Boags Creek Solar Farm Scoping Report

Boags Creek, NSW

Request for Secretary's Environmental Assessment Requirements (SEARs)

August 2024

Table of Contents

Figures

Tables

Abbreviations

ACHA	Aboriginal Cultural Heritage Assessment
AEMO	Australian Energy Market Operator
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
LALC	Local Aboriginal Land Council
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*NSW Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BSAL	Biophysical Strategic Agricultural Land
CLM Act	*NSW Crown Land Management Act 2016*
CMA	Catchment Management Authority
DA	Development Application
DIRN	Defined Interstate Rail Network
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment
DPHI	Department of Planning Housing and Infrastructure
DRG	NSW Department of Resource & Geoscience
DISR	NSW Department of Industry, Science and Resources
EDC	Estimated Development Cost
EMP	Environmental Management Plan
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A Act	*NSW Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
EPBC Act	*Commonwealth Environment Protection and Biodiversity Conservation Act 1999*
ETL	Electricity Transmission Line
FTE	Full Time Equivalent
GW	Gigawatt
ICNG	Interim Construction Noise Guideline
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
LCVIA	Landscape Character and Visual Impact Assessment
MNES	Matters of National Environmental Significance
MW	Megawatt
MVA	Megavolts
MWh	Megawatt Hour
NSW	New South Wales
O&M	Operations and Management
OEH	NSW Office of Environment and Heritage
PAC	Planning Assessment Commission
PCT	Preliminary plant community type
PHA	Preliminary Hazard Analysis
POEO Act	NSW *Protection of the Environment Operations Act 1997*
PV	Photovoltaic
RAP	Registered Aboriginal Parties
REAP[1]	Renewable Energy Action Plan
REAP[2]	Registered Environmental Assessment Practitioner
RF Act	*NSW Rural Fires Act 1997*
RFS	Rural Fire Service
RMS	NSW Roads and Maritime Service
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SIA Worksheet	Social Impact Assessment Worksheet
SPIC	State Power Investment Corporation
SSD	State Significant Development
TEC	Threatened Ecological Community
TIA	Traffic Impact Assessment

TSR	Travelling Stock Reserve
WM Act	*NSW Water Management Act 2000*

Appendix A Scoping Report Summary

Level of Assessment	Matter	CIA	Engagement	Relevant government plans, policies, and guidelines	Scoping report reference
Detailed					
	Biodiversity	Y	General	• Biodiversity Assessment Method (DPIE 2020) • Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013) • Commonwealth EPBC 1.2 Significant Impact Guidelines – Actions on, or Impacting upon Commonwealth Land and Actions by Commonwealth Agencies (Commonwealth of Australia, 2013) • Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various)	6.1.1
	Heritage – Aboriginal	Y	Specific	• Guide to investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011) • Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010) • Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010)	6.1.2
	Traffic	Y	Specific	• *Guide to Traffic Management – Part 3 Traffic Studies and Analysis* (Austroads, 2013)	6.1.5
	Amenity - Visual	No	Specific	• *Technical Supplement- Landscape and Visual Impact Assessment. Large- scale Solar Energy*	6.1.3

Level of Assessment	Matter	CIA	Engagement	Relevant government plans, policies, and guidelines	Scoping report reference
				Guideline (NSW Department of Planning and Environment, 2022) • Guidance Note for Landscape and Visual Assessment (Australian Institute of Landscape Architects 2018).	
Standard					
	Amenity – Noise and vibration	Yes	General	• NSW Interim Construction Noise Guideline (DECC 2009) • NSW Noise Policy for Industry (EPA 2017) • NSW Road Noise Policy (DECCW 2011) and • Assessing Vibration: A Technical Guideline (DECC 2006)	6.1.4
	Stakeholder Engagement	Yes	Specific	• Social Impact Assessment Guideline for State Significant Projects 2022 (DPIE 2022)	5
	Heritage – Historical	Yes	General	• Historical Archaeology Code of Practice (Heritage Council 2006)	6.1.10
	Land resources	No	General	• Land Use Conflict Risk Assessment Guideline (DPI 2011) • SEPP (Resilience and Hazards) 2021	6.1.6
	Water resources	No	General	• Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) • Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008)	6.1.10

Level of Assessment	Matter	CIA	Engagement	Relevant government plans, policies, and guidelines	Scoping report reference
				• Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000) • Guidelines for instream works on waterfront land (NOW 2012) • Guidelines for riparian corridors on waterfront land (NOW 2012) • Guidelines for watercourse crossings on waterfront land (NOW 2012)	
	Air quality	No	General	• N/A	6.1.10
	Hazards and risks	No	Specific	• Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (DoP, 2011a) • Multi-Level Risk Assessment (DoP, 2011b). • Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (DoP 2011)	

Appendix B Social Impact Assessment (SIA) Scoping Worksheet

Social Impact Assessment (SIA) Worksheet Project name: Boags Creek Solar Farm Date: 25/07/2024

PROJECT ACTIVITIES	CATEGORIES OF SOCIAL IMPACTS	POTENTIAL IMPACTS ON PEOPLE		PREVIOUS INVESTIGATION OF IMPACT		CUMULATIVE IMPACTS	ELEMENTS OF IMPACTS - Based on preliminary investigation						ASSESSMENT LEVEL FOR EACH IMPACT				PROJECT REFINEMENT	MITIGATION / ENHANCEMENT MEASURES
Which **project activity / activities** could produce social impacts ?	what **social impact categories** could be affected by the project activities	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.	Is the impact expected to be **positive or negative**	Has this impact previously been investigated (on this or other projects)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics **extent** i.e. number of people potentially affected?	**duration** of expected impacts? (i.e. construction vs operational phase)	**intensity** of expected impacts i.e. scale or degree of change?	**sensitivity** or vulnerability of people potentially affected?	**level of concern/interest** of people potentially affected?	Level of assessment for each social impact	What methods and data sources will be used to investigate this impact? Secondary data	Primary Data - Consultation	Primary Data - Research	Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What **mitigation / enhancement measures** are being considered?
Community Engagement	community	Stakeholders are unable to make informed decisions; do not have influence on project design or decisions; and are unable to access enquiry and complaint processes.	Negative	Yes - other project	These imacts are well understood from other Edify projects, and industry learnings / best proactice.	Yes	Other renewable energy projects in the area are: Crudine Ridge Wind Farm (SSD-6697) Central West Pumped Hydro (SSD- 32286107) Panorama BESS (SSD- 50587460)	Yes	Yes	No	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	Edify has selected a Development Area that affords over 200m setback distance to the nearest residential received. At this distance, no noise impacts are anticipated and additional measures will be implemented, in addition to this setback distance, to mitigate potential visual impacts that arise from the proposed works. The Development Area is silted in historically impacted land adjacent to an existing high-voltage electrical transmission easment that hosts little to no biodiversity significance. In addition, Edify has prepared and maintains a Community Stakeholder Register, with phone/postal/email contact details, to ensure proactive advice is shared when Planning Milestones for the project are achieved.
Public Exhibition of Environmental Impact Statement	community	Potential impacts on social cohesion between community members (for/against renewable energy and/or the project).	Negative	Yes - other project	These impacts are well understood from other projects.	No	Not required	Yes	Yes	No	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Edify to continue conducting timely and detailed community engagement. Ensure community concerns are listened to and information to address concerns is provided to the community. Work with local community stakeholders to identify needs in the community that can be supported via the Project's Community Benefit Fund / Voluntary Planning Agreement.
Construction	health and wellbeing	Potential impacts on host landowners and nearby neighbours from increased traffic flow or construction works.	Negative	Yes - other project	These impacts are well understood from other projects.	No	Not required	Yes	Yes	Yes	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Project boundary and noise generating infrastructure (substation, inverters, batteries) are positioned minimum 625m from nearest non-associated sensitive receiver. A detailed noise impact assessment will be completed as part of the EIS.
Construction	livelihoods	Additional income for host landowner will provide an alternative income stream to agriculture, which will in turn provide flow on economic benefits for the surrounding community.	Positive	Yes - other project	Other projects have demonstrated benefits for land use and income.	No	Not required	Yes	Yes	Yes	Yes	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Conduct timely and appropriate community engagement and implement measures to maximise benefits for the local and regional economy.
Site selection	surroundings	Land Acquisition: The purchase or leasing of land for the solar farm may require the displacement of current occupants or users. Change in Land Use: Conversion of agricultural or communal land into a solar farm can disrupt existing livelihoods and social structures.	Negative	Yes	Other projects have demonstrated benefits for land use and income.	No	Not required	No	No	No	No	Yes	Minor assessment of the impact	Required	Limited - if required (e.g. local council)	Not required		
Site selection	surroundings	Environmental Changes: Changes in the local environment, such as altered water flows or microclimates, might indirectly cause displacement.	Negative	Yes	These imacts are well understood from other Edify projects, and industry learnings / best proactice.	No	Not required	No	No	No	No	Yes	Minor assessment of the impact	Required	Limited - if required (e.g. local council)	Not required		Design is modified as constraints are identified. Ie. Heritage (PADS) Ecology, Flood mapping
construction and operation	livelihoods	Temporary Jobs: During the construction phase, a significant number of temporary jobs are created for local laborers, technicians, and engineers. Permanent Jobs: Long-term operational and maintenance roles are generated, providing	Positive	Yes	These imacts are well understood from other Edify projects, and industry learnings / best proactice.	No	Not required	Yes	Yes	Yes	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research		Impacts will be investigated assessed and documented in the EIS - Prioritize local hiring and procurement to maximize economic benefits for the community. - Implement community benefit programs that address local priorities, such as education, health, and infrastructure.
construction	livelihoods	Increased demand for local services, such as housing, food, and transportation, stimulates local businesses.	Positive	Yes	These imacts are well understood from other Edify projects, and industry learnings / best proactice.	No	Not required	Yes	Yes	Yes	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research		Impacts will be investigated assessed and documented in the EIS
construction and operation	community	Introduction of new technologies and practices related to solar energy can promote innovation and technical skills within the community.	Positive	Yes	These imacts are well understood from other Edify projects, and industry learnings / best proactice.	Yes	Employment	Yes	Yes	Yes	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research		Impacts will be investigated assessed and documented in the EIS
Construction	access	Potential upgrades to local road network to facilitate the project may improve the condition of the local road network.	Positive	Yes - other project	Positive impacts as a result of road upgrades have been demonstrated on other projects.	Yes	Other renewable energy projects in the area are: Crudine Ridge Wind Farm (SSD-6697) Central West Pumped Hydro (SSD- 32286107) Panorama BESS	Yes	Yes	Yes	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Consultation with landholder and local Council, Crown Lands and community on transport routes, local roads, private roads and potential upgrades to ensure benefits are delivered for landholder and local community wherever possible.
Construction	access	Potential impacts from increased traffic and over sized loads during construction could include disruption to local roads, cause damage to roads and increased risk of accidents,	Negative	Yes - other project	Traffic imapcts are well understood and assessed by Edify during scoping and EIS	Yes	Other renewable energy projects in the area are: Crudine Ridge Wind Farm (SSD-6697) Central West Pumped Hydro (SSD- 32286107) Panorama BESS (SSD- 50587460)	Yes	Yes	Yes	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Consultation with local Council and community on transport routes, local roads and services. During the EIA stage a detailed Traffic Impact Assessment will be conducted. Edify will implement measures to repair road damage, minimise impacts and delays to local road users/residents during construction. Conduct timely and appropriate community engagement so neighbours are aware of construction schedules and avenues for raising and resolving concerns or complaints.
Construction	surroundings	Potential impacts in relation to change in the natural environment and visual amenity may lead to impacts on the perceived quality, use and aesthetics of the landscape. Topic was raised during initial consultation.	Negative	Yes - this project	Preliminary Landscape and Visual Impact Assessment	Yes	Other renewable energy projects in the area are: Crudine Ridge Wind Farm (SSD-6697) Central West Pumped Hydro (SSD- 32286107) Panorama BESS (SSD- 50587460)	Yes	Yes	Yes	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Appropriate set back from native vegetation will be incorporated into project design, layout will continue to be revised during EIS stage to minimise impacts where possible. Consideration of neighbouring residences will be concidered during the LVIA and mitigation strategies for any residual impact, including landscape screening, will be considered.
Construction	way of life	Potential for increased pressure on limited local accommodation from construction and operational work force. Potential for increased pressure on local work force, negatively impacting local businesses with labour competition and wage increases. Topic was raised during initial consultation.	Negative	Yes - other project	Other projects have investigated accommodation camps for workers and collaborated with local councils for long term accommodation opportunities.	Yes	Other renewable energy projects in the area are: Crudine Ridge Wind Farm (SSD-6697) Central West Pumped Hydro (SSD- 32286107) Panorama BESS (SSD- 50587460)	Yes	Yes	Yes	Yes	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Explore possibility for accommodation camps that may be located within the region during construction, or the use of camps associated with other, larger projects in the region. A Workforce Accommodation Plan will be prepared prior to construction commencing, in consultation with Bathurst Council and stakeholders within the local accommodation economy. Consultation with local business groups and Councils will occur throughout the planning phase, to understand existing constraints and opportunities to deliver local economic benefits.
Construction and Demobilising construction	health and wellbeing	Potential impacts during construction from dust and noise may affect the host landowners and nearby neighbours.	Negative	Yes - other project	Edify hasve assessed and managed dust and noise impacts on our other proejcts	Yes	Not required	Yes	Yes	Yes	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Conduct timely and appropriate dust suppression watering of site, so impacts can be minimised wherever possible through project design and delivery. Ensure construction activities are carried out in accordance with the relevant legislation, including as outlined in a CEMP.
Construction and Operations	Way of life	Broader Community - employment and contracting opportunities during the construction and operation period. Also flow on economic benefits for regional community. Topic was raised during initial consultation.	Positive	Yes - other project	Other projects have demonstrated significant local and regional economic benefits.	Yes	Other renewable energy projects in the area are: Crudine Ridge Wind Farm (SSD-6697) Central West Pumped Hydro (SSD- 32286107) Panorama BESS (SSD- 50587460)	Yes	Yes	Yes	Yes	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Develop project opportunities for local businesses e.g. working with local business networks and using ICN Gateway for business registration. Facilitating local employment opportunities through promoting on website and through local media.
Decommissioning project at end-of-life	surroundings	Potential impacts during deconstruction from dust and noise may affect the host landowners and nearby neighbours.	Negative	No		No	Not required	Yes	Yes	Yes	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Conduct timely and appropriate dust suppression watering of site, so impacts can be minimised wherever possible through project decommissioning. Ensure deconstruction activities are carried out in accordance with the relevant legislaton, including as outlined in the EMP, with a strong emphasis on recycling project materials.
Operation	health and wellbeing	There are concerns about the potential health effects of exposure to electromagnetic fields generated by solar farm infrastructure, though current research indicates that EMF levels from solar farms are well below harmful levels.	Negative	Yes	Edify have assed these EMF impacts on previous projects, the imapcts are well understood and managed	Yes	VIA	No	No	No	Unknown	Yes	Standard assessment of the impact	Required	Targeted consultation	Potentially targeted research	Yes	EMF will be assessed during the EIS and any imapcts mitigated, standard industry setbacks are input into design i.e infrastructure min 400m from any residence
operation	way of life	Choose sites that minimize disruption to existing land use and ecosystems. Implement land restoration and management practices to support local biodiversity.	Positive	Yes	Edify have assed these impacts on previous projects, the imapcts are well understood and managed	Yes	Way of life	Yes	Yes	Yes	Yes	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	Edify are proposing Agri-solar practices for this project. Impacts will be montioring in Agricultural imapct assessment and during operation of the SF.

Appendix C Consultation Records

DPHI

RE: Edify Energy - New SSD Project - Boags Creek Solar farm

Rita Hatem <Rita.Hatem@planning.nsw.gov.au>

Thu 27-Jun-24 11:01 AM

To:Adam Smith <adam.smith@edifyenergy.com>;Iwan Davies <iwan.davies@planning.nsw.gov.au>;Elisha Dunn <elisha.dunn@dpie.nsw.gov.au>
Cc:Patrick Dale <Patrick.dale@edifyenergy.com>;Nestor Tsambos <Nestor.Tsambos@dpie.nsw.gov.au>;Megan Ramsdale <megan.ramsdale@planning.nsw.gov.au>

Hi Adam,

I have organised a meeting for next Wednesday from 10:30-11am.

Kind regards,
Rita

Rita Hatem
A/ Senior Environmental Assessment Officer
Energy Assessments
Department of Planning, Housing and Infrastructure
T 8275 1033 **E** rita.hatem@planning.nsw.gov.au
dphi.nsw.gov.au

I acknowledge the traditional custodians of the land and pay respects to Elders past and present.

From: Adam Smith <adam.smith@edifyenergy.com>
Sent: Wednesday, 26 June 2024 1:45 PM
To: Iwan Davies <iwan.davies@planning.nsw.gov.au>; Nestor Tsambos <Nestor.Tsambos@dpie.nsw.gov.au>; Megan Ramsdale <megan.ramsdale@planning.nsw.gov.au>; Rita Hatem <Rita.Hatem@planning.nsw.gov.au>
Cc: Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: Re: Edify Energy - New SSD Project - Boags Creek Solar farm

Hi Iwan and Team

Just checking in to see when we can arrange this Scoping meeting

Adam

Regards,
Adam Smith

Adam Smith

D +61 2 8790 4048
M +61 424 256 951

Edify

Edify Energy
Level 1, 34-35 South Steyne
Manly NSW 2095
Gayemagal Country

www.edifyenergy.com

From: Iwan Davies <iwan.davies@planning.nsw.gov.au>
Sent: Tuesday, June 18, 2024 11:23 AM
To: Adam Smith <adam.smith@edifyenergy.com>; Nestor Tsambos <Nestor.Tsambos@dpie.nsw.gov.au>; Megan Ramsdale <megan.ramsdale@planning.nsw.gov.au>; Rita Hatem <Rita.Hatem@planning.nsw.gov.au>
Cc: Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: RE: Edify Energy - New SSD Project - Boags Creek Solar farm

Hi Adam,

Great to hear you're proposing another project in NSW.

Scoping Meetings are held 2-3 months prior to lodgement of the Scoping Report to ensure all matters are discussed prior to the Scoping Report being drafted, which I assume your consultant has advised you.

A member of the team will be in touch to arrange the meeting.

Kind regards
Iwan

Iwan Davies
Director, Energy Assessments
Planning and Assessment
Department of Planning, Housing and Infrastructure
T 02 9274 6296 **E** iwan.davies@planning.nsw.gov.au
dphi.nsw.gov.au
4 Parramatta Square, 12 Darcy Street Parramatta NSW 2150
Locked Bag 5022, Parramatta NSW 2124

From: Adam Smith <adam.smith@edifyenergy.com>
Sent: Tuesday, 18 June 2024 10:52 AM
To: Iwan Davies <iwan.davies@planning.nsw.gov.au>; Nestor Tsambos <Nestor.Tsambos@dpie.nsw.gov.au>; Megan Ramsdale <megan.ramsdale@planning.nsw.gov.au>; Rita Hatem <Rita.Hatem@planning.nsw.gov.au>
Cc: Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: Edify Energy - New SSD Project - Boags Creek Solar farm

Hi DPHI

Edify are developing a Solar Farm/BESS Project in Murrumbidgee LGA near our Darlington Point Solar Farm.

We have drafted the Scoping report and have a meeting with Local council this week (20th June) to outline and discuss project pre-SR submission.

Would DPHI like a meeting for us to run you through this project prior to us submitting the Scoping report? If so, please let me know some days/time yourself or representatives from DPHI are free

Thankyou

Adam

Adam Smith

D +61 2 8790 4048
M +61 424 256 951

Edify Energy
Level 1, 34-35 South Steyne
Manly NSW 2095
Gayemagal Country

www.edifyenergy.com

Local Council

Edify Energy - Boags Creek Solar Farm - Initial Project Introduction

Adam Smith <adam.smith@edifyenergy.com>

Thu 13-Jun-24 12:40 PM

To:ruthm@murrumbidgee.nsw.gov.au <ruthm@murrumbidgee.nsw.gov.au>;robertb@murrumbidgee.nsw.gov.au <robertb@murrumbidgee.nsw.gov.au>;faithb@murrumbidgee.nsw.gov.au <faithb@murrumbidgee.nsw.gov.au>; christinec@murrumbidgee.nsw.gov.au <christinec@murrumbidgee.nsw.gov.au>;robertc@murrumbidgee.nsw.gov.au <robertc@murrumbidgee.nsw.gov.au>;gaving@murrumbidgee.nsw.gov.au <gaving@murrumbidgee.nsw.gov.au>; troym@murrumbidgee.nsw.gov.au <troym@murrumbidgee.nsw.gov.au>;judiths@murrumbidgee.nsw.gov.au <judiths@murrumbidgee.nsw.gov.au>;tims@murrumbidgee.nsw.gov.au <tims@murrumbidgee.nsw.gov.au>; mail@murrumbidgee.nsw.gov.au <mail@murrumbidgee.nsw.gov.au>;kellied@murrumbidgee.nsw.gov.au <kellied@murrumbidgee.nsw.gov.au>
Cc:Patrick Dale <Patrick.dale@edifyenergy.com>;Michelle Grogan <Michelle.Grogan@edifyenergy.com>

1 attachments (4 MB)

Edify Energy - Boags Creek SF - Pre-Lodgement June 2024.pdf;

To Murrumbidgee Council Mayor, Deputy Mayor and Councillors

I work with Edify Energy, an Australian owned Independent Power Producer delivering more than $2 billion of investment in Australia. Edify has successfully developed and financed over 1 GW of utility-scale solar farms and battery energy storage systems and, in addition to projects currently in construction, is managing the operations of 6 solar farms and 4 battery energy storage systems that it has developed, financed and constructed, including Australia's largest operational solar farm (Darlington Point) as well as Australia largest integrated solar/battery storage project (Gannawarra Solar and Storage, Victoria)

We have recently secured approximately 845 hectares of land within the Murrumbidgee LGA, located near Darlington Point (See attached). Over the remainder of 2024 and 2025, we will be commencing our planning assessments to develop a new solar and battery project, continuing our investment in Murrumbidgee and regional New South Wales.

The project will have a capital investment of greater than $30 million and therefore, will be considered a State Significant Development. We are finalising a Scoping Report in the coming weeks that will be lodged to NSW Department of Planning Housing and infrastructure (DPHI). This will then inform the preparation of our detailed Environmental Impact Statement in 2025, as we aim to commence construction in FY 2027/28.

As part of the State Government's planning approval process, we are committed to early and detailed engagement with Murrumbidgee Council and the broader community in Darlington Point and surrounds. We recognise that various solar farms and renewable developments already exist, including Edify's development in Darlington Point, and are proposed within the region and wish continue the conversation to gather your feedback, federal electorate perspectives and your experience with such projects to date. This engagement also supports us to improve and deliver equitable outcomes for your constituents.

To provide you with an overview of Edify's Boags Creek Solar Farm:

- The project's investment will be over $500 million
- The project's solar capacity will be up to 300 MW
- The solar generation is supported by an integrated 300MW / 600 MWh battery system
- The development has the potential to supply circa 1.2million NSW households with renewable electricity for a 2 hour period (based on average 30 kWh per household per day)
- The development is located along Kidman Way NSW, approx. 8km south of Darlington Point and 40km south of Griffith, utilising existing transmission infrastructure which is present within the subject land.

Edify recently commenced the project's planning and wishes to share and refine this with local community, government and business groups.

The intention of this correspondence is to provide you with early notice of the project plans and continue relationships with you and your staff. We would like to discuss the project plans, goals and renew our conversations around supporting the council and community.

Please respond with your availabilities should you wish to discuss the project, we are happy to meet in person or we can video call at your convenience. Alternatively if you do not wish to discuss the project at this stage, we will keep you informed as the project progresses.

We look forward to confirming a meeting with you in the coming weeks if you would like to know more information

I have attached an overview of Edify and the project, please let me know if you would like to discuss further prior to our Scoping Report submission to DPHI.

Adam

Adam Smith

D +61 2 8790 4048
M +61 424 256 951

Edify®

Edify Energy
Level 1, 34-35 South Steyne
Manly NSW 2095
Gayemagal Country

www.edifyenergy.com

Murrumbidgee COUNCIL

SC210

1 July 2024

Mr A Smith
Edify Energy
Level 1, 34-35 South Steyene
Manly NSW 2095

Via email: adam.smith@edifyenergy.com

Dear Adam

RE: Proposed Boags Creek Solar Farm Darlington Point – Developer Contribution

Thank you for the recent opportunity to meet with you, Patrick and Michelle to discuss the proposed Boag's Creek Solar Farm on the Kidman Way at Darlington Point.

Following this meeting, I wish to clarify and confirm Council's stance in relation to developer contributions and their application to solar and wind farm developments, as well as battery energy storage systems (BESS).

Council has essentially been involuntarily placed within the South West Renewable Energy Zone and has, as a result, resolved to maximise this unique opportunity to achieve through developer contributions a range of intergenerational community infrastructure such as a new medical centre, early learning centres and critical workers housing, amongst others.

This infrastructure is considered to be essential for the long term sustainability of the communities of Murrumbidgee Council and would, had it not been for contributions from the proponents of renewable energy developments, be otherwise largely unattainable.

Over the past 18 months Council has been successful in applying, firstly developer contributions of 1% of the projects CIV under Council's Section 7.12 Developer Contribution Levy Plan, or more recently the adoption of a Voluntary Planning Agreement based on the recommended levies for wind and solar farm developments under the Benefit Sharing Guidelines contained within the NSW Department of Planning and Environment Draft Energy Policy Framework. In relation to BESS developments a 1% of CIV contribution is still applied.

In this approach Council does not defer to the 2019 Guide to Benefit Sharing Options released by the Clean Energy Council, but rather to the objectives of the NSW Electricity Infrastructure Investment Act 2020, and in particular the need to foster local community support for renewable energy developments and to support local economic development and manufacturing.

In conclusion, Council has received advice that the draft Benefit Sharing Guidelines are to be complied with now in relation to all future State Significant renewable energy developments and that applicants will need to comply with the new guidelines as a requirement of their SEARs in order to enhance the social licence for their development. As such, Council is committed to applying the levies under the draft Guidelines, which have to date, been voluntarily contributed by previous renewable energy developers.

Yours faithfully

Garry Stoll
Director Planning & Infrastructure

T 1300 676 243 | PO Box 96 Jerilderie NSW 2716 | **mail@murrumbidgee.nsw.gov.au** | **murrumbidgee.nsw.gov.au** | ABN 53 573 617 925

Offices: 39 Brolga Place, Coleambally NSW 2707 | **T** 02 6954 4060
21 Carrington Street, Darlington Point NSW 2706 | **T** 02 6960 5500
35 Jerilderie Street, Jerilderie NSW 2716 | **T** 03 5886 1200

State and Federal MP

Edify Energy - Boags Creek Solar Farm - Initial Introduction

Adam Smith <adam.smith@edifyenergy.com>

Thu 13-Jun-24 12:49 PM

To:murray@parliament.nsw.gov.au <murray@parliament.nsw.gov.au>
Cc:Patrick Dale <Patrick.dale@edifyenergy.com>;Michelle Grogan <Michelle.Grogan@edifyenergy.com>

1 attachments (4 MB)

Edify Energy - Boags Creek SF - Pre-Lodgement June 2024.pdf;

Hi Helen Dalton MP

I work with Edify Energy, an Australian owned Independent Power Producer delivering more than $2 billion of investment in Australia. Edify has successfully developed and financed over 1 GW of utility-scale solar farms and battery energy storage systems and, in addition to projects currently in construction, is managing the operations of 6 solar farms and 4 battery energy storage systems that it has developed, financed and constructed, including Australia's largest operational solar farm (Darlington Point) as well as Australia largest integrated solar/battery storage project (Gannawarra Solar and Storage, Victoria)

We have recently secured approximately 845 hectares of land within the Murrumbidgee LGA, located near Darlington Point (See attached). Over the remainder of 2024 and 2025, we will be commencing our planning assessments to develop a new solar and battery project, continuing our investment in Murrumbidgee and regional New South Wales.

The project will have a capital investment of greater than $30 million and therefore, will be considered a State Significant Development. We are finalising a Scoping Report in the coming weeks that will be lodged to NSW Department of Planning Housing and infrastructure (DPHI). This will then inform the preparation of our detailed Environmental Impact Statement in 2025, as we aim to commence construction in FY 2027/28.

As part of the State Government's planning approval process, we are committed to early and detailed engagement with Murrumbidgee Council and the broader community in Darlington Point and surrounds. We recognise that various solar farms and renewable developments already exist, including Edify's development in Darlington Point, and are proposed within the region and wish continue the conversation to gather your feedback, federal electorate perspectives and your experience with such projects to date. This engagement also supports us to improve and deliver equitable outcomes for your constituents.

To provide you with an overview of Edify's Boags Creek Solar Farm:

- The project's investment will be over $500 million
- The project's solar capacity will be up to 300 MW
- The solar generation is supported by an integrated 300MW / 600 MWh battery system
- The development has the potential to supply circa 1.2million NSW households with renewable electricity for a 2 hour period (based on average 30 kWh per household per day)
- The development is located along Kidman Way NSW, approx. 8km south of Darlington Point and 40km south of Griffith, utilising existing transmission infrastructure which is present within the subject land.

Edify recently commenced the project's planning and wishes to share and refine this with local community, government and business groups.

The intention of this correspondence is to provide you with early notice of the project plans and continue relationships with you and your staff. We would like to discuss the project plans, goals and renew our conversations around supporting the council and community.

Please respond with your availabilities should you wish to discuss the project, we are happy to meet in person or we can video call at your convenience. Alternatively if you do not wish to discuss the project at this stage, we will keep you informed as the project progresses.

We look forward to confirming a meeting with you in the coming weeks if you would like to know more information

I have attached an overview of Edify and the project, please let me know if you would like to discuss further prior to our Scoping Report submission to DPHI.

