habitat present as areas of disturbed River Red Gum woodland. No known records exist in the locality.
Numenius madagascariensis	Eastern Curlew	-	CE, Mi	Within Australia, the species is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (*Zosteraceae*). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. The birds are also found in coastal salt works and sewage farms.	**Unlikely:** There are no records within the locality. The Project Area is within the distribution for the species, however suitable habitat is not present.
Pedionomus torquatus	Plains-wanderer	E	CE	Plains-wanderers inhabit sparse grasslands with c.50% bare ground, with most vegetation less than 5 cm in height and some widely spaced plants up to 30 cm high. The species may occasionally use lower-quality habitat including cereal stubble, but cannot persist in an agricultural landscape. Plains-wanderers are sedentary for as long as the habitat remains suitable.	**Known:** The species was recorded on site during the ERM Spring 2021 field surveys
Stictonetta naevosa	Freckled Duck	V	-	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates.	**Potential:** There are no records of the species within the locality of the Project Area. The Project Area contains preferred habitat in the drier seasons in the form of farm dams and is within the species distribution.

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
Petroica phoenicea	Flame Robin	V	-	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas.	**Unlikely:** the Project Area is within the known distribution for the species. There are a lack of records in the locality and suitable habitat is not present within the Project Area.
Pezoporus occidentalis	Night Parrot	Ex	E	Most habitat records are of *Triodia* (Spinifex) grasslands and/or chenopod shrublands in the arid and semi-arid zones, and listed *Astrebla spp.* (Mitchell grass), shrubby samphire and chenopod associations, scattered trees and shrubs, *Acacia aneura* (Mulga) woodland, treeless areas and bare gibber as associated with sightings of the species. Roosting and nesting sites are consistently reported as within clumps of dense vegetation, primarily old and large Spinifex clumps, but sometimes other vegetation types	**Unlikely:** This species is recorded as extinct within NSW.
Polytelis swainsonii	Superb Parrot	V	V	The Superb Parrot mainly inhabits forests and woodlands dominated by eucalypts, especially River Red Gums (*Eucalyptus camaldulensis*) and box eucalypts such as Yellow Box (*Eucalyptus melliodora*) or Grey Box (*E. microcarpa*). The species also seasonally occurs in box-pine (*Callitris*) and Boree *(Acacia pendula)* woodlands. The Superb Parrot uses a number of habitats for different activities. Superb Parrots breed in either River Red Gum forests and woodlands or box woodlands. In the Riverina Region of NSW and adjacent areas of Victoria, the Superb Parrot usually breeds in forests dominated by large mature River Red Gums, typically close to watercourses, though nests are also occasionally located in Blakely's Red Gum (*E. blakelyi*), Grey Box (*E. microcarpa*), Red Box *(E. polyanthemos*) and Inland Red Box (*E. intertexta*). In the Murray-Riverina, nest sites are usually located no further than 10 km from foraging habitat, and in the South-west Slope Region, breeding and foraging habitats may coincide at some sites, and	**Potential:** The Project Area is within the known distribution for the species. There are no records in the locality. However, preferred habitat of River Red Gums and *Acacia pendula* is present across the Project Area.

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
				are no further than 10 km away at other sites. The Superb Parrot forages in box eucalypt woodland, particularly that dominated by Yellow Box or Grey Box, and occasionally Black Box (*E. largiflorens*)	
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses.	**Known:** The species was observed during the ERM Spring 2021 field surveys. The Project Area is within the known distribution for the species. Preferred habitat of Black Box and cypress pine woodlands are present.
Rostratula australis	Australian Painted Snipe	E	E	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum *Muehlenbeckia* or canegrass or sometimes tea-tree (*Melaleuca*). The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber. Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby.	**Potential:** There are no known records of the species in the locality of the Project Area. The Project area contains preferred habitat and is within the species distribution.
Stagonopleura guttata	Diamond Firetail	V	-	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season).	**Unlikely:** Within species distribution and suitable habitat exists however no records have been made in the vicinity of the Project Area.
Fish					
Galaxias rostratus	Flathead Galaxias	CE	CE	The flathead galaxias is only known from the southern half of the Murray-Darling Basin system. The flathead galaxias inhabits a variety of habitats including billabongs, lakes, swamps and rivers, with a preference for still or slow flowing waters. The species has a preference for schooling in midwater.	**Potential:** Lack of records within the locality, however the Project Area contains habitat mapped for the threatened species in the form of the Abercrombie Creek in the north western portion of the site. This area was observed to be dry

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
					at the time of Spring 2021 and Summer 2022 field surveys.
Maccullochella macquariensis	Trout Cod	E	E	Trout Cod inhabit a large (60—100 m wide), deep (>3 m) flowing river section with a sand, silt and clay substrate that contains abundant snags and woody debris. Trout Cod are often angled from within, under or adjacent to snags, branch piles, and steep clay banks, usually in areas of relatively fast current. In the Murray and Murrumbidgee Rivers Trout Cod occupy stream positions characterised by a high abundance of large woody debris (or 'snags') in water that is comparatively deep and close to riverbanks. However, midstream snags are also an important habitat component. As a large proportion of the streams that the Trout Cod originally inhabited are now degraded, it is difficult to accurately determine the habitat requirements of the species.	**Unlikely**: There are a lack of records in the locality, and the Project Area is outside the known distribution for the species.
Maccullochella peelii	Murray Cod	-	V	The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs. Murray Cod are frequently found in the main channels of rivers and larger tributaries. Murray Cod tend to occur in floodplain channels and anabranches when they are inundated, but the species' use of these floodplain habitats appears limited. Preferred microhabitat consists of complex structural features in streams such as large rocks, snags (pieces of large submerged woody debris), overhanging stream banks and vegetation, tree stumps, logs, branches and other woody structures.	**Unlikely**: There are a lack of records in the locality, and the Project Area is outside the known distribution for the species.
Macquaria australasica	Macquarie Perch	E	E	The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks. Spawning occurs just above riffles (shallow running water). Populations may survive in impoundments if able to access suitable spawning sites	**Unlikely**: There are a lack of records in the locality, and the Project Area is outside the known distribution for the species.
Frogs					
Litoria raniformis	Growling Grass Frog	E	V	This species is found mostly amongst emergent vegetation, including *Typha sp.* (bullrush), *Phragmites sp.* (reeds) and *Eleocharis sp.(*sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams. The Growling Grass Frog can be found floating in warmer waters in temperatures between 18–25°C.	**Likely:** There are known records within the locality of the Project Area, and preferred habitat for the species is present.

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
				Additionally, this species occurs in clays or well-watered sandy soils; open grassland, open forest, and ephemeral and permanent non-saline marshes and swamps; montane eucalypt forest, dry schlerophyll forest in coastal Victoria; steep-banked water edges (like ditches and drains) and gently graded edges containing fringing plants; and formerly, areas of high altitudes. The Growling Grass Frog can also inhabit agricultural and higher rainfall pastoral lands so long as permanent and non-permanent water sites are available with dense emergent or fringing vegetation	
Mammals					
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	The species is found in a wide range of inland woodland vegetation types. These include box / ironbark / cypress pine woodlands, Buloke woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee. The species inhabits a variety of vegetation types but it is distinctly more common in box / ironbark / cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of New South Wales and southern Queensland.	**Potential:** There are a lack of records of the species in the locality of the Project Area. However the site is within the potential distribution for the species and preferred habitat is present in the form of Black Box and Cypress Pine woodlands and River Red Gum.
Phascolarctos cinereus	Koala	V	E	Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species. Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees. The distribution of this habitat is largely influenced by land elevation, annual temperature and rainfall patterns, soil types and the resultant soil moisture availability and fertility. Preferred food and shelter trees are naturally abundant on fertile clay soils.	**Potential:** There are a lack of records of the species within the locality of the Project Area. The Mungadal East site is outside the distribution and preferred habitat is not present. Koala Management Plan for the Far West and Riverina regions provides koala use trees, including those identified on site; the River Red Gum as preferred, Black Box as high use, and White Cypress Pine as significant use.
Flora					
Amphibromus fluitans	River Swamp Wallaby-grass	V	V	River Swamp Wallaby-grass grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels. The species has some resistance to salinisation of habitat in experimental tests. Habitats in south-western New South Wales include swamp margins in mud, dam and tank beds in hard clay and in semi-dry mud of lagoons with *Potamogeton spp.* and *Chamaeraphis spp.*	**Unlikely:** There is a lack of records within the locality of the Project Area. The site is outside the distribution for the species.

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
Austrostipa metatoris		V	V	*Austrostipa metatoris* grows in sandy mallee areas of the Murray Valley. Habitat includes sandhills, sand ridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils. Associated species include the trees and shrubs Bimble Box (*Eucalyptus populnea*), Gum Coolibah (*E. intertexta*), White Cypress Pine (*Callitris glaucophylla*), Belah (*Casuarina cristata*), Sweet Quandong (*Santalum acuminatum*), Sticky Hopbush (*Dodonaea viscosa*), *Hakea ivoryi*, and the grasses *Austrostipa drummondii* and *A. eremophila*.	**Unlikely:** The Project Area is outside the known distribution for the species and there are a lack of records in the locality.
Austrostipa wakoolica		E	E	*Austrostipa wakoolica* grows in open woodland, on grey silty clay or sandy loam soils. Recorded habitats include the edge of a lignum swamp in brown loamith box and mallee, creek banks in grey silty clay, mallee and lignum sandy loam flat, open cypress pine forest on low range in sandy soil and a low rock rise fenced-off from stock for about 18 months. Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, Eucalyptus populnea, Austrostipa eremophila, Austrostipa drummondii, Austrodanthonia eriantha, Einadia nutans, Hyalosperma glutinosum subsp. glutinosum* and *Crassula* species.	**Potential:** The Project area is within the NSW distribution for the species. Preferred habitat is present in the form of lignum swampland, and open cypress pine forest. Associated species including *Callitris laucophylla, Astrostipa drummondii,* and *Einadia nutans* have been identified on site. However, there is a lack of records in the locality.
Brachyscome muelleroides	Mueller Daisy	V	V	*Brachyscome muelleroides* occurs in seasonally damp situations such as shallow depressions and around the margins of swamps, lagoons and claypans, on heavy grey cracking clays to lighter clay loam soils, in grassland, grassy woodland and open forest habitats, growing in association with various grasses and seasonal aquatic plants such as *Marsilea* species. Where trees are present, these are typically River Red Gum (*Eucalyptus camuldulensis)* or, less commonly, Grey Box *(E. microcarpa)*	**Potential**: The Project Area is within the NSW distribution for the species. Preferred habitat is present in the form of claypans on grey and lighter cracking soils. *Marsilea sp.* And River Red Gum are also present. However, there is a lack of records in the locality.
Brachyscome papillosa	Mossgiel Daisy	V	V	The species is found primarily in clay soils on Bladder Saltbush (*Atriplex vesicaria*) and *Maireana aphylla* plains but also in grassland and in Grey Box (*Eucalyptus macrocarpa)*–Cypress Pine (*Callitris spp*.) woodland. The distribution of this species overlaps with the following EPBC Act-listed threatened ecological communities: • Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions, and • White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.	**Known:** The species was observed during the Spring 2021 field surveys.

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
Eleocharis obicis	a spike rush	V	V	The species grows in ephemerally wet locations, such as roadside mitre drains and depressions, usually in low-lying grasslands. In NSW, the species is known to occur in heavy clay soils on floodplains, claypans and red sandy soil over clay.	**Unlikely:** The Project Area is outside the known distribution for the species and there are a lack of records in the locality.
Lepidium monoplocoides	Winged Pepper-cress	E	E	Winged Pepper-cress occurs predominantly in mallee scrub in semi-arid areas. Sites are seasonally moist to water-logged with heavy, fertile soils and a mean annual rainfall of around 300 to 500 mm. The predominant vegetation is usually an open-woodland dominated by *Allocasuarina leuhmannii* and/or *eucalypt*s, particularly *Eucalyptus largiflorens* (Black Box) or *Eucalyptus populnea* (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses (notably *Danthonia spp*. and *Stipa spp.*), but the seasonally waterlogged sites preferred by Winged Pepper-cress also support a number of moisture dependent herbs, such as *Marsilea spp.* (Nardoo). Also known from riparian woodland.	**Known:** The species was recorded during the Spring 2021 field survey.
Maireana cheelii	Chariot Wheels	V	V	Chariot Wheels is usually found on floodplains in chenopod shrubland and grassland communities on heavy clay soils, dominated by various native shrubs, grasses and herbs, notably Hairy Bluebush (*Maireana pentagona*), Bottle Bluebush (*Maireana excavata*), Nitre-bush (*Nitraria billardierei*), *Austrostipa nodosa*, *A. scabra, Erodium crinitum, Rhodanthe corymbiflorum, Hyalosperma semisterile* and *H. glutinosa*. In NSW the species appears to favour on heavy brown to red-brown clay-loams, hard cracking red clay, other heavy texture-contrast soils that support Bladder Saltbush (*Atriplex vesicaria*), *Maireana aphylla* and *Acacia homalophylla* shrubland communities.	**Known:** Observations of the species were made during the Spring 2021 field surveys.
Solanum karsense	Menindee Nightshade	V	V	The Menindee Nightshade is largely confined to floodplain lakes, depressions and Black Box (*Eucalyptus largiflorens*). This species is found in heavy grey clays with a highly self-mulching surface and also on sandy floodplains and ridges and in calcareous soil, red sands, red-brown earths and loamy soils. The vegetation associated with this species includes Saltbush and Bluebush plains and Mallee associations.	**Potential:** the Project Area is within the NSW distribution for the species. Preferred habitat is present in form of Black Box, Saltbush and Bluebush plains. However, there is a lack of records in the locality.
Sclerolaena napiformis	Turnip Copperburr	E	E	The Turnip Copperburr grows in native grasslands and grassy woodlands on relatively fertile clay-loam soils. In NSW, the species occurs in Knotty Spear-Grass *Austrostipa nodosa* and Windmill Grass *Chloris truncata* tussock grasslands on grey to red-brown cracking clays and clay loams. Other common species in these habitats include wallaby-grasses *Austrodanthonia* species, Spider Grass *Enteropogon acicularis*, Paper Sunray *Rhodanthe corymbiflora*, several Swainson-peas *Swainsona* species and several chenopod species.	**Potential:** The Project Area is inside the NSW distribution for the species, and preferred habitat in the form of Windmill Grass communities is present, with Paper Sunray and chenopod species common across the Project area. However, there are a lack of records in the locality.

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPIE Threatened Species Profiles* *	Likelihood of Occurrence
Swainsona murrayana	Slender Darling-pea,	V	V	The Slender Darling-pea often grows in heavy soils, especially depressions, and is also found on grey and red to brown clay and clay-loam soils in *Atriplex vesicaria* (Bladder Saltbush) herbland, *Eucalyptus largiflorens* (Black Box) woodland and grassland communities and is frequently associated with *Maireana* species.	**Known:** Observations of this species were recorded during the Spring 2021 field surveys.
Reptiles					
Delma impar	Striped Legless Lizard	V	V	The Striped Legless Lizard is a grassland specialist. Potential habitat for the Striped Legless Lizard includes all areas which have, or once had, native grasslands or grassy woodlands (including derived grasslands) across the historical range of the species, provided that area retains suitable tussock structure, the soil is of appropriate type and structure, and the site has not had major disturbance such as ploughing. All occupied sites have a grassy ground cover, often with a mixture of native and exotic perennial and annual species of tussock-forming grasses (often >20–50% cover).	**Unlikely:** the Project Area is outside the known distribution for the species and there are a lack of records in the locality.

APPENDIX D BAT CALL ANALYSIS REPORT (GREEN TAPE SOLUTIONS)

Bat Call Analysis Report

The Plains Project

Prepared for ERM

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Document Records - Quality

TITLE	Bat Analysis for the site at Biggenden
FILED AS	ME22022_The Plains

Revision	Date	Prepared by (name/title)	Reviewed by (name/ title)	Approved by (name/title)
Version A	25/04/2022	Kelly Matthews, Principal Ecologist	ERM	Client

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1.0 Introduction

1.1 Background

Green Tape Solutions were commissioned to undertake bat call analysis for The Plains project located north of Deniliquin in New South Wales.

1.2 Scope of Work

The specific scope of works for this report includes the following:

- Outline the methodology used to analyse the microbat call within the subject site; and,
- Present the findings of all of the bat call surveys conducted at the project site;

2.0 Methodology

2.1 Capture Technique

Microbat calls were sampled using eight (8) Anabat Swift detectors (Titley Electronics). Passive monitoring was undertaken from 13 to 24 February 2022. The original call files display Australian Eastern Standard Time. The data was analysed using Anabat Insight.