Adam

Adam Smith

D +61 2 8790 4048
M +61 424 256 951

Edify Energy
Level 1, 34-35 South Steyne
Manly NSW 2095
Gayemagal Country

www.edifyenergy.com

Appendix D AHIMS Searches

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Boags Creek

Client Service ID : 889073

Adam Smith

Level 1 34-35 South Steyne
Manly New South Wales 2095

Attention: Adam Smith

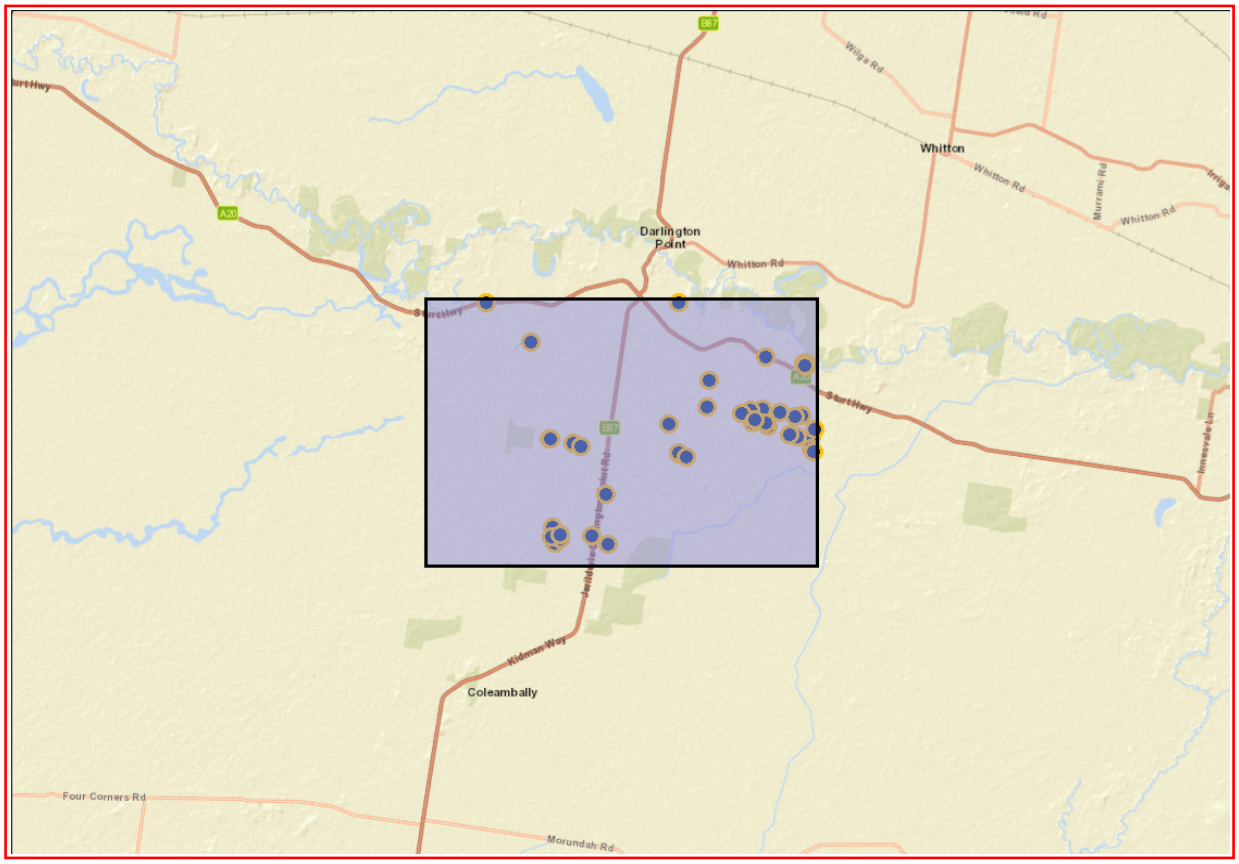
Email: adam.smith@edifyenergy.com

Date: 03 May 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -34.7351, 145.8551 - Lat, Long To : -34.5939, 146.1022, conducted by Adam Smith on 03 May 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

47	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

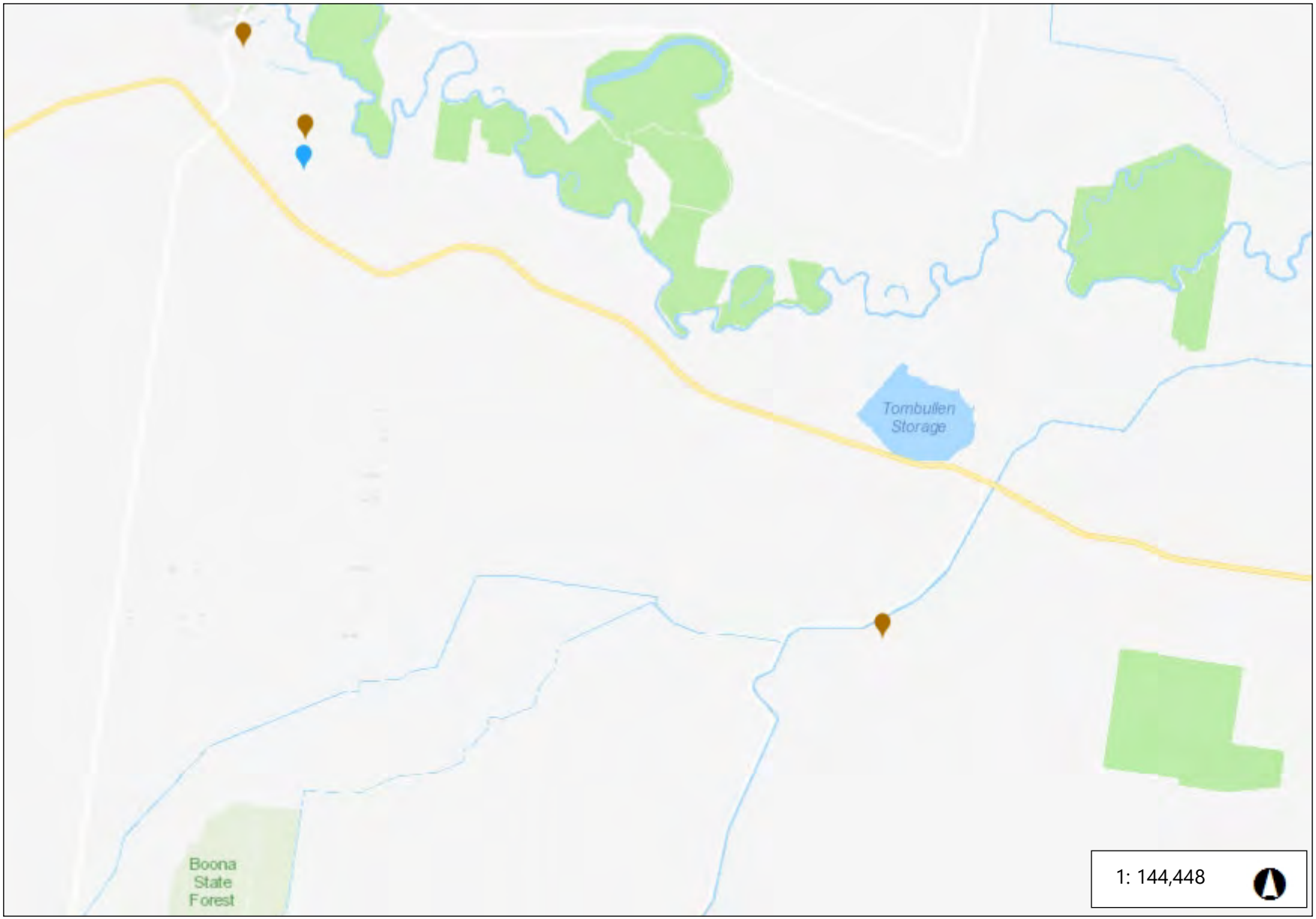
Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Appendix E Australian, State and Local Historic Heritage database search result

Heritage NSW

Title



Legend

- World Heritage Areas NSW
- SEPP
- Local Environmental Plan
  - Cluster (label denotes number)
- State Heritage Register
  - Cluster (label denotes number)
- Aboriginal Place
  - Cluster (label denotes number)
- Interim Heritage Order
  - Cluster (label denotes number)

1: 144,448

Notes

Notes

7,337.9 0 3,668.97 7,337.9 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from the Heritage Management System and is for reference only. Information that appears on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Appendix F Preliminary Ecological Assessment

Preliminary Ecological Assessment

Boags Creek Solar Farm

24001628

29 April 2024

KLEINFELDER
Bright People. Right Solutions.

Suite 3, 240-244 Pacific Highway,
Charlestown, NSW 2290

Phone: +61 2 4949 5200

Preliminary Ecological Assessment

Boags Creek Solar Farm

Kleinfelder Document: NCA24R165244

Prepared for:
Edify Energy Pty Ltd

Level 1, 34-35 South Steyne
Manly NSW 2095
Gayemagal Country

Prepared by:
Kleinfelder Australia Pty Ltd

Suite 3, 240-244 Pacific Highway, Charlestown, NSW 2290
Phone: +61 2 4949 5200
ABN: 23 146 082 500

Document Control:

Version	Description	Date
1.0	Draft	Final
Prepared	Reviewed	Endorsed
Alyx Vandermast	Fig Forest	Rob Townsend

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

EXECUTIVE SUMMARY

Edify Energy Pty Ltd (Edify, the Proponent) proposes to construct a solar farm with battery energy storage system near Darlington Point, in the Murray Riverina region of New South Wales. Kleinfelder Australia (Kleinfelder) were engaged by Edify to conduct a preliminary ecological assessment (PEA) of the proposal according to the requirements of the Biodiversity Assessment Method 2020 (BAM) as part of the Biodiversity Offsets Scheme (BOS). The PEA will accompany a Scoping Report compiled by Edify, for submission to the Department of Planning, Housing and Infrastructure (DPHI), as the proposal is considered a State Significant Development (SSD). A Biodiversity Development Assessment Report (BDAR) will also be required as part of the Environmental Impact Statement (EIS), with all impact to native vegetation to be offset.

The Study Area is located in the Murrumbidgee Council Local Government Area, approximately 8 kilometres (km) South of Darlington Point and 40km South of Griffith. Boags Creek Solar Farm (the Proposal) will occupy up to approximately 875 hectares, effecting nine lots across two properties listed as 7346 Kidman Way, Darlington Point (Property 1) and Ringwood Road, Darlington Point (Property 2) (Figure 1). It is not anticipated all of this area will be required for the proposal and is likely most if not all vegetation will be excluded from the development footprint to avoid and minimise impacts.

As per BAM methodology, twenty-two full floristic/vegetation structural 20 x 20 metre plots, nested within 20 x 50 metre vegetation functional plots; each with five 1m² subplots for assessment of average litter cover, were performed across the site.

The field assessment identified three Plant Community Types (PCTs) on the proposal site:

- PCT 45 Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion. This PCT was predominantly occurring within or immediately adjacent to PCT 16 and was accounted for under PCT 16 in the BAM-C.
- PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion).
- PCT 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone. This PCT consisted of two isolated trees in the south western portion of Property 1.

These PCTs are not currently listed as Threatened Ecological Communities in NSW. PCT 28 is currently under consideration for listing under the EPBC Act. It's extent on the site was limited to three individual trees of White Cypress Pine which can be avoided and are unlikely to be impacted by developments.

Scattered trees were examined when encountered during random meander surveys. Planted native vegetation was examined around existing housing and farming infrastructure. A full assessment of these features will be required during the Biodiversity Development Assessment Report, where development has identified clearing individual scattered remnant trees will occur, and that meet the criteria in the Streamlined assessment modules – Scattered Trees Assessment and Planted native vegetation (Appendix B and D: Biodiversity Assessment Method).

The draft native vegetation regulatory map displays majority of the project as Category 1 exempt land (largely aligning with the area of 3.3.0 land use of cropping). However, all patches of vegetation and isolated trees on the proposal site are mapped Category 2 regulated land in the draft mapping excluding the in-force patch of category 2 sensitive regulated land in the southern area of Property 2.

Likelihood of occurrence assessment of species found from BioNet and Protected Matters searches found a moderate likelihood of the Koala (Endangered- BC Act / EPBC Act), Grey-crowned Babbler (eastern subspecies) (Vulnerable-BC Act) and a high likelihood of the Superb Parrot (Vulnerable- BC Act / EPBC Act) to occur within the Project Area.

The preliminary BAM-C output predicted 15 ecosystem credit species to occur on site, with six ecosystem credit species assumed absent due to species constraints (Table 4-4). The offset obligation is entirely associated with PCT 16 assuming all areas of PCT 16 on site will be cleared. Notably, the Project is likely to avoid all areas of PCT 16 on site which will remove this obligation.

The BAM-C generated 18 candidate species to potentially occur on site. A credit obligation is associated with five species assumed present. Targeted surveys will be required to confirm presence of these species on site and finalise a credit obligation pending clearing of any associated habitat:

- Yellow Gum, *Eucalyptus leucoxylon subsp. Pruinose*
- White-bellied Sea Eagle, *Haliaeetus leucogaster*
- Pink Cockatoo, *Lophochroa leadbeateri*
- Koala, *Phascolarctos cinereus*
- Superb Parrot, *Polytelis swainsonii*

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Edify Energy Pty Ltd (Edify, the Proponent) proposes to construct a solar farm with battery energy storage system near Darlington Point, in the Murray Riverina region of New South Wales. The Study Area is located in the Murrumbidgee Council Local Government Area, approximately 8 kilometres (km) South of Darlington Point and 40km South of Griffith. The proposal will occupy up to 875h hectare effecting nine lots across two properties (Table 1-1). Both properties have a minimum lot size of 200ha. The cadastral boundaries are mapped in Figure 1 for each property, as well as the entire assessed proposal area.

Table 1-1: Cadastral Lots of Proposal

7346 Kidman Way (Property 1)	Ringwood Road (Property 2)
Lot 158 DP750908	Lot 160 DP750908
Lot 1 DP254627	Lot 64 DP750908
Lot 1 DP971064	Lot 63 DP750908
Lot 116 DP750908	
Lot 161 DP750908	
Lot 1 DP1300028	

Edify are preparing a scoping report for submission to the DPHI and require a Preliminary Ecological Assessment (PEA) as a part of the submission. Kleinfelder Australia Pty Ltd (Kleinfelder) was engaged by Edify to conduct the PEA to identify potential ecological constraints associated to development of the site, to ascertain probable pathways for development approvals, and understand further site investigations that may be required.

This report documents the results of this assessment and details of the proponent's biodiversity offset requirements (ecosystem and species credits), with the understanding that this requirement will change as the final development footprint, including avoidance of biodiversity impacts, is refined.

1.2 PROPOSED SITE LOCATION AND DESCRIPTION

The Study Area is located in the Murrumbidgee Council Local Government Area, approximately 8 kilometres (km) South of Darlington Point and 40km South of Griffith. Site access is likely to be via an existing access off Kidman Way. The proposal falls within RU1 Primary Production zoning and is currently agriculturally operated and managed including grazing and cropping. The minimum lot size for development purposes is 200ha for each property.

The proposal encompasses two properties, for which Property 1 contains 6 lot parcels and Property 2 contains 3 lot parcels as detailed in Table 1-1. Collectively these properties and their lots, along with a 1500m buffer form the Study Area (Figure 1). The Study Area includes the existing accesses into Property 1, as well as a corridor of Donald Ross Drive which may be required to facilitate connection to the existing Darlington Point substation as part of the final design footprint. The Study Area has excluded a segregated lot for the irrigation channel that runs along the southern boundary of Property 1.

There are existing 132kV (Line 99T) and 220kV (Line X5) powerlines, owned and operated by Transgrid, that traverse the eastern portion of the proposal site impacting Lots 63, 64 and 160 on Deposit Plans 750908. Two connection options will be explored as part of the EIS phase, which are:

- Connection via a substation and step-down transformer to the 220kV Transgrid line (Line X5), or

- Connection via a constructed transmission line into the existing Darlington Point substation approximately 3- 3.5km northeast of the proposal site.

Features of relevance in the Study Area include two farm dams and a waterway that exists on the properties, as well as several stands and patches of vegetation within and along the boundaries of the proposal site. The site has a generally flat topography at around 135m elevation and lies over a predominantly granite geology and associated landform.

At this stage, the project is anticipated to have a rating of 300MW or more solar PV generation capacity, coupled with an integrated battery energy storage system with approximately 200MW/400MWh energy storage capacity. The energy storage component will require a development footprint of approximately 4 to 5 hectares. Given the area of available land and the moderate scale of the development, it is anticipated the project will be micro-sited in such a way that minimal to no native vegetation will be disturbed.

1.3 REPORT OBJECTIVES

The report provides information to guide the principles of avoidance, minimisation and offsetting as prescribed by the objectives of the Biodiversity Assessment Method.

The focus of the PEA is to identify key biodiversity values and ecological constraints within the Study Area. Individual reporting objectives include the following:

Edify requests Kleinfelder to prepare a preliminary biodiversity assessment report to support the BDAR required during the EIS phase, that considers the following scope:

Desktop assessment of site biodiversity values as listed under the *Biodiversity Conservation Act 2016, Fisheries Management Act 1994* and the *Environment Protection and Biodiversity Conservation Act 1999*. Desktop assessment to consider whether proposal triggers Biodiversity Offsets Scheme (BOS) with consideration of the minimum lot size being 200ha.

Preliminary field surveys as per the Biodiversity Assessment Methodology (BAM) to assess:

- Plant Community Types (PCT's) and Vegetation Zones. Survey to be undertaken using acceptable BAM Vegetation Integrity (VI) plot methodology.
- Threatened Ecological Communities. To be assessed for potential representation as State and/or Federally listed Threatened Ecological Communities.
- Potential habitat for native fauna.
- Opportunistic findings or evidence of native and threatened fauna and flora on site.
- Groundwater Dependent Ecosystems.
- Occurrence of Category 1- Exempt Land.
- Preliminary desktop assessment for likelihood of occurrence and recommendations on targeted survey requirements for MNES with potential to occur or be directly or indirectly impacted by the Project.
- Provide mapping illustrating biodiversity values as observed during preliminary field surveys.
- Provide BAM-C outputs and potential threatened species survey requirements.

Edify also requests Kleinfelder to assess Kidman Way for all practical entry option locations that are largely clear of native vegetation, entering either Lot 257, Lot 161 or Lot 158. Kleinfelder to provide mapping and BAM considerations for each within the Preliminary Biodiversity Assessment report, using the access entry design requirements template provided in Appendix B. Note, entry options cannot include parcel of Crown Land and the driveway access to 'Silverwoods' residence on Lot 158.

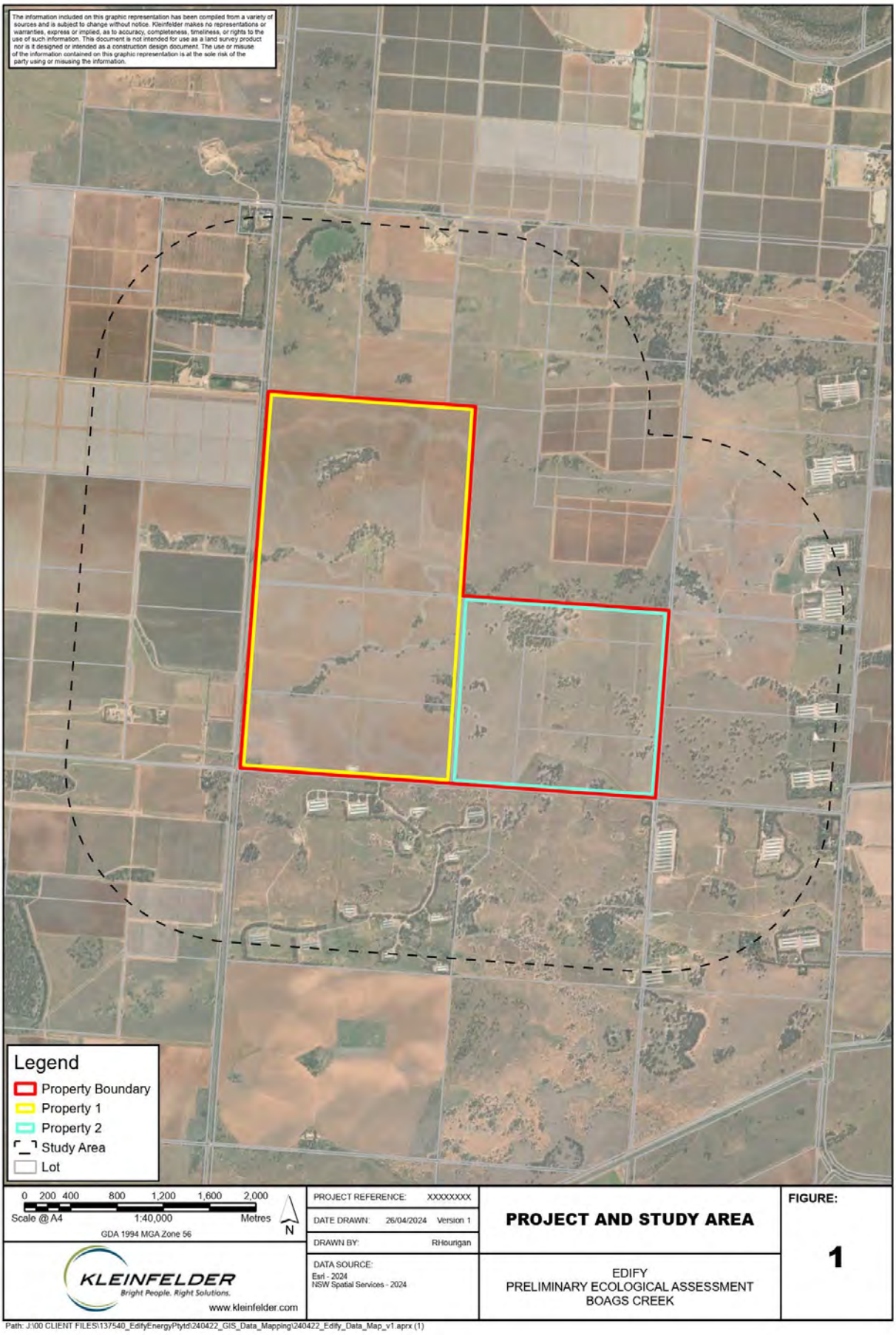


Figure 1: Project Area and Study Area

2 STATUTORY CONTEXT

2.1 KEY LEGISLATION

This PEA was developed in consideration of, and accordance with, the following legislation and planning instruments:

Commonwealth:

- *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act).

State:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Biodiversity Conservation Act 2016* (BC Act)
- *Fisheries Management Act 1994 (*Fisheries Act)
- *Coastal Management Act 2016* (CM Act)
- *Water Management Act 2000* (WM Act)
- *Biosecurity Act 2015* (Biosecurity Act)
- *National Parks and Wildlife Act 1974* (NP&W Act)
- *Local Land Services Act 2013* (LLS Act)
- *Land Management (Native Vegetation) Code 2018 under the Local Land Services Act 2013*
- *State Environmental Planning Policy (Biodiversity and Conservation)* 2021.

Local and regional planning instruments:

- Murrumbidgee Local Environmental Plan 2013
- Riverina Murray Regional Plan 2041

2.2 ASSESSABLE MATTERS AND TRIGGERS

Assessable matters relevant to the Proposal are defined as follows:

- Matters referred to in the BC Act where a development or an activity is "likely to significantly affect threatened species or an ecological community".
- Impacts on matters identified by the BC Act and its regulation as constituting a "Serious and Irreversible Impact (SAII)".
- Matters of National Environmental Significance (MNES) listed under Section 18 and 18A (threatened species and ecological communities) of the EPBC Act.

It is understood that the Proposal is to be assessed as development regulated under Part 4 of the EP&A Act. The first tier of assessment (i.e. thresholds tests) for 'local development' assessed under Part 4 of the EP&A Act initially focuses on 'triggers' that otherwise indicate a requirement, or not, for a second tier of assessment performed under Part 7 of the BC Act. Threshold tests are applied to determine if a development or activity is "likely to significantly affect threatened species" as listed below:

- Impacts exceed the Biodiversity Offsets Scheme thresholds (Section 7.2 of the BC Act); or
- Impacts are likely to significantly affect threatened species or ecological communities, or their habitats (Section 7.3 of the BC Act); or
- Impacts on a declared area of outstanding biodiversity value.

Exceedance or triggering any of the above results in a requirement for an impact assessment performed in accordance with the NSW Biodiversity Assessment Method (BAM) by an Accredited Person (Section 7.7 of the BC Act).

Additional local provisions mapped for the Proposal site for consideration and assessment include:

- Terrestrial Biodiversity Values (Murrumbidgee LEP)
- Groundwater Vulnerability (Murrumbidgee LEP)

The Proposal is not mapped to occur on flood prone or bushfire prone land, as per local and state mapping.

2.3 SERIOUS AND IRREVERSIBLE IMPACTS

It is important to be aware of matters classed as 'serious and irreversible impacts' (SAII) and the potential for associated approval issues generated by these matters (DPIE 2019). Where present, and impacted, the consent authority is unable to issue statutory approvals where a project will or is likely to impact an SAII. An impact avoidance outcome is required in these circumstances.

2.4 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The purpose of the Commonwealth EPBC Act is to ensure that actions likely to cause a significant impact on Matters of National Environmental Significance (MNES) undergo an adequate assessment. Under the EPBC Act, an action includes a proposal, undertaking, development or activity that may impact MNES. An action that '*has, will have or is likely to have a significant impact on a MNES*' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Commonwealth Minister.

MNES categories listed under the EPBC Act relevant to the Study Area include:

- Threatened species and ecological communities
- Migratory species

A self-assessment performed in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DoE 2013) is required to determine if there is likelihood for an action to have a significant impact on MNES. Where a significant impact is likely, a referral to the Commonwealth Minister must be undertaken.

2.5 AREAS OF OUTSTANDING BIODIVERSITY VALUE

Reference was made to the Areas of Outstanding Biodiversity Value register for declarations of in force areas. (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/areas-of-outstanding-biodiversity-value/area-of-outstanding-biodiversity-value-register).

No areas of Areas of Outstanding Biodiversity Value were noted for the site.

3 METHODOLOGY

3.1 DESKTOP ANALYSIS

A review of relevant information on local biodiversity values pertaining to the Study Area, including relevant threatened biota was obtained via desktop analysis from:

- State Vegetation Type Mapping (DPHI 2024)
- The BioNet Atlas of NSW Wildlife (DPE 2024) – database search for previous records of threatened species, populations and ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act) within a 5 km radius of the site
- A PlantNet spatial search for all flora within a 25 kilometres radius of Narranderra and Darlington Point was undertaken (https://plantnet.rbgsyd.nsw.gov.au/search/spatial.htm)
- NSW Department of Planning and Environment Biodiversity Values Map and Threshold Tool
- The Department of Climate Change, Energy, the Environment and Water Protected Matters Search Tool – database search for matters of national environmental significance predicted to occur within a 10 km radius of the site
- Review of the LLS Act for consideration of exemptions pertaining to Category 1 lands
- Review of NSW Draft Native Vegetation Regulatory Map and Land Use Map (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=DraftNVRMap)
- Relevant published literature on vegetation communities of relevance and threatened biota (see References).

The results of the database searches were used to compile a list of threatened species, populations and communities, as listed under the BC Act and EPBC Act that could potentially occur within the Study Area, and their likelihood of occurrence (Appendix A).

3.1.1 Vegetation Assessment

Existing vegetation mapping was examined for the study area (https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map). This dataset showed a potential of four Plant Community Types (PCT) mapped. This was used to determine the extent and type of vegetation potentially present at the site. Highly modified areas with intensive cropping were evident from examination of aerial photography.

An assessment of vegetation and PCTs present was conducted during site inspections and plot based surveys undertaken between the 19th to 22nd March 2024. Survey effort involved 21 hours in the field assessing the site.

An initial site familiarisation and collection of voucher specimens was conducted. All flora species encountered with suitable flowering or vegetative material were photographed, collected, and pressed. Species were later identified using various Flora identification keys (NSW Plantnet Flora Online; Brooker and Kleinig 1999; Harden 1990, 1992, 1993, 2000 & 2002; Jacobs et al 2023). Specimens, where necessary to identify to genera or species level, were examined with tweezers, scalpel, a 12 X illuminated hand lens and a TOMLOV DM602 Digital Microscope with 10-inch HDMI LCD monitor at 200 X zoom. The National Herbarium of New South Wales will be provided with a species list and offered any voucher specimens collected for lodgement with the State collection. Digital still photography was made of individual features and of the area generally. Manageable and risk weighted High Threat Weeds (HTW) according to the BAM were noted. A listing of all species identified is shown at Appendix B.

Twenty-two full floristic/vegetation structural 20 x 20 metre, nested within 20 x 50 metre vegetation functional plots; each with five 1m² subplots for assessment of average litter cover, were performed across the site (Figure 2).

Plots were chosen by walking randomly into a vegetated area and establishing the plot centreline on a random bearing. Floristic plots recorded all species present within the plot along with their cover expressed as percentage and their numerical abundance based upon visual estimations. These were recorded to data sheets and later transferred to Excel spreadsheet. A handheld GPS unit, (Garmin Oregon 750T) was used to record

locations of the south-eastern corner of plots, with accuracy being generally <5 metres. Digital photography was made from the south-eastern corner of each plot. All locations were recorded in Geodetic Datum of Australia Map Grid Zone 55.

Hollow bearing trees were noted within plot based surveys and also where encountered during random meander surveys. Lack of seedling recruitment amongst populations of *Eucalyptus largiflorens* has been recognised (Doody et al 2021). In view of this, one floristic/ functional/structural plot was undertaken on a grove of seedling recruitment. Additionally, another area was traversed with GPS to encompass the areas of recruitment of *E. largiflorens* present.

Individual trees were measured for diameter at breast height over bark (DBHOB) with a foresters π measuring tape for the BAM functional assessment. Larger sized trees outside of plots were occasionally measured.

Scattered trees were examined when encountered during random meander surveys. Planted native vegetation was examined around existing housing and farming infrastructure.

3.1.2 Fauna Habitat Assessment

A pre-dawn visit was made to visit the site on the 19th of March 2024 to ascertain and view the presence of any of the Order Chiroptera (microbats and Flying Foxes), Dasyuromorphia (Quolls, Dunnarts, Phascogales, Antechinus, etc) and Diprotodontia (Gliders, Possums, Kangaroos, etc).

Diurnal opportunistic and incidental observations of fauna species were photographed or viewed with binoculars during field surveys. These included opportunistic observation of fauna activity such as scats, tracks, burrows or other traces.

Searches for potential habitat features included stick nests, microbat roosting habitat, terrestrial nests/burrows, hollow-bearing trees including fissures within the bark, branches and trunk, Gilgai, waterbodies were photographed with a handheld Android smartphone with Google Earth geolocation enabled.

A listing of all vertebrate and invertebrates noted is shown at Appendix B.

3.1.3 Prescribed Biodiversity Impacts

Identifying additional prescribed impacts on the habitat of threatened entities included a visual assessment of site for the following:

- Karst, caves, crevices, cliffs, rocks and other geological features of significance.
- Human-made structures.
- Non-native vegetation.
- Areas connecting threatened species habitat, such as movement corridors.
- Effect on water quality, water bodies and hydrological processes that sustain threatened entities.
- Threatened and protected animals impacts from turbine strikes of a wind farm (not considered as scope of development does not include wind farm).
- Threatened fauna or native animals that are part of a TEC impacted by potential vehicle strikes.

3.1.4 Scattered Trees and Planted Native Vegetation

Scattered trees and planted native vegetation were examined by aerial photography, binoculars and examination where encountered by random meander in the field.

3.1.5 Interim Grasslands and other Groundcover Assessment Method

The Grasslands and other Groundcover Assessment Method (IGGAM:,OEH 2017) was applied to determine the conservation value of the groundcover vegetation (including grasslands) present as either one of the following three categories: ‘low’, ‘moderate’ or ‘high’. Grasslands or groundcover cannot be designated as low conservation value under the native species assessment where threatened species have been mapped by OEH as having been present on the land or are known to be present by the assessor (OEH 2017).

3.2 SURVEY LIMITATIONS

Field surveys were undertaken during a single seasonal site visit. Whilst a diversity of native and exotic flora species were recorded, additional surveys across various seasonal conditions would result in the detection of a greater diversity of species. Threatened flora species were conducted during site and meander surveys, targeted flora surveys in accordance with The NSW Guide to Surveying Threatened Plants (DPIE 2020) or relevant threatened species profiles were not conducted. Further habitat assessments and targeted threatened flora and fauna surveys will be required to inform a Development Application.

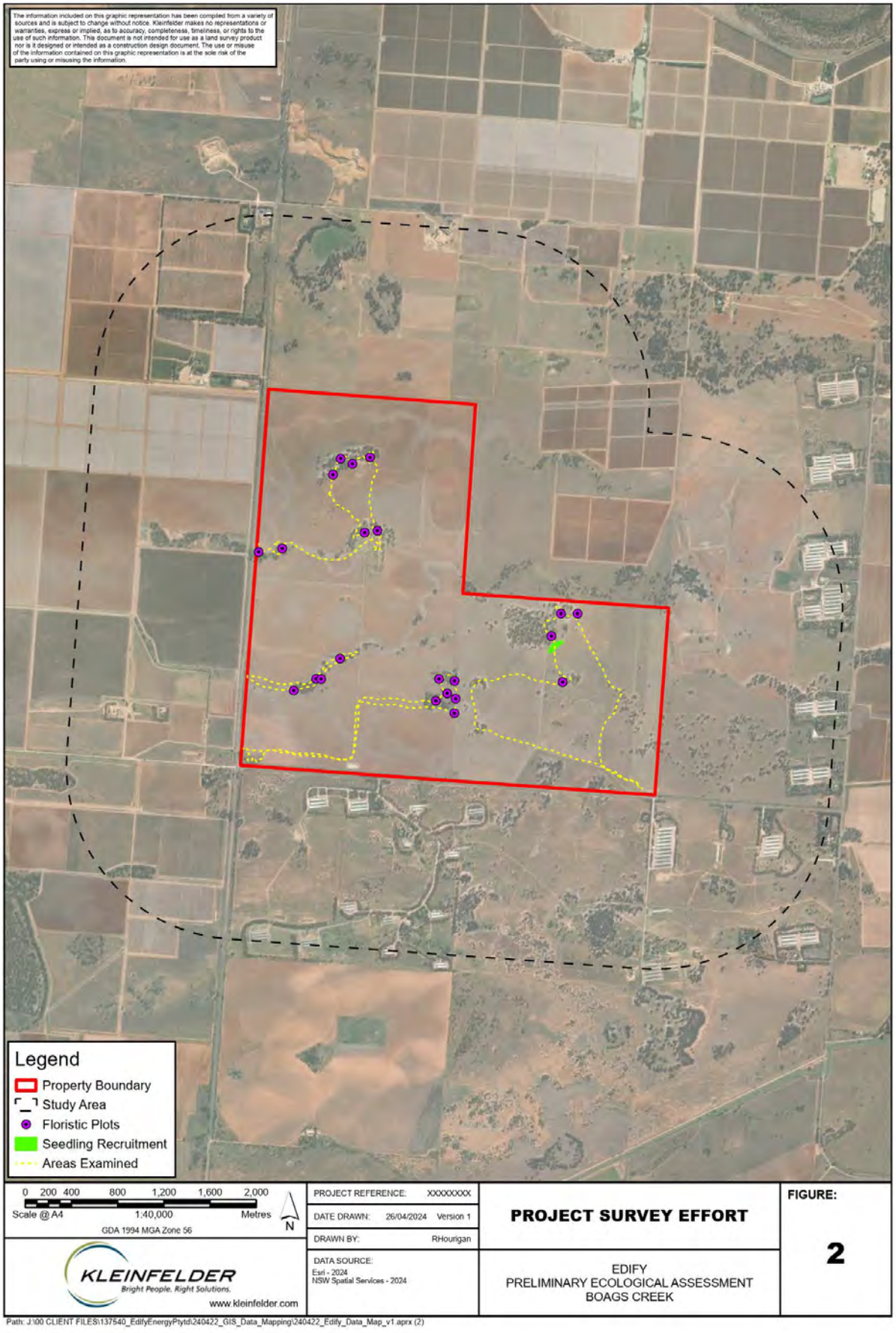


Figure 2: Survey Effort

4 RESULTS

4.1 LAND CATEGORY ASSESSMENT

4.1.1 *Historical Imagery*

Historical aerial imagery from 1993 and 1997 show no further vegetation clearing has occurred on site since 1990, as demonstrated in Figure 3 and Figure 4. Category 1 exemption applies to land that was cleared prior to 1990 or lawfully cleared between 1 January 1990 and 25 August 2017.

Figure 3: Historical Imagery (1993) (Source: NSW Government Spatial Portal)

Figure 4: Historical Imagery (1997) (Source: NSW Government Spatial Portal)

4.1.2 Land Zoning

The site is located on land zoned as RU1- Primary Production. This zoning is compatible with Category 1 classification. According to section 6.8(3) of the BC Act, land defined as Category 1 (exempt land) is rural land where clearing can occur without needing an approval. Category 1 - exempt land is to be excluded from assessment under the BAM. For this reason, impacts to Category 1 land do not contribute to the clearing threshold for entry into the NSW BOS. Category 1 exemption applies to rural land (zoned RU1, RU2, or RU3) that was cleared of native vegetation as of 1 January 1990 or lawfully cleared of vegetation between 1 January 1990 and 25 August 2017. The gazettal of a draft Native Vegetation Regulatory map for the state of New South Wales has been recently completed.

- Land zoning maps in the applicable Local Environment Plan (Murrumbidgee LEP 2013).
- Public land use mapping (OEH, 2017).
- NSW woody vegetation extent mapping (NSW Government, 2011).
- Transitional Native Vegetation Regulatory Map (NSW Government, 2024).
- Historical imagery accessed via the NSW Government Spatial Services platform (Spatial Services, 2024).
- Vegetation surveys conducted during the field assessment.

4.1.3 Native Vegetation Regulatory Mapping

The transitional native vegetation regulatory map identifies a small polygon of Category 2 Sensitive Regulated Land within Lot 63 DP750908.

The draft native vegetation regulatory map displays majority of the land as Category 1 exempt land (largely aligning with the area of 3.3.0 land use) and all patches of vegetation and isolated trees on the proposal site as Category 2 regulated land excluding the in-force patch of category 2 sensitive regulated land.

4.1.4 Woody Vegetation Extent

Woody vegetation within the proposal area is composed of patches, stands, scattered trees or paddock trees. Areas possessing woody vegetation are assumed to be ineligible for Category 1 listing and were in large parts confirmed by site surveys.

4.1.5 Land Use

Six land use types are mapped to occur within the Proposal site including:

- 2.1.0 Grazing Native Vegetation (approximately 43ha)
- 3.2.0 Grazing Modified Pastures (approximately 9.5ha)
- 3.3.0 Cropping (approximately 799ha)
- 5.4.0 Residential and Farm Infrastructure (approximately 11ha)
- 6.4.0 Channel/aqueduct (approximately 9ha)
- 6.5.0 Marsh/wetland (approximately 4ha)

The patches of 2.1.0, 3.2.0 and 6.5.0 largely align with the draft mapping for Category 2 regulated land, with an isolated patch of 2.1.0 aligning with the enforced Category 2 sensitive regulated land, within the proposal site. Notably, the Project is likely to exclude these areas from development.

The channel associated with 6.4.0 and farm residence associated with 5.4.0 is also to be excluded from any development.

Land uses 3.2.0 and 3.3.0 are compatible land uses for Category 1 exempt land, for which the development will largely occur within the area mapped as 3.3.0.

4.1.6 Conclusion

The Project Area, excluding patches of vegetation and scattered trees is likely to be Category 1- exempt land.

4.2 LAND

4.2.1 Climate

The nearest weather station is located at the Griffith Airport (station 075041), which is approximately 51km from the subject land. Records commenced at this station in 1960.

The area experiences hot summers, with the highest average maximum temperature of 33.3°C experienced in January. Temperatures in winter are cool to mild with the coldest temperatures being recorded in July with a mean minimum of 3.4°C.

The average annual rainfall at this station is 410.2mm. Rainfall occurs regularly all year round (Figure 5), with October recording the highest average rainfall of 40.4mm. The lowest monthly rainfall occurs in February with 28.0mm falling.

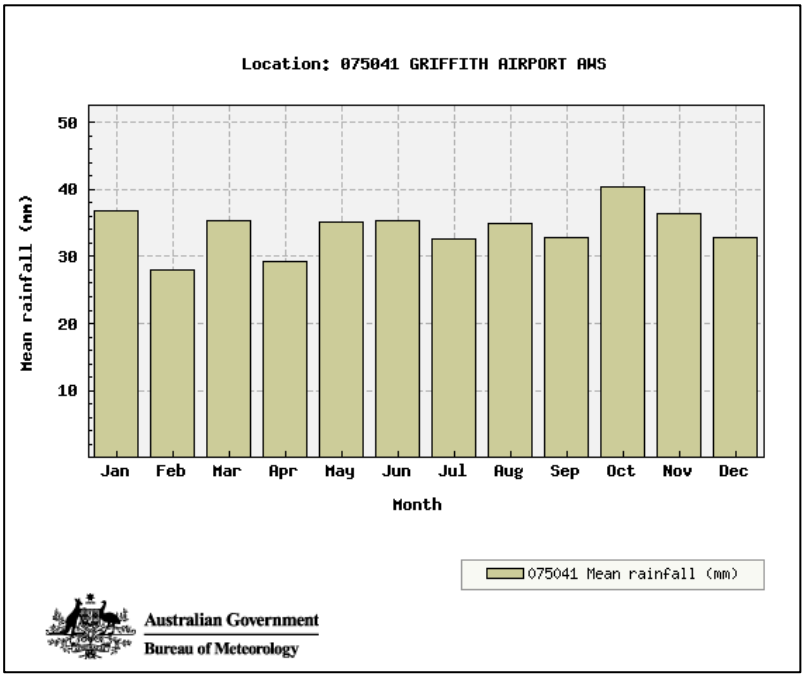


Figure 5: Climate Data for Griffith Airport Weather Station

4.2.2 Interim Bioregionalisation of Australia

The study area is located within the Riverina IBRA region and Murrumbidgee IBRA subregion (CoA 2012).

4.2.3 Biodiversity Values Map

The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the *Biodiversity Conservation Regulation 2017*. The subject land does not contain land identified on the BV Map.

4.2.4 SEPP (Biodiversity and Conservation) 2021

The *SEPP (Biodiversity and Conservation)* 2021 is the collation of biodiversity and conservation related SEPPs. Chapters 3 and 4 aim to encourage the 'proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline'.

The Murrumbidgee LGA is not listed in any of the relevant Schedules of the *SEPP (Biodiversity and Conservation)* 2021, therefore, Chapters 3 and 4 of the *SEPP (Biodiversity and Conservation)* 2021 do not apply to this proposal.

4.2.5 Water Features

Waterbodies on the site include agricultural dams and agricultural channels. These portions of the proposal area are excluded from development.

A gilgai was noted on Lot 160 DP 750908 which has been impacted by stock. A mapped watercourse was assessed on site, it was not considered as a stream order watercourse as it meandered out of a typical line and was braided and diffused.

Aerial imagery interpretation shows the site having various flow paths from stormwater run-off, which is also evident by standing water marks on trees in the patches of PCT 16 on site. Whilst the site is not mapped as flood prone, stormwater from rainfall likely meanders through site in drainage lines and remains standing for an unknown period of time. A flood and hydrology assessment should be considered to support the design and micro-siting of infrastructure.

4.2.6 Mitchell Landscapes

Two Mitchell Landscapes (V 3.1) are mapped to occur across the site, Murrumbidgee Scalded Plains and Murrumbidgee Depression Plains.

Landscapes with relatively homogenous geomorphology, soils and broad vegetation types in NSW have been classified and mapped at a 1:250,000 scale. These landscapes are referred to as NSW (or Mitchell) Landscapes (Mitchell, 2002). The subject land falls largely within the Murrumbidgee Scalded Plains landscape, with the southern limit of the disturbance footprint extending into the Murrumbidgee Depression Plains (Figure 6). The characteristics of these landscapes are described below.

Murrumbidgee Scalded Plains

Murrumbidgee Scalded Plains Quaternary alluvial plains with extensive scalding interpreted as relic floodplains or terraces. Grey, brown and red cracking clays, red brown texture-contrast soils with scalds. Levees traces evident, relief generally <1m, up to 5m on associated pans, swamps and lunettes. Murrumbidgee Lakes, Swamps and Lunettes ecosystem includes parts of the Cargelligo land system.

Over-clearing status: Not over-cleared. 67% of this landscape is estimated to have been cleared.

Murrumbidgee Depression Plains

Murrumbidgee Depression Plains Quaternary alluvial plains with numerous circular depressions interpreted as high floodplains or low terraces beyond the reach of average floodwaters, relief to 10 m. Grey to brown clays and clay loams with linear patterns of sandy prior streams. Murrumbidgee Channels and Floodplains ecosystem includes parts of three land systems: Murrumbidgee, Lowbidgee and Riverland.

Over-clearing status: Over-cleared. 93% of this landscape is estimated to have been cleared.

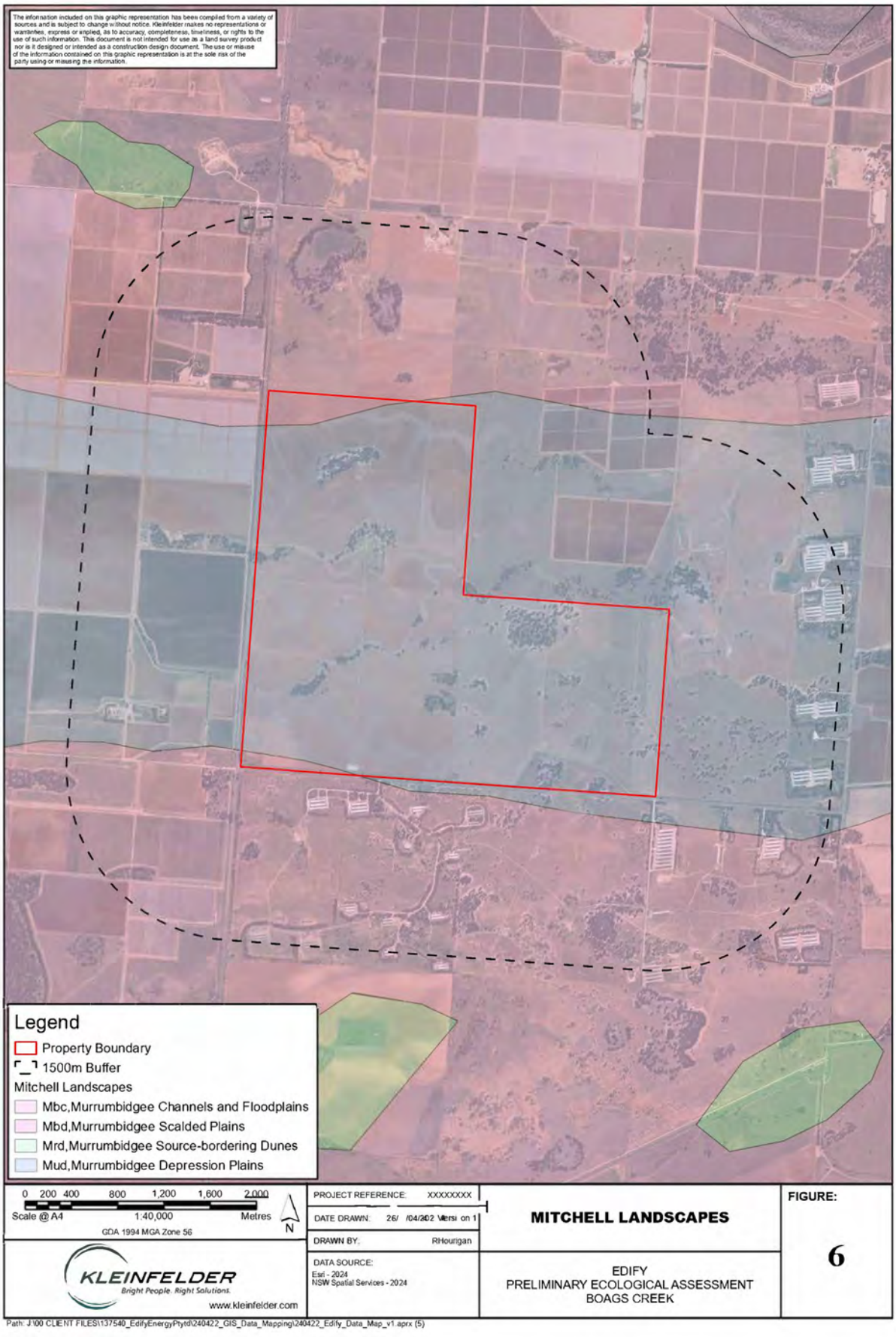


Figure 6: Mitchell Landscapes within Project Area

4.2.7 Geology

Geology for the Study Area is part of the Lachlan Orogen, Leeton Igneous Complex; Early Silurian to Early Devonian intrusions 435 to 380 ma years of age. Described as altered, weathered, white porphyritic leucocratic 2 mm granite, weathered muscovite quartz greisen, mafic dyke.

No caves or rocky outcrops were identified on site.

4.2.8 Soils

Two Greater Soil Groups are mapped for the site; Grey, Brown and Red Clays (7456) and Siliceous Sands (19957).

4.2.9 Groundwater Dependent Ecosystems

Groundwater plays an important ecological role in directly and indirectly supporting terrestrial and aquatic ecosystems. Groundwater sustains terrestrial and aquatic ecosystems by supporting vegetation and providing discharge to channels, lacustrine and palustrine wetlands, and both the estuarine and marine environment.

The degree of groundwater dependence of ecosystems can be categorised into three broad categories:

- Non-dependent ecosystems that occur mostly in recharge areas and have no connection with groundwater.
- Facultative GDEs that require groundwater in some locations but not in others, particularly where an alternative source of water can be accessed to maintain ecological function. Minor changes to the groundwater regime in facultative GDEs with proportional or opportunistic groundwater dependence may not have any adverse impacts but these ecosystems can be damaged or destroyed if a lack of access to groundwater is prolonged.
- Obligate GDEs that are restricted to locations of groundwater discharge and ecosystems located within aquifers (e.g. subterranean cave and stygofauna communities (Kuginis *et al*. 2012). Aquifer ecosystems are inherently groundwater dependent.

Groundwater dependent ecosystems have been classified into seven types under two broad categories as follows (Kuginis *et al*. 2012):

- Subsurface ecosystems – Underground ecosystems
- Karst systems and caves (limestone geology)
- Subsurface aquifer (phreatic) ecosystems
- Baseflow streams (hyporheic or subsurface component)
- Surface ecosystems – Above ground ecosystems
- Groundwater dependent wetlands
- Baseflow surface streams (surface/free-water component)
- Estuarine and near shore marine ecosystems
- Groundwater dependent terrestrial ecosystems; dependent on subsurface groundwater (phreatophytic).

The Bureau of Meteorology Atlas of Groundwater Dependent Ecosystems (GDEs) identifies low potential GDEs on the subject land (Figure 7). Within the study area, low potential terrestrial GDEs are mapped. No aquatic GDEs are predicted within the study area.

The low-potential terrestrial GDE's mapped to occur on site largely align with areas of vegetation on site. Some interaction with groundwater may result from trenching operations. However, as the mapped GDEs are all modelled as low potential, this is unlikely to adversely impact any identified GDE. Mitigation measures to reduce the impacts of erosion and runoff, which may adversely affect groundwater should be implemented during construction and operation.

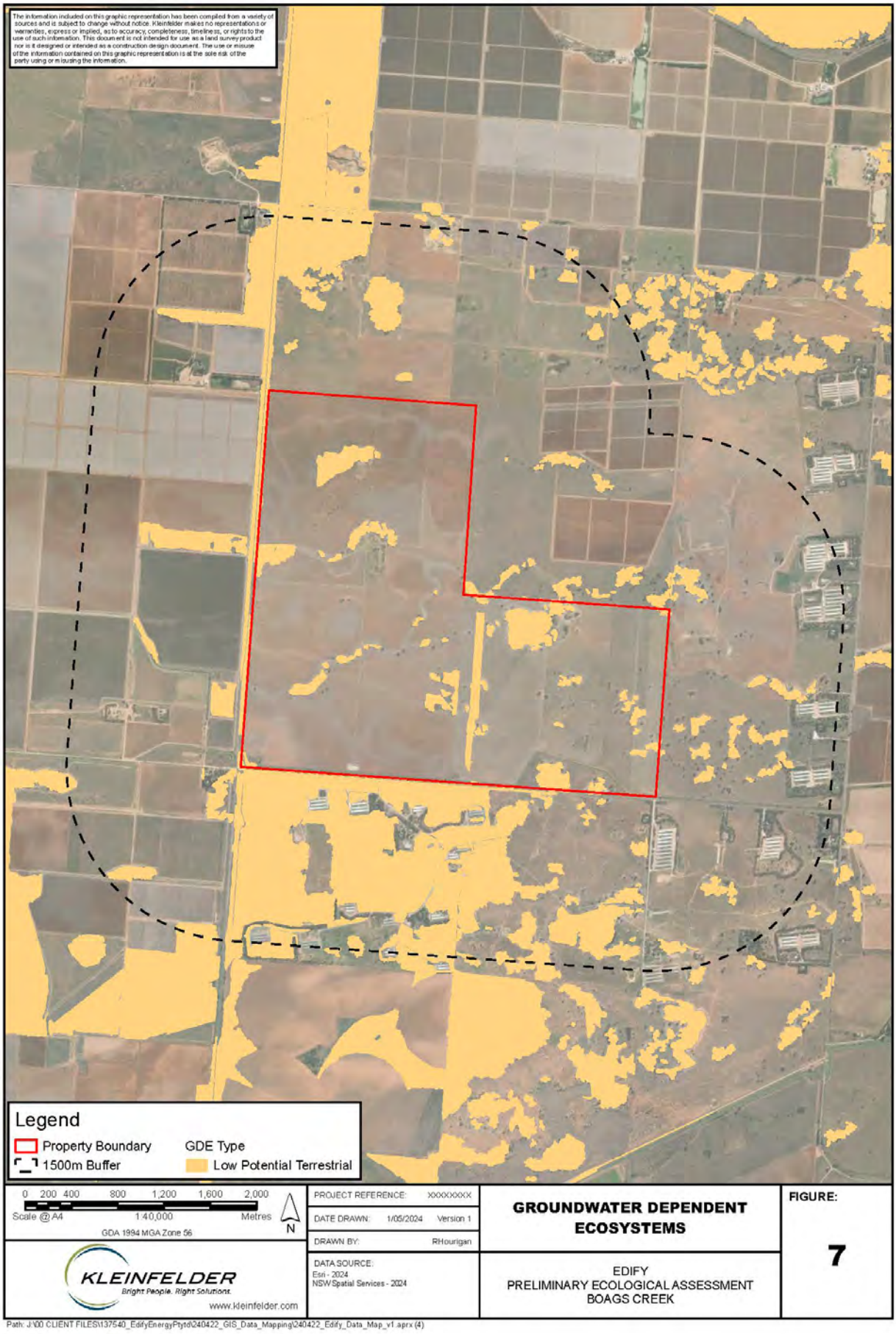


Figure 7: Groundwater Dependent Ecosystems within Project Area

4.2.10 Connectivity

The landscape surrounding the subject land has been heavily cleared for agricultural development and electrical infrastructure, including the adjacent solar farm approximately 3km north-east of the site. Habitat connectivity is highly fragmented from these past disturbance activities. Some connectivity is apparent to the north of Lot 160 DP 750908 with areas of vegetation on adjoining Lot 159 DP 750908. This portion of the proposal area is excluded from development.

The subject land forms part of a larger Plains Grass grassland, providing some scope for movement or gene flow within the landscape for grassland species.

4.3 VEGETATION

4.3.1 Vegetation Surveys

Twenty one hours were spent on random meander and plot based surveys applied according to the BAM. Cropping areas were devoid of native vegetation and not surveyed. Areas being constantly grazed by domestic stock were similar to areas of vegetation below the dripline of *E. largiflorens*. These were assessed visually and any additional species sampled on transects only.

An area of Category 2-sensitive regulated land, classed as a “set aside area”, is noted upon Lot 63 DP750908.

4.3.2 Native Vegetation Cover

Native vegetation cover (woody vegetation, including regrowth and plantations comprised of plants native to NSW and non-woody vegetation with no signs of cultivation) was assessed within the subject land and study area. Native cover estimated as the proportion of the study area retaining native vegetation. A summary of vegetation cover is provided in Table 4-1, and for the propose of the BAM a native cover class has been determined as <10% (Figure 8).

Table 4-1: Native Vegetation Cover

Vegetation Cover Type	Description	Cover within Project Area (ha)	Total area of Project Area (ha)	Native Cover within Project Area (%)
Native Vegetation	Remnant woodland and both natural and derived grassland	61.1	875	7%

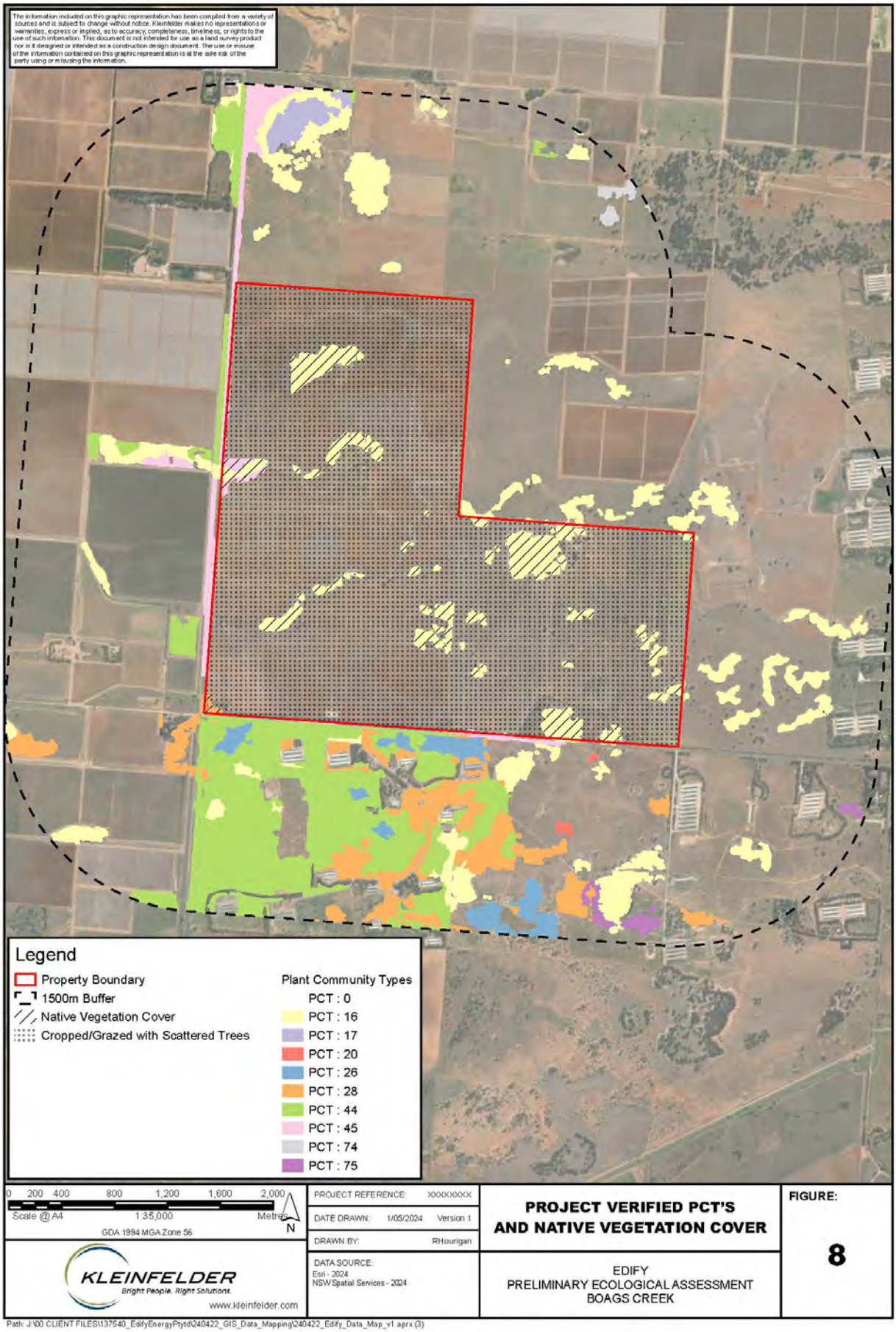


Figure 8: Site Verified PCT's and Native Vegetation Cover within Project Area

4.3.3 Mapped Plant Community Types

The following plant community types are mapped to occur in the Project Area and within the Study Area.

Grasslands; Riverine Plain Grasslands;

PCT 44 Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion, and,

PCT 45 Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion

Semi-arid Woodlands (Shrubby sub-formation); Riverine Sandhill Woodlands;

PCT 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone.

Semi-arid Woodlands (Grassy sub-formation); Inland Floodplain Woodlands;

PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

4.3.4 Site Verified Plant Community Types

Floristic plots undertaken within the Project Area, as well as visual observation of the Kidman Way road corridor confirmed three of the above mapped PCT's to occur.

Based upon plot data, observations of vegetation present during traverses and a review of literature, the author is of the opinion that the following classes (Keith 2004) and ecological associations are present on the site.

Grasslands; Riverine Plain Grasslands

- PCT 45 Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion (Table 4-2)

Considered to be mostly derived from a chenopod shrubland or woodlands prior to European settlement where grassland probably formed a mosaic with shrubland. Grazing and fire affects species composition and abundance. Species composition alters with the seasons and from year to year depending on rainfall.

This community on the site was not in areas noted to be mapped as PCT 45. It was occasionally associated with chenopod shrubland and grazed areas on Lots 64 and 160 DP 750908, on Property 2. It was predominantly associated with areas of young regrowth of *E. largiflorens* and within areas mapped as PCT 16 on Lot 161 in Property 1 (Figure 8). The Kidman Way Road corridor adjacent the Project's western boundary was found via visual inspection to closely resemble PCT 45 that had been modified and derived from association with PCT 16.

Table 4-2: PCT 45 Project Area Occurrence

PCT 45 Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	
Vegetation Formation and Class	Grasslands; Riverine Plain Grasslands;
Survey Effort	**Conducted: 1** plot/transect (#2).
Mitchell landscapes	Murrumbidgee Depression Plains
Floristic description	*Walwhalleya proluta* was the most commonly encountered grass species recorded. *Themeda triandra*, *Paspalidium jubiflorum*, *Eriochloa australiensis* and *Austrostipa scabra* were the only other grass species noted and at very low levels throughout all areas examined.
Condition within Study Area	Few areas were noted with a dominance by species of the family Poaceae. Intensive grazing by stock has reduced cover of grasses and appears to have favoured their

PCT 45 Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	
	replacement with shrubs and groundcover of the family Chenopodiaceae.  **Plot 18 Grassland of *Walwhalleya proluta* and regrowth *E. largiflorens***
Justification for PCT selection	*Walwhalleya proluta, Marsilea drummondii, Rhodanthe corymbiflora, Solanum esuriale* and *Sida trichopoda* are noted as constituent species for this PCT and were recorded on the site.
Vegetation Integrity Score	Assessed as part of PCT 16 regrowth.
Groundwater Dependent Ecosystem	Partly as part of PCT 16
Conservation Status	**BC Act:** Not listed
	EPBC Act: Not listed
SAII	No
PCT % Cleared	50%

- PCT 44 Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion

Whilst mapped to occur upon the site this PCT was not apparent. No species noted as constituent species were recorded on the site. The composition of characteristic grassy groundlayer is difficult to identify by remote sensing methods, particularly in variegated landscapes.

<u>Semi-arid Woodlands (Grassy sub-formation); Inland Floodplain Woodlands</u>

- PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (Table 4-3)

Black Box grassy open woodland is noted as tending to grow in monospecific stands (Roberts & Marston 2011). Black box woodlands are also considered to be in decline (Roberts & Marston 2011). One plot was conducted on an area of recruitment of *E. largiflorens.* An area on Lot 64 of Property 2 was traversed with GPS to encompass the areas of recruitment of *E. largiflorens* present (Figure 2). This PCT was the dominant community on type, accounting for 60 hectares within the Project Area. PCT 45 was found to occur predominantly within this PCT and slightly surrounding it in one location on Property 1 (Figure 8).