Monitoring commenced at dusk (approximately 1800 hours) and continued until dawn (approximately 0530 hours). Ultrasonic call monitoring surveys on anabat detectors were conducted using full-spectrum fitted with omnidirectional ultrasonic microphone.

2.2 Call Identification

Anabat recordings were analysed using Anabat software (Anabat Insight). Identifications were made by categorising call shape and frequency, with a species match given in consideration to region, known bat distributions, and habitats present. The focus of the bat surveys was to assess the presence of bat species found within the Project Area, and to assess the potential for rare and threatened species to occur.

Call identification for this dataset was based on call keys and descriptions published for Queensland (Reinhold *et al.*, 2001) and New South Wales (Pennay *et al.*, 2004).

Species' identification was further refined using the probability of occurrence of each species based on their geographic distribution (Churchill, 2008, Van Dyck and Strahan, 2008). Species nomenclature used in this report follows Churchill (2008).

The reliability of identification is as follows:

- **Definite** - one or more calls where there is no doubt about the identification of the species;
- **Probable** - most likely to be the species named, low probability of confusion with species that use similar calls; and,
- **Possible -** call is comparable with the named species, with a moderate to high probability of confusion with species of similar calls.

2.3 National Standard

The format and content of this report complies with the nationally accepted standards for the interpretation and reporting of Anabat and Songmeter data (Reardon, 2003), which is currently available from the Australasian Bat Society at www.ausbats.org.au.

3.0 Results

3.1 Total Species Recorded

The majority of calls were considered to be of medium to good quality calls.

A total of 91,171 sequence files were analysed. A proportion of these files (20,836) in this dataset contained background noise or resulted in poor quality calls that did not provide bat calls for analysis. While some call sequences were recognised as bat calls, the quality was not sufficient to assign species identification.

A summary of the species identified through bat call analysis is provided in **Table 1**.

Table 1: Summary of bat call analysis (QLD)

Species	Biodiversity Act	EPBC Act	SD1	SD2	Anabat 1	Anabat 2	Anabat 6	Anabat 10	Anabat 11	Anabat 12
Austronomus australis	LC	NOC	Definite	Definite						
Chalinolobus gouldii	LC	NOC	Definite	Definite	Definite		Definite		Definite	Definite
Chalinolobus morio	LC	NOC	Definite	Definite			Definite		Definite	
Myotis macropus	V	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
Nyctophilus sp	V (*N. Coberni and N bifax)*	V (*N. Coberni and N bifax)*	Possible				Possible			
Ozimops planiceps	LC	NOC	Probable	Probable					Definite	
Ozimops ridei	LC	NOC	Probable	Definite			Definite		Definite	
Saccolaimus flaviventris	V	NOC	Definite	Definite						
Scotorepens balstoni	LC	NOC	Definite	Definite			Definite			Probable
Scotorepens greyi	LC	NOC	Definite	Definite			Definite			Probable
Vespadelus darlingtoni	LC	NOC	Probable	Definite		Definite				Definite
Vespadelus regulus	LC	NOC	Possible	Possible	Possible	Probable	Possible	Possible	Possible	Possible
Vespadelus vulturnus	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible

LC: Least Concern, NOC: Not of Concern, V: Vulnerable

3.2 Samples of Calls / Sequences Files

Samples of call extracted from the dataset for each species identified is provided in the following figures

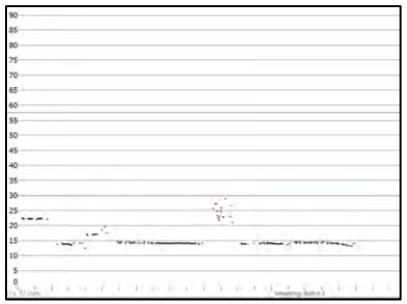
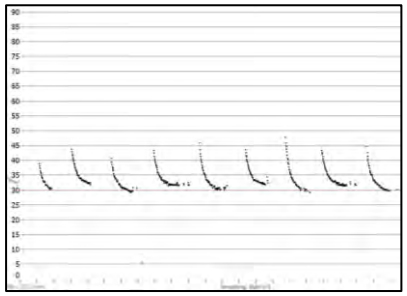
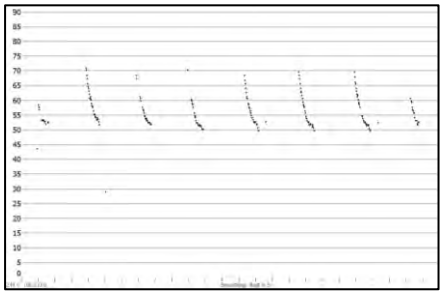
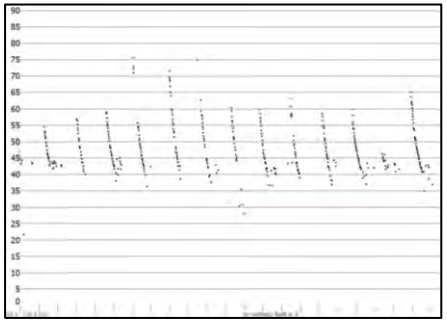
Species	Calls	Known distribution (Extract from Ausbats maps from Australian Bat Society)
Figure 1: *Austronomus australis* This bat is easily recognised by its constant frequency calls range in bandwidth from 10.5 to 15 kHz (Pennay *et al.*, 2004).		
Figure 2: *Chalinolobus gouldii* This species has a curved shape call with characteristic frequency 28 to 34kHz. Pulse alternates in frequency and mostly down-sweeping tail or no tail.		

Figure 3: *Chalinolobus morio*



C. morio has a down-sweeping tail curved pulse with characteristic frequency 47.5 to 53 kHz. It has often a very brief characteristic section. Species that overlap in frequency (*V. vulturnus*) but all have up-sweeping tails.

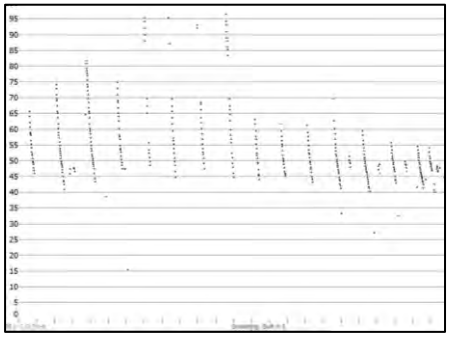
Figure 4: *Myotis macropus*



Near-vertical pulse dropping to about 30 to 35-50kHz. *M. macropus* mostly have a pulse interval of less than 75ms and usually have one kink close to the middle so that the second part has a lesser slope than the first (Reinhold, 2001).

This call can be confused with *Nyctophilus spp* calls. The latest have usually a pulse interval greater than 95ms and are slightly more complicated structure with two kinks instead of one.

Figure 5: *Nyctophilus spp*



This species displays a near-vertical pulse, characteristic frequency between 80 and 35KHz (Pennay *et al*, 2004).

The species from this genus cannot be distinguished from each other. There are 3 species that are known to occur in the project area.

N. Corbeni

N. geoffroyi

N. gouldi

Figure 6: *Ozimops planiceps*

This bat calls between 24 and 29 kHz. These search calls have their energy max around 25-26 kHz.

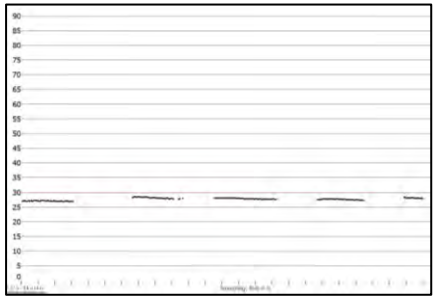


Figure 7: *Ozimops ridei*

O. ridei calls are flat. Characteristic frequency of this species is between 28 to 36 kHz.

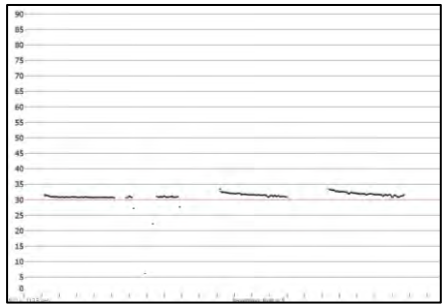


Figure 8: *Saccolaimus flaviventris*

Curved, characteristic frequency 18 to 21.5 kHz. The characteristic frequency does not go above 22 kHz. Other species that could overlap do not occur in this area.

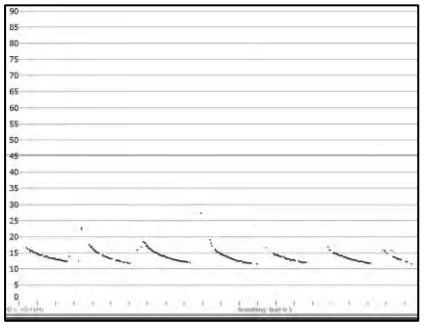


Figure 9: *Scotorepens balstoni*

Pulse of this species is curved with tail variable, but an up-sweeping tail is often more prominent with greater duration. Characteristic frequency 31 to 35 kHz and the frequency of the knee 33 to 37 kHz.

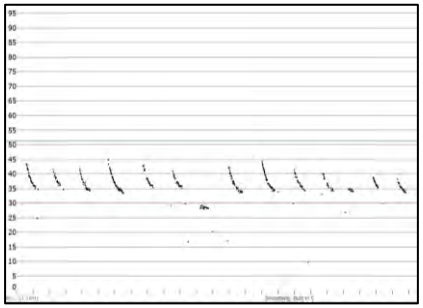


Figure 10: *Scotorepens greyii*

S. greyii has a curved and up-sweeping tail pulse. Its characteristic frequency is between 36 to 41.5 kHz.

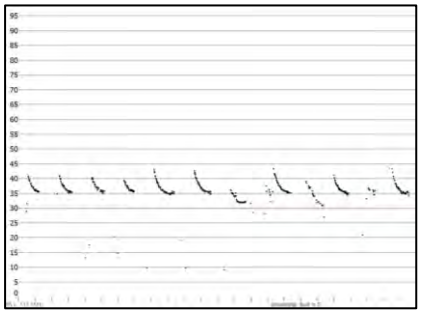


Figure 11: *Vespadelus darlingtoni*

This species call has a curved call with no tail or sometime an up-sweeping tail. The call's characteristic frequency is between 42.5 to 48.5 kHz. Characteristic section is often, but not always, relatively long.

Shorter duration with up-sweeping tails and higher frequencies, cannot be distinguished from *V. regulus* or *V. vulturnus*.

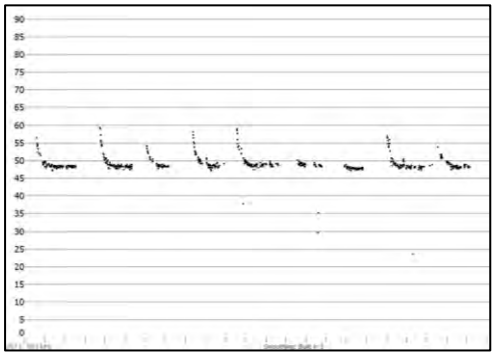
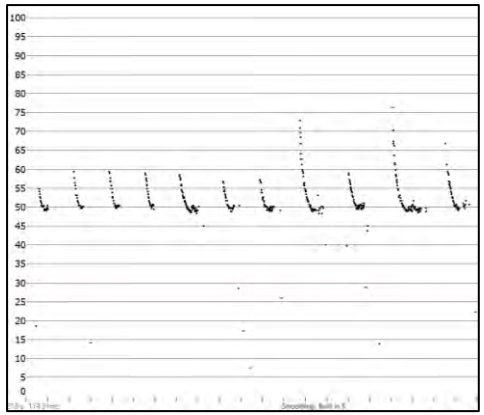


Figure 12: *Vespadelus regulus or Vespadelus vulturnus*

Characteristic frequency varies significantly over distribution from 40 to 55 kHz (n = 95). Call shape also varies between regions (see regional information).



Vespadelus regulus

Vespadelus vulturnus

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APPENDIX E MNES SIGNIFICANT IMPACT ASSESSMENTS

It is noted that due to the early stage of design development, it is not possible to assess impacts based on a development footprint or clearing footprint for this assessment. Biodiversity values have been identified across a broader Project Area, consisting of the landholding boundaries and a more defined area referred to as the subject land. The subject land consists of the preliminary Project layout, with a 100m buffer applied. This subject land has been the area across which detailed ecological fieldwork has been completed. For the purpose of the following Significant Impact Assessments, it has been assumed that up to 20% of the subject land will be directly impacted as a result of a development footprint associated with the Project.

Winged Pepper-cress (*Lepidium monoplocoides*)

The proposed development in the Project Area has potential to lead to a significant impact to the Winged Pepper-cress.

The Winged Pepper-cress is considered 'Endangered' under the EPBC Act and as a result of targeted flora transects, has been confirmed to occur within the Project Area. This species is an erect annual herb or perennial forb, 15-20 cm high, with angular and striped stems roughened with small warts.

The Winged Pepper-cress has experienced widespread decline in both range and abundance since European settlement. The species was once widely distributed and probably reasonably abundant on floodplains across the inland plains of the Murray-Darling Basin regions of Victoria, New South Wales and South Australia. Currently there are estimated to be fewer than 6,000 plants occurring in around 13 wild populations in Victoria and New South Wales (Mavromihalis, 2010b).

The Winged Pepper-cress occurs in open, sparsely vegetated sites in a range of habitats on heavy clay or clay-loam soils. Sites are seasonally flooded or prone to waterlogging, in arid to semi-arid areas with an average rainfall range of 200–450mm per year. The mean average annual rainfall for Hay NSW is 367 mm (Bureau of Meteorology (BOM) 2015). The predominant vegetation is usually grasslands, wetlands and floodplain woodlands dominated by *Eucalyptus coolabah* and *Eucalyptus largiflorens*, and chenopod shrublands dominated by *Atriplex*, *Maireana* and/or *Nitraria* species, but the seasonally waterlogged sites preferred by Winged Pepper-cress also support a number of moisture dependent herbs, such as *Marsilea spp.* (Nardoo) (Mavromihalis, 2010b).

Suitable habitat is present within the Project Area in the form of PCTs 153, 157, 163, 17, 216, 160, 46, 13, and 15. Additional surveys are required to cover further areas of suitable habitat and to refine species mapping for the species. Conservatively, all areas of the aforementioned have been considered suitable habitat within the Project Area and Subject Land and are presented in **Figure 7.1**. These PCTs make up 21,184.03 ha of suitable habitat within the Project Area. Based on this preliminary assessment, the total area of habitat within 20% of the Subject Land and subsequently with the potential to be impacted by the Project is 213.42 ha, this makes up 1.01% of the total suitable habitat within the Project Area. Areas of suitable habitat will be further avoided during detailed project design.

Thirteen populations of the Winged Pepper-cress, with seven (7) in NSW, are identified within the Recovery Plan (Mavromihalis, 2010b), none of which are located within the Project Area.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented in the following table. There is a potential for a **significant impact** to Winged Pepper-cress as a result of the Project although this will be further reduced through detailed design and assessment in the EIS.

Table 7.1 Significant Impact Assessment for Winged Peppercress

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population	Winged Pepper-cress habitat is present within the Project Area associated with PCTs 153, 157, 163, 17, 216, 160, 46, 13, and 15 totals 21,184.03 ha. A single population of the species was identified within the Subject Land within PCT 44, however additional field surveys are required to confirm presence of additional plants and undertake habitat mapping for the species. The area of Winged Pepper-cress habitat based in associated PCTs with the potential to be disturbed as a result of the development is 213.42 ha, the majority of suitable habitat within the Project Area (98.99%) will remain undisturbed. Development in the area where the population was recorded has the potential to have significant impact on this species experiencing decline within the Project Area.	Yes. Assessment and mapping to be refined in the EIS.
Reduce the area of occupancy of the species	Winged Pepper-cress habitat is present within the Project Area associated with PCTs 153, 157, 163, 17, 216, 160, 46, 13, and 15 which totals 21184.03 ha area of occupancy. The area of Winged Pepper-cress habitat with the potential to be disturbed as a result of the development is 213.42 ha, which is 1.01% of the suitable habitat within the Project Area. The disturbance is likely to reduce the area of occupancy of the species, however only at a relatively small scale.	Yes
Fragment an existing population into two or more populations	Complete habitat mapping for the species is yet to be confirmed for the Project Area. As such Winged Pepper-cress habitat is mapped within the Project Area associated with PCTs 153, 157, 163, 17, 216, 160, 46, 13, and 15, which totals 21184.03 ha. The Project results in the potential removal of 213.42 ha of suitable habitat (1.01%). Due to the small scale of habitat disturbance relative to the size of the Project Area the works are unlikely to fragment an existing population.	No
Adversely affect habitat critical to the survival of a species	Critical habitat for the species is yet to be mapped and is part of the objectives presented within the Recovery Plan (Mavromihalis, 2010b). Winged Pepper-cress habitat is present within the Project Area associated with PCTs 153, 157, 163, 17, 216, 160, 46, 13, and 15. The suitability of this habitat will be further assessed in future field surveys to confirm the presence of low lying, waterlogged sites. It is predicted that the area of suitable habitat will be reduced as a result of this updated mapping. In the absence of critical habitat mapping, all suitable PCTs will be conservatively considered habitat critical to the survival of the species. The potential area of disturbance of critical habitat is 213.42 ha. This area of disturbance is a relatively small scale (1.01%), and is unlikely to have an impact on the survival of the species.	No
Disrupt the breeding cycle of a population	The Winged Pepper-cress grows at sites that are seasonally wet, periods of waterlogging is likely to facilitate seed germination (Mavromihalis, 2010b). The alteration of hydrology is a recognised threat to the species. Hydrology and the management of run-off will be addressed within the EIS. It is unlikely the construction and operation of the Project will disrupt the breeding cycle of the Winged Pepper-cress.	No
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent	The Project Area is inclusive of areas of Winged Pepper-cress habitat associated with PCTs 153, 157, 163, 17, 216, 160, 46, 13, and 15 making up 21184.03 ha. The Project has the potential to disturb 213.42 ha, 1.01%, of the total habitat present within the Project Area. The small scale of disturbance is unlikely to result in	No

Criteria	Description	Criteria Triggered?
that the species is likely to decline	modification, destruction, removal, isolation or a decrease in the availability of habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Weed invasion and grazing by rabbits and kangaroos are recognised threats for the Winged Pepper-cress. Weed invasion includes from exotic annual grass species such as *Vulpia, Bromus, Lolium* and *Avena* species, with Patterson's Curse, Horehound and African Boxthorn being problems at a few known Winged Pepper-cress population sites (Mavromihalis, 2010b). Grazing may threaten the species by reducing the amount of seed produced by individuals through defoliation, prior to critical periods of flowering and seed production (Mavromihalis, 2010b). Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced and are controlled within the Project Area.	No
Introduce disease that may cause the species to decline	There is currently limited evidence of diseases causing detrimental effects on Winged Pepper-cress populations. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	No
Interfere with the recovery of the species	There is a National Recovery Plain for the Winged Pepper-cress published in 2010 (Mavromihalis, 2010b). The overall objective of recovery is to minimise the probability of extinction of the Winged Pepper-cress in the wild and to increase the probability of populations becoming self-sustaining in the long term. Within the duration of the Recovery Plan, the specific objectives for the recovery of the Winged Pepper-cress are to: 1. Determine distribution, abundance and population structure 2. Determine habitat requirements 3. Manage threats to populations 4. Identify key biological functions 5. Determine growth rates and viability of populations 6. Establish a seed bank 7. Build community support for conservation. The Project is unlikely to interfere with the objective presented above.	No

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

- Winged Pepper-cress Habitat Area
- Plains Renewable Energy Park Indicative Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Winged Pepper-cress (Lepidium monoplocoides) Habitat Mapping

E-1

Drawing No:	0606253m_PREHWF_Bio_G011_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

Plains-wanderer (*Pedionomus torquatus*)

The proposed development in the Project Area has potential to lead to a significant impact to the Plains-wanderer.

The Plains-wanderer is listed as 'Critically Endangered' under the EPBC Act and based on Spring 2021 surveys undertaken by ERM is known to occur within the Project Area. The species was once widespread across south-eastern Australia, with declines first observed in the 1960's as a result of overgrazing during droughts and predation by introduced species. Increased habitat loss and degradation remain current threats, exacerbated by climate change and small population size. Recent analysis of monitoring data collected between 2001 and 2014 indicates that there was an overall decline in numbers of 93% across sites in the Riverina region over this time period due to draught followed by increased rainfall (Wilson et al., 2014). In 2015, there was estimated to be between 250-1000 of these small, ground-dwelling grassland birds left in the wild (Baker-Gabb, 2015).

The vast majority of records of Plains-wanderers in NSW over the last 30 years come from an area of the western Riverina bounded by Hay and Narrandera on the Murrumbidgee River in the north, the Cobb Highway in the west, the Billabong Creek in the south, and Urana in the east (NSW OEH, 2022f). Core habitat mapping has been conducted for the species and includes areas within the Project Area (DCEEW, 2010). ERM undertook two nights of spotlighting surveys, recording two (2) adults and one (1) chick on the second night. No further surveys were undertaken to reduce disturbance to the species.

The extent of occurrence for the species is estimated to be 930 000 km^2 (Garnett et al., 2011). However Garnett et al. (2011) estimated the actual area of occupancy to be 330 km^2, with a continuing declining trend. Given the historically low population size and the fragmented distribution of the Plains-wanderer, all areas in which birds are found, and any regions where the species is likely to occur, represents habitat critical to the survival of the species (Garnett et al., 2011).

Plains-wanderers inhabit sparse, treeless, lowland native grasslands which usually occur on hard red-brown clay soils. Grassland structure is much more important than floristic composition with the species showing a strong preference for sites with approximately 50% bare ground and most vegetation less than 5 cm in height and some widely-spaced plants up to 30 cm. (DoE & SA DEWNR 2016). This habitat is present across the Project Area associated with PCT 44 and PCT 46. All areas of PCT 44 and PCT 46, and the core habitat mapping for the species are mapped as habitat for the species in **Figure 7.2** and makes up 4525.32 ha of habitat**.** Habitat for the Plains-wanderer was avoided where possible during the design process to date, resulting in only 72.25 ha of suitable habitat within the Subject Land. The total area of habitat within 20% of the Subject Land and subsequently with the potential to be impacted by the Project is 18.06 ha, this makes up 0.34% of the total suitable habitat within the Project Area.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table. There is potential that the Project will result in a **significant impact** to Plains-wanderer although this will be further reduced through detailed design and assessment in the EIS. Biodiversity stewardship and conservation options are also being explored to ensure that habitat for this species within the Project Area is protected in perpetuity.

Table 7.2 Significant Impact Assessment for Plains-wanderer

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population	Plains-wanderer habitat is present within the Project Area associated with PCT 44, PCT 46 and Core habitat mapping for the species, this totals 4525.32 ha. The area of Plains-wanderer habitat with the potential to be disturbed as a result of the development is 18.06 ha. All suitable habitat is recognised as habitat critical to the survival of the species, therefore the removal of any suitable habitat may subsequently result in the decrease of the size of the population.	Yes Assessment and mapping to be refined in the EIS.
Reduce the area of occupancy of the species	The total area of occupancy for the Plains-wanderer was estimated in 2011 to be only 33,000 ha with a continuing declining trend (Garnett et al., 2011). The area of habitat to be disturbed as a result of the development is 18.06 ha, which is 0.34% of the suitable habitat within the Project Area, and 0.055% of the total area of occupancy for the species (330km^2). Provided the area of occupancy is recognised to be low, the reduction of 18.06 ha has the potential to reduce the area of occupancy of the species.	Yes Assessment and mapping to be refined in the EIS.
Fragment an existing population into two or more populations	The Project has the potential to result in the disturbance of 18.06 ha, due to construction of tracks and infrastructure that is positioned within suitable habitat. The Project has the potential to fragment existing populations. Plains-wanderers have a historically low population size, putting them at increased risk of impact of extinction as chance events may have significant impacts on the population.	Yes Assessment and mapping to be refined in the EIS.
Adversely affect habitat critical to the survival of a species	Plains-wanderer habitat is present within the Project Area associated with PCT 46 and PCT 44 and core habitat mapping, which totals 4525.32 ha. The area of Plains-wanderer habitat to be disturbed as a result of the development is 18.06 ha. All suitable habitat is recognised as habitat critical to the survival of the species, therefore the removal of any habitat may result in an adverse effect on habitat critical to the survival of the species.	Yes Assessment and mapping to be refined in the EIS.
Disrupt the breeding cycle of a population	In the Riverina region, the home range of individual plains-wanderers vary in size from 7-21 ha (average size is 12 ha) in suitable habitat. As about half of a pairs' home range overlaps, a pair requires about 18 hectares to breed. The Plains-wanderer nest is a hollow or 'scrape' that is scratched into the ground and lined with grass, with nests placed amongst native grasses and herbs within suitable habitat. Therefore, the removal of suitable habitat (18.06 ha) for the Project has the potential to disrupt the breeding cycle of a population of Plains-wanderers.	Yes Assessment and mapping to be refined in the EIS.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project Area is inclusive of areas of Plains-wanderer habitat associated with PCT 44, PCT 46 and Core habitat mapping. The area of disturbance currently includes areas of suitable habitat for the species, totalling 18.06 ha. As all suitable habitat is determined to be critical habitat for the survival of species, the Project has the potential to remove, isolate and decrease the availability of habitat to the extent that the species has the potential to decline.	Yes Assessment and mapping to be refined in the EIS.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or	A range of invasive species are harmful to the Plains-wanderer, including feral cats and foxes which predate on the species, and invasive rabbits and weeds which can degrade the species habitat. In addition, introduced species such as Boxthorn have been attributed to providing increased perches for raptors that prey on the species. Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced into the Project Area.	No

Criteria	Description	Criteria Triggered?
critically endangered species' habitat	It is noted that pesticides, such as fipronil and fenitrothion, have the potential to impact on Plains-wanderer either directly or via their food supply. The use of such pesticide use will not be permitted within or nearby Plains-wanderer habitat.	
Introduce disease that may cause the species to decline	There is currently limited evidence of diseases causing detrimental effects on Plains-wanderer populations. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	No
Interfere with the recovery of the species	There is a National Recovery Plan for the Plains-wanderer published in 2016. The objectives of the recovery plan are: Reverse the long-term population trend of decline and increase the numbers of plains- wanderers to a level where there is a viable, wild breeding population, even in poor breeding years; and to Enhance the condition of habitat across the plains-wanderers' range to maximise survival and reproductive success, and provide refugia during periods of extreme environmental fluctuation. The Project Area is inclusive of Plains-wanderer habitat, and will have a small, albiet negative impact on 18.06 ha. Therefore, the Project may interfere with the objective of enhancing the condition of habitat across the Plains-wanderers' range.	Yes Assessment and mapping to be refined in the EIS.

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

- Plains-wanderer Habitat Area
- Plains Renewable Energy Park Indicative Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Plains-wanderer (Pedionomus torquatus) Habitat Mapping

E-2

Drawing No:	0606253m_PREHWF_Bio_G012_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

Mossgiel Daisy (*Brachyscome papillosa*)

The proposed development in the Project Area is unlikely to lead to a significant impact to the Mossgiel Daisy.

The Mossgiel Daisy is listed as 'Vulnerable' under the EPBC Act and is known to occur within the Project Area based on observations during field surveys. The Mossgiel Daisy is a multi-stemmed perennial herb that grows to 40 cm high. It has sessile leaves up to 7 cm long growing on its stems, with leaf edges varying from smooth to deeply dissected (NSW OEH, 2022c). The Mossgiel Daisy is endemic to NSW and chiefly occurs within the Riverina Bioregion, the species is known to occur mainly from Mossgiel to Urana, in south-western NSW with sites around Jerilderie, Hay Plain, Willandra Lakes, and north to Ivanhoe (NSW OEH 2022c, DEWHA 2008a). The Project Area is within the known distribution for the species.

The species is found primarily in clay soils on Bladder Saltbush (*Atriplex vesicaria*) and *Maireana aphylla* plains but also in grassland and in Grey Box (*Eucalyptus macrocarpa*)–Cypress Pine (*Callitris spp.*) woodland (DECC, 2005a). Eleven Plant Community Types associated with the species have been mapped within the Project Area; PCTs 153, 157,165, 216, 163, 160, 44, 46, 164, 13, and 15. This habitat covers majority of the Project Area (55319.22 ha). The total area of habitat within 20% of the Subject Land and subsequently with the potential to be impacted by the Project is 535.72 ha, this makes up 0.97% of the total suitable habitat within the Project Area. Flora transects were undertaken targeting this species in Spring 2021, and as a result the species was confirmed to be present. Further surveys are required to confirm the species polygon, in the interim habitat for the species is mapped as all areas of aforementioned associated PCTs and is presented in **Figure 7.3**.

The main identified threat to Mossgiel Daisy is clearing for improved pasture (Ayers et al., 1996), and cropping. The main potential threats to Mossgiel Daisy include changes in agricultural practices, possible habitat disturbance during road maintenance, and grazing by stock as the species is potentially palatable to them (DECC, 2005a).

The significant impact guidance for 'vulnerable' species in SIG 1.1, refers to impacts to 'important populations' of a species (DoE, 2013). An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

There is no adopted or made recovery plan for the Mossgiel Daisy. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species or a key source population for breeding or dispersal, as larger populations are recorded in surrounding areas. As such, the individuals identified within the Project area are not considered to form part of an 'important population'.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table. It is **unlikely** that the Project will result in a **significant impact** to the Mossgiel Daisy.

Table 7.3 Significant Impact Assessment for Mossgiel Daisy

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
lead to a long-term decrease in the size of an important population of a species	There is no adopted or made recovery plan for the Mossgiel Daisy. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, the individuals identified within the Project area are not considered to form part of an 'important population'. Therefore the Project will not lead to a long-term decrease in the size of an important population.	No
reduce the area of occupancy of an important population	There is no adopted or made recovery plan for the Mossgiel Daisy. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, individuals identified within the Project area are not considered to form part of an 'important population'. Therefore, the Project will not reduce the area of occupancy of an important population.	No
fragment an existing important population into two or more populations	There is no adopted or made recovery plan for the Mossgiel Daisy. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, individuals identified within the Project area are not considered to form part of an 'important population'. Therefore, the Project will not result in fragmenting an existing important population into two or more populations.	No
adversely affect habitat critical to the survival of a species	No critical habitat has been identified for the species. The Project area contains 55319.22 Ha of suitable habitat for the species, with the potential for disturbance of 20% of the Subject Land, 535.72 ha (0.97%). Low to high quality habitat is present across the Project area that will not be disturbed. It is unlikely that the development on 0.97% of the suitable habitat within the Project Area will adversely affect habitat critical to the survival of the Mossgiel Daisy.	No
disrupt the breeding cycle of an important population	There is no adopted or made recovery plan for the Mossgiel Daisy. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, the individuals identified within the Project area are not considered to form part of an 'important population'. Therefore, the Project will not disrupt the breeding cycle of an important population.	No
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project area contains 55319.22 Ha of suitable habitat for the species, associated with PCTs 153, 157,165, 216, 163, 160, 44, 46, 164, 13, and 15. Development within 20 % of the Subject Land would result in the disturbance of 535.72 ha (0.97% of suitable habitat within the Project Area). This area of disturbance is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline.	No
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasive species are not currently listed as a threat for the species, however, Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced into the Project Area.	No

Criteria	Description	Criteria Triggered?
introduce disease that may cause the species to decline, or	There is currently limited evidence of diseases causing detrimental effects on Mossgiel Daisy populations. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. However, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	No
interfere substantially with the recovery of the species.	There is no recovery plan adopted or made for the species. The main identified threats to Mossgiel Daisy are habitat loss, disturbance and modification, in addition to trampling, browsing and grazing by livestock. The Project has the potential to result in the disturbance of 535.72 ha, 0.97% of the suitable habitat across the Project area. This habitat has been historically subject to grazing pressures. It is unlikely that the Project will interfere with the recovery of the species.	No

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

- Mossgiel Daisy Habitat Area
- Plains Renewable Energy Park Indicative Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Mossgiel Daisy (Brachyscome papillosa) Habitat Mapping

E-3

Drawing No:	0606253m_PREHWF_Bio_G013_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

Slender Darling-pea (*Swainsona murrayana*)

The proposed development in the Project Area is unlikely to lead to a significant impact to the Slender Darling-pea.

The Slender Darling-pea is listed as 'Vulnerable' under the EPBC Act. The Slender Darling-pea is an ascending to erect perennial forb growing to 25 cm high with flowers that are pink or purple and greyish, thin or tapered, stiffly leathery pods (NSW OEH, 2022e). The Slender Darling-pea is found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree (NSW OEH, 2022e).

The species has been recorded in clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. The species grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with *Maireana* species (DEWHA, 2008b). Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated (DEWHA, 2008b). Suitable habitat for the species is present within the Project Areas associated with Plant Community Types 157, 163, 17, 44, 46, 164, 165, 216, 15, 26, and 28. Suitable habitat is presented in **Figure** 7.4**.** The total area of habitat within 20% of the Subject Land and subsequently with the potential to be impacted by the Project is 515.69ha, this makes up 0.97% of the total suitable habitat within the Project Area.

Targeted flora transects were undertaken for the Slender Darling-pea in associated PCTs during the Spring 2021 survey effort. As a result, the species was confirmed within the Project Area. Further surveys are required to confirm the species polygon, in the interim habitat for the species is mapped as all areas of aforementioned associated PCTs.