Table 4-3: PCT 16 Project Area Occurrence

PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	
Vegetation Formation and Class	Semi-arid Woodlands (Grassy sub-formation); Inland Floodplain Woodlands;
Survey Effort	**Conducted:** 22 plots and transects.
Mitchell landscapes	Murrumbidgee Depression Plains
Floristic description	Black Box grassy open woodland typically supports a mixed shrub and grass understorey with chenopods also present (Keith 2004). Black Box grassy open woodland typically supports a mixed shrub and grass understorey with chenopods also present (Keith 2004). It is considered to rely intermittently on groundwater (Doble et al 2023) and requires occasional flooding. Prior to European settlement and stock and rabbit grazing it is likely that there was a denser understorey of chenopod shrubs and native grasses more similar to PCT15.
Condition within Study Area	Generally good. Areas of PCT 16 in cropped areas without grazing were in significantly better condition than in those areas being currently grazed. Many examples of large to very large *E. largiflorens* were noted present (Plate 2 and Plate 3), often with abundant hollows. 
Justification for PCT selection	Woodland dominated by *E. largiflorens* on Clay, Alluvial loams and clays on Drainage depressions and Alluvial plains of the Riverina bioregion.
Vegetation Integrity Score	93.2
Groundwater Dependent Ecosystem	It is considered to rely intermittently on groundwater (Doble et al 2023).
Conservation Status	**BC Act:** Not listed
	EPBC Act: Not listed
SAII	No
PCT % Cleared	50%

Plate 1: Regrowth area of *Eucalyptus largiflorens*

Plate 2: Large (195cm DBHOB) Old Growth *Eucalyptus largiflorens*

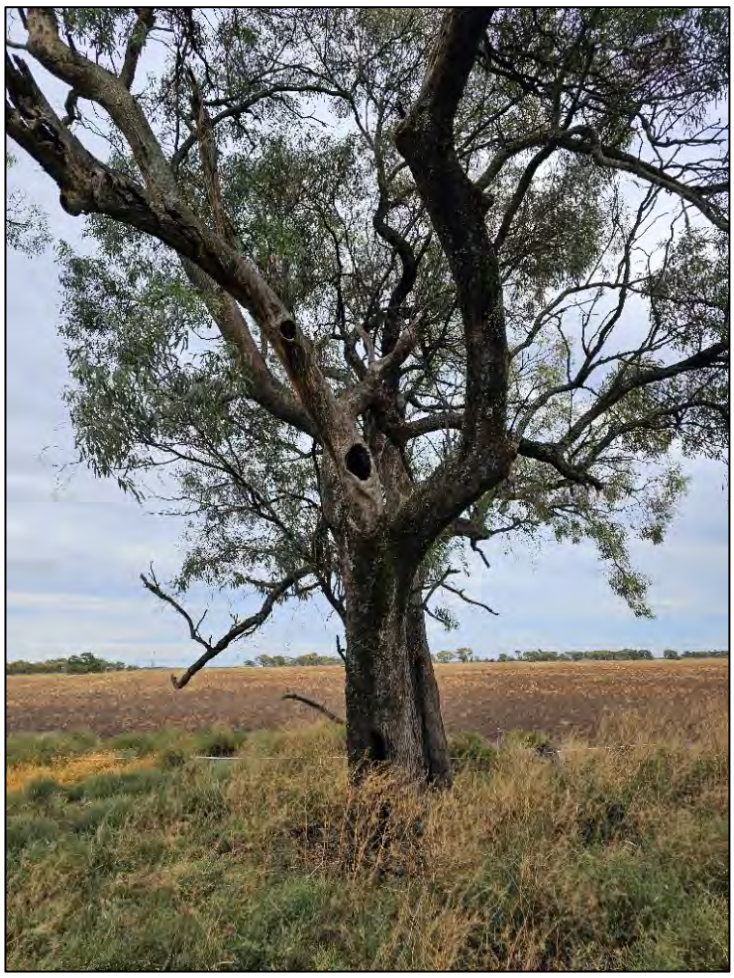


Plate 3: *Euclayptus largiflorens* with Several Large Hollows

Semi-arid Woodlands (Shrubby sub-formation); Riverine Sandhill Woodlands

- PCT 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone (Table 4-4)

At present a similar, or the same community, is under consideration for listing under the EPBC Act: "Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions - Endangered Ecological Community listing. Under assessment EPBC Act - Assessment Due Date 30/04/2025."

Table 4-4: PCT 28 Project Area Occurrence

PCT 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	
Vegetation Formation and Class	Semi-arid Woodlands (Shrubby sub-formation); Riverine Sandhill Woodlands;
Survey Effort	**Conducted:** visual inspection only.
Mitchell landscapes	Murrumbidgee Depression Plains
Floristic description	Highly degraded woodlands of *Callitris glaucophylla* composed of three individual trees only (Figure 8).

PCT 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	
Condition within Study Area	Highly degraded. A small area of this PCT was mapped to occur on the site but was not evident from examination in the field instead being noted to be an area of PCT 16.  **Plate 11: *Callitris glaucophylla trees***
Justification for PCT selection	On Eolian sand or loam, composed of two individual trees only of *Callitris glaucophylla*.
Vegetation Integrity Score	Not assessed.
Groundwater Dependent Ecosystem	Not known.
Conservation Status	**BC Act:** Not Listed **EPBC Act**: May be considered Rare and Endangered, however likely to not meet size thresholds.
SAII	No
PCT % Cleared	73%

4.3.5 Interim Grasslands and other Groundcover Assessment Method

The release of the Draft native vegetation regulatory map on the 27/03/2024 post dates surveys undertaken at the site. Most treeless areas of the site, with some exceptions for potential grasslands, are mapped as Category 1 – exempt land.

Parts of Property 2 were at the time of survey being grazed by cattle and sheep and were not in a suitable state to apply the IGGAM. In large parts, the groundcover in grazed areas was dominated by low growing shrubs of the family Chenopodiaceae.

The clearing of “compromised” groundcover authorised under the *Land Management (Native Vegetation) Code 2018* is in large part the same as the requirements from the IGGAM.

The assessment of natural and derived grasslands according to the IGGAM states that “assessments should not be conducted when vegetation cover is low (e.g. during or immediately after drought events or fire, or immediately following heavy grazing)”, and, “if the vegetation has been disrupted within six months prior to the assessment (e.g. by fire, heavy grazing, drought, etc.) such that the typical assemblage of species is absent”.

Areas of cropped land were consistently absent of native groundcover in Property 1 (Plate 4) (Figure 8).

Plate 4: Typical Cropped Land on Property 1

Comparison native groundcover grazed vs ungrazed.	
Vegetation Formation and Class	Semi-arid Woodlands (Shrubby sub-formation); Riverine Sandhill Woodlands;
Survey Effort	**Conducted:** visual inspection only of Property 2.
Mitchell landscapes	Murrumbidgee Depression Plains
Floristic description	Degraded grasslands.
Condition within Study Area	Degraded. 

Comparison native groundcover grazed vs ungrazed.	
Justification for PCT selection	Native groundcover grazed. (n.b. ungrazed in foreground, grazed other side of fence)
Vegetation Integrity Score	Not assessed due to current grazing.
Groundwater Dependent Ecosystem	Not known.
Conservation Status	**BC Act:** N/a
	EPBC Act: N/a
SAII	No

4.3.6 Threatened Ecological Communities

No Threatened Ecological Communities under the BC Act or EPBC Act were noted for the site. None of the PCTs ascribed by PCT mapping or noted on the site during BAM surveys are considered to belong to a listed TEC or CEEC.

PCT 28 is currently under consideration for listing on the EPBC Act with an assessment due date 30/04/2025. In the interim, PCT 28 owing to the high rates of clearing and disturbance, the trees may be considered Rare and Endangered (F.F. pers comm). However, noting the size of the PCT 28 patch on site (limited to three isolated trees) it will likely not meet the patch size thresholds for an EPBC Act listed TEC.

4.3.7 High Threat Weeds

Two weeds of significance were identified within the Study Area, as detailed in Table 4-2. The manageable HTW *Lycium ferocissimum* was noted. The risk-weighted HTW *Xanthium spinosum* also occurred on site. Both were at very low abundance. *Xanthium spinosum* could become more prominent with a change in land use from intensive cropping (F.F. pers comm.). These species were rarely recorded in the Grassy Box Woodland.

Table 4-5: Weeds of significance

Species	Priority Weed	High Threat Weed	Weed of National Significance
African Boxthorn, *Lycium ferocissimum*	✓	✓	✓
Hunter Burr, *Xanthium spinosum*		✓	

4.3.8 Threatened Flora Species

A search of the BioNet Atlas of NSW Wildlife returned no records of threatened plant species within a 5 km radius of the Study Area. An EPBC Protected Matters Search returned 12 species that may occur through species or species habitat modelling.

A likelihood of occurrence assessment determined that no threatened flora species are likely to occur in the Study Area. A complete list of the likelihood of threatened flora occurring within the Study Area is presented in Appendix A.

No threatened flora species were identified during the site assessment.

Growing nearby to the two individuals of *C. glaucophylla* were two trees of *Eucalyptus leucoxylon* subsp. *megalocarpa* (Latitude -34.671886 Longitude 145.972399) (Plate 5). *E. leucoxylon* subsp *pruinosa* is listed as Vulnerable in the NSW BC Act and is known to occur 200 kilometre south-west at Barham NSW. *E. leucoxylon* subsp. *megalocarpa* is presently listed as Critically Endangered within Victoria.

E. leucoxylon subsp. *megalocarpa* is not presently known to occur naturally within NSW. *E. leucoxylon* subsp. *megalocarpa* is also known to be planted as a street tree owing to the large red flowers on this subspecies. It is

unclear whether these trees are naturally occurring or were planted. Owing to the location of the 2 individuals in the far south-western corner of the site it is unlikely that they will impacted by the developments.

No threatened flora species were discerned in other areas.

Plate 5: Eucalyptus leucoxylon subsp. megalocarpa trunk and flowers

4.3.9 Plant Diversity

A total of 58 plants were identified during the assessment, these were comprised of 40 native species and 18 exotic species. These plants are divided into the growth forms identified in Table 4-3. A complete list of flora species is listed in Appendix B.

Table 4-6: Boags Creek Flora Diversity Growth Forms

Form	Number of species
Trees	5
Shrubs	10
Grass and grasslike	5
Forbs	18
Ferns and allies	1
'Other' growth forms	1
Exotics (High Threat Exotics)	16 (2)

4.3.10 Prescribed Biodiversity Impacts

No karst, cave, cliffs or rocks were geologically significant features were noted during surveys. A farm homestead, sheds and outbuildings, currently unoccupied, are located on Lot 158 DP 750908 in the northern extent Property 1. These could provide potential habitat for microbat roosts. This portion of the proposal area is to be exempted from developments. A water tank and windmill are located on Lot 1 DP 1300028 in the southern extent of Property 1.

Two steel sheds are located on Lot 63 DP 750908 on Property 2 and could provide potential habitat for microbat roosts.

Habitat connectivity is highly fragmented from past clearing activities. Some connectivity is apparent to the north of Property 2 on Lot 160 DP 750908 with areas of vegetation on adjoining Lot 159 DP 750908. This portion of the proposal area is to be exempted from developments.

Waterbodies on the site include agricultural dams and agricultural channels. This portion of the proposal area is to be exempted from developments. Natural water bodies were limited to a gilgai noted on Lot 160 DP 750908 on Property 2 (Plate 6). This has been impacted by stock and is to be exempted from developments.

The development is not a wind farm so will not affect any flight path, migration route, resident threatened Aves including raptors and nomadic or migratory species.

The proposal is unlikely to result in additional vehicle strikes on threatened fauna or animals that are part of any TEC.

Plate 6: Gilgai upon Lot 160 DP 750908

4.3.11 Scattered Trees and Planted Native Vegetation

Scattered trees were examined on Property 1 and were found to, in large part, be the species *Acacia salicina* (Plate 7). The largest *A. salicina* was measured at 74 cm at DBHOB. From examination in the field viewed through binoculars, and later of aerial photography, scattered and individual trees on Property 2 would appear to be in large parts *E. largiflorens*.

Planted native vegetation was evident around the farmhouse on Lot 158 of Property 1. *Brachychiton populneus* was noted and is known to have been commonly planted as a drought fodder tree. This area is not proposed to be developed.

Plate 7: Scattered trees of *Acacia salicina* in Cropped Areas of Property 1

4.3.12 Vegetation Integrity Score

The BAM calculator was accessed for an assessment as regards to the vegetation integrity score. All areas of PCT 16 were given the same condition status and the composite scored averaged for the entire site. The current vegetation integrity score was 93.2 with a composition condition score of 92.4, structure condition score of 100 and function condition score 87.6.

4.4 FAUNA AND HABITAT ASSESSMENT

Fauna and habitat were assessed during random meander surveys.

4.4.1 Fauna Species

Twenty-two species of birds, four species of mammals, two species of reptiles and three species of invertebrate were identified during the site assessment (Appendix B).

4.4.2 Threatened Fauna Species

A search of the BioNet Atlas of NSW Wildlife returned a list of ten threatened fauna species that have previously been recorded within 5 km of the Study Area. An EPBC Protected Matters Search returned a list of 35 threatened fauna species known or predicted to occur (potential habitat) within the locality of the Study Area.

A likelihood of occurrence assessment (Appendix A) determined a moderate likelihood of occurrence for two fauna species within the Study Area based on the occurrence of (broadly) suitable habitat and recent records within 5km of the Study Area.

These species are:

- Superb Parrot, *Polytelis swainsonii*.
- Grey-crowned Babbler (eastern subspecies), *Pomatostomus temporalis temporalis.*

No threatened fauna was recorded during the site inspection.

4.4.3 Fauna Habitat

Diffuse drainage lines were evident often with remnant *E. largiflorens* woodlands present. Some individual trees showed signs of standing water to a depth of 60 cm (Plate 9). An individual gilgai was identified on Lot 160 (Plate 6). An irrigation channel runs along the southern boundary. Three farm dams are present on within the proposal area. These water features alongside woodland vegetation will be offering foraging and potential breeding habitat for a wide variety of fauna.

Fauna habitat was available and associated with PCT 16 throughout the whole Project Area in the form of large trees of *E. largiflorens* with many large hollow limbs, spouts and fissures. Hollows were evident from 5 cm to 50 cm in diameter. *E. largiflorens* woodlands often had fallen logs likely providing microhabitat for reptiles and other ground-dwelling fauna. Stick nests were present (Plate 8) on Property 1 in the mature trees of PCT 16. Native groundcover was in better condition in areas without grazing by cattle and sheep on Property 1, allowing foraging potential for bird species. Bare ground was often evident in grazed areas. Burrows likely to have been dug by rabbits were present within areas of PCT 16.

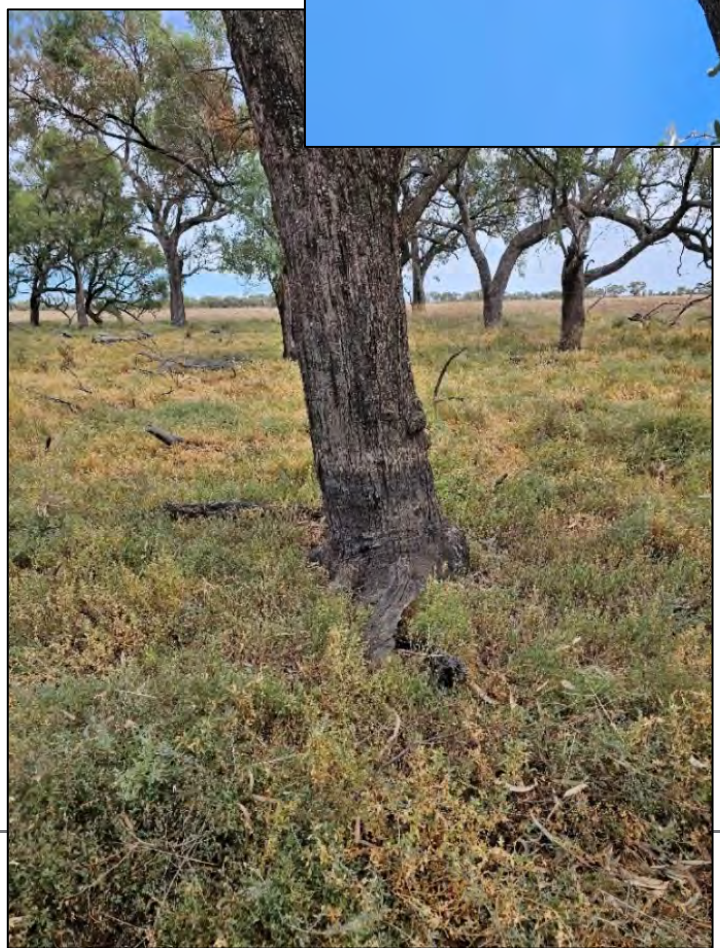


Plate 9: *Eucalyptus largiflorens with Water Line*

4.4.4 Koala habitat

The proposed development intends to avoid patches of vegetation within the project area, however for information purposes:

- The Study Area is zoned as RU1 Primary Production within the Murrumbidgee Shire Council Local Government Area. The Murrumbidgee LGA is not listed in any of the relevant Schedules of the *SEPP (Biodiversity and Conservation)* 2021, therefore, Chapters 3 and 4 of the *SEPP (Biodiversity and Conservation)* 2021 do not apply to this proposal.
- Several species of Koala use trees of the Western Slopes and Plains Koala Management Area, as per the Biodiversity and Conservation SEPP 2021, were recorded onsite associated with PCT 16 and PCT 28 as well as scattered paddock trees (*Acacia sp*).
- Although the project area contains a portion of the 7% of PCT 16 of Koala use trees there are no recent Koala records within 2.5 km of the site (closest record >10 km). The vegetation within the Project Area is therefore not considered as core Koala habitat.
- The patch is highly isolated from other Koala habitat.

4.5 Preliminary BAM-C Outputs

Data derived from the plots conducted during the site assessment were entered into the BAM-C to determine offset cost associated with each PCT. As the final footprint is currently not determined, this assessment assumes all vegetation within the 875ha proposal site will be cleared. While this significantly overstates the credit obligation on the proposal, it aids in project planning and consideration of infrastructure design and locating. The BAM-C provides two credit classes including ecosystem credits and candidate species credits.

4.5.1 Ecosystem Credits

These account for the direct impacts to PCTs and habitat for threatened species that can be reliable predicted to occur within each PCT. Ecosystem credit species cannot be ruled out by targeted surveys, however credits can be reduced by reducing the impact to PCTs from the development.

The BAM-C predicted 15 species to occur on site, with six ecosystem credit species assumed absent due to species constraints (Table 4-4). The offset obligation is entirely associated with PCT 16, assuming all areas of PCT 16 on site will be cleared. Notably, the Project is likely to avoid all areas of PCT 16 on site which will remove this obligation.

Table 4-7: Ecosystem Credit Species Predicted to Occur and Nature of Presence/Absence on Project Site

Species	Vegetation Association
Black Falcon, *Falco subniger*	Assumed Present (PCT 16, 45)
Brolga, *Grus rubicunda*	Assumed Absent (PCT 16, 45)
Diamond Firetail, *Stagonopleura guttata*	Assumed Present (PCT 16, 45)
Dusky Woodswallow, *Artamus cyanopterus cyanopterus*	Assumed Absent (PCT 16, 45)
Grey Falcon, *Falco hypoleucos*	Assumed Present (PCT 16, 45)
Grey- crowned Babbler (eastern subspecies), *Pomatostomus temporalis temporalis*	Assumed Present (PCT 16)
Inland Forest Bat, *Vespadelus bavertocki*	Assumed Absent (PCT 16)
Pink Cockatoo, *Lophochroa leadbeateri*	Assumed Present (PCT 16, 45)
Regent Parrot (eastern subsp), *Polytelis anthopeplus monarchoides*	Assumed Absent (PCT 16)
South-eastern Hooded Robin, *Melanodryas cucullata cucullata*	Assumed Present (PCT 16)
Superb Parrot, *Poytelis swainsonii*	Assumed Present (PCT 45).
Swift Parrot, *Lathamus discolor*	Assumed Absent (PCT 16)
White-bellied Sea Eagle, *Haliaeetus leucogaster*	Assumed Present (PCT 16, 45)
White-fronted Chat, *Epthianura albifrons*	Assumed Present (PCT 45)
White-throated Needletail, *Hirundapus caudacutus*	Assumed Absent (PCT 16, 45)

4.5.2 Candidate Species Credits

These credits account for species whose likelihood of occurrence cannot be predicted by vegetation surrogates and/or landscape features and can be reliably detected during surveys. Targeted surveys or expert reports can be used to confirm the presence/absence of these species as part of the BDAR.

The BAM-C generated 18 candidate species to potentially occur on site. A credit obligation is associated with five species assumed present. Targeted surveys will be required to confirm presence of these species on site and finalise a credit obligation pending clearing of any associated habitat.

Candidate Species	Recommended Survey Period	Serious and Irreversible Impacts	Comment
Threatened Flora			
Claypan Daisy, *Brachyscome muelleroides*	Nov	Yes	Project not within geographic distribution and habitat on site highly degraded. Surveys conducted on nearby development site (within 3km of Project) failed to detect species. **Habitat considered unsuitable, unlikely to occur.**

Candidate Species	Recommended Survey Period	Serious and Irreversible Impacts	Comment
Mossdiel Daisy, *Brachyscome papillosa*	Sep to Nov	No	Project habitat on site highly degraded. Surveys conducted on nearby development site (within 3km of Project) failed to detect species. **Habitat considered unsuitable, unlikely to occur.**
Bindweed, *Convolvulus tedmoorei*	June to Sep	Yes	Associated PCT habitat on site highly degraded. **Habitat considered unsuitable, unlikely to occur.**
Yellow Gum, *Eucalyptus leucoxylon* subsp. *pruinosa*	Year round	No	If proposal avoids clearing areas of PCTs on site, credit obligation will not be required. Surveys conducted on nearby development site (within 3km of Project) failed to detect species. Habitat on site potentially suitable. **Potential to occur, targeted surveys required.**
Winged Peppercress, *Lepidium monoplocoides*	Sep to Dec	No	If proposal avoids clearing areas of PCTs on site, credit obligation will not be required. Habitat on site is highly degraded. Surveys conducted on nearby development site (within 3km of Project) failed to detect species. **Habitat considered unsuitable, unlikely to occur.**
Lanky Buttons, *Leptorhynchos orientalis*	Nov	No	Associated PCT habitat on site highly degraded. **Habitat considered unsuitable, unlikely to occur.**
Austral Pillwort, *Pilularia novae-hollandiae*	Oct to Dec	Yes	If proposal avoids clearing areas of PCTs on site, credit obligation will not be required. Potential habitat on site is highly degraded and site is outside of geographic limitations. Surveys conducted on nearby development site (within 3km of Project) failed to detect species. **Habitat considered unsuitable, unlikely to occur.**
Menindee Nightshade, *Solanum karsense*	-	No	Habitat constraints on site absent. Species considered to be confined to an area west of Maude. Subject land is ~155km east of Maude. **Unlikely to occur.**
Slender Darling-pea, *Swainsona murrayana*	Sep	No	If proposal avoids clearing areas of PCTs on site, credit obligation will not be required. This species is also only considered to occur on the Hay Plain, for which the proposal area does not occur on. **Habitat considered unsuitable, unlikely to occur.**
Red Darling-pea, *Swainsona plagiotropis*	-	No	Associated PCT habitat on site highly degraded. **Habitat considered unsuitable, unlikely to occur.**

Candidate Species	Recommended Survey Period	Serious and Irreversible Impacts	Comment
Silky Swainson- pea, *Swainsona plagiotropis*	Sep to Nov	No	Associated PCT habitat on site highly degraded. Surveys conducted on nearby development site (within 3km of Project) failed to detect species. **Habitat considered unsuitable, unlikely to occur.**
Threatened Birds			
Australian Bustard, *Ardeotis australis*	Year round	No	Associated with PCT 16 and 45, however habitat on site is considered marginal and highly degraded. Surveys conducted on nearby development site (within 3km of Project) failed to detect species. **Habitat considered unsuitable, unlikely to occur.**
White-bellied Sea Eagle, *Haliaeetus leucogaster*	Jul to Dec	No	As per the BAM-C, requires living or dead mature trees within 'suitable vegetation' and within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines. Considered marginal habitat suitability on site. One record within the locality. **Potential to occur, targeted surveys required.**
Swift Parrot, *Lathamus discolor*	Year round	Yes	Site falls outside of geographic distribution. **Unlikely to occur.**
Pink Cockatoo, *Lophochroa leadbeateri*	Sep Dec	No	Potential habitat on site within PCT 16 due to presence of suitable hollows and proximity to water source. **Potential to occur, targeted surveys required.**
Regent Parrot (Eastern subs), *Polytelis anthopeplus monarchoides*	Aug to Nov	No	This species could be excluded as it requires living or dead *Eucalyptus camaldulensis* trees with hollows >5cm and confined to an area 'within 10km of the junction of the Murray River' as per BAM-C. This species of eucalypt does not occur on site and the Project area is outside of the defined geographical area. **Habitat considered unsuitable, unlikely to occur.**
Superb Parrot, *Polytelis swainsonii*	Sep to Nov	No	Associated with PCT 16 and 45. Records found in surrounding and in the area from 1997-2021. Recorded during field surveys in 2023 3km northeast of site. The species is a vagrant for the site locality. **Potential to occur, targeted surveys required.**
Threatened Mammals			

Candidate Species	Recommended Survey Period	Serious and Irreversible Impacts	Comment
Koala, *Phascolarctos cinereus*	Year round	No	Koala food trees present on site associated with PCT 16 and scattered paddock trees. Considered marginal habitat due to poor connectivity and highly modified surrounds. Surveys conducted on nearby development site (within 3km of Project) failed to detect species. **Potential to occur due (foraging, non-breeding) to high presence of food trees, targeted surveys required.**

4.5.3 Potential SAII

Four species generated through the BAM calculator are considered as having the potential to occur on the site and are at risk of potential Serious and Irreversible Impacts; Claypan Daisy (*Brachyscome muelleroides),* Bindweed (*Convolvulus tedmoorei),* Austral Pilwort (*Pilularia novae-hollandiae*) and Swift Parrot (*Lathamus discolor*).

4.6 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

No EPBC Act listed threatened or migratory species were identified within the Study Area during the site assessment.

A likelihood of occurrence assessment was conducted for all threatened species, migratory species and threatened ecological communities returned by the EPBC Protected Matters Search (**Appendix A**). The vulnerable Superb Parrot listed under the Act was identified as having a high likelihood of occurring or may occur, noting it was positively identified during surveys for a development ~3km northeast of the project site in November 2022 (OzArk Environment and Heritage, 2022).

4.7 POTENTIAL SITE ACCESS VEGETATION

The Kidman Way Road corridor has PCT 45 mapped to occur adjacent the project area western boundary, however it is likely derived from PCT 16. Point data at various locations (Plate 10) along Kidman Way was undertaken confirming a lack of trees however grasses were unable to be identified. These locations may be suitable for access pending a grassland assessment and digital elevation modelling or a flood and hydrological assessment for suitable locations that will not be affected by stormwater run-off and pooling.

Plate 10: Kidman Way Corridor View of Project Western Boundary

The vegetation along Donald Ross Drive where a potential connection to the existing Darlington Point substation may occur was confirmed as PCT 16 during surveys for a Battery Energy Storage System development proposed ~3km northeast of the Project.

These areas of PCT 16 along Kidman Way and Donald Ross Drive have not been factored into the BAM-calculator.

5 SUMMARY

The proposal site, in areas cleared of native vegetation and cropped constitutes Category 1- Exempt Land. Those areas of Property 2 that are utilized for agricultural purposes by way of grazing may constitute Category 1- Exempt Land. The IGGAM could not applied at this time to confirm the state of natural or derived groundcover. An area of Category 2-sensitive regulated land, classed as a “set aside area”, is noted upon Lot 63 DP750908. Confirmation of a Property Vegetation Plan associated with this set aside area should be sought during the BDAR.

Approximately 61.1ha on the proposal site consisting of patches of vegetation and the farm residence cannot be classified as Category 1- exempt land, however these areas are likely to be excluded from development. There are scattered paddock trees throughout both Property’s that will require assessment during the BDAR, to confirm potential offset obligations if any or all scattered paddock trees are to be cleared.

The field assessment identified three Plant Community Types (PCTs) on the proposal site:

- PCT 45 Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion. This PCT was predominantly occurring within or immediately adjacent (1.1 hectares) to PCT 16.
- PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion). This PCT was the dominant community accounting for 60ha.
- PCT 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone. This PCT consisted of two isolated trees in the south western portion of Property 1.

These PCTs are not currently listed as Threatened Ecological Communities in NSW. PCT 28 is currently under consideration for listing on the EPBC Act. It’s extent on the site was limited to three individual trees of White Cypress Pine which can be avoided and are unlikely to be impacted by developments.

Scattered trees were examined when encountered during random meander surveys to confirm species. Planted native vegetation was examined around existing housing and farming infrastructure to confirm species.

Likelihood of occurrence assessment of species found from BioNet and Protected Matters searches found a moderate likelihood of the Koala (Endangered- BC Act / EPBC Act), Grey-crowned Babbler (eastern subspecies) (Vulnerable-BC Act) and a high likelihood of the Superb Parrot (Vulnerable- BC Act / EPBC Act) to occur within the Project Area.

The preliminary BAM-C output predicted 15 ecosystem credit species to occur on site, with six ecosystem credit species assumed absent due to species constraints (Table 4-4). The offset obligation is entirely associated with PCT 16, assuming all areas of PCT 16 on site will be cleared. Notably, the Project is likely to avoid all areas of PCT 16 on site which will remove this obligation.

The BAM-C generated 18 candidate species to potentially occur on site. A credit obligation is associated with five species assumed present. Targeted surveys will be required to confirm presence of these species on site and finalise a credit obligation pending clearing of any associated habitat:

- Yellow Gum, *Eucalyptus leucoxylon subsp. Pruinose*
- White-bellied Sea Eagle, *Haliaeetus leucogaster*
- Pink Cockatoo, *Lophochroa leadbeateri*
- Koala, *Phascolarctos cinereus*
- Superb Parrot, *Polytelis swainsonii*

5.1 APPROVALS PATHWAYS

The BC Act requires that a State Significant Development application must be accompanied by a BDAR.

A BDAR following streamlined assessments for scattered trees, planted trees and small areas may be applicable pending the final disturbance. The development site is zoned RU1 Primary Production within the Murrumbidgee LGA. The minimum lot size for each Property is 200ha. If the Proposal were to proceed via the streamlined small area assessment module under the BAM, the maximum clearing limit on each Property is equal to or less than 3ha. If the Project pursues a small area module BDAR, only species credit species at risk of SAII require targeted surveys.

A full assessment of scattered/isolated trees will be required during the Biodiversity Development Assessment Report, where development has identified clearing individual scattered remnant trees will occur, and that meet the criteria in the Streamlined assessment modules – Scattered Trees Assessment and Planted native vegetation (Appendix B and D: Biodiversity Assessment Method). Scattered Trees Assessment of the BAM will need to be considered and applied to the potential removal of trees that are >20 cm DBHOB and without hollows.

A self-assessment for the described Matters of National Environmental Significance would be required in accordance with relevant Commonwealth Significant Impact Assessment guidelines to determine whether a referral to the Minister is considered necessary.

6 REFERENCES

Botanic Gardens Trust. (2023). New South Wales Flora online - PlantNET. Retrieved from http://plantnet.rbgsyd.nsw.gov.au/.

Brooker, M.I.H. and Kleinig, D.A. 1999. *Field guide to eucalypts. Vol. 1 South-eastern Australia.* Bloomings Books Hawthorn, Vic, Australia.

Commonwealth of Australia 2012. *Interim bioregionalisation for Australia (IBRA) Version 7 (Subregions).* http://www.environment.gov.au/land/nrs/science/ibra/australias-bioregion-maps

Cunningham, G.M. Mulham, W.E. Milthorpe, P.L. and Leigh, J.H. 1981. *Plants of Western New South Wales.* N.S.W. Government Printing Office.

DCCEEW (2023a). EPBC Protected Matters Search Tool. Commonwealth of Australia

DCCEEW (2023b). Species Profile and Threats Database (SPRAT). Commonwealth of Australia

DCCEEW (2023c). Weeds of National Significance. Retrieved from http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html

Department of Primary Industries (2023). NSW WeedWise. Retrieved from https://weeds.dpi.nsw.gov.au/

Doble, R. Walker, G. Crosbie, R. Guillaume, J. and Doody, T.M. 2023. *An overview of groundwater response to a changing climate in the Murray-Darling Basin, Australia: potential implications for the basin system and opportunities for management* Hydrogeology Journal (2024) 32:59–80 https://doi.org/10.1007/s10040-023-02723-5

Doody, T.M. Gehrig, S.L. Vervoort, R.W. Colloff, M.J. Doble, R. 2021. *Determining water requirements for Black Box (Eucalyptus largiflorens) floodplain woodlands of high conservation value using drip-irrigation.* Hydrological Processes. 2021;35:e14291. https://doi.org/10.1002/hyp.1429

DPE. (2023a) Bionet Atlas of NSW Wildlife. Retrieved from https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

Department of Planning, Industry and Environment (2019). Guidance to assist a decisionmaker to determine a serious and irreversible impact.