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

There is no adopted or made recovery plan for the Slender Darling-pea. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, the individuals identified within the Project area are not considered to form part of an 'important population'.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table. It is **unlikely** that the Project will result in a significant impact to the Slender Darling-pea.

Table 7.4 Significant Impact Assessment for Slender Darling-pea

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
lead to a long-term decrease in the size of an important population of a species	There is no adopted or made recovery plan for the Slender Darling-pea. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, the individuals identified within the Project area are not considered to form part of an 'important population'. Therefore the Project will not lead to a long-term decrease in the size of an important population.	No
reduce the area of occupancy of an important population	There is no adopted or made recovery plan for the Slender Darling-pea. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, individuals identified within the Project area are not considered to form part of an 'important population'. Therefore, the Project will not reduce the area of occupancy of an important population.	No
fragment an existing important population into two or more populations	There is no adopted or made recovery plan for the Slender Darling-pea. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, individuals identified within the Project area are not considered to form part of an 'important population'. Therefore, the Project will not result in fragmenting an existing important population into two or more populations.	No
adversely affect habitat critical to the survival of a species	No critical habitat has been identified for the Slender Darling-pea. The Project area contains 52948.79 Ha of suitable habitat for the species associated with PCTs 157, 163, 17, 44, 46, 164, 165, 216, 15, 26, and 28. The Project would result in the potential disturbance of 515.69 Ha (0.97%). Low to high quality habitat is present across the Project area that will not be disturbed. It is unlikely that the development on 0.97% of the Project area will adversely affect habitat critical to the survival of the Slender Darling-pea.	No
disrupt the breeding cycle of an important population	There is no adopted or made recovery plan for the Slender Darling-pea. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, as larger populations are recorded in surrounding areas. As such, the individuals identified within the Project area are not considered to form part of an 'important population'. Therefore, the Project will not disrupt the breeding cycle of an important population.	No
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project area contains 52948.79 Ha of suitable habitat for the species, associated with PCTs 157, 163, 17, 44, 46, 164, 165, 216, 15, 26, and 28. The Subject Land would result in the disturbance of 515.69 ha (0.97%). This area of disturbance is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline.	No
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable	Some of the main threats identified for the Slender Darling-pea include grazing from rabbits (*Oryctolagus cuniculus*) and weed invasion. With additional potential threats to habitat from Feral Goats (*Capra hircus*) and Feral Pigs (*Sus scrofa*).	No

Criteria	Description	Criteria Triggered?
species' habitat	Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced or exacerbated in the Project Area.	
introduce disease that may cause the species to decline, or	There is currently limited evidence of diseases causing detrimental effects on Slender Darling-pea populations. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. However, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	No
interfere substantially with the recovery of the species.	There is no recovery plan adopted or made for the species. The Project has the potential to result in the disturbance of 515.69 ha (0.97%) of the suitable habitat across the Project area. This habitat has been historically subject to grazing pressures. It is unlikely that the Project will interfere with the recovery of the species.	No

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

- Slender Darling-pea Habitat Area
- Plains Renewable Energy Park Indicative Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Slender Darling-pea (Swainsona murrayana) Habitat Mapping

E-4

Drawing No:	0606253m_PREHWF_Bio_G014_R03.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

Chariot Wheels (*Maireana cheelii*)

The proposed development in the Project Area has potential to lead to a significant impact to the Chariot Wheels.

Chariot Wheels are listed as 'Vulnerable' under the EPBC Act and based on field surveys is known to occur within the Project Area. Chariot Wheels are a perennial forb growing to about 20 cm high, with slender striped woolly stems and a fleshy swollen taproot. The fruiting body is whitish, often slightly woolly or cottony above, 5-6 mm in diameter, with five distinctly wheel-like wings (NSW OEHa, 2022a).

Chariot Wheels were once widely distributed across the inland plains of south-eastern Australia, occurring from south-western Queensland through western New South Wales to north-western Victoria. However, conversion of much of its former range to agriculture has resulted in an extensive decline in range and abundance (Mavromihalis, 2010a). The species is now extinct in Queensland and northern NSW, and survives only in southern NSW and Victoria, where there are about 17 populations containing perhaps 700,000 plants (Mavromihalis, 2010a). Most of these populations occur on private land or along roadsides, where they are threatened by continued degradation and destruction of habitat from weed invasion, grazing, cropping, clearing and increasing salinity (Mavromihalis, 2010a).

The Chariot Wheels is usually found in chenopod shrubland and grassland communities on heavy clay soils, dominated by various native shrubs, grasses and herbs, notably Hairy Bluebush *Maireana pentagona*, Bottle Bluebush *Maireana excavata*, Nitre-bush *Nitraria billardierei*, *Austrostipa nodosa*, *A. scabra, Erodium crinitum, Rhodanthe corymbiflorum, Hyalosperma semisterile* and *H. glutinosa*. In NSW the species appears to favour heavier grey clay soils that support Bladder *Saltbush Atriplex vesicaria* communities (Mavromihalis, 2010a). The Project area contains suitable habitat in the form of five (5) Plant Community Types, PCTs 157, 44, 46, 164, and 26. This habitat is present in **Figure 7.5.** The total area of habitat within 20% of the Subject Land and subsequently with the potential to be impacted by the Project is 356.87 ha, this makes up 0.91% of the total suitable habitat within the Project Area. Flora transects were undertaken targeting the species during the Spring 2021 survey effort, and as a result the species is confirmed to be present within the Project area. Further surveys are required to define species polygons for the species, currently all associated PCTs are considered habitat. There is a known population of the species along the Cobb Highway, between Hay and Deniliquin (Mavromihalis, 2010a). Individuals recorded within the Project area are likely to form part of this broader population.

The significant impact guidance for 'vulnerable' species in SIG 1.1, refers to impacts to 'important populations' of a species (DoE, 2013). An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

The Chariot Wheels Recovery Plan (Mavromihalis, 2010a) states that since the year 2000, plants have been recorded in about 15 populations, with most plants occurring in just six populations, five in Victoria and one in New South Wales, with four on private property and two along roadsides. A known population is present along the Cobb Highway between Deniliquin and Hay. The population size is unknown, however it is stated that the population is likely to include roadside and adjacent private land. The Project area is adjacent to the Cobb Highway between Deniliquin and Hay. For the purpose of this assessment, the individuals identified within the Project area are considered part of an important population.

Most of the identified sites within the Recovery Plan were found to contain small isolated populations within degraded and weedy vegetation, with remaining populations being highly fragmented (Mavromihalis, 2010a). Clearance of habitat, weed invasion, damage from road and utilities installation and maintenance, lack of regeneration, fragmentation and isolation of most remaining stands and disruption of ecological processes necessary for regeneration are the main threats for the species (Mavromihalis, 2010a).

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table. There is potential for a **significant impact** to Chariot Wheels as a result of the Project although this will be further reduced through detailed design and assessment in the EIS.

Table 7.5 Significant Impact Assessment for Chariot Wheels

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
lead to a long-term decrease in the size of an important population of a species	The records of Chariot Wheels within the Project area are considered to form part of an important population. The Project area contains 39348.60 ha of suitable habitat in the forms of PCTs 157, 44, 46, 164, and 26. Of this area, 356.87 ha is within 20% of the Subject Land where disturbance has potential to occur. This would lead to a long-term reduction of the size of the important population by 356.87 ha.	Yes Assessment and mapping to be refined in the EIS.
reduce the area of occupancy of an important population	The records of Chariot Wheels within the Project area are considered to form part of an important population. The Project area contains 39348.60 ha of suitable habitat in the forms of PCTs 157, 44, 46, 164, and 26. Of this area, 356.87 ha is within the Subject Land where disturbance would occur. This would lead to a reduction of the area of occupancy of the important population by 356.87 ha.	Yes Assessment and mapping to be refined in the EIS.
fragment an existing important population into two or more populations	The records of Chariot Wheels within the Project area are considered to form part of an important population. Chariot Wheels seeds are dispersed by wind or ants in the early summer (VIS DSE 2009). The disturbance to 356.87 ha is unlikely to fragment the individuals recorded into two or more populations.	No
adversely affect habitat critical to the survival of a species	Recovery actions within the recovery plan (Mavromihalis, 2010a) includes mapping of habitat critical to the survival of chariot wheels, however this is yet to be completed. The Project has the potential to result in the disturbance to 356.87 ha within the Subject Land.	No
disrupt the breeding cycle of an important population	The records of Chariot Wheels within the Project area are considered to form part of an important population. . Chariot Wheels seeds are dispersed by wind or ants in the early summer (VIS DSE 2009). The disturbance of 356.87 ha in linear areas is unlikely to disrupt the breeding cycle of the population.	No
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project area contains 39348.60 ha of suitable habitat associated with 157, 44, 46, 164, and 26. 356.87 ha within the Subject Land would be disturbed. This disturbance is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline.	No
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable	Weed invasion is a recognised threat for the species, including exotic species; Oat (*Avena spp*.) and Fescue (*Vulpia spp*). These weeds may hinder seedling establishment and compete with Chariot Wheels for local resources such as nutrients, water and space (VIS DSE 2009).	No

species' habitat	Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced or exacerbated in the Project Area.	
introduce disease that may cause the species to decline, or	There is currently limited evidence of diseases causing detrimental effects on Chariot wheels populations. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. However, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	No
interfere substantially with the recovery of the species.	The recovery plan for the species (Mavromihalis, 2010a), details seven objectives: 1. Determine distribution, abundance and population structure 2. Determine habitat requirements 3. Ensure that important populations and their habitat are protected and managed. 4. Manage threats to populations 5. Identify key biological functions 6. Determine growth rates and viability of populations 7. Build community support for conservation The Project impacts of 356.87 ha of suitable habitat for the species, however is unlikely to interfere with the recovery of the species.	No

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

- Chariot Wheels Habitat Area
- Plains Renewable Energy Park Indicative Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Chariot Wheels (Maireana cheelii) Habitat Mapping

E-5

Drawing No:	0606253m_PREHWF_Bio_G015_R02.mxd	The Plains Renewable Energy Park Wind Farm	
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

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ERM

Corben's Long-eared Bat (*Nyctophilus corbeni*)

The proposed development in the Project Area is unlikely to lead to a significant impact to the Corben's Long-eared Bat.

Corben's Long-eared Bat is listed as 'Vulnerable' under the EPBC Act. This nocturnal insectivorous microbat is uniformly dark grey-brown in colour, with ears about 3 cm long, larger than the head. The species was previously included as a distinct form of the Greater Long-eared Bat (*Nyctophilus timoriensis*) however in 2009 was formally described as a separate species (TSSC, 2015).

The Corben's Long-eared Bat was originally considered to be found across temperate southern Australia, however this is most likely incorrect due to the separation of the taxon into three different species; therefore the historic distribution is unclear (TSSC 2015). The Corben's Long-eared Bat is found in southern central Queensland, central western New South Wales, north-western Victoria and eastern South Australia, where it is patchily distributed, with most of its range in the Murray Darling Basin. Most records are from inland of the Great Dividing Range. The species is uncommon within this distribution and is rarely recorded (TSSC 2015).

The species inhabits a variety of vegetation types, including mallee, bulloke (*Allocasuarina leuhmanni)* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland (NSW OEH 2022b). The Project Area contains suitable habitat for the species in the form of PCTs 17, 21, 26, 70 and 28, this habitat is mapped in **Figure 7.6**. The total area of habitat within 20% of the Subject Land and subsequently with the potential to be impacted by the Project is 17.46 ha, this makes up 0.41% of the total suitable habitat within the Project Area. During the Summer 2022 survey effort eight Anabat devices were deployed across the Project area to target microchiopteran bat species. During the survey event, call records of *Nyctophilus sp*. were detected. It is noted that the species from genus *Nyctophilus* cannot be distinguished from each other by call (TSSC 2015). There are three (3) species that are known to occur in the Project area; *N.corbeni, N.geoffroyi* and *N. gouldi*. For the purpose of this assessment, *N. corbeni*, is assumed to be recorded. Further surveys will be undertaken during Spring 2022.

The significant impact guidance for 'vulnerable' species in SIG 1.1, refers to impacts to 'important populations' of a species (DoE, 2013). An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

There is no adopted or made Recovery Plan for this species. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, or considered a key source population for breeding or dispersal. As such, the individuals identified within the Project area are not considered to form part of an 'important population'.

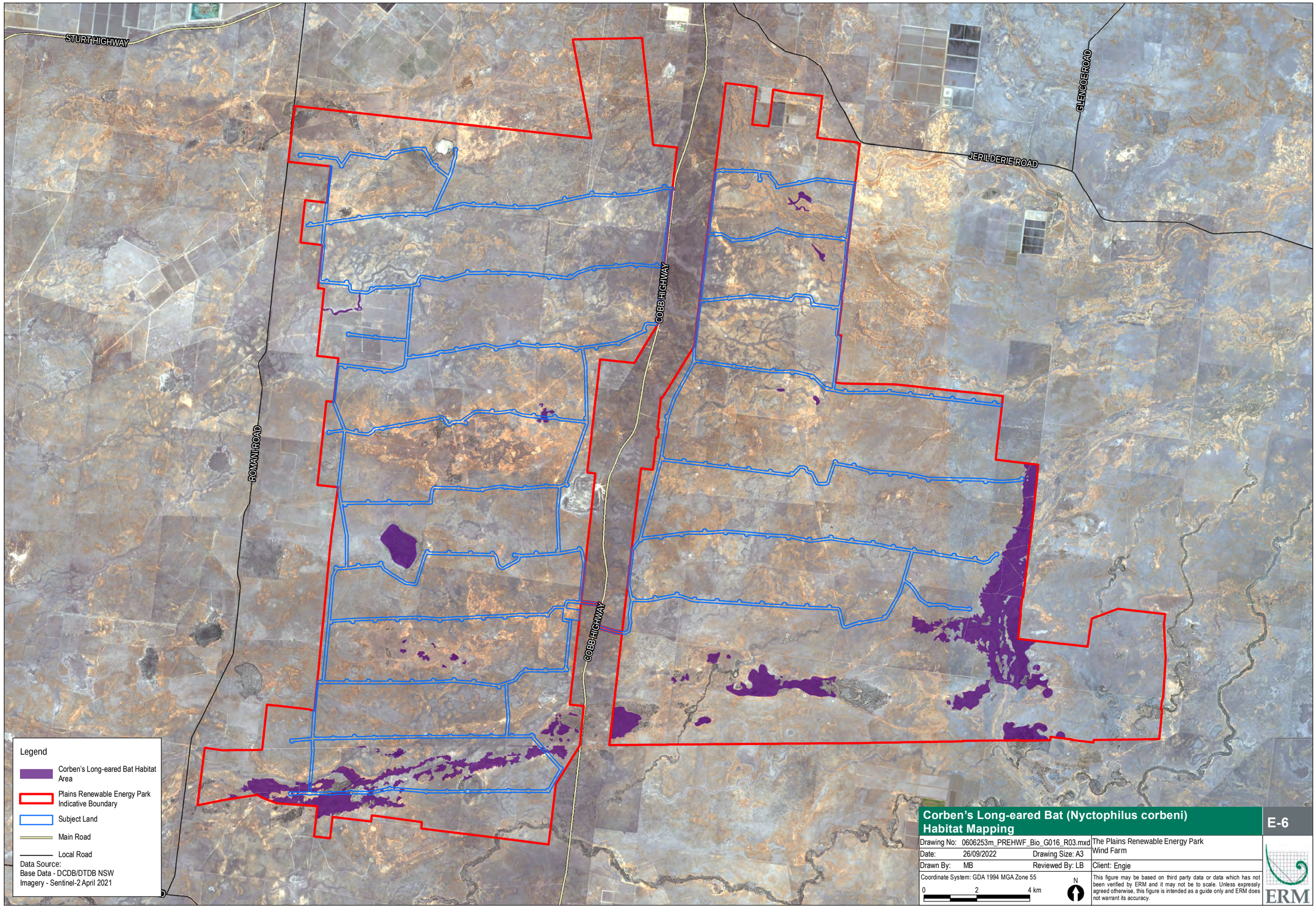
Due to the lack of data available to assess the population decline of the south-eastern long-eared bat, providing a detailed assessment of the current threats to the survival of this species is difficult. However it is likely that area of occupancy is declining due to habitat loss, particularly in New South Wales and Queensland, and to habitat degradation associated with altered fire regimes, timber extraction, mining and other factors. Habitat loss and fragmentation are considered here as known threats, with potential threats discussed following these known threats.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table. It is **unlikely** for a **significant impact** to Corben's Long-eared Bat as a result of the Project.

Table 7.6 Significant Impact Assessment for Corben's Long-eared Bat

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
lead to a long-term decrease in the size of an important population of a species	There is no adopted or made Recovery Plan for this species. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, or considered a key source population for breeding or dispersal. As such, the individuals identified within the Project area are not considered to form part of an 'important population'. The Project will not lead to a long-term decrease in the size of an important population of a species.	No
reduce the area of occupancy of an important population	There is no adopted or made Recovery Plan for this species. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, or considered a key source population for breeding or dispersal. As such, the individuals identified within the Project area are not considered to form part of an 'important population'. The Project will not reduce the area of occupancy of an important population.	No
fragment an existing important population into two or more populations	There is no adopted or made Recovery Plan for this species. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, or considered a key source population for breeding or dispersal. As such, the individuals identified within the Project area are not considered to form part of an 'important population'. The Project will not fragment an existing important population into two or more populations	No
adversely affect habitat critical to the survival of a species	Critical habitat is not defined for the species, however old growth vegetation, inclusive of hollow bearing trees, appear to be a critical habitat component in the Victorian distribution (TSSC 2015). Old Growth vegetation with hollow bearing trees is present within the Subject Land, however not in associated PCTs for the species. It is unlikely the Project will result adversely affecting habitat critical to the survival of a species.	No
disrupt the breeding cycle of an important population	There is no adopted or made Recovery Plan for this species. The Project area is not at the limit of the species range, nor is the population considered necessary for maintaining genetic diversity for the species, or considered a key source population for breeding or dispersal. As such, the individuals identified within the Project area are not considered to form part of an 'important population'. The Project will not disrupt the breeding cycle of an important population.	No
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The area of suitable habitat within the Project area is 4236.48 ha, with 17.46 ha (0.41 %) with potential to be impacted within the Subject Land. This low level of disturbance is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline.	No
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasive species are not currently listed as a threat for the species, however, habitat loss leads to increased competition for remaining hollows, with Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced into the Project Area.	No

Criteria	Description	Criteria Triggered?
introduce disease that may cause the species to decline, or	There is currently limited evidence of diseases causing detrimental effects on Corben's Long-eared Bat populations. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. However, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	No
interfere substantially with the recovery of the species.	There is no adopted or made Recovery Plan for this species. It is likely that this species' area of occupancy is declining due to habitat loss, and to habitat degradation associated with altered fire regimes, timber extraction, mining and other factors including the loss of hollow availability. The Project is unlikely to interfere substantially with the recovery of the species.	No


STURT HIGHWAY
ROMANI ROAD
COBB HIGHWAY
COBB HIGHWAY
JERILDERIE ROAD
GLENCOE ROAD
Legend
Corben's Long-eared Bat Habitat Area
Plains Renewable Energy Park Indicative Boundary
Subject Land
Main Road
Local Road
Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
Corben's Long-eared Bat (Nyctophilus corbeni) Habitat Mapping
E-6
Drawing No: 0606253m_PREHWF_Bio_G016_R03.mxd
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: LB
Coordinate System: GDA 1994 MGA Zone 55
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4 km
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The Plains Renewable Energy Park Wind Farm
Client: Engie
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.
ERM

Grey Falcon (*Falco hypoleucos*)

The proposed development in the Project Area is unlikely to lead to a significant impact to the Grey Falcon.

The Grey Falcon is listed as 'Vulnerable' under the EPBC Act. The species is considered likely to occur within the Project area based on a Likelihood of Occurrence assessment undertaken, considering records within the locality and presence of habitat. There are two (2) ALA records of the Grey Falcon in the locality with the closest record located approximately 4 km north of the Project area from 2008 (*noting that ALA records are generalised by 10 km).*

The Grey Falcon is an elusive species endemic to mainland Australia and occurs at low densities. It is the rarest of six Australian members of the genus *Falco.* Two members of the Falco genus have been recorded within the Project area during field survey events, the Black Falcon and Brown Falcon. Survey efforts for raptors have been undertaken across three seasonal survey events, with additional surveys to be completed.

The species occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia. The species is mainly found where annual rainfall is less than 500 mm. Hay NSW has an annual mean rainfall of 367 mm (BOM 2015).

The Grey Falcon is associated with all PCTs, with the exception of PCT 159, identified within the Project area, with this habitat mapped in **Figure 7.7**. The total area of habitat within 20% of the Subject Land and subsequently with the potential to be impacted by the Project is 559.40 ha. The species frequents timbered lowland plains, particularly *Acacia* shrublands that are crossed by tree-lined water courses (TSSC 2020). The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (TSSC 2020). The Project area consists of timbered lowland plains, in the form of Black Box, Cypress Pine, Weeping Myall and Rosewood communities, however *Acacia* shrublands are not present. Tussock grasslands in the form of Speargrass and Windmill grass communities are common across the Project area landscape. The Grey Falcon is likely to opportunistically hunt within habitat across the Project area.

Grey Falcon eggs are laid in the old nests of other birds, particularly those of other raptors or corvids. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*), but they also nest in telecommunication towers. It is unlikely that the species would utilise areas within the Project area for breeding due to a lack of timbered waterways.

The significant impact guidance for 'vulnerable' species in SIG 1.1, refers to impacts to 'important populations' of a species (DoE, 2013). An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

There is no adopted or made Recovery Plan for this species. The Grey Falcon has a wide range across mainland Australia, the Project area is not at the limit of the species range. The potential population is not considered necessary for maintaining genetic diversity for the species, nor considered a key source population for breeding or dispersal. As such, the potential population within the Project area is not considered to form part of an 'important population'.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table. It is **unlikely** for there to be a significant impact to Grey Falcon as a result of the Project.

Table 7.7 Significant Impact Assessment for Grey Falcon

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
lead to a long-term decrease in the size of an important population of a species	There is no adopted or made Recovery Plan for this species. The Grey Falcon has a wide range across mainland Australia, the Project area is not at the limit of the species range. The potential population is not considered necessary for maintaining genetic diversity for the species, nor considered a key source population for breeding or dispersal. As such, potential population within the Project area are not considered to form part of an 'important population'. The Project will not lead to a long-term decrease in the size of an important population of a species	No
reduce the area of occupancy of an important population	There is no adopted or made Recovery Plan for this species. The Grey Falcon has a wide range across mainland Australia, the Project area is not at the limit of the species range. The potential population is not considered necessary for maintaining genetic diversity for the species, nor considered a key source population for breeding or dispersal. As such, potential population within the Project area are not considered to form part of an 'important population'. The Project will not reduce the area of occupancy of an important population.	No
fragment an existing important population into two or more populations	There is no adopted or made Recovery Plan for this species. The Grey Falcon has a wide range across mainland Australia, the Project area is not at the limit of the species range. The potential population is not considered necessary for maintaining genetic diversity for the species, nor considered a key source population for breeding or dispersal. As such, potential population within the Project area are not considered to form part of an 'important population'. The Project will not fragment an existing important population into two or more populations.	No
adversely affect habitat critical to the survival of a species	There is no recognised critical habitat for the species. The suitable habitat for the Grey Falcon is associated with all PCTs identified within the Project area, with the exception of PCT 159. 559.40 ha of habitat within the Subject Land has the potential to be disturbed for the Project. No suitable breeding habitat (treed waterways with old raptor nests) will be disturbed. It is unlikely that this low level of disturbance of will adversely affect the habitat critical to the survival of the species.	No
disrupt the breeding cycle of an important population	There is no adopted or made Recovery Plan for this species. The Grey Falcon has a wide range across mainland Australia, the Project area is not at the limit of the species range. The potential population is not considered necessary for maintaining genetic diversity for the species, nor considered a key source population for breeding or dispersal. As such, potential population within the Project area are not considered to form part of an 'important population'. Breeding habitat is not present within the Project area. The Project will not disrupt the breeding cycle of an important population.	No
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The suitable habitat for the Grey Falcon is associated with all PCTs identified within the Project area with the exception of PCT 159. 559.40 ha of habitat within the Subject Land has the potential to be disturbed for the Project. This low level of disturbance top habitat for this wide ranging species is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline.	No
result in invasive species that are harmful to a	Predation by feral cats is recognised as a threat for the species, with studies revealing Grey Falcon present in gut contents of cats	No

Criteria	Description	Criteria Triggered?
vulnerable species becoming established in the vulnerable species' habitat	(TSSC 2020). Feral cats have been observed within the Project area during field surveys undertaken to date. Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced or exacerbated in the Project Area.	
introduce disease that may cause the species to decline, or	There is currently limited evidence of diseases causing detrimental effects on Grey Falcon populations. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. However, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	No
interfere substantially with the recovery of the species.	A Recovery Plan has not been made or adopted for the Grey Falcon, however the Conservation Advice (TSSC 2020) details conservation actions, including: • Support improved fire and grazing management in areas where Grey Falcons are known to occur. • Protect known nesting trees and include adequate exclusion buffers with regard to proposed developments and land clearing activities. • Support the establishment and survival of replacement nest trees in areas where Grey Falcon in known to breed. • Retain artificial structures with known or potential Grey Falcon nests. • Control invasive cats and camels in areas where Grey Falcons are known to occur, especially in known roosting and nesting areas. In addition to stakeholder engagement, survey and monitoring and information and research priority actions. The Project is unlikely to interfere substantially with these conservation actions, or the recovery of the species.	No


STURT HIGHWAY
ROMANI ROAD
COBB HIGHWAY
COBB HIGHWAY
JERILDERIE ROAD
GLENCOE ROAD
Legend
Grey Falcon Habitat Area
Plains Renewable Energy Park Indicative Boundary
Subject Land
Main Road
Local Road
Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
Grey Falcon (Falco hypoleucos) Habitat Mapping
E-7
Drawing No: 0606253m_PREHWF_Bio_G017_R03.mxd
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: LB
Coordinate System: GDA 1994 MGA Zone 55
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4 km
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The Plains Renewable Energy Park Wind Farm
Client: Engie
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.
ERM

Growling Grass Frog (*Litoria raniformis*)

The proposed development in the Project Area is unlikely to lead to a significant impact to the Growling Grass Frog.

The Growling Grass Frog is listed as 'Vulnerable' under the EPBC Act and is considered likely to occur within the Project Area. The Project Area occurs within the range for the Growling Grass Frog, which is endemic to south-eastern Australia, including South Australia, Victoria, Tasmania, New South Wales and the Australian Capital Territory. In NSW the species occurs from Bombala in the far south-eastern corner of the state, through the Southern Tablelands, and along the Murrumbidgee and Murray Rivers. It formerly occurred as far north as Bathurst and the Willandra National Park (NSW). Growling Grass Frog population has since been isolated or fragmented, with the most pronounced decline evident in NSW (Clemann & Gillespie 2012). The species is currently widespread throughout the Murray River valley, and has been recorded from six Catchment Management Areas in NSW, including the Murrumbidgee.

Habitat critical to the survival of the Southern Bell Frog differs throughout its range. Populations in NSW occur in swamps dominated by River Red Gums (*Eucalyptus camaldulensis)*, Lignum and Typha, and Black Box (*Eucalyptus largiflorens*) / Lignum / Nitre Goosefoot (*Chenopodium nitrariaceum*), and will also occur in irrigated rice crops Clemann & Gillespie 2012. Associated PCTs within the Project area include PCT 11, 13, and 17, along with areas of water pooling surrounding leaking water tanks (creating well established submerged vegetation) the PCTs are mapped in **Figure 7.8**. The total area of habitat within 20% of the Subject Land and subsequently with the potential to be impacted by the Project is 16.75 ha, this makes up 0.65% of the total suitable habitat within the Project Area.

There are multiple BioNet Atlas and ALA records of the species to the south of the Project Area, with the closest being from 2017, 6.9 km from the south east corner. This record is from the Werkenbergal Swamp in Booroorban. Audio visual surveys were undertaken targeting the Growling Grass Frog in accordance with the Survey Guidelines for Australia's Threatened Frogs during the summer 2022 survey effort. No individuals were recorded.

The significant impact guidance for 'vulnerable' species in SIG 1.1, refers to impacts to 'important populations' of a species (DoE, 2013). An 'important population' is a population that is necessary for a species' long-term survival and recovery. DEWHA (2009) define a Growling Grass Frog 'important population' as:

'Any viable population is considered to be an important population for the persistence and recovery of the species. For this species, a viable population is one which is not isolated from other populations or waterbodies, such that it has the opportunity to interact with other nearby populations or has the ability to establish new populations when the suitability or availability of waterbodies changes. Interaction with nearby populations and colonisation of newly available waterbodies occurs via the dispersal of individual frogs across suitable habitat. 'In addition, a population of L. raniformis could be considered an important population if it is near the limit of the species' range (for example small isolated populations in South Australia), is well-studied or has a history of monitoring, and hence provides opportunity for greater understanding of the species and its conservation status through the collection of long-term data''.

The Project Area is located approximately 6.9 km south of a known population of the species. There are mapped watercourses and drainage lines within the Project Area, which would allow for connectivity to waterbodies. However, these creek lines were observed to be dried during all survey efforts, despite significant rainfall during the La Nina events during 2021 and 2022. It is unlikely that the presumed population of Grass Growling Frogs within the Project Area would be considered an important population of the species.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table. It is **unlikely** the Project will result in a significant impact to Growling Grass Frog.

Table 7.8 Significant Impact Assessment for Growling Grass Frog

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
lead to a long-term decrease in the size of an important population of a species	The Project Area is located approximately 6.9 km south of a known population of the species. There are mapped watercourses and drainage lines within the Project Area, which would allow for connectivity to waterbodies. However, these creek lines were observed to be dried during all survey efforts, despite significant rainfall during the La Nina events during 2021 and 2022. It is unlikely that the presumed population of Grass Growling Frogs within the Project Area would be considered an important population of the species. It is unlikely the Project would result in the long-term decrease in size of an important population of the species.	No
reduce the area of occupancy of an important population	The Project Area is located approximately 6.9 km south of a known population of the species. There are mapped watercourses and drainage lines within the Project Area, which would allow for connectivity to waterbodies. However, these creek lines were observed to be dried during all survey efforts, despite significant rainfall during the La Nina events during 2021 and 2022. It is unlikely that the presumed population of Grass Growling Frogs within the Project Area would be considered an important population of the species. The Project is unlikely to result in the reduction of the area of occupancy of an important population.	No
fragment an existing important population into two or more populations	The Project Area is located approximately 6.9 km south of a known population of the species. There are mapped watercourses and drainage lines within the Project Area, which would allow for connectivity to waterbodies. However, these creek lines were observed to be dried during all survey efforts, despite significant rainfall during the La Nina events during 2021 and 2022. It is unlikely that the presumed population of Grass Growling Frogs within the Project Area would be considered an important population of the species. The Project is unlikely to fragment an existing important population into two or more populations.	No
adversely affect habitat critical to the survival of a species	The potential habitat present within the Project Area has poor connectivity, particularly to know populations of the species. This limited habitat is not considered critical to the survival of the species, and therefore the Project will not adversely affect habitat critical to the survival of a species.	No
disrupt the breeding cycle of an important population	The Project Area is located approximately 6.9 km south of a known population of the species. There are mapped watercourses and drainage lines within the Project Area, which would allow for connectivity to waterbodies. However, these creek lines were observed to be dried during all survey efforts, despite significant rainfall during the La Nina events during 2021 and 2022. It is unlikely that the presumed population of Grass Growling Frogs within the Project Area would be considered an important population of the species. The Project is unlikely to disrupt the breeding cycle of an important population.	No
modify, destroy, remove or isolate or decrease the availability or quality of	The suitable habitat within the Project Area is limited to PCTs 11, 13, and 17 and areas of leaking water tanks surrounded by submerged vegetation. The PCTs cover 2582.57 ha, with only 16.75 ha with potential to be disturbed within the Subject Land.The Project is unlikely to disrupt the breeding cycle of an important	No

Criteria	Description	Criteria Triggered?
habitat to the extent that the species is likely to decline	population modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasive species such as the introduced Eastern Gambusia (*Gambusia holbrooki*) has been implicated in the decline of the closely-related Green and Golden Bell Frog (*Litoria aurea*) (Morgan and Buttemer 1996; White and Pyke 1996; Pyke and White 2001, and references therein). However, the implicated impact of Eastern Gambusia on the Growling Grass Frog is based on circumstantial evidence. Regardless, the Project activities during construction and operation will adopt and follow Biosecurity measures that ensure that further invasive species are not introduced into the Project Area.	No
introduce disease that may cause the species to decline, or	Chytrid fungus, a water-borne pathogen responsible for the Chytridiomycosis, is widespread in frog populations in eastern Australia and has recently been detected in the Growling Grass Frog (Berger et al. 1999). Chytridiomycosis disease is believed to be a significant cause of death in some frog species in recent years (Berger et al. 1999). Precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	No
interfere substantially with the recovery of the species.	The Recovery Plan for Litoria raniformis was published in 2021 (Clemann & Gillespie, 2012) and detail four main objectives: • Secure extant populations of Southern Bell Frogs (aka Growling Grass Frogs), particularly those occurring in known breeding habitats, and improve their viability through increases in size and / or area of occurrence. • Determine distribution, biology and ecology of the Southern Bell Frog (aka Growling Grass Frogs), and identify causes of the decline of the species across its geographic range. • Address known or predicted threatening processes, and implement appropriate management practices where possible to ensure that land use activities do not threaten the survival of the Southern Bell Frog (aka Growling Grass Frogs). • Increase community awareness of and support for Southern Bell Frog (aka Growling Grass Frogs)conservation The disturbance to artificial farm dam and minimal disturbance to natural water sources on site, will not interfere with the objectives of the recovery plan for this species.	No

STURT HIGHWAY

STURT HIGHWAY

ROMANI ROAD

COBB HIGHWAY

COBB HIGHWAY

JERILDERIE ROAD

GLENCOE ROAD

Legend

- Growling Grass Frog Habitat Area
- Plains Renewable Energy Park Indicative Boundary
- Subject Land
- Main Road
- Local Road

Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021

Growling Grass Frog (Litoria raniformis) Habitat Mapping

E-8

Drawing No:	0606253m_PREHWF_Bio_G018_R02.mxd		The Plains Renewable Energy Park Wind Farm
Date:	26/09/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: LB	Client: Engie

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

N

ERM

Weeping Myall Woodlands TEC

The proposed development in the Project Area is unlikely to lead to a significant impact to the Weeping Myall Woodlands TEC.