Department of Planning, Industry and Environment (2020). Biodiversity Assessment Method. Published by the Environment, Energy and Science, Department of Planning, Industry and Environment, Parramatta, NSW.

Department of Planning and Environment (2023a). Bionet Atlas of NSW Wildlife. Retrieved from https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

Department of Planning and Environment (2023b). BioNet Vegetation Classification. Available at: https://www.environment.nsw.gov.au/research/Visclassification.htm

Department of Planning and Environment (DPE) (2023c). Threatened Biodiversity Profile Search. Available at: https://www.environment.nsw.gov.au/threatenedspeciesapp/

Department of Planning and Environment (2023d). State Vegetation Type Map – NSW_Extant_PCT. Retrieved from https://geo.seed.nsw.gov.au/

Department of Planning and Environment (2023e). Native Vegetation Regulatory mapping. Retrieved from https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=DraftNVRmap

Doble, R. Walker, G. Crosbie, R. Guillaume, J. and Doody, T. (2023). *An overview of groundwater response to a changing climate in the Murray-Darling Basin, Australia: potential implications for the basin system and opportunities for management*. Hydrogeology Journal (2024) 32:59–80 https://doi.org/10.1007/s10040-023-02723-5

Gehrig, S.L. and Nicol, J.M. (2010). *Relationship between floodplain black box (Eucalyptus largiflorens) woodlands and soil condition on the Pike River Floodplain.* South Australian Research and Development Institute (Aquatic Sciences), Adelaide, 23pp. SARDI Publication Number F2010/000634-1.SARDI Research Report Series No. 479.

Geological Survey of New South Wales Quarterly Notes No 145 September 2015. *Seamless geology of New South Wales: approach, methodology and application.* NSW Department of Industry, Division of Resources & Energy 516 High Street, Maitland NSW 2320.

George, A. K. (2004). *Eucalypt regeneration on the Lower Murray floodplain, South Australia. Thesis submitted in fulfilment of the requirements for the Degree of Doctor of Philosophy.* The University of Adelaide School of Earth and Environmental Sciences.

Harden, G.J. (editor) (1990 & 2000). *Flora of New South Wales, vol 1*, New South Wales University Press, Kensington

Harden, G.J. (editor) (2002). *Flora of New South Wales, vol 2*, New South Wales University Press, Kensington

Harden, G.J. (editor) (1992). *Flora of New South Wales, vol 3*, New South Wales University Press, Kensington

Harden, G.J. (editor) (1993). *Flora of New South Wales, vol 4*, New South Wales University Press, Kensington

Jacobs, S.W.L., Whalley, R.D.B., and Wheeler. D.J.B. (2023). *Grasses of New South Wales 4th Edition.* University of New England

Local Land Services (2023). *Murray Regional Natural Resource Management Strategy 2023-2028* State of New South Wales

Moore, P. (2005). ***A guide to plants of Inland Australia*****.** Reed New Holland Frenchs Forest NSW 2086 Australia

Murray Catchment Management Authority & Office of Environment and Heritage 2012, *New South Wales Murray Biodiversity Management Plan: A guide to terrestrial biodiversity investment priorities in the central and eastern NSW* Murray Catchment Management Authority, Albury.

Office of Environment and Heritage 2017. *Interim Grasslands and other Groundcover Assessment Method Determining conservation value of grasslands and groundcover vegetation in NSW.* 59 Goulburn Street, Sydney NSW 2000

OzArk Environment and Heritage 2023. *Biodiversity Assessment Development Report Woodland Battery Energy Storage System.* Murrumbidgee Local Government Area.

Roberts, J. and Marston, F. (2011). *Water regime for wetland and floodplain plants: a source book for the Murray–Darling Basin,* National Water Commission, Canberra

Vincent, B.E. Smith, R. Good, M. and Clarke P.J. (2018). *Seed germination traits of two common floodplain eucalypts: optimum germination temperatures and influence of leaf litter***,** in Proceedings of the 9th Australian Stream Management Conference. Hobart, Tasmania

Westbrooke, M.E., Kerr, M.K.C. and Leversha, J. (2001). *The vegetation of Kinchega National Park, western New South Wales* Cunninghamia 7(1): 1–25.

APPENDIX A THREATENED SPECIES LIKELIHOOD OF OCCURRENCE TABLE

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Study Area was obtained from the following databases:

- NSW DPIE BioNet Atlas: (http://www.bionet.nsw.gov.au/); and
- Commonwealth DAWE Protected Matters search tool: (https://www.environment.govSPRAT.au/epbc/protected-matters-search-tool).

Further resources used to inform the threatened species database search included:

- The BAM – Calculator (BAM Calculator (nsw.gov.au)), and
- NSW DPIE BioNet Threatened Biodiversity Profiles: (NSW BioNet Quick Guides and Manuals | NSW Environment, Energy and Science/).
- DAWE (2021b). *Species Profile and Threats Database (SPRAT)*. Available at: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

An assessment was then made of the likelihood of the threatened species, populations, and ecological communities reported or modelled to occur in the locality occurring within the Development Site or using the habitat within the Development Site as an essential part of a foraging range.

The table below summarises the likelihood of threatened species and EPBC Act listed migratory species occurring within the Development Site based on the habitat requirements of each species.

A brief definition of the likelihood of occurrence criteria is provided below:

- Known – species identified within the site during surveys;
- High – species known from the area (DPIE BioNet Atlas records), suitable habitat (such as roosting and foraging habitat) present within the site;
- Moderate – species may be known from the area, potential habitat is present within the site;
- Low – species not known from the area and/or marginal habitat is present within the site; and
- Absent – habitat requirements not met for this species within the site.

Note: Strictly aquatic / marine species listed in the Commonwealth Protected Matters Search Tool have been omitted from the below table based on obvious habitat constraints

Table A1 'Likelihood of Occurrence' table

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Flora								
1.	*Diuris tricolor* Pine Donkey Orchid	V	-	1	BioNet	Associated species include *Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta*, Ironbark and Acacia shrubland. The understorey is often grassy with herbaceous plants such as *Bulbine* species.	Low	1 record within 10km radius of site. Not recorded during site assessment.
2.	*Lepidium monoplocoides* Winged Peppercress	E	E	-	PMST	Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by Bulloak (*Allocasuarina luehmannii*) and/or eucalypts, particularly Black Box (*Eucalyptus largiflorens*) or Poplar Box (*Eucalyptus populnea*). The field layer of the surrounding woodland is dominated by tussock grasses. Recorded in a wetland-grassland community comprising *Eragrostis australasicus, Agrostis avenacea, Austrodanthonia duttoniana, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma,* and *Pycnosorus globosus*, on waterlogged grey-brown clay. Also recorded from a *Maireana pyramidata* shrubland.	Low	No records from BioNet search, only recorded from PMST within 10km of site. Not recorded during site assessment.
3.	*Swainsona murrayana* Slender Darling-pea	V	V	-	PMST	The species has been collected from clay-based soils, ranging from grey, red, and brown cracking clays to red-brown earths and loams. 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. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.	Low	No BioNet records. Not recorded during site assessment.
Birds								

	Species	Status		Record	Source	Habitat	LoO	Summary
1.	***Anseranas semipalmata*** Magpie Goose	V	-	1	BioNet	The Magpie Goose is seen in floodplains and wet grasslands. Some individuals, mostly younger birds, may be seen at quite long distances inland.	Low	Marginal to nil habitat suitability. One record within the locality. **Not recorded during site assessment.**
2.	***Aphelocephala leucopsis*** Southern Whiteface	-	V	-	PMST	The southern whiteface is a small stocky thornbill-like bird with a brown dorsum, white belly, dark brown wings and a black tail with narrow white tip. Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**
3.	***Botaurus poiciloptilus*** Australasian Bittern	E	E	-	PMST	The Australasian Bitterns is widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spikerushes.	Low	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
4.	***Circus assimilis*** Spotted Harrier	V,P	-	1	BioNet	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment, and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Preferred habitat is grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland, and shrub steppe. It is found most in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Low	Marginal to nil habitat suitability. One record within the locality. **Not recorded during site assessment.**

	Species	Status		Record	Source	Habitat	LoO	Summary
5.	***Climacteris picumnus victoriae*** Brown Treecreeper (south-eastern)	V,P	V	1	BioNet, PMST	Found in eucalypt woodlands (including box-gum woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and river red gum forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	Low	Marginal to nil habitat suitability. One record within the locality. **Not recorded during site assessment.**
6.	***Falco hypoleucos*** Grey Falcon	E	V	-	PMST	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	Low	Marginal to nil habitat suitability. **Not recorded during site assessment.**
7.	***Grantiella picta*** Painted Honeyeater	V	V	-	PMST	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits boree, brigalow and box-gum woodlands and box-ironbark forests.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**
8.	***Haliaeetus leucogaster*** White-bellied Sea-Eagle	V,P	-	1	BioNet	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or seashore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest) (NSWGov, 2023).	Low	Marginal habitat suitability. One record within the locality. **Not recorded during site assessment.**

	Species	Status		Record	Source	Habitat	LoO	Summary
9.	***Hieraaetus morphnoides*** Little Eagle	V,P	-	2	BioNet	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion (NSWGov, 2023).	Low	Marginal habitat suitability. Two records within the locality. **Not recorded during site assessment.**
10.	***Leipoa ocellata*** Malleefowl	E	V	-	PMST	Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as inland grey box, ironbark or bimble box woodlands with thick understorey, or in other woodlands such dominated by mulga or native cypress pine species.	Low	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
11.	***Lophochroa leadbeateri leadbeateri*** Major Mitchell's Cockatoo (Eastern Subspecies)	V,P, 2	E	-	PMST	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water.	Low	Marginal habitat suitability. No records within the locality. **Not recorded during site assessment.**
12.	***Neophema chrysostoma*** Blue-winged Parrot	-	V	-	PMST	Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs.	Low	Marginal habitat suitability. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Record	Source	Habitat	LoO	Summary
13.	***Pedionomus torquatus*** Plains-wanderer	E	CE	-	PMST	Found in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. These grasslands support a high diversity of plant species, including several state and nationally threatened species. Most of the grassland habitat of the Plains-wanderer is <5 cm high, but some vegetation up to a maximum of 30 cm is important for concealment if grass tussocks are spaced 10-20 cm apart. During prolonged drought, the denudation of preferred habitats may force birds into marginal denser and taller grassland habitats that become suitable.	Low	Unlikely to find due to habitat suitability. No records within the locality. **Not recorded during site assessment.**
14.	***Polytelis swainsonii*** Superb Parrot	V	V	22	BioNet, PMST	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. Inhabits box-gum, box-cypress-pine and boree woodlands and river red gum forest.	**High**	Records found in surrounding and in the area from 1997-2021. Recorded during field surveys in 2023 3km northeast of site. **Not recorded during site assessment.**
15.	***Pomatostomus temporalis temporalis*** Grey-crowned Babbler (eastern subspecies)	V,P	-	11	BioNet	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. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas.	**Moderate**	Marginal habitat suitability. Eleven records within the locality. **Not recorded during site assessment.**
16.	***Rostratula australis*** Australian Painted Snipe	E	E	P	PMST	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	Low	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Record	Source	Habitat	LoO	Summary
17.	***Stagonopleura guttata*** Diamond Firetail	V	V	1	BioNet, PMST	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). Found in grassy eucalypt woodlands, including box-gum woodlands and snow gum woodlands. Also occurs in open forest, mallee, natural temperate grassland, and in secondary grassland derived from other communities.	Low	Marginal habitat suitability. One record within locality. **Not recorded during site assessment.**
Mammals								
1.	***Phascolarctos cinereus*** Koala	E1, P	E	-	PMST	Inhabits eucalypt forests and woodlands. The suitability of these forests for habitation depends on the size and species of trees present, soil nutrients, climate and rainfall.	**Moderate**	Foraging habitat present (Koala use trees). Poor connectivity and highly modified surrounds. **Not recorded during site assessment.**
2.	***Saccolaimus flaviventris*** Yellow-bellied Sheathtail-bat	V,P	-	1	BioNet	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Low	**Not recorded during site assessment**
3.	***Vespadelus baverstocki*** Inland Forest Bat	V,P	-	1	BioNet	The habitat requirements of this species are poorly known but it has been recorded from a variety of woodland formations, including Mallee, Mulga and River Red Gum. Most records are from drier woodland habitats with riparian areas inhabited by the Little Forest Bat. However, other habitats may be used for foraging and/or drinking. Roosts in tree hollows and abandoned buildings. Known to roost in very small hollows in stunted trees only a few metres high.	Low	**Not recorded during site assessment**
Amphibians								

	Species	Status		Record	Source	Habitat	LoO	Summary
1.	***Litoria raniformis*** Southern Bell Frog	E	V	2	BioNet, PMST	Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat.	Low	Dependant on waterbodies found on site. Low records from BioNet found in 10km radius. **Not recorded during site assessment**

	Species	Status		Record	Source	Habitat	LoO	Summary
Migratory Species								
1.	*Calidris acuminata* Sharp-tailed Sandpiper	-	V, M	-	PMST	Primarily an Asian species, breeding on tundra in Russia and wintering to Australia and New Zealand. Regular migrant in Alaska; rare to Pacific coast of U.S. and Canada. Found in freshwater marshes and coastal mudflats, sometimes inland. Likely to find in or near Murray River, in buffer zone.	Low	Unlikely to find due to unsuitable habitat requirements. **Not recorded during site assessment**
2.	*Apus pacificus* Fork-tailed Swift	-	M	-	PMST	It breeds in eastern Asia in sheltered locations such as caves, natural rock crevices or under the roofs of houses. It is migratory and spends winters in Australia in a wide range of climatic zones and habitats.	Low	Unlikely to find due to unsuitable habitat requirements. **Not recorded during site assessment**

	Species	Status		Record	Source	Habitat	LoO	Summary
Threatened Ecological Communities								
1.	Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	-	E	-	PMST	This grassy woodland form has a tree canopy that is dominated or co-dominated by Grey Box (*Eucalyptus microcarpa*). The shrub or mid layer is variable. It ranges from absent, where it has been removed, to moderately dense cover. Shrub composition also can be variable. Widespread shrubs include wattles (*Acacia* species), sweet bursaria (Bursaria spinosa), Cassinia species, hop-bushes (Dodonaea species), emu bushes *(Eremophila* species) and blue-bushes (Maireana species). In many situations, regrowth of canopy trees also may be present in the mid layer. Patches of derived native grassland* can occur where the tree canopy and mid layer has been almost entirely removed but the native ground layer remains largely intact.	Absent	**Not recorded during site assessment.**
2.	Weeping Myall Woodlands	-	E	-	PMST	Weeping Myall Woodlands occur in a range of forms from open woodlands to woodlands, in which weeping myall (*Acacia pendula*) trees are the sole or dominant overstorey species. Although weeping myall trees are often the only tree species in these woodlands, other trees can occur in the overstorey of the ecological community. The understorey of Weeping Myall Woodlands often includes an open layer of shrubs above an open ground layer of grasses and herbs, though the ecological community can exist naturally as either a shrubby, or grassy woodland.	Absent	**Not recorded during site assessment.** Although diagnostic tree species are present, the vegetation lacks key condition requirements.

	Species	Status		Record	Source	Habitat	LoO	Summary
3.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland	-	CE	-	PMST	Commonly referred to as Box-Gum Woodland, White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions is an open woodland community (sometimes occurring as a forest formation), in which the most obvious species are one or more of the following: White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi*. Modified sites include the following: • Areas where the main tree species are present ranging from an open woodland formation to a forest structure, and the groundlayer is predominantly composed of exotic species; and • Sites where the trees have been removed and only the grassy groundlayer and some herbs remain. The Australian Government listing of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is slightly different to the NSW listing.	Low	Main canopy species not present on site. **Not Recorded during site assessment.**

APPENDIX B FLORA AND FAUNA SPECIES LIST

Table B1: Flora species list

Number	Family	Binomial	Common name	Authority
Native trees.				
1	CUPPRESSACEAE	*Callitris glaucophylla*	White Cypress Pine	Joy Thomps. & L.A.S.Johnson
2	FABACEAE (MIMOSOIDEAE)	*Acacia salicina*	Cooba	Lindl.
3	MALVACEAE	*Brachychiton populneus*	Kurrajong	(Schott & Endl.) R.Br.
4	MYRTACEAE	*Eucalyptus largiflorens*	Black Box	F.Muell.
5		*Eucalyptus leucoxylon* subsp. *megalocarpa*	Yellow Gum	(F.Muell. ex Miq.) Boland
	Native shrubs.			
6	FABACEAE (MIMOSOIDEAE)	*Acacia trineura*	Three-nerve Wattle	F.Muell.
7	MALVACEAE	*Sida cunninghamii*	Ridged Sida	C.T.White
8		*Sida trichopoda*	Hairy Sida	F.Muell.
9	SANTALACEAE	*Santalum lanceolatum*	Northern Sandalwood	R.Br.
10	SOLANACEAE	*Solanum esuriale*	Quena	Lindl.
Native Chenopod shrubs.				
11	CHENOPODIACEAE	*Atriplex semibaccata*	Creeping Saltbush	R.Br.
12		*Chenopodium desertorum* subsp. *microphyllum*	Frosted Goosefruit	Paul G.Wilson
13		*Dissocarpus paradoxus*	Cannonball Burr	(R.Br.) F.Muell. ex Ulbr.
14		*Einadia hastata*	Berry Saltbush	(R.Br.) A.J.Scott
15		*Maireana brevifolia*	Small-leaf Bluebush	(R.Br.) Paul G.Wilson
16		*Maireana decalvans*	Black Cotton Bush	(Gand.) Paul G.Wilson
17		*Salsola australis*	Soft Rolypoly	R.Br.
18		*Sclerolaena birchii*	Galvanized Burr	(F.Muell.) Domin
Native grasses.				
19	POACEAE	*Austrostipa scabra*	Speargrass	(Lindl.) S.W.L.Jacobs & J.Everett
20		*Eriochloa australiensis*	Australian Cupgrass	Stapf ex Thell.
21		*Paspalidium jubiflorum*	Warrego Grass	(Trin.) Hughes
22		*Themeda triandra*	Kangaroo Grass	Forssk.
23		*Walwhalleya proluta*	Blown Grass	(F.Muell.) Wills & J.J.Bruhl
Native forbs.				
24	AMARYLLIDACEAE	*Calostemma purpureum*	Garland Lily	R.Br.

Number	Family	Binomial	Common name	Authority
25	ASTERACEAE	*Rhodanthe corymbiflora*	Small White Sunray	(Schltdl.) Paul G.Wilson
26		*Vittadinia cuneata* var. *hirsuta*	Fuzzweed	N.T.Burb.
27	CHENOPODIACEAE	*Chenopodium erosum*	Papery Goosefoot	R.Br.
28		*Dysphania cristata*	Crested Goosefoot	(F.Muell.) Mosyakin & Clemants
29		*Dysphania pumilio*	Small Crumbweed	(R.Br.) Mosyakin & Clemants
30		*Enchylaena tomentosa*	Ruby Saltbush	R.Br.
31		*Rhagodia parabolica*	Mealy Saltbush	R.Br.
32		*Rhagodia spinescens*	Berry Saltbush	R.Br.
33	EUPHORBIACEAE	*Euphorbia dallachyana*	Mat Spurge	Baill.
34	GERANIACEAE	*Geranium solanderi* var. *solanderi*	Austral Cranesbill	Carolin
35	POLYGONACEAE	*Polygonum plebeium*	Small Knotweed	R.Br.
36		*Rumex tenax*	Shiny Dock	Rech.f.
37	ZYGOPHYLLACEAE	*Tribulus minutus*	Puncture Vine	Leichh. ex Benth.
Native vines.				
38	NYCTAGINACEAE	*Boerhavia coccinea*	Tarvine	Mill.
39	CONVULVULACEAE	*Convolvulus graminetinus*	Grassland Bindweed	R.W.Johnson
Native ferns.				
40	MARSILEACEAE	*Marsilea drummondii*	Nardoo	A.Braun
Exotic Trees.				
1	ANACARDIACEAE	*Schinus molle* var. *areira*	Pepper Tree	(L.) DC.
Exotic shrubs.				
2	SOLANACEAE	*Lycium ferocissimum* (HIGH THREAT WEED)	African Boxthorn	Miers
3		*Solanum nigrum*	Black-berry Nightshade	L.
Exotic grasses.				
4	POACEAE	*Avena fatua*	Wild Oats	L.
5		*Hordeum leporinum*	Barley Grass	Link
Exotic forbs.				
6	BORAGINACEAE	*Borago officinalis*	Borage	L.
7	ASTERACEAE	*Conyza sumatrensis*	Tall Fleabane	(Retz.) E.Walker
8		*Lactuca saligna*	Willow-leaved Lettuce	L.
9		*Onopordum acanthium* subsp. *acanthium*	Scotch Thistle	L.

Number	Family	Binomial	Common name	Authority
10		*Onopordum illyricum*	Illyrian Thistle	L.
11		*Xanthium spinosum* (HIGH THREAT WEED)	Hunter Burr	L.
12	BORAGINACEAE	*Plagiobothrys canescens*	Valley Popcorn Flower	Benth.
13	BRASSICACEAE	*Capsella bursa-pastoris*	Shepherd's Purse	(L.) Medik.
14		*Lepidium africanum*	Rubble Peppercress	(Burm.f.) DC.
15		*Rorippa palustris*	Marsh Watercress	(L.) Besser
16	CHENOPODIACEAE	*Chenopodium murale*	Nettle-leaf Goosefoot	L.
17	LAMIACEAE	*Marrubium vulgare*	Horehound	L.
18	MALVACEAE	*Malva parviflora*	Small-flowered Mallow	L.

Table B2: Percentage cover and abundance from 22 floristic 20 x 20 metre plots

Growth habit	Weed species	Family	Binomial	Name	B1	B1	B2	B2	B3	B3	B4	B4	B5	B5	B6	B6
T		FABACEAE (MIMOSOIDEAE)	*Acacia salicina*	Cooba	>1	1							>1	1		
S		FABACEAE (MIMOSOIDEAE)	*Acacia trineura*	Three-nerve Wattle												
S		CHENOPODIACEAE	*Atriplex semibaccata*	Creeping Saltbush	15	100	60	1000	75	1000	50	500	40	500	5	50
H		POACEAE	*Austrostipa scabra*	Speargrass												
H	*	POACEAE	*Avena fatua*	Wild Oats									>1	10		
H		NYCTAGINACEAE	*Boerhavia coccinea*	Tarvine	1	5										
H	*	BORAGINACEAE	*Borago officinalis*	Borage												
T		MALVACEAE	*Brachychiton populneus*	Kurrajong												
T		CUPPRESSACEAE	*Callitris glaucophylla*	White Cypress Pine												
H		AMARYLLIDACEAE	*Calostemma purpureum*	Garland Lily												
H	*	BRASSICACEAE	*Capsella bursa-pastoris*	Shepherd's Purse												
H		CHENOPODIACEAE	*Chenopodium erosum*	Papery Goosefoot					5	20	10	50				
H		CHENOPODIACEAE	*Chenopodium desertorum* subsp. *microphyllum*	Frosted goosefruit			5	50								
H	*	CHENOPODIACEAE	*Chenopodium murale*	Nettle-leaf Goosefoot									1	20		
V		CONVULVULACEAE	*Convolvulus graminetinus*	Grassland Bindweed	>1	5										
H	*	ASTERACEAE	*Conyza sumatrensis*	Tall Fleabane	>1	1										
S		CHENOPODIACEAE	*Dissocarpus paradoxus*	Cannonball Burr												
H		CHENOPODIACEAE	*Dysphania cristata*	Crested Goosefoot												
H		CHENOPODIACEAE	*Dysphania pumilio*	Small Crumbweed												
H		CHENOPODIACEAE	*Einadia hastata*	Berry Saltbush	10	40										
H		CHENOPODIACEAE	*Enchylaena tomentosa*	Ruby Saltbush												
H		POACEAE	*Eriochloa australiensis*	Australian Cupgrass												

Growth habit	Weed species	Family	Binomial	Name	B1	B1	B2	B2	B3	B3	B4	B4	B5	B5	B6	B6
T		MYRTACEAE	*Eucalyptus largiflorens*	Black Box	40	5	45	14	50	12	45	9	15	3	45	6
T		MYRTACEAE	*Eucalyptus leucoxylon* subsp. *megalocarpa*	Yellow Gum												
H		EUPHORBIACEAE	*Euphorbia dallachyana*	Mat Spurge												
H		GERANIACEAE	*Geranium solanderi* var. *solanderi*	Austral Cranesbill	>1	5										
H	*	POACEAE	*Hordeum leporinum*	Barley Grass												
H	*	ASTERACEAE	*Lactuca saligna*	Willow-leaved Lettuce	1	20										
H	*	BRASSICACEAE	*Lepidium africanum*	Rubble Peppercress	10	100	>1	5			>1	20	>1	5	2	50
S	HTW*	SOLANACEAE	*Lycium ferocissimum*	African Boxthorn												
H		CHENOPODIACEAE	*Maireana brevifolia*	Small-leaf Bluebush									5	100		
H		CHENOPODIACEAE	*Maireana decalvans*	Black Cotton Bush												
H	*	MALVACEAE	*Malva parviflora*	Small-flowered Mallow												
H	*	LAMIACEAE	*Marrubium vulgare*	Horehound											2	10
A		MARSILEACEAE	*Marsilea drummondii*	Nardoo												
H	*	ASTERACEAE	*Onopordum acanthium* subsp. *acanthium*	Scotch Thistle												
H	*	ASTERACEAE	*Onopordum illyricum*	Illyrian Thistle												
H		POACEAE	*Paspalidium jubiflorum*	Warrego Grass												
H	*	BORAGINACEAE	*Plagiobothrys canescens*	Valley Popcorn Flower												
H		POLYGONACEAE	*Polygonum plebeium*	Small Knotweed												
S		CHENOPODIACEAE	*Rhagodia parabolica*	Mealy Saltbush											60	500
S		CHENOPODIACEAE	*Rhagodia spinescens*	Berry Saltbush												
H		ASTERACEAE	*Rhodanthe corymbiflora*	Small White Sunray												
H	*	BRASSICACEAE	*Rorippa palustris*	Marsh Watercress												

Growth habit	Weed species	Family	Binomial	Name	B1	B1	B2	B2	B3	B3	B4	B4	B5	B5	B6	B6
H		POLYGONACEAE	*Rumex tenax*	Shiny Dock												
H		CHENOPODIACEAE	*Salsola australis*	Soft Rolypoly			>1	10	>1	20	5	50			1	10
S		SANTALACEAE	*Santalum lanceolatum*	Northern Sandalwood												
T	*	ANACARDIACEAE	*Schinus molle* var. *areira*	Pepper Tree												
S		CHENOPODIACEAE	*Sclerolaena birchii*	Galvanized Burr	1	5	5	50	2	20	15	100	15	50	15	50
S		MALVACEAE	*Sida cunninghamii*	Ridged Sida												
S		MALVACEAE	*Sida trichopoda*	Hairy Sida												
S		SOLANACEAE	*Solanum esuriale*	Quena	5	50									>1	10
S	*	SOLANACEAE	*Solanum nigrum*	Black-berry Nightshade									>1	5	5	50
H		POACEAE	*Themeda triandra*	Kangaroo Grass												
H		ZYGOPHYLLACEAE	*Tribulus minutus*	Puncture Vine												
H		ASTERACEAE	*Vittadinia cuneata* var. *hirsuta*	Fuzzweed												
H		POACEAE	*Walwhalleya proluta*	Blown Grass	>1	5	1	20	2	20	10	200	5	50	5	50
H	HTW*	ASTERACEAE	*Xanthium spinosum*	Hunter Burr												

Growth habit	Weed species	Family	Binomial	Name	B7	B7	B8	B8	B9	B9	B10	B10	B11	B11	B12	B12
T		FABACEAE (MIMOSOIDEAE)	*Acacia salicina*	Cooba												
S		FABACEAE (MIMOSOIDEAE)	*Acacia trineura*	Three-nerve Wattle												
S		CHENOPODIACEAE	*Atriplex semibaccata*	Creeping Saltbush	15	200	50	500	70	1000	50	500	80	1000		
H		POACEAE	*Austrostipa scabra*	Speargrass												
H	*	POACEAE	*Avena fatua*	Wild Oats			>1	5								
H		NYCTAGINACEAE	*Boerhavia coccinea*	Tarvine												
H	*	BORAGINACEAE	*Borago officinalis*	Borage												
T		MALVACEAE	*Brachychiton populneus*	Kurrajong												
T		CUPPRESSACEAE	*Callitris glaucophylla*	White Cypress Pine												
H		AMARYLLIDACEAE	*Calostemma purpureum*	Garland Lily												
H	*	BRASSICACEAE	*Capsella bursa-pastoris*	Shepherd's Purse												
H		CHENOPODIACEAE	*Chenopodium erosum*	Papery Goosefoot											20	500
H		CHENOPODIACEAE	*Chenopodium desertorum* subsp. *microphyllum*	Frosted Goosefruit							10	200				
H	*	CHENOPODIACEAE	*Chenopodium murale*	Nettle-leaf Goosefoot									10	100		
V		CONVULVULACEAE	*Convolvulus graminetinus*	Grassland Bindweed												
H	*	ASTERACEAE	*Conyza sumatrensis*	Tall Fleabane	>1	2										
S		CHENOPODIACEAE	*Dissocarpus paradoxus*	Cannonball Burr												
H		CHENOPODIACEAE	*Dysphania cristata*	Crested Goosefoot												
H		CHENOPODIACEAE	*Dysphania pumilio*	Small Crumbweed												
H		CHENOPODIACEAE	*Einadia hastata*	Berry Saltbush									10	200		
H		CHENOPODIACEAE	*Enchylaena tomentosa*	Ruby Saltbush	10	100	10	25	10	100	5	50				
H		POACEAE	*Eriochloa australiensis*	Australian Cupgrass	>1	15										
T		MYRTACEAE	*Eucalyptus largiflorens*	Black Box	70	11	35	12	15	5	50	4	20	4	60	7

Growth habit	Weed species	Family	Binomial	Name	B7	B7	B8	B8	B9	B9	B10	B10	B11	B11	B12	B12
T		MYRTACEAE	*Eucalyptus leucoxylon* subsp. *megalocarpa*	Yellow Gum												
H		EUPHORBIACEAE	*Euphorbia dallachyana*	Mat Spurge												
H		GERANIACEAE	*Geranium solanderi* var. *solanderi*	Austral Cranesbill												
H	*	POACEAE	*Hordeum leporinum*	Barley Grass			>1	5								
H	*	ASTERACEAE	*Lactuca saligna*	Willow-leaved Lettuce	1	10									>1	1
H	*	BRASSICACEAE	*Lepidium africanum*	Rubble Peppercress	1	10										
S	HTW*	SOLANACEAE	*Lycium ferocissimum*	African Boxthorn												
H		CHENOPODIACEAE	*Maireana brevifolia*	Small-leaf Bluebush												
H		CHENOPODIACEAE	*Maireana decalvans*	Black Cotton Bush												
H	*	MALVACEAE	*Malva parviflora*	Small-flowered Mallow	1	10	1	10								
H	*	LAMIACEAE	*Marrubium vulgare*	Horehound												
A		MARSILEACEAE	*Marsilea drummondii*	Nardoo												
H	*	ASTERACEAE	*Onopordum acanthium* subsp. *acanthium*	Scotch Thistle	>1	2									>1	1
H	*	ASTERACEAE	*Onopordum illyricum*	Illyrian Thistle												
H		POACEAE	*Paspalidium jubiflorum*	Warrego Grass	>1	10										
H	*	BORAGINACEAE	*Plagiobothrys canescens*	Valley Popcorn Flower												
H		POLYGONACEAE	*Polygonum plebeium*	Small Knotweed							>1	5			>1	5
S		CHENOPODIACEAE	*Rhagodia parabolica*	Mealy Saltbush	10	100	5	50								
S		CHENOPODIACEAE	*Rhagodia spinescens*	Berry Saltbush												
H		ASTERACEAE	*Rhodanthe corymbiflora*	Small White Sunray												
H	*	BRASSICACEAE	*Rorippa palustris*	Marsh Watercress	>1	5										
H		POLYGONACEAE	*Rumex tenax*	Shiny Dock												
H		CHENOPODIACEAE	*Salsola australis*	Soft Rolypoly	>1	10	1	10	>1	5	5	50			5	100

Growth habit	Weed species	Family	Binomial	Name	B7	B7	B8	B8	B9	B9	B10	B10	B11	B11	B12	B12
S		SANTALACEAE	*Santalum lanceolatum*	Northern Sandalwood												
T	*	ANACARDIACEAE	*Schinus molle* var. *areira*	Pepper Tree												
S		CHENOPODIACEAE	*Sclerolaena birchii*	Galvanized Burr	>1	10	1	10	5	50	5	50	5	50	40	500
S		MALVACEAE	*Sida cunninghamii*	Ridged Sida												
S		MALVACEAE	*Sida trichopoda*	Hairy Sida												
S		SOLANACEAE	*Solanum esuriale*	Quena			1	5	>1	5					>1	1
S	*	SOLANACEAE	*Solanum nigrum*	Black-berry Nightshade	1	10	5	25			>1	5			5	50
H		POACEAE	*Themeda triandra*	Kangaroo Grass												
H		ZYGOPHYLLACEAE	*Tribulus minutus*	Puncture Vine												
H		ASTERACEAE	*Vittadinia cuneata* var. *hirsuta*	Fuzzweed	>1	5										
H		POACEAE	*Walwhalleya proluta*	Blown Grass			1	10								
H	HTW*	ASTERACEAE	*Xanthium spinosum*	Hunter Burr	5	50										

Growth habit	Weed species	Family	Binomial	Name	B13	B13	B14	B14	B15	B15	B16	B16	B17	B17	B18	B18
T		FABACEAE (MIMOSOIDEAE)	*Acacia salicina*	Cooba												
S		FABACEAE (MIMOSOIDEAE)	*Acacia trineura*	Three-nerve Wattle												
S		CHENOPODIACEAE	*Atriplex semibaccata*	Creeping Saltbush			>1	5			5	50	20	200		
H		POACEAE	*Austrostipa scabra*	Speargrass												
H	*	POACEAE	*Avena fatua*	Wild Oats											1	50
H		NYCTAGINACEAE	*Boerhavia coccinea*	Tarvine												
H	*	BORAGINACEAE	*Borago officinalis*	Borage												
T		MALVACEAE	*Brachychiton populneus*	Kurrajong												
T		CUPPRESSACEAE	*Callitris glaucophylla*	White Cypress Pine												
H		AMARYLLIDACEAE	*Calostemma purpureum*	Garland Lily												
H	*	BRASSICACEAE	*Capsella bursa-pastoris*	Shepherd's Purse												

Growth habit	Weed species	Family	Binomial	Name	B13	B13	B14	B14	B15	B15	B16	B16	B17	B17	B18	B18
H		CHENOPODIACEAE	*Chenopodium erosum*	Papery Goosefoot					5	50			15	200		
H		CHENOPODIACEAE	*Chenopodium desertorum* subsp. *microphyllum*	Frosted goosefruit												
H	*	CHENOPODIACEAE	*Chenopodium murale*	Nettle-leaf Goosefoot											1	20
V		CONVULVULACEAE	*Convolvulus graminetinus*	Grassland Bindweed			>1	5					>1	5		
H	*	ASTERACEAE	*Conyza sumatrensis*	Tall Fleabane									>1	5		
S		CHENOPODIACEAE	*Dissocarpus paradoxus*	Cannonball Burr												
H		CHENOPODIACEAE	*Dysphania cristata*	Crested Goosefoot									>1	20		
H		CHENOPODIACEAE	*Dysphania pumilio*	Small Crumbweed												
H		CHENOPODIACEAE	*Einadia hastata*	Berry Saltbush												
H		CHENOPODIACEAE	*Enchylaena tomentosa*	Ruby Saltbush			>1	5	>1	5			1	20	1	20
H		POACEAE	*Eriochloa australiensis*	Australian Cupgrass												
T		MYRTACEAE	*Eucalyptus largiflorens*	Black Box	60	19	60	2	25	2	30	5	80	1	10	12
T		MYRTACEAE	*Eucalyptus leucoxylon* subsp. *megalocarpa*	Yellow Gum												
H		EUPHORBIACEAE	*Euphorbia dallachyana*	Mat Spurge											>1	10
H		GERANIACEAE	*Geranium solanderi* var. *solanderi*	Austral Cranesbill												
H	*	POACEAE	*Hordeum leporinum*	Barley Grass											2	50
H	*	ASTERACEAE	*Lactuca saligna*	Willow-leaved Lettuce									2	50		
H	*	BRASSICACEAE	*Lepidium africanum*	Rubble Peppercress	>1	5	10	100					10	100		
S	HTW*	SOLANACEAE	*Lycium ferocissimum*	African Boxthorn									>1	1		
H		CHENOPODIACEAE	*Maireana brevifolia*	Small-leaf Bluebush												
H		CHENOPODIACEAE	*Maireana decalvans*	Black Cotton Bush												
H	*	MALVACEAE	*Malva parviflora*	Small-flowered Mallow	>1	5	>1	5					5	20		

Growth habit	Weed species	Family	Binomial	Name	B13	B13	B14	B14	B15	B15	B16	B16	B17	B17	B18	B18
H	*	LAMIACEAE	*Marrubium vulgare*	Horehound	>1	5	>1	5					5	50		
A		MARSILEACEAE	*Marsilea drummondii*	Nardoo												
H	*	ASTERACEAE	*Onopordum acanthium* subsp. *acanthium*	Scotch Thistle							>1	2	>1	5	>1	2
H	*	ASTERACEAE	*Onopordum illyricum*	Illyrian Thistle												
H		POACEAE	*Paspalidium jubiflorum*	Warrego Grass												
H	*	BORAGINACEAE	*Plagiobothrys canescens*	Valley Popcorn Flower												
H		POLYGONACEAE	*Polygonum plebeium*	Small Knotweed												
S		CHENOPODIACEAE	*Rhagodia parabolica*	Mealy Saltbush												
S		CHENOPODIACEAE	*Rhagodia spinescens*	Berry Saltbush												
H		ASTERACEAE	*Rhodanthe corymbiflora*	Small White Sunray												
H	*	BRASSICACEAE	*Rorippa palustris*	Marsh Watercress			>1	5								
H		POLYGONACEAE	*Rumex tenax*	Shiny Dock			>1	5								
H		CHENOPODIACEAE	*Salsola australis*	Soft Rolypoly	>1	5							>1	10		
S		SANTALACEAE	*Santalum lanceolatum*	Northern Sandalwood												
T	*	ANACARDIACEAE	*Schinus molle* var. *areira*	Pepper Tree												
S		CHENOPODIACEAE	*Sclerolaena birchii*	Galvanized Burr	10	50	10	50	80	500	30	200	5	20	1	20
S		MALVACEAE	*Sida cunninghamii*	Ridged Sida												
S		MALVACEAE	*Sida trichopoda*	Hairy Sida												
S		SOLANACEAE	*Solanum esuriale*	Quena			>1	5					2	50		
S	*	SOLANACEAE	*Solanum nigrum*	Black-berry Nightshade									5	50		
H		POACEAE	*Themeda triandra*	Kangaroo Grass												
H		ZYGOPHYLLACEAE	*Tribulus minutus*	Puncture Vine												
H		ASTERACEAE	*Vittadinia cuneata* var. *hirsuta*	Fuzzweed												
H		POACEAE	*Walwhalleya proluta*	Blown Grass					1	20			5	50	80	200
H	HTW*	ASTERACEAE	*Xanthium spinosum*	Hunter Burr											>1	2

Growth habit	Weed species	Family	Binomial	Name	B13	B13	B14	B14	B15	B15	B16	B16	B17	B17	B18	B18
Growth habit	Weed species	Family	Binomial	Name	B19	B19	B20	B20	B21	B21	B22	B22				
T		FABACEAE (MIMOSOIDEAE)	*Acacia salicina*	Cooba												
S		FABACEAE (MIMOSOIDEAE)	*Acacia trineura*	Three-nerve Wattle												
S		CHENOPODIACEAE	*Atriplex semibaccata*	Creeping Saltbush	5	100	10	100	20	200	30	200				
H		POACEAE	*Austrostipa scabra*	Speargrass												
H	*	POACEAE	*Avena fatua*	Wild Oats												
H		NYCTAGINACEAE	*Boerhavia coccinea*	Tarvine			5	20								
H	*	BORAGINACEAE	*Borago officinalis*	Borage												
T		MALVACEAE	*Brachychiton populneus*	Kurrajong												
T		CUPPRESSACEAE	*Callitris glaucophylla*	White Cypress Pine												
H		AMARYLLIDACEAE	*Calostemma purpureum*	Garland Lily												
H	*	BRASSICACEAE	*Capsella bursa-pastoris*	Shepherd's Purse												
H		CHENOPODIACEAE	*Chenopodium erosum*	Papery Goosefoot			20	200	5	100	5	50				
H		CHENOPODIACEAE	*Chenopodium desertorum* subsp. *microphyllum*	Frosted Goosefruit	1	50					10	50				
H	*	CHENOPODIACEAE	*Chenopodium murale*	Nettle-leaf Goosefoot												
V		CONVULVULACEAE	*Convolvulus graminetinus*	Grassland Bindweed					>1	10						
H	*	ASTERACEAE	*Conyza sumatrensis*	Tall Fleabane												
S		CHENOPODIACEAE	*Dissocarpus paradoxus*	Cannonball Burr												
H		CHENOPODIACEAE	*Dysphania cristata*	Crested Goosefoot							1	10				
H		CHENOPODIACEAE	*Dysphania pumilio*	Small Crumbweed												
H		CHENOPODIACEAE	*Einadia hastata*	Berry Saltbush												
H		CHENOPODIACEAE	*Enchylaena tomentosa*	Ruby Saltbush	>1	10	5	20	5	100						

Growth habit	Weed species	Family	Binomial	Name	B13	B13	B14	B14	B15	B15	B16	B16	B17	B17	B18	B18
H		POACEAE	*Eriochloa australiensis*	Australian Cupgrass												
T		MYRTACEAE	*Eucalyptus largiflorens*	Black Box	30	2	30	3	25	2	30	4				
T		MYRTACEAE	*Eucalyptus leucoxylon* subsp. *megalocarpa*	Yellow Gum												
H		EUPHORBIACEAE	*Euphorbia dallachyana*	Mat Spurge												
H		GERANIACEAE	*Geranium solanderi* var. *solanderi*	Austral Cranesbill												
H	*	POACEAE	*Hordeum leporinum*	Barley Grass												
H	*	ASTERACEAE	*Lactuca saligna*	Willow-leaved Lettuce												
H	*	BRASSICACEAE	*Lepidium africanum*	Rubble Peppercress							>1	5				
S	HTW*	SOLANACEAE	*Lycium ferocissimum*	African Boxthorn							>1	3				
H		CHENOPODIACEAE	*Maireana brevifolia*	Small-leaf Bluebush					1	20						
H		CHENOPODIACEAE	*Maireana decalvans*	Black Cotton Bush												
H	*	MALVACEAE	*Malva parviflora*	Small-flowered Mallow							>1	5				
H	*	LAMIACEAE	*Marrubium vulgare*	Horehound	1	20			>1	5						
A		MARSILEACEAE	*Marsilea drummondii*	Nardoo												
H	*	ASTERACEAE	*Onopordum acanthium* subsp. *acanthium*	Scotch Thistle	>1	10	>1	5	>1	5	>1	5				
H	*	ASTERACEAE	*Onopordum illyricum*	Illyrian Thistle												
H		POACEAE	*Paspalidium jubiflorum*	Warrego Grass												
H	*	BORAGINACEAE	*Plagiobothrys canescens*	Valley Popcorn Flower												
H		POLYGONACEAE	*Polygonum plebeium*	Small Knotweed												
S		CHENOPODIACEAE	*Rhagodia parabolica*	Mealy Saltbush												
S		CHENOPODIACEAE	*Rhagodia spinescens*	Berry Saltbush												
H		ASTERACEAE	*Rhodanthe corymbiflora*	Small White Sunray												

Growth habit	Weed species	Family	Binomial	Name	B13	B13	B14	B14	B15	B15	B16	B16	B17	B17	B18	B18
H	*	BRASSICACEAE	*Rorippa palustris*	Marsh Watercress												
H		POLYGONACEAE	*Rumex tenax*	Shiny Dock												
H		CHENOPODIACEAE	*Salsola australis*	Soft Rolypoly	1	20	5	100	5	50	5	50				
S		SANTALACEAE	*Santalum lanceolatum*	Northern Sandalwood												
T	*	ANACARDIACEAE	*Schinus molle* var. *areira*	Pepper Tree												
S		CHENOPODIACEAE	*Sclerolaena birchii*	Galvanized Burr	60	500	40	200	10	100	40	100				
S		MALVACEAE	*Sida cunninghamii*	Ridged Sida												
S		MALVACEAE	*Sida trichopoda*	Hairy Sida					1	20						
S		SOLANACEAE	*Solanum esuriale*	Quena	>1	5	2	50	5	100						
S	*	SOLANACEAE	*Solanum nigrum*	Black-berry Nightshade	>1	5	>1	5	>1	5	>1	5				
H		POACEAE	*Themeda triandra*	Kangaroo Grass												
H		ZYGOPHYLLACEAE	*Tribulus minutus*	Puncture Vine												
H		ASTERACEAE	*Vittadinia cuneata* var. *hirsuta*	Fuzzweed												
H		POACEAE	*Walwhalleya proluta*	Blown Grass	20	100	5	50	10	100	1	10				
H	HTW*	ASTERACEAE	*Xanthium spinosum*	Hunter Burr												

Table B32: Vertebrate and invertebrate Fauna Species identified on site

No.	Scientific Name	Common Name	Status	
			BC Act	EPBC Act
1.	*Anas superciliosa*	Pacific Black Duck	P	-
2.	*Chenonetta jubata*	Australian Wood Duck	P	
3.	*Coturnix pectoralis*	Stubble Quail	P	-
4.	*Elanus axillaris*	Black Shouldered-kite	P	-
5.	*Falco cenchroides*	Nankeen Kestrel	P	-
6.	*Falco berigora*	Brown Falcon	P	-
7.	*Eolophus roseicarilla*	Galah	P	-
8.	*Cacatua sanguinea*	Little Corella	P	-
9.	*Cacatua galerita*	Sulphur-crested Cockatoo	P	-
10.	*Nymphicus hollandicus*	Cockatiel	P	-
11.	*Platycerus eximius*	Eastern Rosella	P	-
12.	*Ocyphaps lophates*	Crested Pigeon	P	-
13.	*Grallina cyanoleuca*	Magpie Lark	P	-
14.	*Gymnorhina tibicen*	Magpie	P	-
15.	*Cracticus nigrogularis*	Pied Butcherbird	P	-
16.	*Corvus coronoides*	Australian Raven	P	-
17.	*Egretta novaehollandiae*	White-faced Heron	P	-
18.	*Manorina melanocephala*	Noisy Miner	P	-
19.	*Entomyzon cyanotis*	Blue-faced Honeyeater	P	-
20.	*Dacelo novaeguineae*	Laughing Kookaburra	P	-
21.	*Rhipidura leucophrys*	Willie Wagtail	P	-
22.	*Anthus novaeseelandiae*	Richard's Pipit	P	-
23.	*Macropus fuliginosus*	Western Grey Kangaroo	P	-
24.	*Macropus rufus*	Red Kangaroo	P	-
25.	*Order Chiroptera*	Unknown Microbat	P	-
26.	*Order Chiroptera*	Unknown Flying Fox	P	-
27.	*Cryptoblephharus pannosus*	Snake-eyed Skink	P	-
28.	*Morethia boulengeri*	Boulenger's Skink	P	-
29.	*Blepharotes sp.*	Robber Fly		-
30.	*Zizinia otis*	Common Grass-blue		-
31.	*Theclinesthes serpentata*	Saltbush Blue		-

P – Protected

APPENDIX C DATABASE SEARCH RESULTS

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. Please see the caveat for interpretation of information provided here.

Report created: 19-Apr-2024

Summary

Matters of National Environment 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 (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	35
Listed Migratory Species:	8

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 https://www.dcceew.gov.au/parks-heritage/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 Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	500 - 600km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes	300 - 400km upstream from Ramsar site	In feature area
Riverland	400 - 500km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	500 - 600km upstream from Ramsar site	In feature area

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.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area	In feature area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat may occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo, Pink Cockatoo (eastern) [82926]	Endangered	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Craterocephalus fluviatilis Murray Hardyhead [56791]	Endangered	Species or species habitat may occur within area	In buffer area only
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	In feature area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Maccullochella peelii](#) Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Macquaria australasica](#) Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
FROG			
[Crinia sloanei](#) Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
[Litoria raniformis](#) Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
[Nyctophilus corbeni](#) Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature 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]	Endangered	Species or species habitat known to occur within area	In feature area
PLANT			
[Austrostipa wakoolica](#) [66623]	Endangered	Species or species habitat may occur within area	In buffer area only
[Brachyscome papillosa](#) Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area	In feature area
[Lepidium monoplocoides](#) Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area	In feature area
[Maireana cheelii](#) Chariot Wheels [8008]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Swainsona murrayana			
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Aprasia parapulchella			
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii			
Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalcites osculans as Chrysococcyx osculans			
Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster			
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Lathamus discolor			
Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus			
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma			
Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Murrumbidgee Valley	Regional Park	NSW	In buffer area only
Murrumbidgee Valley	National Park	NSW	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Darlington Point Solar Farm, near Darlington Point, NSW	2018/8218	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-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
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records
Animalia	Amphibia	Myobatrachidae	3131	*Crinia parinsignifera*		Eastern Sign-bearing Froglet	P		34
Animalia	Amphibia	Myobatrachidae	9048	*Limnodynastes sp.*		unidentified Limnodynastes	P		62
Animalia	Amphibia	Limnodynastidae	3058	*Limnodynastes dumerilii*		Eastern Banjo Frog	P		1
Animalia	Amphibia	Limnodynastidae	3059	*Limnodynastes fletcheri*		Long-thumbed Frog	P		29
Animalia	Amphibia	Limnodynastidae	3060	*Limnodynastes interioris*		Giant Banjo Frog	P		18
Animalia	Amphibia	Limnodynastidae	3063	*Limnodynastes tasmaniensis*		Spotted Grass Frog	P		70
Animalia	Amphibia	Hylidae	3204	*Litoria peronii*		Peron's Tree Frog	P		144
Animalia	Amphibia	Hylidae	3207	*Litoria raniformis*		Southern Bell Frog	E1,P	V	2
Animalia	Reptilia	Chelidae	5259	*Chelodina expansa*		Broad-shelled Turtle	P		4
Animalia	Reptilia	Chelidae	2017	*Chelodina longicollis*		Eastern Snake-necked Turtle	P		17
Animalia	Reptilia	Chelidae	2034	*Emydura macquarii*		Macquarie Turtle	P		2
Animalia	Reptilia	Gekkonidae	2126	*Christinus marmoratus*		Marbled Gecko	P		20
Animalia	Reptilia	Scincidae	T222	*Cryptoblepharus pannosus*		Ragged Snake-eyed Skink	P		6
Animalia	Reptilia	Scincidae	2519	*Menetia greyii*		Common Dwarf Skink	P		1
Animalia	Reptilia	Scincidae	2526	*Morethia boulengeri*		South-eastern Morethia Skink	P		4
Animalia	Reptilia	Elapidae	2693	*Pseudechis porphyriacus*		Red-bellied Black Snake	P		1
Animalia	Reptilia	Elapidae	2722	*Suta suta*		Curl Snake	P		1
Animalia	Aves	Casuariidae	0001	*Dromaius novaehollandiae*		Emu	P		3
Animalia	Aves	Phasianidae	0011	*Synoicus ypsilophora*		Brown Quail	P		1
Animalia	Aves	Anseranatidae	0199	*Anseranas semipalmata*		Magpie Goose	V,P		1
Animalia	Aves	Anatidae	0210	*Anas castanea*		Chestnut Teal	P		3
Animalia	Aves	Anatidae	0211	*Anas gracilis*		Grey Teal	P		128
Animalia	Aves	Anatidae	0212	*Anas rhynchotis*		Australasian Shoveler	P		6
Animalia	Aves	Anatidae	0208	*Anas superciliosa*		Pacific Black Duck	P		91
Animalia	Aves	Anatidae	0215	*Aythya australis*		Hardhead	P		7
Animalia	Aves	Anatidae	0202	*Chenonetta jubata*		Australian Wood Duck	P		61
Animalia	Aves	Anatidae	0203	*Cygnus atratus*		Black Swan	P		4
Animalia	Aves	Anatidae	0213	*Malacorhynchus membranaceus*		Pink-eared Duck	P		17
Animalia	Aves	Anatidae	0207	*Tadorna tadornoides*		Australian Shelduck	P		2

Animalia	Aves	Podicipedidae	0062	*Poliocephalus poliocephalus*	Hoary-headed Grebe	P	4
Animalia	Aves	Podicipedidae	0061	*Tachybaptus novaehollandiae*	Australasian Grebe	P	20
Animalia	Aves	Columbidae	9931	*Geopelia striata*	Peaceful Dove	P	14
Animalia	Aves	Columbidae	0043	*Ocyphaps lophotes*	Crested Pigeon	P	8
Animalia	Aves	Columbidae	0034	*Phaps chalcoptera*	Common Bronzewing	P	2
Animalia	Aves	Anhingidae	8731	*Anhinga novaehollandiae*	Australasian Darter	P	4
Animalia	Aves	Phalacrocoracidae	0100	*Microcarbo melanoleucos*	Little Pied Cormorant	P	36
Animalia	Aves	Phalacrocoracidae	0096	*Phalacrocorax carbo*	Great Cormorant	P	5
Animalia	Aves	Phalacrocoracidae	0097	*Phalacrocorax sulcirostris*	Little Black Cormorant	P	8
Animalia	Aves	Pelecanidae	0106	*Pelecanus conspicillatus*	Australian Pelican	P	6
Animalia	Aves	Ardeidae	0186	*Ardea intermedia*	Intermediate Egret	P	1
Animalia	Aves	Ardeidae	0189	*Ardea pacifica*	White-necked Heron	P	17
Animalia	Aves	Ardeidae	8712	*Casmerodius modesta*	Eastern Great Egret	P	11
Animalia	Aves	Ardeidae	0185	*Egretta garzetta*	Little Egret	P	1
Animalia	Aves	Ardeidae	0188	*Egretta novaehollandiae*	White-faced Heron	P	57
Animalia	Aves	Ardeidae	0192	*Nycticorax caledonicus*	Nankeen Night Heron	P	9
Animalia	Aves	Threskiornithidae	0182	*Platalea flavipes*	Yellow-billed Spoonbill	P	10
Animalia	Aves	Threskiornithidae	0181	*Platalea regia*	Royal Spoonbill	P	4
Animalia	Aves	Threskiornithidae	0179	*Threskiornis moluccus*	Australian White Ibis	P	13
Animalia	Aves	Threskiornithidae	0180	*Threskiornis spinicollis*	Straw-necked Ibis	P	4
Animalia	Aves	Accipitridae	0221	*Accipiter fasciatus*	Brown Goshawk	P	1
Animalia	Aves	Accipitridae	0224	*Aquila audax*	Wedge-tailed Eagle	P	2
Animalia	Aves	Accipitridae	0218	*Circus assimilis*	Spotted Harrier	V,P	1
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	1
Animalia	Aves	Accipitridae	0228	*Haliastur sphenurus*	Whistling Kite	P	10
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*	Little Eagle	V,P	2
Animalia	Aves	Accipitridae	0229	*Milvus migrans*	Black Kite	P	3
Animalia	Aves	Falconidae	0240	*Falco cenchroides cenchroides*	Nankeen Kestrel	P	5

Animalia	Aves	Falconidae	0235	*Falco longipennis*	Australian Hobby	P		2
Animalia	Aves	Rallidae	0059	*Fulica atra*	Eurasian Coot	P		11
Animalia	Aves	Rallidae	0056	*Gallinula tenebrosa*	Dusky Moorhen	P		11
Animalia	Aves	Rallidae	0058	*Porphyrio porphyrio*	Purple Swamphen	P		3
Animalia	Aves	Charadriidae	0144	*Elseyornis melanops*	Black-fronted Dotterel	P		6
Animalia	Aves	Charadriidae	0133	*Vanellus miles*	Masked Lapwing	P		1
Animalia	Aves	Laridae	0110	*Chlidonias hybrida*	Whiskered Tern	P		1
Animalia	Aves	Cacatuidae	0269	*Cacatua galerita*	Sulphur-crested Cockatoo	P		18
Animalia	Aves	Cacatuidae	0271	*Cacatua sanguinea*	Little Corella	P		7
Animalia	Aves	Cacatuidae	0272	*Cacatua tenuirostris*	Long-billed Corella	P		3
Animalia	Aves	Cacatuidae	0273	*Eolophus roseicapilla*	Galah	P		19
Animalia	Aves	Cacatuidae	0274	*Nymphicus hollandicus*	Cockatiel	P		4
Animalia	Aves	Psittacidae	0282	*Platycercus elegans*	Crimson Rosella	P		25
Animalia	Aves	Psittacidae	0284	*Platycercus elegans flaveolus*	[Yellow Rosella]	P		16
Animalia	Aves	Psittacidae	0288	*Platycercus eximius*	Eastern Rosella	P		12
Animalia	Aves	Psittacidae	0277	*^^Polytelis swainsonii*	Superb Parrot	V,P,3	V	22
Animalia	Aves	Psittacidae	0295	*Psephotus haematonotus*	Red-rumped Parrot	P		3
Animalia	Aves	Cuculidae	0342	*Chalcites basalis*	Horsfield's Bronze-Cuckoo	P		1
Animalia	Aves	Strigidae	9922	*Ninox novaeseelandiae*	Southern Boobook	P		2
Animalia	Aves	Tytonidae	9923	*Tyto javanica*	Eastern Barn Owl	P		1
Animalia	Aves	Alcedinidae	0319	*Ceyx azureus*	Azure Kingfisher	P		1
Animalia	Aves	Alcedinidae	0322	*Dacelo novaeguineae*	Laughing Kookaburra	P		16
Animalia	Aves	Alcedinidae	0326	*Todiramphus sanctus*	Sacred Kingfisher	P		62
Animalia	Aves	Meropidae	0329	*Merops ornatus*	Rainbow Bee-eater	P		8
Animalia	Aves	Coraciidae	0318	*Eurystomus orientalis*	Dollarbird	P		1
Animalia	Aves	Climacteridae	8126	*Climacteris picumnus picumnus*		P		2

Animalia	Aves	Climacteridae	8127	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P	V	1
Animalia	Aves	Climacteridae	0558	*Cormobates leucophaea*	White-throated Treecreeper	P		2
Animalia	Aves	Maluridae	0529	*Malurus cyaneus*	Superb Fairy-wren	P		8
Animalia	Aves	Maluridae	0536	*Malurus lamberti*	Variegated Fairy-wren	P		1
Animalia	Aves	Acanthizidae	0476	*Acanthiza apicalis*	Inland Thornbill	P		1
Animalia	Aves	Acanthizidae	0486	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	P		3
Animalia	Aves	Acanthizidae	0471	*Acanthiza nana*	Yellow Thornbill	P		3
Animalia	Aves	Acanthizidae	0475	*Acanthiza pusilla*	Brown Thornbill	P		3
Animalia	Aves	Acanthizidae	0463	*Gerygone fusca*	Western Gerygone	P		8
Animalia	Aves	Acanthizidae	0488	*Sericornis frontalis*	White-browed Scrubwren	P		2
Animalia	Aves	Acanthizidae	0465	*Smicrornis brevirostris*	Weebill	P		15
Animalia	Aves	Pardalotidae	0976	*Pardalotus striatus*	Striated Pardalote	P		27
Animalia	Aves	Meliphagidae	0638	*Anthochaera carunculata*	Red Wattlebird	P		1
Animalia	Aves	Meliphagidae	0641	*Entomyzon cyanotis*	Blue-faced Honeyeater	P		3
Animalia	Aves	Meliphagidae	0634	*Manorina melanocephala*	Noisy Miner	P		23
Animalia	Aves	Meliphagidae	0583	*Melithreptus brevirostris*	Brown-headed Honeyeater	P		1
Animalia	Aves	Meliphagidae	0646	*Philemon citreogularis*	Little Friarbird	P		9
Animalia	Aves	Meliphagidae	0645	*Philemon corniculatus*	Noisy Friarbird	P		5
Animalia	Aves	Meliphagidae	0585	*Plectorhyncha lanceolata*	Striped Honeyeater	P		1
Animalia	Aves	Meliphagidae	0625	*Ptilotula penicillata*	White-plumed Honeyeater	P		24
Animalia	Aves	Pomatostomidae	8388	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		11
Animalia	Aves	Campephagidae	0424	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	P		16
Animalia	Aves	Campephagidae	0430	*Lalage sueurii*	White-winged Triller	P		2
Animalia	Aves	Pachycephalidae	0408	*Colluricincla harmonica*	Grey Shrike-thrush	P		20
Animalia	Aves	Pachycephalidae	0401	*Pachycephala rufiventris*	Rufous Whistler	P		7
Animalia	Aves	Artamidae	0546	*Artamus cinereus*	Black-faced Woodswallow	P		1

Animalia	Aves	Artamidae	0700	*Cracticus nigrogularis*		Pied Butcherbird	P	6
Animalia	Aves	Artamidae	0702	*Cracticus torquatus*		Grey Butcherbird	P	1
Animalia	Aves	Artamidae	0705	*Gymnorhina tibicen*		Australian Magpie	P	20
Animalia	Aves	Artamidae	0694	*Strepera graculina*		Pied Currawong	P	1
Animalia	Aves	Rhipiduridae	0361	*Rhipidura albiscapa*		Grey Fantail	P	3
Animalia	Aves	Rhipiduridae	0364	*Rhipidura leucophrys*		Willie Wagtail	P	17
Animalia	Aves	Corvidae	0930	*Corvus coronoides*		Australian Raven	P	18
Animalia	Aves	Corvidae	0954	*Corvus mellori*		Little Raven	P	6
Animalia	Aves	Monarchidae	0415	*Grallina cyanoleuca*		Magpie-lark	P	29
Animalia	Aves	Monarchidae	0366	*Myiagra cyanoleuca*		Satin Flycatcher	P	1
Animalia	Aves	Monarchidae	9955	*Myiagra inquieta*		Restless Flycatcher	P	2
Animalia	Aves	Corcoracidae	0693	*Corcorax melanorhamphos*		White-winged Chough	P	8
Animalia	Aves	Corcoracidae	0675	*Struthidea cinerea*		Apostlebird	P	2
Animalia	Aves	Petroicidae	0377	*Microeca fascinans*		Jacky Winter	P	1
Animalia	Aves	Cisticolidae	0525	*Cisticola exilis*		Golden-headed Cisticola	P	2
Animalia	Aves	Acrocephalidae	0524	*Acrocephalus australis*		Australian Reed-Warbler	P	3
Animalia	Aves	Locustellidae	0509	*Cincloramphus mathewsi*		Rufous Songlark	P	5
Animalia	Aves	Locustellidae	0522	*Poodytes gramineus*		Little Grassbird	P	1
Animalia	Aves	Hirundinidae	0357	*Hirundo neoxena*		Welcome Swallow	P	4
Animalia	Aves	Hirundinidae	0360	*Petrochelidon ariel*		Fairy Martin	P	1
Animalia	Aves	Hirundinidae	0359	*Petrochelidon nigricans*		Tree Martin	P	11
Animalia	Aves	Turdidae	0991	*Turdus merula*	*	Eurasian Blackbird		2
Animalia	Aves	Sturnidae	0999	*Sturnus vulgaris*	*	Common Starling		11
Animalia	Aves	Dicaeidae	0564	*Dicaeum hirundinaceum*		Mistletoebird	P	1
Animalia	Aves	Estrildidae	0662	*Neochmia temporalis*		Red-browed Finch	P	1
Animalia	Aves	Passeridae	0995	*Passer domesticus*	*	House Sparrow		1
Animalia	Mammalia	Tachyglossidae	1003	*Tachyglossus aculeatus*		Short-beaked Echidna	P	3
Animalia	Mammalia	Vombatidae	1165	*Vombatus ursinus*		Bare-nosed Wombat	P	2