The Weeping Myall Woodland TEC is listed as 'Endangered' under the EPBC Act and is known to occur within the Project Area based on vegetation integrity plots (BAM plots) undertaken during field surveys. The Project Area is within the range of the TEC, which occurs in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Brigalow Belt North, Murray-Darling Depression, Nandewar and Cobar Peneplain IBRA Bioregions (DEWHA 2008c).

The central Riverina district historically supported extensive stands of Weeping Myall Woodlands. It is clear that woody vegetation has declined significantly across the plains, particularly in the eastern Riverina (TSCC 2009). The Weeping Myall Woodlands have declined from an original extent of between 1 900 000 ha and 3 300 000 ha to a current extent of between 190 000 ha and 330 000 ha. This represents a considerable decline of extent within the range 83% to 94% (TSSC 2009). The ecological community currently occurs in small pockets throughout its range (DEWHA 2008c).

The Weeping Myall Woodlands TEC was confirmed within the Project Area in association with PCT 26 and covers a Patch of 15.67 ha, this community has been avoided during the design process, with none of the TEC mapped within the Subject Land as presented in **Figure 7.9**.

The confirmed TEC meets diagnostic features including the following:

- Tree canopy is dominated by >50% of living Weeping Myall;
- The overstory has >5% tree canopy cover;
- The area is >0.5 ha in size; and
- The tallest layer of living Weeping Myall in the patch reaches >4m tall, and vegetation cover present in BAM plot is comprised of 100% native species.

The tree canopy of the Patch is dominated by Weeping Myall (*Acacia pendula*), containing additional descriptive mid stratum and ground stratum species; *Rhagodia spinescens, Calotis scabiosifolia, Einadia nutans, Enteropogon acicularis* and *Maireana aphylla.* The ecological community occurs on black, brown, red-brown or grey clay or clay loam soils, of which grey, brown and red clays are present within the Project area.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table. It is **unlikely** for there to be a significant impact to Weeping Myall Woodlands as a result of the Project.

Table 7.9 Significant Impact Assessment for Weeping Myall Woodlands

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Reduce the extent of an ecological community	A Patch of the Weeping Myall Woodlands TEC was confirmed within the Project Area in association with PCT 26 and covers an area of 15.67 ha. This community has been avoided during the design process, with none of the TEC mapped within the Subject Land. The Project will not result in the reduction of the extent of the TEC.	No
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	A Patch of the Weeping Myall Woodlands TEC was confirmed within the Project Area in association with PCT 26 and covers an area of 15.67 ha. This community has been avoided during the design process, with none of the TEC mapped within the Subject Land. It is unlikely that the Project will fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines.	No
Adversely affect habitat critical to the survival of an ecological community	A Patch of the Weeping Myall Woodlands TEC was confirmed within the Project Area in association with PCT 26 and covers an area of 15.67 ha. This community has been avoided during the design process, with none of the TEC mapped within the Subject Land. It is unlikely that the Project will adversely affect habitat critical to the survival of an ecological community	
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Hydrology impacts as a result of the Project have not been explored as part of this assessment, and will be considered in the EIS.	No
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	A Patch of the Weeping Myall Woodlands TEC was confirmed within the Project Area in association with PCT 26 and covers an area of 15.67 ha. This community has been avoided during the design process, with none of the TEC mapped within the Subject Land. The proposed developed is unlikely to cause substantial change in the species composition of the TEC.	No
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: ■ assisting invasive species, that are harmful to the listed	A Patch of the Weeping Myall Woodlands TEC was confirmed within the Project Area in association with PCT 26 and covers an area of 15.67 ha. This community has been avoided during the design process, with none of the TEC mapped within the Subject Land. Biosecurity measures will be implemented to reduce the introduction and establishment of invasive species. These measures will further explore the mitigation measures to be undertaken to minimise the impacts of chemicals utilised, if any, for weed management within the Project Area and the consideration for native vegetation, inclusive of the TEC.	No

Criteria	Description	Criteria Triggered?
ecological community, to become established, or ■ causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or		
Interfere with the recovery of an ecological community	A recovery plan for the TEC has not been developed. The TEC has been avoided during the design process, with none of the TEC mapped within the Subject Land. It is unlikely that the Project will interfere with the recovery of an ecological community.	No


STURT HIGHWAY
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ROMANI ROAD
COBB HIGHWAY
COBB HIGHWAY
JERILDERIE ROAD
GLENCOE ROAD
Legend
Weeping Myall Woodlands TEC Area
Plains Renewable Energy Park Indicative Boundary
Subject Land
Main Road
Local Road
Data Source:
Base Data - DCDB/DTDB NSW
Imagery - Sentinel-2 April 2021
Weeping Myall Woodlands TEC Mapping
E-9
Drawing No: 0606253m_PREHWF_Bio_G019_R02.mxd
Date: 26/09/2022
Drawing Size: A3
Drawn By: MB
Reviewed By: LB
Coordinate System: GDA 1994 MGA Zone 55
0
2
4 km
N
The Plains Renewable Energy Park Wind Farm
Client: Engie
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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APPENDIX F HOLLOW BEARING TREES

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
1	290274	6163517	60	5H15W	-	-	-	-	-	-	-	-
2	290226.8	6163575	80	8H20W	4H10W	5H10W	5H15W	-	-	-	-	-
3	290216.3	6163576	100+	9H10W	10H15W	10H10W	-	-	-	-	-	-
4	290200	6163611	70	6H10W	5H12W	8H10W	7H15W	-	-	-	-	-
5	290208.3	6163611	60	7H15W	-	-	-	-	-	-	-	-
6	290203.3	6163636	100	7H10W	9H10W	6H10W	-	-	-	-	-	-
7	290175.5	6163628	80	6H15W	7H12W	-	-	-	-	-	-	-
8	290159.4	6163658	90	9H10W	-	-	-	-	-	-	-	-
9	291057.1	6164128	80	4H10W	7H12W	-	-	-	-	-	-	-
10	291038.7	6164106	90	7H10W	-	-	-	-	-	-	-	-
11	291051.1	6164083	80	8H10W	-	-	-	-	-	-	-	-
12	291017.6	6164053	80	7H10W	-	-	-	-	-	-	-	-
13	291077.1	6163983	70	6H15W	-	-	-	-	-	-	-	-
14	291090.7	6163970	70	5H 12W	-	-	-	-	-	-	-	-
15	291082.7	6163995	70	5H10W	6H10W	4H10W	-	-	-	-	-	-
16	291068.2	6164006	70	9H12W	8H10W	-	-	-	-	-	-	-
17	291077.9	6163968	60	6H10W	-	-	-	-	-	-	-	-
18	291049.8	6164028	60	6H10W	-	-	-	-	-	-	-	-
19	290664.2	6153902	70	6H10W	6H10W	7H10W	4H10W	-	-	-	-	-
20	290671.7	6153889	50	8H10W	-	-	-	-	-	-	-	-
21	290686.4	6153885	25	6H10W	-	-	-	-	-	-	-	-
22	290687.8	6153880	60	5H15W	6H10W	-	-	-	-	-	-	-
23	290701.3	6153855	70	6H10W	-	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
24	290721.7	6153829	70	5H10W	-	-	-	-	-	-	-	-
25	290725.1	6153820	50	7H10W	6H10W	6H10W	-	-	-	-	-	-
26	290757	6153783	30	4H10W	4H10W	-	-	-	-	-	-	-
27	290757.1	6153761	50	5H10W	4H10W	-	-	-	-	-	-	-
28	290756.7	6153756	70	6H10W	6H10W	6H10W	6H10W	-	-	-	-	-
29	290765.1	6153687	100	6H15W	6H12W	-	-	-	-	-	-	-
30	290843.3	6153777	30	6H10W	6H10W	7H10W	-	-	-	-	-	-
31	290756.5	6153901	50	8H10W	4H10W	6H10W	-	-	-	-	-	-
32	291598.6	6153738	30	6H15W	6H12W	-	-	-	-	-	-	-
33	291602.6	6153738	25	4H10W	-	-	-	-	-	-	-	-
34	290328.1	6151118	80	9H15W	4H10W	4H15W	5H10W	-	-	-	-	-
35	290332.2	6151169	60	7H10W	4H10W	4H10W	-	-	-	-	-	-
36	290338.9	6151214	60	5H15W	6H16W	5H15W	6H20W	-	-	-	-	-
37	290350	6151218	50	4H10W	-	-	-	-	-	-	-	-
38	290340.6	6151227	100	4H10W	6H10W	6H10W	7H20W	6H12W	5H15W	5H10W		
39	290294.6	6151233	80	5H15W	4H10W	-	-	-	-	-	-	-
40	295580.5	6142812	35	6H10W	3H10W	4H12W	-	-	-	-	-	-
41	295575.5	6142835	30	4H10W	5H15W	5H10W	6H10W	-	-	-	-	-
42	295569.8	6142846	30	5H12W	-	-	-	-	-	-	-	-
43	295560.9	6142851	40	4H12W	4H10W	4H10W	-	-	-	-	-	-
44	295566.8	6142859	40	5H12W	6H10W	6H10W	-	-	-	-	-	-
45	295547.5	6142868	30	3H10W	-	-	-	-	-	-	-	-
46	295562.9	6142883	40	4H10W	-	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
47	295556.6	6142890	30	5H12W	4H10W	4H12W	-	-	-	-	-	-
48	295543	6142898	40	7H15W	6H10W	-	-	-	-	-	-	-
49	295573.3	6142892	50	3H10W	-	-	-	-	-	-	-	-
50	295597.3	6142857	40	4H20W	5H10W	-	-	-	-	-	-	-
51	295646.7	6142780	50	3H20W	4H10W	-	-	-	-	-	-	-
52	295616.5	6142818	60	5H10W	5H10W	-	-	-	-	-	-	-
53	295455.3	6141950	30	8H12W	6H10W	7H10W	-	-	-	-	-	-
54	295468.5	6141921	80	5H10W	5H15W	-	-	-	-	-	-	-
55	295480.7	6141916	90	7H12W	6H15W	4H20W	-	-	-	-	-	-
56	295489.1	6141902	40	5H10W	-	-	-	-	-	-	-	-
57	290278.7	6163628	40	4H10W	-	-	-	-	-	-	-	-
58	290280.9	6163622	100	7H15W	6H20W	6H15W	-	-	-	-	-	-
59	290258.3	6163688	70	5H25W	5H20W	-	-	-	-	-	-	-
60	290251.8	6163698	50	6H10W	-	-	-	-	-	-	-	-
61	290239.1	6163685	70	6H15W	10H10W	-	-	-	-	-	-	-
62	290224.2	6163661	60	7H10W	4H20W	5H20W	6H10W	-	-	-	-	-
63	291154.5	6164096	60	6H10W	-	-	-	-	-	-	-	-
64	291132.2	6164067	110	6H15W	-	-	-	-	-	-	-	-
65	291125.6	6164031	50	5H10W	-	-	-	-	-	-	-	-
66	291090.6	6163966	60	5H20W	-	-	-	-	-	-	-	-
67	291070.8	6164021	110	6H15W	-	-	-	-	-	-	-	-
68	290547.8	6153892	40	4H10W	-	-	-	-	-	-	-	-
69	290552.7	6153872	40	4H10W	-	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
70	290569	6153899	60	6H10W	-	-	-	-	-	-	-	-
71	290569.4	6153901	50	7H10W	-	-	-	-	-	-	-	-
72	290601.4	6153897	70	5H10W	-	-	-	-	-	-	-	-
73	291149.4	6153707	50	5H15W	-	-	-	-	-	-	-	-
74	290393.2	6151172	60	7H10W	-	-	-	-	-	-	-	-
75	290405	6151202	70	4H30W	-	-	-	-	-	-	-	-
76	290347	6151331	60	5H15W	-	-	-	-	-	-	-	-
77	295600.2	6142933	90	7H10W	7H10W	7H15W	8H10W	8H20W	-	-	-	-
78	295620.3	6142973	50	6H10W	-	-	-	-	-	-	-	-
79	295631.4	6142884	70	5H10W	-	-	-	-	-	-	-	-
80	295640.5	6142899	40	5H10W	-	-	-	-	-	-	-	-
81	295650.8	6142882	60	6H15W	-	-	-	-	-	-	-	-
82	295646.7	6142858	50	5H15W	5H15W	-	-	-	-	-	-	-
83	295645.9	6142850	70	6H12W	-	-	-	-	-	-	-	-
84	295495.6	6141877	70	6H10W	-	-	-	-	-	-	-	-
85	295491.3	6141851	50	6H10W	-	-	-	-	-	-	-	-
86	295488.1	6141870	70	5H15W	-	-	-	-	-	-	-	-
87	295484.3	6141884	90	5H15W	-	-	-	-	-	-	-	-
88	295475.2	6141883	70	9H15W	-	-	-	-	-	-	-	-
89	295474.1	6141893	70	5H15W	-	-	-	-	-	-	-	-
90	297341.6	6143189	100	5H15W	6H7W	6H20W	6H7W	6H5W	8H10W	8H5W	4H12W	4H5W
91	297368.2	6143181	35	4H10W	4H6W	4H15W	4H12W	-	-	-	-	-
92	297375.8	6143188	60	5H15W	4H5W	4H12W	4H15W	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
93	297387	6143154	50	8H7W	6H15W	-	-	-	-	-	-	-
94	297370.2	6143137	45	7H10W	6H10W	6H5W	6H5W	4H7W	-	-	-	-
95	297330	6143160	70	5H6W	5H10W	5H10W	-	-	-	-	-	-
96	297318.2	6143136	50	4H6W	5H5W	5H10W	5H10W	6H12W	-	-	-	-
97	297311.1	6143119	40	4H5W	-	-	-	-	-	-	-	-
98	297306.2	6143108	40	4H15W	-	-	-	-	-	-	-	-
99	297300.3	6143111	30	4H10W	4H10W	-	-	-	-	-	-	-
100	297333.2	6143094	45	4H5W	-	-	-	-	-	-	-	-
101	297336.6	6143073	60	4H6W	4H10W	-	-	-	-	-	-	-
102	300772.1	6144436	40	4H6W	-	-	-	-	-	-	-	-
103	300770	6144427	80	5H7W	6H15W	6H10W	8H15W	7H18W	7H15W	-	-	-
104	300826.2	6144529	40	4H12W	5H7W	4H12W	-	-	-	-	-	-
105	300727.2	6144191	40	5H5W	-	-	-	-	-	-	-	-
106	300726.1	6144184	40	4H10W	4H10W	5H5W	4H10W	5H12W	-	-	-	-
107	300739.8	6144163	60	4H5W	6H6W	-	-	-	-	-	-	-
108	300751.8	6144169	60	4H5W	4H10W	5H10W	7H5W	-	-	-	-	-
109	300757.4	6144156	30	4H10W	4H5W	-	-	-	-	-	-	-
110	300760	6144156	30	5H10W	-	-	-	-	-	-	-	-
111	300769.4	6144145	20	4H5W	-	-	-	-	-	-	-	-
112	300778.8	6144132	70	8H10W	5H12W	5H15W	7H15W	7H10W	7H5W	-	-	-
113	300770.1	6144129	45	4H13W	6H15W	-	-	-	-	-	-	-
114	300791.7	6144141	60	5H10W	4H5W	-	-	-	-	-	-	-
115	300817.4	6144126	40	6H12W	4H5W	5H15W	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
116	300813.4	6144146	40	4H5W	5H5W	5H10W	5H10W	5H10W	4H5W	-	-	-
117	300796.6	6144120	60	7H5W	7H5W	5H10W	7 H10W	-	-	-	-	-
118	300777.4	6144133	60	7H12W	7H10W	7H15W	8H10W	8H5W	8H10W	6H7W	-	-
119	300771.3	6144130	40	4H10W	6H12W	-	-	-	-	-	-	-
120	300763.6	6144129	35	4H10W	4H8W	4H10W	-	-	-	-	-	-
121	299678.6	6141940	40	5H13W	4H5W	-	-	-	-	-	-	-
122	299673.9	6141940	50	6H5W	-	-	-	-	-	-	-	-
123	299664	6141953	45	5H12W	5H10W	-	-	-	-	-	-	-
124	299672.6	6141925	35	4H10W	5H10W	5H5W	4H5W	-	-	-	-	-
125	299660.9	6141910	50	6H10W	7H10W	6H5W	5H10W	-	-	-	-	-
126	299646.8	6141907	50	6H12W	7H5W	-	-	-	-	-	-	-
127	299636.7	6141907	30	6H5W	6H10W	6H5W	-	-	-	-	-	-
128	299646.3	6141899	30	7H15W	6H10W	5H10W	-	-	-	-	-	-
129	299645.4	6141893	25	4H13W	-	-	-	-	-	-	-	-
130	299639	6141891	30	4H7W	5H10W	-	-	-	-	-	-	-
131	299630.5	6141870	60	5H5W	6H10W	5H5W	-	-	-	-	-	-
132	299627.7	6141875	40	6H15W	6H10W	7H5W	5H5W	-	-	-	-	-
133	299625.6	6141875	40	4H5W	4H5W	6H10W	-	-	-	-	-	-
134	299610.2	6141858	40	5H13W	5H5W	5H10W	6H7W	-	-	-	-	-
135	299604.2	6141848	40	5H15W	40DBH	5H15W	7H5W	-	-	-	-	-
136	299634.1	6141849	80	7H15W	7H10W	4H8W	-	-	-	-	-	-
137	299600.9	6141854	20	5H5W	6H5W	6H5W	-	-	-	-	-	-
138	299554.1	6141851	50	4H7W	4H5W	5H8W	5H10W	5H5W	4H5W	8H5W	7H5W	

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
139	299573.4	6141878	20	4H5W	-	-	-	-	-	-	-	-
140	301633.6	6143999	50	4H5W	5H5W	-	-	-	-	-	-	-
141	301601.9	6144029	50	6H15W	6H20W	5H18W	6H13W	7H5W	6H5W	-	-	-
142	301601.9	6144022	30	4H10W	5H15W	7H10W	-	-	-	-	-	-
143	301603.3	6144012	35	5H5W	6H5W	6H5W	-	-	-	-	-	-
144	301615.1	6144007	70	5H12W	-	-	-	-	-	-	-	-
145	301603.3	6143988	50	5H10W	4H5W	5H5W	-	-	-	-	-	-
146	301594.1	6143982	30	6H5W	6H10W	7H10W	-	-	-	-	-	-
147	301588.7	6143959	30	5H5W	5H10W	4H5W	-	-	-	-	-	-
148	301588.2	6143952	40	7H5W	-	-	-	-	-	-	-	-
149	301548	6143953	40	4H5W	4H10W	5H5W	6H5W	5H10W	-	-	-	-
150	301564.5	6143966	40	5H10W	6H5W	6H15W	7H10W	5H10W	-	-	-	-
151	301569.8	6143984	45	6H18W	5H5W	-	-	-	-	-	-	-
152	301575.3	6144004	100	5H5W	5H5W	6H10W	7H6W	-	-	-	-	-
153	299428.1	6144112	50	4H15W	5H5W	5H5W	7H10W	-	-	-	-	-
154	299448.2	6144101	40	5H10W	6H10W	4H10W	5H15W	-	-	-	-	-
155	299447.2	6144081	35	4H12W	6H8W	4H5W	-	-	-	-	-	-
156	299458.7	6144078	50	5H5W	5H8W	-	-	-	-	-	-	-
157	299468.3	6144093	25	5H13W	5H5W	-	-	-	-	-	-	-
158	299458.2	6144095	25	4H10W	-	-	-	-	-	-	-	-
159	299457.2	6144106	30	5H10W	4H5W	-	-	-	-	-	-	-
160	299456.5	6144119	15	6H8W	-	-	-	-	-	-	-	-
161	299464.5	6144106	20	4H8W	-	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
162	299482.6	6144111	40	6H10W	5H5W	7H5W	6H10W	-	-	-	-	-
163	299486.9	6144121	30	5H10W	6H5W	-	-	-	-	-	-	-
164	299497.9	6144111	25	4H15W	5H8W	-	-	-	-	-	-	-
165	299497.9	6144111	30	4H10W	-	-	-	-	-	-	-	-
166	299498.9	6144097	35	5H7W	4H5W	-	-	-	-	-	-	-
167	299505.4	6144096	35	5H5W	4H5W	-	-	-	-	-	-	-
168	299507.9	6144084	30	6H5W	6H15W	7H15W	-	-	-	-	-	-
169	299509.7	6144105	30	4H5W	5H5W	-	-	-	-	-	-	-
170	299515.3	6144113	20	4H10W	-	-	-	-	-	-	-	-
171	299520.2	6144107	40	4H8W	4H5W	4H12W	-	-	-	-	-	-
172	299518.8	6144104	40	5H20W	5H10W	-	-	-	-	-	-	-
173	299529.6	6144108	35	4H10W	4H6W	4H5W	5H10W	-	-	-	-	-
174	299533.7	6144124	30	4H5W	-	-	-	-	-	-	-	-
175	299541.7	6144118	20	6H8W	-	-	-	-	-	-	-	-
176	299547	6144120	40	4H10W	-	-	-	-	-	-	-	-
177	299555.4	6144129	30	6H5W	-	-	-	-	-	-	-	-
178	299558.1	6144114	50	4H20W	6H10W	-	-	-	-	-	-	-
179	299561	6144117	50	6H10W	6H5W	5H5W	-	-	-	-	-	-
180	299568.6	6144124	15	4H10W	-	-	-	-	-	-	-	-
181	299574.4	6144116	50	5H6W	-	-	-	-	-	-	-	-
182	297305.9	6142991	80	7H10W	6H8W	6H15W	-	-	-	-	-	-
183	297302.5	6143001	70	6H5W	5H10W	-	-	-	-	-	-	-
184	297292.4	6143018	70	5H10W	5H10W	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
185	297284.2	6143019	90	5H15W	5H10W	7H20W	-	-	-	-	-	-
186	297283.2	6143012	90	5H18W	-	-	-	-	-	-	-	-
187	297299	6143029	60	8H10W	-	-	-	-	-	-	-	-
188	297325.6	6143037	60	6H5W	-	-	-	-	-	-	-	-
189	297325.1	6143023	60	5H10W	-	-	-	-	-	-	-	-
190	297336.1	6143008	70	6H5W	5H5W	6H15W	5H10W	-	-	-	-	-
191	297351.5	6143031	70	7H5W	-	-	-	-	-	-	-	-
192	297353.8	6143022	70	6H15W	6H10W	-	-	-	-	-	-	-
193	297380.3	6143025	110	6H10W	7H5W	5H15W1	7H20W	-	-	-	-	-
194	297388.3	6143027	100	5H5W	-	-	-	-	-	-	-	-
195	297373.5	6143056	80	6H10W	-	-	-	-	-	-	-	-
196	297394.9	6143056	80	8H10W	-	-	-	-	-	-	-	-
197	297370.1	6143069	50	5H10W	-	-	-	-	-	-	-	-
198	297360.7	6143077	60	5H5W	-	-	-	-	-	-	-	-
199	297304.9	6143063	60	8H5W	66H15W	8H5W	-	-	-	-	-	-
200	300812.3	6144555	80	6H5W	6H15W	9H15W	-	-	-	-	-	-
201	300852.9	6144578	90	5H15W	-	-	-	-	-	-	-	-
202	300852.4	6144555	80	5H15W	-	-	-	-	-	-	-	-
203	300789.8	6144064	60	6H10W	5H10W	-	-	-	-	-	-	-
204	300789.5	6144075	50	6H10W	-	-	-	-	-	-	-	-
205	300776.8	6144075	70	5H10W	5H15W	-	-	-	-	-	-	-
206	300772.2	6144078	60	6H10W	6H15W	-	-	-	-	-	-	-
207	300767.3	6144060	60	5H15W	-	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
208	300759.6	6144056	60	5H10W	-	-	-	-	-	-	-	-
209	300749.6	6144059	50	7H15W	5H5W	-	-	-	-	-	-	-
210	300730.4	6144058	40	5H10W	-	-	-	-	-	-	-	-
211	300736.6	6144068	70	8H5W	6H15W	-	-	-	-	-	-	-
212	300737.3	6144072	50	7H10W	-	-	-	-	-	-	-	-
213	300689.6	6144071	40	5H15W	-	-	-	-	-	-	-	-
214	300745.2	6144084	70	6H10W	5H10W	-	-	-	-	-	-	-
215	300738.5	6144083	40	5H5W	-	-	-	-	-	-	-	-
216	300772.3	6144096	60	5H15W	-	-	-	-	-	-	-	-
217	300781.6	6144089	40	5H5W	-	-	-	-	-	-	-	-
218	300786.3	6144107	70	6H15W	-	-	-	-	-	-	-	-
219	300774.5	6144110	50	5H5W	-	-	-	-	-	-	-	-
220	300757.9	6144105	60	5H10W	-	-	-	-	-	-	-	-
221	300747	6144107	40	6H10W	-	-	-	-	-	-	-	-
222	300743.8	6144110	50	7H10W	7H10W	-	-	-	-	-	-	-
223	300759.4	6144129	60	5H10W	-	-	-	-	-	-	-	-
224	300753.4	6144135	40	6H10W	-	-	-	-	-	-	-	-
225	299631.1	6141953	80	5H5W	5H10W	5H10W	-	-	-	-	-	-
226	299649.5	6141938	50	5H10W	-	-	-	-	-	-	-	-
227	299627.6	6141940	50	6H15W	-	-	-	-	-	-	-	-
228	299618.8	6141944	50	6H5W	-	-	-	-	-	-	-	-
229	299617.3	6141936	40	5H5W	-	-	-	-	-	-	-	-
230	299611.5	6141917	40	5H10W	-	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
231	299609.7	6141909	30	6H5W	5H10W	5H5W	-	-	-	-	-	-
232	299612.2	6141898	30	5H10W	-	-	-	-	-	-	-	-
233	299605.3	6141902	40	5H20W	-	-	-	-	-	-	-	-
234	299602.7	6141895	30	5H10W	-	-	-	-	-	-	-	-
235	299602.7	6141892	40	7H10W	-	-	-	-	-	-	-	-
236	299603	6141887	50	5H10W	-	-	-	-	-	-	-	-
237	299597	6141897	30	5H10W	-	-	-	-	-	-	-	-
238	299588.3	6141894	20	6H5W	-	-	-	-	-	-	-	-
239	299579.7	6141902	40	5H10W	6H5W	-	-	-	-	-	-	-
240	299572.8	6141906	60	6H10W	-	-	-	-	-	-	-	-
241	299549.8	6141905	50	7H5W	5H10W	7H5W	5H15W	-	-	-	-	-
242	299566.7	6141900	50	5H5W	-	-	-	-	-	-	-	-
243	299572.5	6141898	40	6H5W	6H10W	-	-	-	-	-	-	-
244	299573.5	6141892	30	5H5W	-	-	-	-	-	-	-	-
245	299586.4	6141890	20	5H10W	-	-	-	-	-	-	-	-
246	299591.3	6141886	30	5H10W	7H10W	-	-	-	-	-	-	-
247	299591.9	6141883	40	6H15W	-	-	-	-	-	-	-	-
248	299601	6141875	40	6H10W	-	-	-	-	-	-	-	-
249	299594.4	6141865	40	5H5W	-	-	-	-	-	-	-	-
250	299581.4	6141868	60	5H10W	-	-	-	-	-	-	-	-
251	299581.2	6141868	60	5H5W	-	-	-	-	-	-	-	-
252	299583.4	6141873	60	5H10W	-	-	-	-	-	-	-	-
253	301502.4	6143978	100	5H10W	5H20W	6H10W	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
254	301514.5	6143992	40	5H10W	-	-	-	-	-	-	-	-
255	301525.5	6144014	80	8H5W	-	-	-	-	-	-	-	-
256	301520.2	6144023	80	5H5W	-	-	-	-	-	-	-	-
257	301500.3	6144036	80	7H10W	7H10W8	-	-	-	-	-	-	-
258	301509.2	6144039	80	7H10W	-	-	-	-	-	-	-	-
259	301512.4	6144032	80	7H10W	9H15W8	-	-	-	-	-	-	-
260	301489.6	6144021	80	6H10W	-	-	-	-	-	-	-	-
261	301493	6144006	100	6H10W	9H10W	8H10W	-	-	-	-	-	-
262	301562.9	6144030	80	10H10W	-	-	-	-	-	-	-	-
263	299721.9	6144259	90	8H5W	7H10W	7H10W	6H5W	9H5W	-	-	-	-
264	299716.2	6144244	100	5H5W	-	-	-	-	-	-	-	-
265	299704.7	6144235	50	5H10W	8H10W	6H10W5	-	-	-	-	-	-
266	299703.5	6144219	80	5H15W	-	-	-	-	-	-	-	-
267	299702.7	6144211	80	9H10W	-	-	-	-	-	-	-	-
268	299695.9	6144207	80	6H10W	-	-	-	-	-	-	-	-
269	299699.6	6144194	60	7H10W	-	-	-	-	-	-	-	-
270	299685.5	6144194	40	5H5W	-	-	-	-	-	-	-	-
271	299689.3	6144181	60	8H10W	-	-	-	-	-	-	-	-
272	299680.3	6144170	40	6H10W	-	-	-	-	-	-	-	-
273	299675.3	6144159	50	6H10W	-	-	-	-	-	-	-	-
274	299690.5	6144144	50	5H10W	-	-	-	-	-	-	-	-
275	299668.2	6144151	70	7H5W	-	-	-	-	-	-	-	-
276	299661.4	6144129	60	5H20W	-	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
277	299655.2	6144118	110	5H15W	-	-	-	-	-	-	-	-
278	299644.9	6144117	30	6H5W	-	-	-	-	-	-	-	-
279	299648.9	6144113	50	7H5W	5H10W	-	-	-	-	-	-	-
280	299622.7	6144119	60	6H10W	-	-	-	-	-	-	-	-
281	299631.3	6144123	60	5H10W	-	-	-	-	-	-	-	-
282	299636.1	6144120	50	5H10W	-	-	-	-	-	-	-	-
283	299635.1	6144142	30	5H10W	-	-	-	-	-	-	-	-
284	299631.8	6144144	40	5H10W	-	-	-	-	-	-	-	-
285	299626.5	6144147	30	5H10W	-	-	-	-	-	-	-	-
286	299622.2	6144142	30	5H10W	-	-	-	-	-	-	-	-
287	299613.2	6144132	70	6H10W	-	-	-	-	-	-	-	-
288	299626.6	6144128	70	5H10W	5H10W	7H5W	-	-	-	-	-	-
289	299619.3	6144123	60	9H10W	7H15W	-	-	-	-	-	-	-
290	299607.9	6144135	30	5H10W	-	-	-	-	-	-	-	-
291	299597.9	6144136	40	6H5W	-	-	-	-	-	-	-	-
292	299594.7	6144137	50	8H10W	-	-	-	-	-	-	-	-
293	299592.2	6144131	40	5H10W	-	-	-	-	-	-	-	-
294	299599.8	6144129	80	7H10W	-	-	-	-	-	-	-	-
295	299609.8	6144117	50	5H15W	8H10W	-	-	-	-	-	-	-
296	299608.4	6144122	40	5H10W	-	-	-	-	-	-	-	-
297	299600.2	6144123	80	7H10W	-	-	-	-	-	-	-	-
298	299600.2	6144122	70	5H10W	-	-	-	-	-	-	-	-
299	299583.6	6144118	50	8H10W	-	-	-	-	-	-	-	-

Hollow Bearing Tree	Easting	Northing	Diameter at Breast Height (cm)	Hollow 1 H = Hollow Height (m) D = Hollow Diameter (cm)	Hollow 2	Hollow 3	Hollow 4	Hollow 5	Hollow 6	Hollow 7	Hollow 8	Hollow 9
300	299589.5	6144116	50	5H10W	7H10W	5H10W	-	-	-	-	-	-
301	299584.7	6144123	50	6H5W	-	-	-	-	-	-	-	-
302	299587.7	6144123	50	5H10W	7H10W	-	-	-	-	-	-	-
303	299587.4	6144132	40	5H5W	-	-	-	-	-	-	-	-
304	299590.1	6144136	40	10H10W	6H10W	-	-	-	-	-	-	-
305	299601.2	6141875	40	5H10W	-	-	-	-	-	-	-	-