Animalia	Mammalia	Pseudocheiridae	1129	*Pseudocheirus peregrinus*		Common Ringtail Possum	P	1
Animalia	Mammalia	Phalangeridae	T082	*Trichosurus sp.*		brushtail possum	P	3
Animalia	Mammalia	Phalangeridae	1113	*Trichosurus vulpecula*		Common Brushtail Possum	P	3
Animalia	Mammalia	Macropodidae	1265	*Macropus giganteus*		Eastern Grey Kangaroo	P	4
Animalia	Mammalia	Macropodidae	T085	*Macropus sp.*		kangaroo / wallaby	P	4
Animalia	Mammalia	Macropodidae	1242	*Wallabia bicolor*		Swamp Wallaby	P	1
Animalia	Mammalia	Pteropodidae	1281	*Pteropus scapulatus*		Little Red Flying-fox	P	1
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*		Yellow-bellied Sheathtail-bat	V,P	1
Animalia	Mammalia	Molossidae	1324	*Austronomus australis*		White-striped Freetail-bat	P	1
Animalia	Mammalia	Vespertilionidae	1349	*Chalinolobus gouldii*		Gould's Wattled Bat	P	1
Animalia	Mammalia	Vespertilionidae	1351	*Chalinolobus morio*		Chocolate Wattled Bat	P	1
Animalia	Mammalia	Vespertilionidae	T092	*Nyctophilus sp.*		long-eared bat	P	1
Animalia	Mammalia	Vespertilionidae	1364	*Scotorepens balstoni*		Inland Broad-nosed Bat	P	1
Animalia	Mammalia	Vespertilionidae	1362	*Scotorepens greyii*		Little Broad-nosed Bat	P	1
Animalia	Mammalia	Vespertilionidae	1382	*Vespadelus baverstocki*		Inland Forest Bat	V,P	1
Animalia	Mammalia	Vespertilionidae	1378	*Vespadelus regulus*		Southern Forest Bat	P	1
Animalia	Mammalia	Vespertilionidae	1379	*Vespadelus vulturnus*		Little Forest Bat	P	1
Animalia	Mammalia	Muridae	1412	*Mus musculus*	*	House Mouse		3
Animalia	Mammalia	Canidae	1532	*Vulpes vulpes*	*	Fox		10
Animalia	Mammalia	Leporidae	1510	*Oryctolagus cuniculus*	*	Rabbit		1
Animalia	Mammalia	Bovidae	1518	*Bos taurus*	*	European cattle		1
Plantae	Flora	Amaranthaceae	6478	*Alternanthera denticulata*		Lesser Joyweed		3
Plantae	Flora	Amaranthaceae	7079	*Alternanthera nana*		Hairy Joyweed		2
Plantae	Flora	Amaranthaceae	7191	*Alternanthera pungens*	*	Khaki Weed		1
Plantae	Flora	Amaryllidaceae	3537	*Calostemma purpureum*		Garland Lily		2
Plantae	Flora	Asparagaceae	3518	*Arthropodium minus*		Small Vanilla Lily		2
Plantae	Flora	Asphodelaceae	3532	*Bulbine semibarbata*		Wild Onion		5
Plantae	Flora	Asteraceae	1273	*Arctotheca calendula*	*	Capeweed		1

Plantae	Flora	Asteraceae	1277	*Artemisia arborescens*	*	Tree Wormwood	1
Plantae	Flora	Asteraceae	10401	*Brachyscome basaltica var. gracilis*		Swamp Daisy	1
Plantae	Flora	Asteraceae	1348	*Calotis scapigera*		Tufted Burr-daisy	8
Plantae	Flora	Asteraceae	1384	*Centipeda cunninghamii*		Common Sneezeweed	6
Plantae	Flora	Asteraceae	1400	*Cirsium vulgare*	*	Spear Thistle	13
Plantae	Flora	Asteraceae	1404	*Conyza bonariensis*	*	Flaxleaf Fleabane	5
Plantae	Flora	Asteraceae	10442	*Conyza sumatrensis*	*	Tall fleabane	1
Plantae	Flora	Asteraceae	7903	*Eclipta platyglossa*		Yellow Twin-heads	5
Plantae	Flora	Asteraceae	1550	*Lactuca serriola*	*	Prickly Lettuce	7
Plantae	Flora	Asteraceae	7780	*Pseudognaphaliu m luteoalbum*		Jersey Cudweed	3
Plantae	Flora	Asteraceae	1675	*Senecio quadridentatus*		Cotton Fireweed	10
Plantae	Flora	Asteraceae	1690	*Sonchus oleraceus*	*	Common Sowthistle	1
Plantae	Flora	Asteraceae	1711	*Vittadinia cuneata*			8
Plantae	Flora	Asteraceae	1714	*Vittadinia gracilis*		Woolly New Holland Daisy	6
Plantae	Flora	Asteraceae	1729	*Xanthium spinosum*	*	Bathurst Burr	2
Plantae	Flora	Boraginaceae	1751	*Echium plantagineum*	*	Patterson's Curse	4
Plantae	Flora	Boraginaceae	1761	*Heliotropium europaeum*	*	Potato Weed	2
Plantae	Flora	Brassicaceae	1787	*Brassica juncea*	*	Indian Mustard	1
Plantae	Flora	Brassicaceae	6643	*Lepidium pseudohyssopifoli um*		Peppercress	1
Plantae	Flora	Brassicaceae	LEPI	*Lepidium spp.*			1
Plantae	Flora	Brassicaceae	1852	*Sisymbrium erysimoides*	*	Smooth Mustard	2
Plantae	Flora	Campanulaceae	14937	*Lobelia concolor*		Poison Pratia	1
Plantae	Flora	Campanulaceae	1931	*Wahlenbergia fluminalis*		River Bluebell	8
Plantae	Flora	Caryophyllaceae	1979	*Polycarpon tetraphyllum*	*	Four-leaved Allseed	1
Plantae	Flora	Caryophyllaceae	13841	*Spergularia brevifolia*			2
Plantae	Flora	Casuarinaceae	2013	*Allocasuarina luehmannii*		Bulloak	1
Plantae	Flora	Chenopodiaceae	2056	*Atriplex lindleyi*		Eastern Flat-top Saltbush	1

Plantae	Flora	Chenopodiaceae	2063	*Atriplex nummularia*		Old Man Saltbush	1
Plantae	Flora	Chenopodiaceae	2070	*Atriplex semibaccata*		Creeping Saltbush	3
Plantae	Flora	Chenopodiaceae	2084	*Chenopodium album*	*	Fat Hen	1
Plantae	Flora	Chenopodiaceae	14529	*Dysphania pumilio*		Small Crumbweed	2
Plantae	Flora	Chenopodiaceae	2111	*Einadia nutans*		Climbing Saltbush	2
Plantae	Flora	Chenopodiaceae	6481	*Einadia nutans subsp. linifolia*		Climbing Saltbush	4
Plantae	Flora	Chenopodiaceae	6482	*Einadia nutans subsp. nutans*		Climbing Saltbush	17
Plantae	Flora	Chenopodiaceae	2114	*Enchylaena tomentosa*		Ruby Saltbush	1
Plantae	Flora	Chenopodiaceae	2127	*Maireana decalvans*		Black Cotton Bush	2
Plantae	Flora	Chenopodiaceae	2128	*Maireana enchylaenoides*		Wingless Fissure-weed	1
Plantae	Flora	Chenopodiaceae	14594	*Salsola australis*			1
Plantae	Flora	Chenopodiaceae	7923	*Salsola kali var. kali*		Buckbush	2
Plantae	Flora	Chenopodiaceae	2185	*Sclerolaena muricata*		Black Rolypoly	2
Plantae	Flora	Chenopodiaceae	7570	*Sclerolaena muricata var. muricata*		Black Rolypoly	3
Plantae	Flora	Chenopodiaceae	7799	*Sclerolaena muricata var. villosa*		Black Rolypoly	4
Plantae	Flora	Convolvulaceae	2220	*Convolvulus erubescens*		Pink Bindweed	1
Plantae	Flora	Cucurbitaceae	15126	*Citrullus amarus*	*	Camel Melon	2
Plantae	Flora	Cupressaceae	6379	*Callitris glaucophylla*		White Cypress Pine	1
Plantae	Flora	Cyperaceae	2327	*Carex inversa*		Knob Sedge	12
Plantae	Flora	Cyperaceae	2408	*Eleocharis acuta*			2
Plantae	Flora	Cyperaceae	2421	*Eleocharis plana*		Flat Spike-sedge	2
Plantae	Flora	Cyperaceae	2422	*Eleocharis pusilla*			5
Plantae	Flora	Dilleniaceae	2542	*Hibbertia obtusifolia*		Hoary Guinea Flower	1
Plantae	Flora	Euphorbiaceae	7628	*Euphorbia drummondii*		Caustic Weed	13
Plantae	Flora	Fabaceae (Faboideae)	2920	*Medicago minima*	*	Woolly Burr Medic	1
Plantae	Flora	Fabaceae (Faboideae)	3072	*Trifolium angustifolium*	*	Narrow-leaved Clover	5

Plantae	Flora	Fabaceae (Faboideae)	3073	*Trifolium arvense*	*	Haresfoot Clover	4
Plantae	Flora	Fabaceae (Faboideae)	3076	*Trifolium dubium*	*	Yellow Suckling Clover	3
Plantae	Flora	Fabaceae (Faboideae)	3079	*Trifolium glomeratum*	*	Clustered Clover	7
Plantae	Flora	Fabaceae (Mimosoideae)	3791	*Acacia homalophylla*		Yarran	1
Plantae	Flora	Fabaceae (Mimosoideae)	3848	*Acacia pendula*		Weeping Myall, Boree	1
Plantae	Flora	Fabaceae (Mimosoideae)	3872	*Acacia salicina*		Cooba	1
Plantae	Flora	Fabaceae (Mimosoideae)	3879	*Acacia stenophylla*		River Cooba	1
Plantae	Flora	Goodeniaceae	3181	*Goodenia fascicularis*		Mallee Goodenia	1
Plantae	Flora	Haloragaceae	3249	*Haloragis aspera*		Rough Raspwort	11
Plantae	Flora	Haloragaceae	6724	*Myriophyllum crispatum*			1
Plantae	Flora	Juncaceae	3315	*Juncus aridicola*		Tussock Rush	4
Plantae	Flora	Lamiaceae	3371	*Ajuga australis*		Austral Bugle	1
Plantae	Flora	Lamiaceae	3381	*Marrubium vulgare*	*	White Horehound	9
Plantae	Flora	Lamiaceae	3453	*Teucrium racemosum*		Grey Germander	1
Plantae	Flora	Loranthaceae	6394	*Amyema miquelii*		Box Mistletoe	1
Plantae	Flora	Loranthaceae	3607	*Amyema pendula*			1
Plantae	Flora	Malvaceae	3657	*Malva parviflora*	*	Small-flowered Mallow	2
Plantae	Flora	Malvaceae	7267	*Pavonia hastata*	*		1
Plantae	Flora	Malvaceae	3664	*Sida corrugata*		Corrugated Sida	4
Plantae	Flora	Malvaceae	6711	*Sida fibulifera*		Pin Sida	1
Plantae	Flora	Malvaceae	3674	*Sida trichopoda*		High Sida	11
Plantae	Flora	Marsileaceae	8803	*Marsilea drummondii*		Common Nardoo	14
Plantae	Flora	Myrtaceae	6360	*Eucalyptus camaldulensis*		River Red Gum	25
Plantae	Flora	Myrtaceae	4114	*Eucalyptus largiflorens*		Black Box	3
Plantae	Flora	Myrtaceae	4125	*Eucalyptus melliodora*		Yellow Box	2

Plantae	Flora	Nyctaginaceae	6841	*Boerhavia dominii*		Tarvine		3
Plantae	Flora	Orchidaceae	4457	*^Diuris tricolor*		Pine Donkey Orchid	V,P,2	1
Plantae	Flora	Oxalidaceae	4621	*Oxalis perennans*				16
Plantae	Flora	Plantaginaceae	6002	*Veronica arvensis*	*	Wall Speedwell		1
Plantae	Flora	Plumbaginaceae	4708	*Limonium sinuatum*	*	Perennial Sea Lavender		1
Plantae	Flora	Poaceae	14896	*Anthosachne scabra*		Wheatgrass, Common Wheatgrass		3
Plantae	Flora	Poaceae	10384	*Austrostipa aristiglumis*		Plains Grass		1
Plantae	Flora	Poaceae	10386	*Austrostipa bigeniculata*		Yanganbil		1
Plantae	Flora	Poaceae	10378	*Austrostipa scabra subsp. scabra*		Rough Speargrass		1
Plantae	Flora	Poaceae	10371	*Austrostipa verticillata*		Slender Bamboo Grass		1
Plantae	Flora	Poaceae	4780	*Avena fatua*	*	Wild Oats		1
Plantae	Flora	Poaceae	7813	*Bromus catharticus*	*	Praire Grass		1
Plantae	Flora	Poaceae	4806	*Bromus diandrus*	*	Great Brome		13
Plantae	Flora	Poaceae	4810	*Bromus madritensis*	*	Madrid Brome		1
Plantae	Flora	Poaceae	4811	*Bromus molliformis*	*	Soft Brome		1
Plantae	Flora	Poaceae	4813	*Bromus rubens*	*	Red Brome		10
Plantae	Flora	Poaceae	14903	*Cenchrus clandestinus*	*	Kikuyu Grass		1
Plantae	Flora	Poaceae	4833	*Chloris truncata*		Windmill Grass		3
Plantae	Flora	Poaceae	4834	*Chloris ventricosa*		Tall Chloris		1
Plantae	Flora	Poaceae	4920	*Diplachne fusca*		Brown Beetle Grass		1
Plantae	Flora	Poaceae	6818	*Echinochloa microstachya*	*	Prickly Barnyard Grass		1
Plantae	Flora	Poaceae	6721	*Enteropogon acicularis*		Curly Windmill Grass		2
Plantae	Flora	Poaceae	7335	*Eriochloa pseudoacrotricha*		Early Spring Grass		1
Plantae	Flora	Poaceae	5012	*Hordeum leporinum*	*	Barley Grass		2
Plantae	Flora	Poaceae	5013	*Hordeum marinum*	*	Sea Barley Grass		2
Plantae	Flora	Poaceae	11388	*Lachnagrostis filiformis*				7
Plantae	Flora	Poaceae	5033	*Lolium rigidum*	*	Wimmera Ryegrass		19

Plantae	Flora	Poaceae	5082	*Paspalidium jubiflorum*		Warrego Grass	13
Plantae	Flora	Poaceae	5086	*Paspalum dilatatum*	*	Paspalum	1
Plantae	Flora	Poaceae	5110	*Phalaris minor*	*	Lesser Canary Grass	1
Plantae	Flora	Poaceae	5129	*Poa fordeana*		Sweet Swamp-grass	1
Plantae	Flora	Poaceae	7878	*Rostraria cristata*	*	Annual Cat's Tail	1
Plantae	Flora	Poaceae	14305	*Rytidosperma caespitosum*		Ringed Wallaby Grass	1
Plantae	Flora	Poaceae	14322	*Rytidosperma setaceum*		Small-flowered Wallaby-grass	4
Plantae	Flora	Poaceae	RYTI	*Rytidosperma spp.*			1
Plantae	Flora	Poaceae	VULP	*Vulpia spp.*	*	Rat's-tail Fescue	8
Plantae	Flora	Polygonaceae	5291	*Polygonum plebeium*		Small Knotweed	1
Plantae	Flora	Polygonaceae	5296	*Rumex brownii*		Swamp Dock	2
Plantae	Flora	Polygonaceae	5298	*Rumex crispus*	*	Curled Dock	1
Plantae	Flora	Polygonaceae	5299	*Rumex crystallinus*		Shiny Dock	1
Plantae	Flora	Rosaceae	ROSA	*Rosa spp.*	*		1
Plantae	Flora	Rubiaceae	5653	*Asperula conferta*		Common Woodruff	1
Plantae	Flora	Rubiaceae	5684	*Galium gaudichaudii*		Rough Bedstraw	3
Plantae	Flora	Scrophulariaceae	5999	*Verbascum virgatum*	*	Twiggy Mullein	1
Plantae	Flora	Solanaceae	6081	*Solanum esuriale*		Quena	2
Plantae	Flora	Solanaceae	6091	*Solanum nigrum*	*	Black-berry Nightshade	1
Plantae	Flora	Verbenaceae	11134	*Phyla canescens*	*	Lippia	2
Plantae	Flora	Verbenaceae	6256	*Verbena bonariensis*	*	Purpletop	1
Plantae	Flora	Verbenaceae	10717	*Verbena gaudichaudii*		Verbena	6

APPENDIX D BAM-C REPORTS

BAM Credit Summary Report

Proposal Details

Assessment Id
00047733/BAAS22016/24/00047734

Proposal Name
Boags Creek Solar Farm

BAM data last updated *
14/03/2024

Assessor Name
Fig Forest

Report Created
27/04/2024

BAM Data version *
67

Assessor Number
BAAS22016

BAM Case Status
Open

Date Finalised
To be finalised

Assessment Revision
0

Assessment Type
Major Projects

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)											
1	16_high	Not a TEC	25.9	25.9	60	PCT Cleared - 50%	High Sensitivity to Gain			1.75	679
										Subtotal	**679**
Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion											
2	45_mod	Not a TEC	3.8	3.8	1.1	PCT Cleared - 60%	High Sensitivity to Gain			1.75	0
										Subtotal	**0**
										Total	**679**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Eucalyptus leucoxylon subsp. pruinosa / Yellow Gum (Flora)									
45_mod	N/A	N/A	1	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Not Listed	False	2
								Subtotal	**2**

Haliaeetus leucogaster / White-bellied Sea-Eagle (Fauna)									
16_high	25.9	25.9	1	Biodiversity Conservation Act listing status	Fecundity – age at which females first produce	Vulnerable	Not Listed	False	13
								Subtotal	**13**
Lophochroa leadbeateri / Pink Cockatoo (Fauna)									
16_high	25.9	25.9	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	13
								Subtotal	**13**
Phascolarctos cinereus / Koala (Fauna)									
16_high	25.9	25.9	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	13
								Subtotal	**13**

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00047733/BAAS22016/24/00047734

Proposal Name
Boags Creek Solar Farm

BAM data last updated *
14/03/2024

Assessor Name
Fig Forest

Assessor Number
BAAS22016

BAM Data version *
67

Proponent Name(s)

Report Created
27/04/2024

BAM Case Status
Open

Assessment Revision
0

Assessment Type
Major Projects

Date Finalised
To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Grus rubicunda / Brolga
Lathamus discolor / Swift Parrot
Polytelis anthopeplus monarchoides / Regent Parrot (eastern subspecies)
Polytelis swainsonii / Superb Parrot
Vespadelus baverstocki / Inland Forest Bat
Artamus cyanopterus cyanopterus / Dusky Woodswallow
Hirundapus caudacutus / White-throated Needletail

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Not a TEC	60.0	679	0	679.00
45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	Not a TEC	1.1	0	0	0.00

16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Inland Floodplain Woodlands This includes PCT's: 13, 15, 16, 83, 438, 454, 630	Inland Floodplain Woodlands >=50% and <70%	16_high	Yes	679	Murrumbidgee,Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Semi-arid Woodlands (Grassy sub-formation)	Tier 3 or higher threat status	16_high	Yes (including artificial)	679	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Plain Grasslands This includes PCT's: 44, 45	Riverine Plain Grasslands >=50% and <70%	45_mod	No	0	Murrumbidgee,Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grasslands	Tier 3 or higher threat status	45_mod	No	0	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Eucalyptus leucoxylon subsp. pruinosa / Yellow Gum	**45_mod**	1.0	2.00
Haliaeetus leucogaster / White-bellied Sea-Eagle	**16_high**	1.0	13.00
Lophochroa leadbeateri / Pink Cockatoo	**16_high**	1.0	13.00
Phascolarctos cinereus / Koala	**16_high**	1.0	13.00

Credit Retirement Options

Like-for-like options

Eucalyptus leucoxylon subsp. pruinosa/ Yellow Gum

Spp	IBRA region
Eucalyptus leucoxylon subsp. pruinosa/Yellow Gum	Any in NSW

Variation options

Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Vulnerable	Murrumbidgee, Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Haliaeetus leucogaster/ White-bellied Sea-Eagle	Spp	IBRA region	
	Haliaeetus leucogaster/White-bellied Sea-Eagle	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Murrumbidgee, Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lophochroa leadbeateri/ Pink Cockatoo	Spp	IBRA region	
	Lophochroa leadbeateri/Pink Cockatoo	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Murrumbidgee, Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascolarctos cinereus/ Koala	Spp	IBRA region	
	Phascolarctos cinereus/Koala	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Murrumbidgee, Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00047733/BAAS22016/24/00047734

Assessment name
Boags Creek Solar Farm

BAM data last updated *
14/03/2024

Assessor Name
Fig Forest

Report Created
27/04/2024

BAM Data version *
67

Assessor Number
BAAS22016

Assessment Type
Major Projects

BAM Case Status
Open

Assessment Revision
0

Date Finalised
To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	16_high	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	high	60	5	
2	45_mod	45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	mod	1.1	1	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00047733/BAAS22016/24/00047734	Boags Creek Solar Farm	14/03/2024
Assessor Name	Report Created	BAM Data version *
Fig Forest	27/04/2024	67
Assessor Number	Assessment Type	BAM Case Status
BAAS22016	Major Projects	Open
Assessment Revision		Date Finalised
0		To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
		45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
Diamond Firetail	Stagonopleura guttata	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
		45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
Grey Falcon	Falco hypoleucos	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
		45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Pink Cockatoo	Lophochroa leadbeateri	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Pink Cockatoo	Lophochroa leadbeateri	45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
South-eastern Hooded Robin	Melanodryas cucullata cucullata	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
White-bellied Sea-Eagle	Haliaeetus leucogaster	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
		45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
White-fronted Chat	Epthianura albifrons	45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Brolga	Grus rubicunda	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
		45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
		45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
Inland Forest Bat	Vespadelus baverstocki	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Regent Parrot (eastern subspecies)	Polytelis anthopeplus monarchoides	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Superb Parrot	Polytelis swainsonii	45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
Swift Parrot	Lathamus discolor	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

White-throated Needletail	Hirundapus caudacutus	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
		45-Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Brolga	Grus rubicunda	Species is vagrant
Dusky Woodswallow	Artamus cyanopterus cyanopterus	Species is vagrant
Inland Forest Bat	Vespadelus baverstocki	Species is vagrant
Regent Parrot (eastern subspecies)	Polytelis anthopeplus monarchoides	Species is vagrant
Superb Parrot	Polytelis swainsonii	Species is vagrant
Swift Parrot	Lathamus discolor	Species is vagrant
White-throated Needletail	Hirundapus caudacutus	Species is vagrant

BAM Candidate Species Report

Proposal Details

Assessment Id 00047733/BAAS22016/24/00047734	Proposal Name Boags Creek Solar Farm	BAM data last updated * 14/03/2024
Assessor Name Fig Forest	Report Created 27/04/2024	BAM Data version * 67
Assessor Number BAAS22016	Assessment Type Major Projects	BAM Case Status Open
Assessment Revision 0	Date Finalised To be finalised	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Eucalyptus leucoxylon subsp. pruinosa Yellow Gum	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Lophochroa leadbeateri Pink Cockatoo	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

Phascolarctos cinereus Koala	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

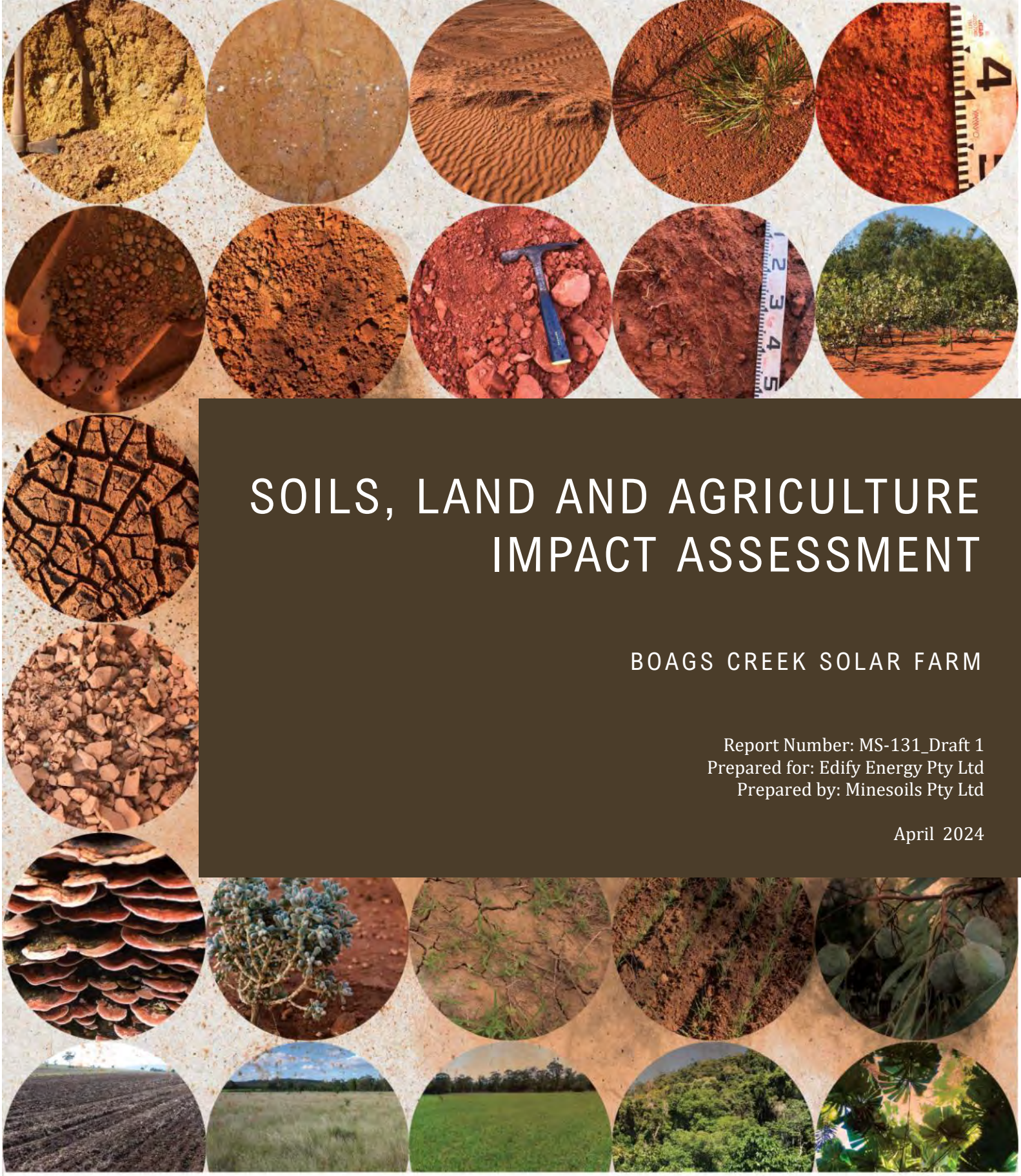
Common name	Scientific name	Justification in the BAM-C
Austral Pillwort	Pilularia novae-hollandiae	Habitat degraded Geographic limitations
Australian Bustard	Ardeotis australis	Habitat degraded
Bindweed	Convolvulus tedmoorei	Habitat degraded
Claypan Daisy	Brachyscome muelleroides	Habitat degraded Geographic limitations
Lanky Buttons	Leptorhynchos orientalis	Habitat degraded
Menindee Nightshade	Solanum karsense	Habitat constraints
Mossgiel Daisy	Brachyscome papillosa	Habitat degraded
Red Darling Pea	Swainsona plagiotropis	Habitat degraded
Regent Parrot (eastern subspecies)	Polytelis anthopeplus monarchoides	Species is vagrant
Silky Swainson-pea	Swainsona sericea	Habitat degraded
Slender Darling Pea	Swainsona murrayana	Habitat degraded
Superb Parrot	Polytelis swainsonii	Species is vagrant
Swift Parrot	Lathamus discolor	Species is vagrant
Winged Peppercress	Lepidium monoplocoides	Habitat degraded

Appendix G Preliminary Landscape and Visual Impact Worksheets

	X	Y	
Name/ID	Relative Height Difference (m)	Distance from viewpoint (m)	Sector
1	1	200	2°
2	1	200	2°
3	5.2	450	2°
4	3	470	1°
5	3	363	2°
6	1	280	2°
7	0	360	1°
8	0	710	1°
9	3	730	1°
10	3	1531	0°
11	0	2326	0°
12	0	3433	0°
13	0	1900	0°
14	0	2000	0°
15	0	1690	0°
16	0	1500	0°
17	0	1550	0°
18	0	2212	0°
19	0	1587	0°
20	0	1390	0°
21	0	1350	0°
22	0	1610	0°
23	0	1530	0°
24	0	1630	0°
25	0	1030	1°
26	1	1554	0°
27	3	1378	0°
28	3	1369	0°
29	1	1884	0°
30	5	2000	0°
31	2	3316	0°
32	0	3485	0°
33	0	4040	0°
34	2	1160	1°
35	0	4167	0°
36	0	3433	0°
37	0	1518	0°
38	0	1740	0°
39	2	3312	0°
Kidman Way	0	150	2°
Intersection Kidma	0	150	2°
Donald Ross and Ri	2	1620	0°
DPSF	2	2500	0°
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
	0		

	X	Y	Equation
Line 1	0	1100	y = 72.5x + 1100
	40	4000	
Line 2	0	325	y = 25.167x + 325
	150	4100	
Line 3	0	150	y = 15.5x + 150
	200	3250	
Line 4	0	97	y = 11.515x + 97
	200	2400	

Appendix H Soils and Agricultural Impact Assessment



SOILS, LAND AND AGRICULTURE IMPACT ASSESSMENT

BOAGS CREEK SOLAR FARM

Report Number: MS-131_Draft 1
Prepared for: Edify Energy Pty Ltd
Prepared by: Minesoils Pty Ltd

April 2024

MINESOILS
LAND & REHABILITATION SPECIALISTS

PREPARED BY

Minesoils Pty Ltd
ABN 84 627 497 509

0408 474 248
clayton@minesoils.com.au
www.minesoils.com.au
PO Box 11034 Tamworth NSW 2340

DISCLAIMER

This report has been prepared by Minesoils Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Edify Energy Pty Ltd. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Minesoils. Minesoils disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared by	Approved
MS-131_ Draft 1	22 April 2024	Matt Hemingway	Clayton Richards
MS-131_ Draft 2	22 July 2024	Matt Hemingway	Clayton Richards

TABLE OF CONTENTS

List of Figures

EXECUTUVE SUMMARY

Minesoils Pty Ltd (Minesoils) was engaged by Edify Energy Pty Ltd (Edify) to conduct a Soil and Agricultural Impact Assessment of the Boags Creek Solar Farm (the Project) located in the Riverina region of New South Wales. The baseline soil and agriculture resources are detailed within this report. The impacts on these resources from the proposed construction, operation and decommissioning phases of the Project are addressed in this report in accordance with relevant regulatory requirements and guidelines.