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APPENDIX E CUMULATIVE IMPACT ASSESSMENT SCOPING SUMMARY

Key

Level of Assessment	Description
Detailed Assessment	The Project may result in significant impacts on the matter, including cumulative impacts. Detailed assessment is characterised by: ■ Potential overlap in impacts between a future project (e.g. Project A) and the proposed project ■ Potential for significant cumulative impacts as a result of the overlap, requiring detailed technical studies to assess the impacts ■ Sufficient data is available on the future project to allow a detailed assessment of cumulative impacts with the proposed project for the relevant matter ■ Uncertainties exist with respect to data, mitigation, assessment methods and criteria
Standard Assessment	The Project is unlikely to result in significant impacts on the matter, including cumulative impacts. Standard assessments are characterised by: ■ Impacts are well understood ■ Impacts are relatively easy to predict using standard methods ■ Impacts are capable of being mitigated to comply with relevant standards or performance measures ■ the assessment is unlikely to involve any significant uncertainties or require any detailed cumulative impact assessment.
N/A	No potential overlap in impacts between a future project and the proposed project that would warrant any consideration in the cumulative impact assessment

Cumulative Impact Assessment Scoping Summary Table

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	Amenity – Noise	Amenity – Visual	Social (workforce, workers accommodation, health and wellbeing, goods and services)
Limondale Solar Farm (Operational)	95 km	■ Project completed; no construction overlap ■ Operational since late 2021 ■ Proposed operational life of 30 years ■ Operations overlap				
	Key Features ■ 349 MW capacity solar farm ■ Approx. 872,000 panels ■ Area across 900 hectares		No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required
Sunraysia Solar Farm (Operational)	100 km	■ Project completed; no construction overlap ■ Operational since 2020 ■ Proposed operational life of 30 years ■ Operations overlap				
	Key Features ■ 255 MW capacity solar farm ■ 750,000 solar modules ■ Area across 1,000 hectares		No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	**Amenity – Noise**	**Amenity – Visual**	**Social (workforce, workers accommodation, health and wellbeing, goods and services)**
Lang's Crossing Solar Farm (Approved)	13 km	■ Currently in its early planning phase ■ Construction and operations timeframes unknown				
	Key Features ■ 5MW solar farm *Not a designated development or State significant project. In accordance with Table 2.1 of the Cumulative Impact Assessment Guidelines for State Significant Projects (DPIE, 2021c) this project may be excluded from the cumulative impact assessment within the EIS.*		Low risk of cumulative impacts relating to access, traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	Low risk of cumulative visual impacts. Further assessment required.	Low risk of cumulative social impacts subject to the proposed timing of the construction of. Lang's Crossing Solar Farm. Further assessment required.

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	**Amenity – Noise**	**Amenity – Visual**	**Social (workforce, workers accommodation, health and wellbeing, goods and services)**
Hay Solar Farm (Approved)	15 km	■ Project approved in 2017 ■ Proposed 12-month construction period (construction timeline unknown) ■ Proposed operational life of 30 years				
	Key Features ■ 110 MW solar farm ■ 300,000 panels ■ Area across 660 hectares		Low risk of cumulative impacts relating to access, traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts. Further assessment required.	Low risk of cumulative social impacts subject to the proposed timing of the construction of. Hay Solar Farm. Further assessment required.
Burrawong Wind Farm (Proposed)	82 km	■ SEARs issued; EIS submission expected in late 2022 ■ Construction to begin in 2023 across a 2-3 year period ■ Proposed operational life of 30-35 years ■ Construction and operations overlap				

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	**Amenity – Noise**	**Amenity – Visual**	**Social (workforce, workers accommodation, health and wellbeing, goods and services)**
	Key Features ■ 750 MW wind farm ■ 107 WTGs ■ Area across approx. 2660 ha		Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Low risk given the distance of this project from the proposed Project. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts. Further assessment required.
Baldon Wind Farm	40 km	■ Proposed; currently undertaking community engagement and preparing the Scoping Report ■ SEARs not yet requested ■ Construction and operations timeframes unknown				
	Key Features ■ 800 – 900 MW wind farm ■ 140 – 170 WTGs		Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts. Further assessment required.

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	**Amenity – Noise**	**Amenity – Visual**	**Social (workforce, workers accommodation, health and wellbeing, goods and services)**
Keri Keri Solar Farm (Proposed)	65 km	■ SEARs requested ■ Construction expected to begin in 2024 for a 18-24 month period ■ Operational phase begins in 2026 for a 30-year period ■ Construction and Operations overlap				
	Key Features ■ 400 MW solar farm ■ Area across approx. 1,322 ha		Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts. Further assessment required.
Keri Keri Wind Farm (Proposed)	50 km	■ SEARs requested ■ Construction expected to begin in 2024 for a 24 month period ■ Operational phase begins in 2026 for a 30-year period ■ Construction and Operations overlap				
	Key Features ■ 1003 MW wind farm ■ 176 Wind Turbine Generators (WTGs) Area across 18,081 hectares		Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts. Further assessment required.

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	**Amenity – Noise**	**Amenity – Visual**	**Social (workforce, workers accommodation, health and wellbeing, goods and services)**
Dinawan Energy Hub (Proposed)	25 km	■ SEARs not yet requested ■ Construction expected to begin in 2024				
	■ Solar Farm ■ Wind Farm ■ BESS		Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts. Further assessment required.
Bullawah Wind Farm (Proposed)	5 km	■ SEARs not yet requested				
	■ 1000 MW wind farm ■ 170 Wind Turbine Generators (WTGs) ■ Maximum blade tip height 300m		No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in noise impacts between this project and the proposed Project.	Potential risk of cumulative visual impacts given the close distance of this project to the east of the proposed Project. Further assessment is required.	Low risk of cumulative social impacts subject to the timing of the construction of the Bullawah Wind Farm. Further assessment required.
Yanco Delta Wind Farm (Proposed)	42 km	■ SEARs issued; EIS submission expected in late 2022 ■ Potential construction and operations overlap				

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	**Amenity – Noise**	**Amenity – Visual**	**Social (workforce, workers accommodation, health and wellbeing, goods and services)**
	Key Features ■ 1500 MW wind farm and BESS ■ 225 Wind Turbine Generators (WTGs) ■ Area across approx. 24,000 ha		Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts. Further assessment required.
The Plains Solar Farm (Proposed)	0 km (within the Project Area)	■ SEARs requested ■ Construction expected to begin in 2024 for an 18 month period ■ Construction and Operations overlap				
	Key Features ■ 500 MW solar farm		Further assessment required.	Further assessment required.	Further assessment required.	Further assessment required.
Project EnergyConnect (NSW – Eastern Section) (Proposed)	0 km (within the Project Area)	■ Proposed; EIS currently on exhibition ■ Construction expected to begin in late 2022 for a 18 month period ■ Potential construction overlap				
	Key Features ■ 330kV transmission line ■ Includes 375 km of new transmission lines and associated infrastructure		Possible overlap of construction phase. Potential risk of cumulative impacts relating to access, traffic and transport.	Low risk of cumulative noise impacts. Further assessment required.	Low risk of cumulative visual impacts. Further assessment required.	Low risk of cumulative social impacts. Further assessment required.

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	**Amenity – Noise**	**Amenity – Visual**	**Social (workforce, workers accommodation, health and wellbeing, goods and services)**
			Further assessment required.			
Currawarra Solar Farm (Approved)	66 km	■ Project approved in 2018 ■ Proposed 18-month construction period				
	Key Features ■ 195 MW solar farm ■ 670,000 panels		Low risk of cumulative impacts relating to access, traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required
Tarleigh Park Solar Farm (Approved)	85 km	■ Project approved in 2018 ■ Proposed 12-month construction period				
	Key Features ■ 90 MW solar farm ■ 290,000 panels		Low risk of cumulative impacts relating to access, traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required
Southdown Solar Farm (Proposed)	85 km	■ SEARs requested ■ Construction of the Project is expected to take approximately 15 months				

Project	Distance to Project (approx.)	Project Status/ Indicative timing/ Overlap	Potential overlap between impacts of Project and impact of other projects			
			Access (Traffic)	**Amenity – Noise**	**Amenity – Visual**	**Social (workforce, workers accommodation, health and wellbeing, goods and services)**
		and is anticipated to begin in 2022.				
	Key Features ■ 130 MW capacity solar farm ■ Approx. 335,000 panels ■ Area across 390 hectares		Low risk of cumulative impacts relating to access, traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required
Finley Solar Farm (Operational)	97 km	■ Project completed; no construction overlap ■ Operational since 2019 ■ Proposed operational life of 30 years ■ Operations overlap				
	Key Features ■ 175 MW capacity solar farm ■ Area across 350 hectares		No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in noise impacts between this project and the proposed Project.	No potential overlap in visual impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required

APPENDIX F WIND TURBINES COORDINATES

Wind Turbines Coordinates

ID	GPS Co-ordinates (UTM Zone 55H)		ID	GPS Co-ordinates (UTM Zone 55H)	
	Easting	Northing		Easting	Northing
19	285770.57	6141809.90	154	309142.00	6154742.00
20	286540.57	6141821.90	155	309938.00	6154655.00
21	287340.57	6141882.90	156	310733.00	6154568.00
22	288080.57	6141847.90	157	311528.00	6154481.00
23	288871.40	6141860.71	158	286379.81	6153371.21
24	290184.57	6141889.90	159	287409.00	6153411.00
25	290964.57	6141893.90	160	288417.61	6153522.51
26	291744.57	6141898.90	161	289044.71	6153626.43
27	292524.57	6141902.90	162	289958.00	6153795.00
28	293290.57	6141912.90	163	290803.00	6153771.00
29	294040.57	6141917.90	164	291543.63	6153722.55
52	286101.44	6143939.75	165	292549.00	6154173.00
53	287054.00	6143972.00	166	293372.00	6154161.00
54	287874.00	6143970.00	167	294116.00	6154010.00
55	288694.00	6143968.00	168	294908.00	6153969.00
56	289514.00	6143966.00	169	296086.00	6153901.00
57	290324.00	6143998.00	170	300530.22	6158347.78
58	291110.00	6144024.00	171	301500.99	6158438.71
59	291850.00	6143964.00	172	302317.52	6158512.24
60	292808.00	6143754.00	173	303106.01	6158450.76
61	293819.00	6144401.00	174	303833.00	6158389.00
62	294560.00	6144392.00	175	304668.35	6158220.95
63	295341.00	6144425.00	176	305438.00	6158083.00
64	297894.00	6147075.00	177	286988.00	6155851.00
65	298705.00	6147118.00	178	287739.00	6155761.00
66	299531.00	6147253.00	179	288472.00	6155680.00
67	300196.00	6147067.00	180	289564.00	6156234.77
68	301044.00	6147018.00	181	290466.52	6156350.49
69	301893.00	6146969.00	182	291203.00	6156523.00
70	302742.00	6146920.00	183	291985.00	6156602.00
71	303590.00	6146870.00	184	292696.00	6156525.00
72	304439.00	6146821.00	185	293548.00	6156742.00
73	305287.00	6146772.00	186	294264.00	6156659.00
74	306432.83	6146171.53	187	295037.00	6156658.00
75	307379.00	6146395.00	188	295716.00	6156492.00
76	286443.00	6146195.00	189	296485.00	6156570.00
77	287282.00	6146230.00	190	297324.00	6156732.00
78	288122.00	6146265.00	191	298304.00	6157211.00
79	288961.00	6146300.00	192	300982.16	6160854.25
80	289800.00	6146334.00	193	301633.82	6160627.55
81	290571.00	6146269.00	194	302386.26	6160682.89

ID	GPS Co-ordinates (UTM Zone 55H)		ID	GPS Co-ordinates (UTM Zone 55H)	
	Easting	Northing		Easting	Northing
82	291389.00	6146312.00	195	303318.24	6161021.94
83	292208.00	6146355.00	196	304087.19	6160831.16
84	293027.00	6146397.00	197	304954.56	6160771.16
85	293837.00	6146448.00	198	305760.43	6160693.00
86	294637.00	6146464.00	199	286295.00	6159078.00
87	298150.00	6149305.00	200	287049.95	6159043.36
88	298923.00	6149408.00	201	287992.85	6158790.34
89	299703.00	6149510.00	202	288813.83	6158863.23
90	300579.00	6149642.00	203	289761.00	6158961.00
91	301372.00	6149579.00	204	290663.00	6159173.00
92	302164.00	6149516.00	205	291614.00	6159429.00
93	302957.00	6149452.00	206	292407.00	6159429.00
94	303749.00	6149389.00	207	293162.00	6159366.00
95	304542.00	6149325.00	208	293985.00	6159319.00
96	305349.00	6149409.00	209	294707.00	6159222.00
97	306135.00	6149292.00	210	295488.00	6159262.00
98	306941.00	6149209.00	211	296405.00	6159551.00
99	307708.00	6149058.00	212	297235.00	6159667.00
100	308495.00	6148941.00	213	297989.00	6159672.00
101	309215.39	6148839.80	214	298759.00	6159692.00
102	310001.39	6148722.80	215	301280.34	6163265.64
103	310787.39	6148605.80	216	302012.24	6163239.37
104	286645.00	6148251.00	217	302663.26	6162917.31
105	287491.00	6148336.00	218	303336.87	6162654.50
106	288337.00	6148420.00	219	305223.38	6162889.10
107	290093.00	6148852.00	220	285681.00	6161236.00
108	290913.00	6148834.00	221	286450.40	6161285.49
109	291732.00	6148816.00	222	287521.00	6161494.00
110	292552.00	6148797.00	223	288439.00	6161543.00
111	293393.00	6148734.00	224	289287.00	6161599.00
112	294209.00	6148812.00	225	290037.33	6161603.02
113	295026.00	6148890.00	226	290981.00	6161867.00
114	295842.00	6148968.00	227	291839.00	6161992.00
115	298981.00	6152391.00	228	292634.00	6161989.00
116	299795.00	6152293.00	229	293407.00	6161907.00
117	300609.00	6152195.00	230	294262.00	6161867.00
118	301423.00	6152096.00	231	295283.00	6162196.00
119	302238.00	6151998.00	232	297169.00	6162368.00
120	303052.00	6151899.00	233	298148.00	6162462.00
121	303866.00	6151801.00	234	299055.00	6162656.00
122	305509.00	6152252.00	235	285295.00	6163838.00
123	306217.00	6152128.00	236	286051.00	6163755.00

ID	GPS Co-ordinates (UTM Zone 55H)		ID	GPS Co-ordinates (UTM Zone 55H)	
	Easting	Northing		Easting	Northing
124	306851.00	6151863.00	237	286857.75	6163437.42
125	307585.00	6151796.00	238	287906.89	6163814.46
126	308338.00	6151721.00	239	288791.33	6163938.01
127	309032.00	6151577.00	240	289978.48	6164065.91
128	310234.00	6151557.00	241	291158.45	6164050.57
129	311193.00	6151515.00	242	296321.00	6162407.00
130	286988.00	6150635.00	244	304160.30	6162802.34
131	287855.00	6150748.00	245	309072.29	6146862.48
132	288652.00	6150757.00	246	309858.88	6146747.16
133	289422.00	6150690.00	247	310585.42	6146696.64
134	290207.00	6150734.00	248	288858.16	6156878.05
135	291273.24	6151257.76	249	288134.81	6156965.50
136	292184.00	6151207.00	250	287123.39	6157077.47
137	293056.00	6151299.00	251	284974.12	6141715.49
138	293790.00	6151286.00	252	284932.38	6139714.63
139	294596.00	6151343.00	253	285651.75	6139741.89
140	295374.00	6151379.00	254	286413.69	6139733.72
141	299149.00	6153966.00	255	287216.38	6139767.99
142	300183.94	6156037.29	256	287957.57	6139754.01
143	300949.96	6155967.15	257	288673.95	6139910.81
144	301688.47	6155868.37	258	290059.04	6139802.43
145	302421.34	6155769.42	259	290836.36	6139804.64
146	303174.00	6155709.00	260	291618.89	6139806.89
147	303893.00	6155632.00	261	292401.30	6139814.28
148	304628.00	6155478.00	262	293162.62	6139831.50
149	305212.20	6155020.73	263	293914.08	6139822.48
150	305889.00	6154928.00	264	294659.87	6139834.04
151	306689.00	6154925.00	265	295144.60	6140670.69
152	307552.00	6154916.00	266	312558.72	6151612.40
153	308347.00	6154829.00	267	311605.50	6148764.99

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