The Project includes infrastructure such as solar panel arrays, inverters, transformers, overhead lines, underground cabling, an integrated battery storage system (proposed up to 300MW / 600MW), site office and maintenance building, access tracks, road and electrical easement crossings, perimeter security fencing, and a proposed substation.

The Project is located approximately 8 km south of Darlington Point and 40 km south of Griffith, within the Murrumbidgee Local Government Area (LGA). The Project Area subject to the Project and this assessment covers approximately 845 ha. The Study Area has historically been utilised for agricultural practices with evidence of broad native vegetation modification resulting from extensive clearing and agricultural land use. Current land use comprises broadacre cropping and livestock grazing land, and is consistent with the surrounding locality.

A soil survey undertaken by Minesoils found the Project Area to contain one dominant soil mapping unit characterised by the Vertosol soil type (deep, cracking clay).

Due to flat nature of the landscape, the risk of soil erosion from surface water flows is low, and while there is a moderate to high risk of dispersion where soils directly impacted, erosion and sediment control management options are available to mitigate this risk.

The Project Area was also subject to a site verification assessment of land and soil capability (LSC), in accordance with the LSC Guideline, and was found to be comprised of a single class: LSC class 3: High capability land.

There is a high level of certainty about the status of agricultural resources and enterprises in the Project Area, locality and broader region, based on the site verification assessment undertaken, consultation and desktop studies carried out. Further, there is a high level of confidence regarding the Project activities, surface disturbance requirements and commitments to returning land to pre-disturbance agricultural status following the life of the Project.

Based on these factors, the impacts on agriculture as a result of the Project are determined to be low, temporary, and limited to the development footprint. These impacts can be summarised as the following:

- Temporary removal of up to 845 ha from agricultural land use within the Project Area for the duration of the Project.
- Temporary removal of potential agricultural primary productivity to the estimated value of up to $811,155 per year for the duration of the Project.
- Temporary impacts on soil resources within the Project Area where surface disturbance occurs.
- Temporary removal of 0.6% of LSC class 3 land in the Murrumbidgee LGA from highly productive land use activities such as cropping.

The temporary impacts on agriculture listed above are considered a negligible impact in the context of the gross commodity values and land use coverage of the agricultural industries operating within the Murrumbidgee LGA. Further, at the scale of the enterprises operating within the Project Area, impacts are considered offset as the involved landowners would be financially compensated.

Following construction and resting period of approximately one year, subject to the approval of Project stakeholders such as Rural Fire Service, Murrumbidgee Council and the Project's insurance providers, Edify

anticipates that merino sheep can be introduced to graze within the Project boundary. This integrated land use of solar panels and livestock grazing offers the potential to enable the continuation of agricultural land usage and mitigate the above listed temporary impacts of the Project.

Further, it is anticipated that by adopting the principles of impact minimisation and targeted soil and erosion management during Project construction and operation, and implementing effective decommissioning and rehabilitation at the end of Project life, the Project will have no permanent negative impacts on agricultural resources or enterprises.

A summary of mitigation measures and management recommendations have been provided at Section 6.7 to eliminate the permanent risks and control the temporary risks of the Project on land and soil resources. The salvage of topsoil material for re-use purposes combined with sound erosion and sedimentation management practices during construction, operational and decommissioning phases of the Project, will ensure rehabilitation requirements are met and land is returned to a pre-disturbance agricultural status.

1 INTRODUCTION

1.1 OVERVIEW

Minesoils Pty Ltd (Minesoils) was engaged by Edify Energy Pty Ltd (Edify) to conduct a Soil and Agricultural Impact Assessment of the Boags Creek Solar Farm (the Project) located in the Riverina region of New South Wales. The baseline soil and agriculture resources are detailed within this report. The impacts on these resources from the proposed construction, operation and decommissioning phases of the Project are addressed in this report in accordance with relevant regulatory requirements and guidelines.

This report supports a State Significant Development (SDD) Development Consent approval under Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979, as part of a Scoping Report and subsequent Environmental Impact Statement (EIS) for the Project.

Soil, land and agriculture related Secretary's Environmental Assessment Requirements (SEAR's) items that are anticipated to be included for the Project consist of the following:

- *A soil survey to determine the soil characteristics and consider the potential for erosion to occur;*
- *An assessment of the agricultural impacts in accordance with the Solar Guideline.*
- *Completion of a Land Use Conflict Risk Assessment in accordance with the NSW Department of Industry's Land Use Conflict Risk Assessment Guide (NSW DPI, 2011).*

The objective of this report is to address the above items.

1.2 PROJECT DESCRIPTION

The proposed Project is a Solar Farm (300MW) with an integrated battery energy storage system (BESS) (300MW / 600MWh). The Project includes infrastructure such as solar panel arrays, inverters, transformers, overhead lines, underground cabling, an integrated battery storage system (proposed up to 300MW / 600MW), site office and maintenance building, access tracks, road and electrical easement crossings, perimeter security fencing, and a proposed substation.

It is estimated that the Project would have an operational lifetime of approximately 30 years, or more, where the Project is re-energised, a scenario that appears feasible based on expectations of future renewable energy requirements.

If it is determined to decommission the solar farm, Project surface infrastructure will be dismantled and removed from site, with the possible exception of the 330kV switching station. There are provisions in the land and lease agreements with the site landowners for rehabilitation of the site after decommissioning. All impacted land would then be returned to agricultural land use.

1.3 PROJECT AREA

The Project is located approximately 8 km south of Darlington Point and 40 km south of Griffith, within the Murrumbidgee Local Government Area (LGA) (refer **Figure 1**). The Project Area covers approximately 845 ha, as shown on **Figure 2**.

The Project Area is situated on thirteen Lots of 7346 Kidman Way, Darlington Point and Ringwood Road, Darlington Point. The Development Footprint will be a portion of the Project Area, to be confirmed following further constraints investigations.

The Project Area is within the plains country and sits between the Murray River to the south and Murrumbidgee River much closer to the north. The surrounding locality is characterised by rural land uses and intensive animal production operations. The Project Area and locality have historically been utilised for agricultural practices primarily consisting of livestock grazing on native pastures as well as irrigated cropping, cultivation and

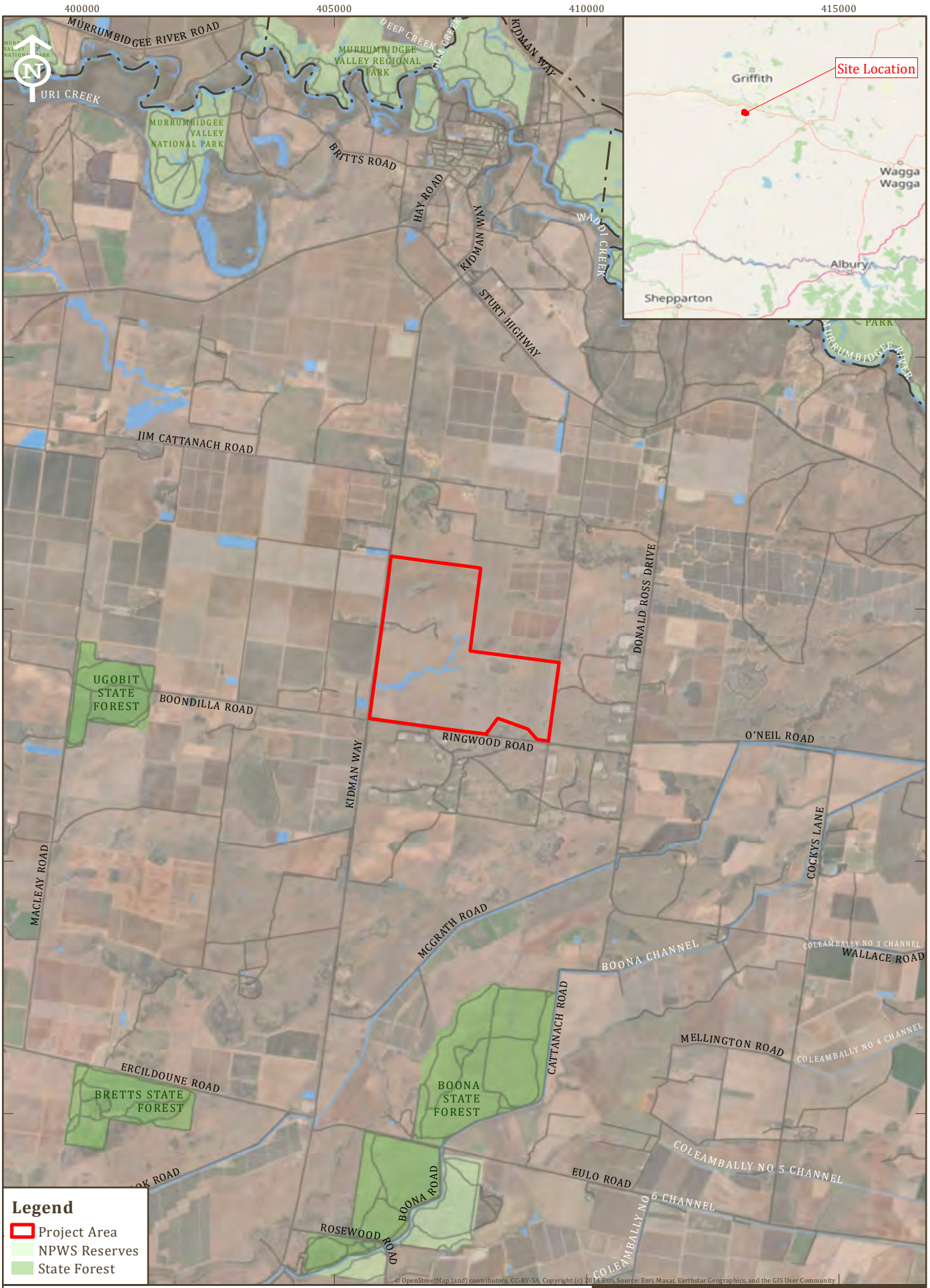
horticulture, with evidence of broad native vegetation modification resulting from extensive clearing and agricultural land use. Current land use comprises cropping and livestock grazing.

1.4 ASSESSMENT APPROACH

The assessment has been undertaken in accordance with the *Large-Scale Solar Energy Guidelines* (LSSE Guidelines) (NSW DPIE, 2022) which includes requirements to undertake a soil survey and verify land and soil capability (LSC) in accordance with *Land and Soil Capability Assessment Scheme* (LSC Scheme) (EOH 2012). The results of the site verification, as presented in Section 3.2, determined the level of agriculture impact assessment as Level 3 – Detailed, as per the LSSE Guidelines. The assessment requirement pathway for this assessment from the LSSE Guidelines is presented in **Figure 3**. The requirements for this level of assessment, and where these items are addressed in this report, are presented in **Table 1**.

1.5 ASSESSMENT ASSUMPTION

This assessment assumes the Project connects to the existing Darlington Point Substation (off Donald Ross Drive), by connecting the Project via an easement. However, this is yet to be confirmed. Any impacts associated with hosting substation within the Project Area that are not covered by this assessment will be included in the EIS, noting any Project substation located within the Project Area would be no more than 2ha and represent negligible additional agricultural impacts to those presented in this report.



GDA2020 MGA Zone 55

MINESOILS
LAND & REHABILITATION SPECIALISTS

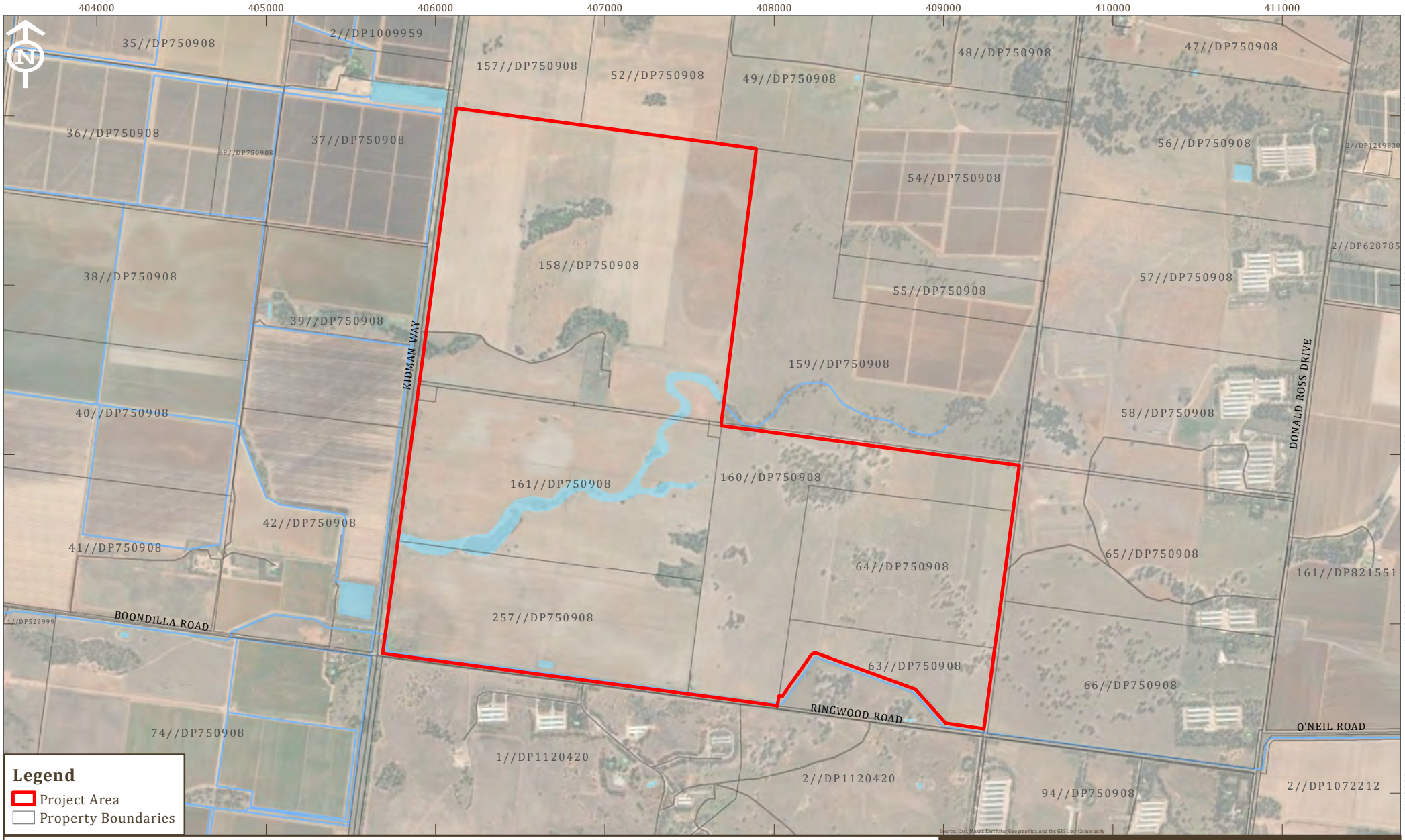
0 500 1,000 2,000 Meters

Scale 1:100000 at A4

Project Locality

FIGURE 1

D:\RST002_MineSoils\MS131_BoagsCreek\MS131_001_ProjectLocality.mxd 21/04/2024 5:19:52 PM



GDA2020 MGA Zone 55

Meters

0 125 250 500

Scale 1:30000 at A4

MINESOILS

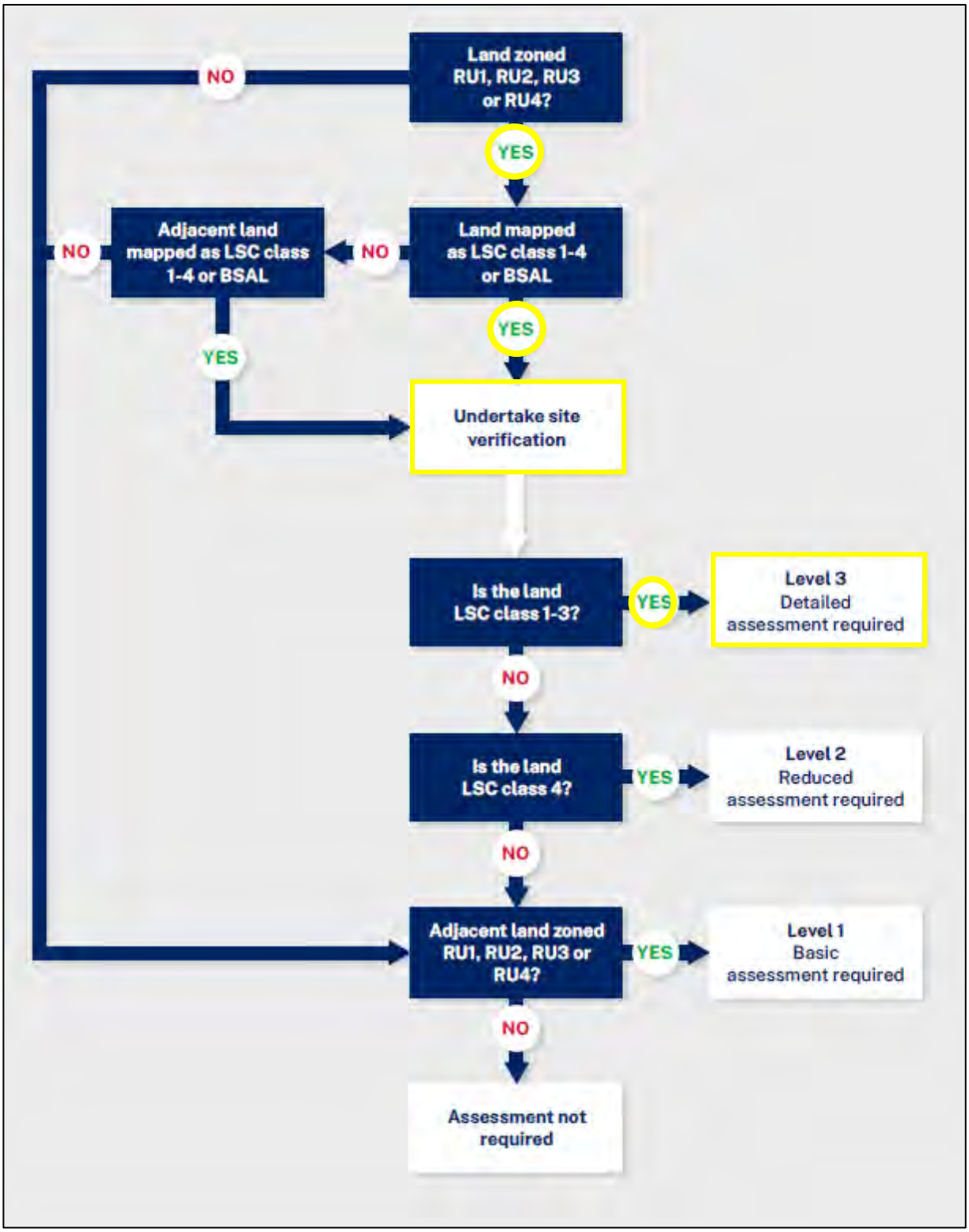
LAND & REHABILITATION SPECIALISTS

Project Area

FIGURE 2

MS131_002_ProjectArea 14/08/2024 7:10:46 PM

Figure 3. Adopted Agricultural Assessment Pathway



(NSW DPIE, 2022)

Table 1: Adopted Requirements of 'Level 3 - Detailed' Assessment and Section Addressed

Assessment	Content and form	Section Addressed
Project description Describe the nature, location, intensity and duration of the project and include a map of the project area.	• project description • areas of the site that would be disturbed or temporarily removed from agricultural use • location • duration	**1**
Regional context Describe the regional context.	• property zoning • climate and rainfall • regional landform • regional land use including any significant agricultural industries and/or infrastructure	**2**
Site characteristics and land use description Describe the nature and location of agricultural land with the potential to be impacted by the development. Describe the current agricultural status and productivity of the proposed development area and surrounding locality including the LSC scheme.	• describe the land subject to the project area • describe existing agricultural land uses • describe the history of agricultural practices on the project area • identify soil type, fertility, land and soil capability • provide a map showing the verified LSC class of the project area • provide a map showing topography of the site • describe the agricultural productivity of the site	**3**
LUCRA assessment Conduct an assessment of potential land use conflicts, including completion of an assessment in accordance with the Department of Industries' Land Use Conflict Risk Assessment Guide	• land use compatibility and conflicts • discuss compatibility of the development with the existing land uses on the site and adjacent land (e.g. aerial spraying, dust generation and biosecurity risk) during operation and after decommissioning, with reference to the zoning provisions applying to the land	**4** **(Appendix 1)**
Impacts on agricultural land Identify and describe the nature, duration and consequence of any potential impacts on agricultural land subject to the project area and in the wider region	• describe project impacts on identified agricultural productivity and enterprises including but not limited to livestock, cropping activities, orchard production., etc • consider impacts to the agricultural land of the site • consider project potential to temporarily and/or permanently remove agricultural land and/or fragment or displace existing agricultural industries • consider cumulative impacts of multiple solar projects • a detailed assessment of whether the project would significantly impact the local or regional agricultural industry, including production and supply chains	**5**
Mitigation strategies Outline strategies which may be adopted to mitigate potential impacts on agricultural land and minimise land use conflict.	• outline and consider strategies to mitigate project impacts on agricultural land • consider co-location with existing agricultural practices and investigate feasibility of agrisolar where it would result in a meaningful benefit • justification for the project considering other alternatives which would have lesser impacts on agricultural land. Proponents must demonstrate that other project areas and siting options have been considered and state the reasons why the site and layout was chosen over alternative options • an analysis of whether site design could be amended to reduce impacts	**6**

2 REGIONAL CONTEXT

2.1 ZONING

The Project Area is contained within thirteen cadastral lots and zoned as Rural Use 1 (RU1) – Primary Production under the *Murrumbidgee Local Environmental Plan 2013* (Murrumbidgee Council 2013) (refer **Figure 4**). The objectives of the RU1 zone are:

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

Development for the purpose of electricity generation is not specified in item 2 or 3 of the RU1 Primary Production Land Use Table under Part 2 of the LEP, therefore the development is 'Prohibited' according to item 4. However, the provisions of the State Environmental Planning Policy (Transport and Infrastructure) 2021, override the LEP's, allowing the proposal to be undertaken with consent under clause 2.36 (1(b)).

2.2 CLIMATE AND RAINFALL

The Bureau of Meteorology (BOM) (BOM, 2023) classify the Riverina in the Hot Dry Zone (with cooler winters) climatic zone. This zone can be very hot in the summer months while in the winter, nights can be considerably cold with cool to mild days.

Annual rainfall in the Riverina has remained relatively stable over the past 30 years, decreasing by around 20 mm (4%) from about 520 mm to about 500 mm when compared to the previous 30 years (Bureau of Meteorology and the CSIRO, 2019).

Rainfall reliability maps for Riverina over the past 30 years show winter rainfall has been moderately reliable across the region, usually changing by about 50 mm from year to year. This is in contrast to spring and summer rainfall, which have been less reliable. Autumn rainfall has been unreliable across the entire region.

The Riverina region experiences frost risks to agriculture, which tend to occur through dry winter and spring periods, when soil moisture is low, and cloud cover infrequent.

The closest BOM weather station to the Project Area is at Griffith Airport (Site No. 075041), approximately 40km north (BOM, 2024). The annual average rainfall is 410.6 mm, falling throughout the year over approximately 48 rainy days, with the average highest rainfall in the month of October and the lowest in the month of July.

The annual average maximum temperature recorded at the site is 24.0°C and the annual average minimum temperature is 10.1°C. The highest average maximum temperature of 33.3°C is recorded in January, while the lowest average maximum temperature of 14.8°C is recorded in July.

2.3 REGIONAL LANDFORM

The Project Area is located on the Riverine Plain, the eastern geomorphic subdivision of the Murray Basin that encompasses an area of 77,000 square kilometres. The Riverine Plain is characterised by almost flat topography with extremely low gradients dominated by the open plains of native grasslands and semi-arid shrublands, which is traversed by several major rivers and their tributaries that flow from the east and south. The Murray Basin is a large low lying intracratonic basin containing Cainozoic unconsolidated sediments and sedimentary rocks.

The three main rivers of the Riverina Murray region are the Murray, Murrumbidgee and Lachlan Rivers, all fed by numerous creeks and tributaries. The three river systems are part of the greater Murray-Darling Basin.

The underlying geology of the Project Area consists of Shepparton Formation which formed in a fluvio-lacustrine environment between the Pleistocene and Holocene with the dominant lithology consisting of alluvial floodplain deposits (refer **Figure 5**). The Shepparton Formation consists of unconsolidated to poorly consolidated variegated and mottled clay, silt, silty clay, with intercalated lenses of fine to coarse sand and gravel. The formation has been partially modified by pedogenesis and groundwater table fluctuation.

Soil features are of riverine and aeolian origin – that is, deposited by water and wind geomorphological processes. Riverine features of the plains are, especially in the great alluvial fans and fluvial complexes, but minutiae in a broad natural system of river courses changing with time, and are associated with complex of deposits which vary rapidly both laterally and in depth. The most common aeolian landforms are those which involve accumulation, especially of sandy material, occurring as dunes, lunettes or sand-ridges. In addition, deflationary landforms are present, represented by the occurrences of sheet erosion known as scalds, and the occurrence of dry lake basins (Butler, et al 1973).

2.4 REGIONAL LAND USE

2.4.1 AGRICULTURAL LAND USE

The Riverina Murray region covers approximately 115,000 square kilometres, or 14% of NSW (DPI 2018), including twenty local government areas. The variety of landscapes in the wider Riverina Murray Agricultural region supports a diverse range of agricultural industries that all place a high value on the region's reliable water supplies.

The region has a long and favourable pastoral history in spite of its low stocking rate and its susceptibility to drought and scald (Butler, et al, 1973).

Europeans arrived in the region as early as 1830, with Moulamein (approximately 60km west of the Project Area) being the oldest town in the Riverina (Sydney Morning Herald, 2008). Moulamein's early importance was as a crossroad where wool from western NSW was brought to the local port where the paddle-steamers plying the Edward River could take the cargo downstream.

Following settlement, wool growing quickly became the major local industry. Dominated for over 100 years by squatters and their flocks on immense holdings of land, the introduction of irrigation and the creation of soldier settlement blocks in the 1940s broadened the agricultural industry, increasing the population.

Today agriculture in the region includes beef grazing and temperate fruit (apples, pears, cherries) production in the east, through broad-acre cropping (cereal, oilseed and pulses), beef and sheep grazing, intensive poultry and pigs, irrigation cropping (cotton, rice, maize), to rangeland grazing in the west.

The Project Area lies within the main irrigation areas of the Riverina. These occur in an arc extending from Hillston (water supplied by groundwater and the Lachlan River) in the north, through to Griffith, Leeton & Coleambally (water supplied by the Murrumbidgee River), south through Jerilderie and Tocumwal to extend west along the Murray River (water supplied by the Murray River). This extensively cleared, usually land-formed and highly modified landscape has a was once semi-arid grass/shrub-land known as 'rangelands'. The remaining rangelands landscape is now largely west of the Project Area, around Hay (93m) and south of the Project Area, around Jerilderie.

The properties in the south-west of the Riverina region (Murray River LGA, Edward River LGA) are partially influenced by irrigation, but generally contain rangeland. Here, farm sizes are in the 3,000ha to 4,000ha range. In the far north-west of the region, (Hay LGA) properties are largest for the Riverina region and typically greater than 7,00ha, reflecting use for large scale grazing enterprises. Moving west into the influence of the irrigation areas and the location of the Project Area, property size decreases (Carrathool, Griffith, Murrumbidgee, Berrigan LGA's) into the 2,000ha to 3,000ha range (DPI, 2018).

At the scale of the Murrumbidgee LGA (within which the Project lies), as of the last agricultural census of 2020 - 2021 (ABS, 2022a) 565,620 ha of land is subject to agricultural activity. The area of land used by agricultural type

is presented in **Table 2**, which shows grazing of livestock is the dominant land use within the LGA, accounting for 60% of area subject to agricultural land use, with cropping activity representing 40% of the area.

Table 2: Murrumbidgee LGA Agricultural Land Use by Type 2020 - 2021

Agricultural Land Use	Murrumbidgee LGA	
	ha	%
Grazing	338,237	60
Cropping	226,116	40
Forestry	796	<1
Other	472	<1
Total	565,620	100

2.4.2 AGRICULTURAL ENTERPRISES

At the scale of the project locality, agricultural land use is dominated by enterprises consisting of livestock grazing, irrigated cropping, horticulture, and intensive poultry production (refer **Figure 6**).

Valuable agricultural commodities in the broader LGA largely consist of irrigated cropping enterprises such as cotton, rice, lucerne, maize, millet and sorghum. Winter cereals are often grown in rotation with irrigated summer crops to utilise the sub-soil moisture stored from irrigation and as a break crop. There are widespread plantings of fruit trees, mainly citrus and stone fruit, with some nut plantations, and grape vines for wine. Intensive livestock farming of poultry and pigs takes advantage of the grain and feed grown in the area.

The gross value of agricultural enterprises within the Murrumbidgee LGA for 2020-2021 is $469 million, as shown in **Table 3** (ABS, 2022b). Cropping accounts for approximately 78% of the total gross value of agriculture for the Murrumbidgee LGA, with grazing accounting for 15%.

The value of cropping is dominated by broadacre crops (consisting largely of wheat, rice, barley, canola and cotton) representing 68% of the value of cropping enterprises, followed by and fruit and nuts (largely oranges and almonds)representing 18% of the value of cropping, as shown in **Table 4** (ABS, 2022b).

Within the category of livestock slaughtered, sheep and lambs dominate followed by cattle and calves, as shown in **Table 5** (ABS, 2022b). Livestock grazing enterprises are represented by the following estimates from the latest agricultural census (2020 – 2021) (ABS, 2022a):

- 292,942 sheep and lambs;
- 24,484 head of cattle;
- 250 livestock grazing business enterprises.

Milk dominates livestock products with 68% of gross value for the Murrumbidgee LGA, as shown in **Table 6** (ABS, 2022b).

Table 3: Murrumbidgee LGA Agricultural Commodity Gross Value by Type 2020 - 2021

Agricultural Commodity	Murrumbidgee LGA	
	$	%
Crops	367,435,805	78
Livestock slaughtered	70,157,094	15
Livestock products	31,551,914	7
Total	469,144,814	100

Table 4: Murrumbidgee LGA Crop Gross Value by Type 2020 – 2021

Crop Type	Murrumbidgee LGA	
	$	%
Broadacre crops	232,010,404	63
Vegetables	9,168,255	2
Hay	7,823,046	2
Fruit and nuts	65,497,560	18
Grapes	24,726,769	7
Vegetables	28,209,771	8
Total	367,435,805	100

Table 5: Murrumbidgee LGA Livestock Slaughtered Gross Value by Type 2020 – 2021

Livestock Type	Murrumbidgee LGA	
	$	%
Sheep and lambs	28,888,772	42
Cattle and calves	26,416,517	38
Pigs	13,581,806	20
Poultry	34,453	<1
Other	33,848	<1
Total	68,955,396	100

Table 6: Murrumbidgee LGA Livestock Products Gross Value by Type 2020 – 2021

Livestock Product	Murrumbidgee LGA	
	$	%
Milk	21,550,604	68
Wool	9,978,845	32
Eggs	22,435	<1
Total	31,551,914	100

2.4.3 REGIONAL AGRICULTURAL INFRASTRUCTURE

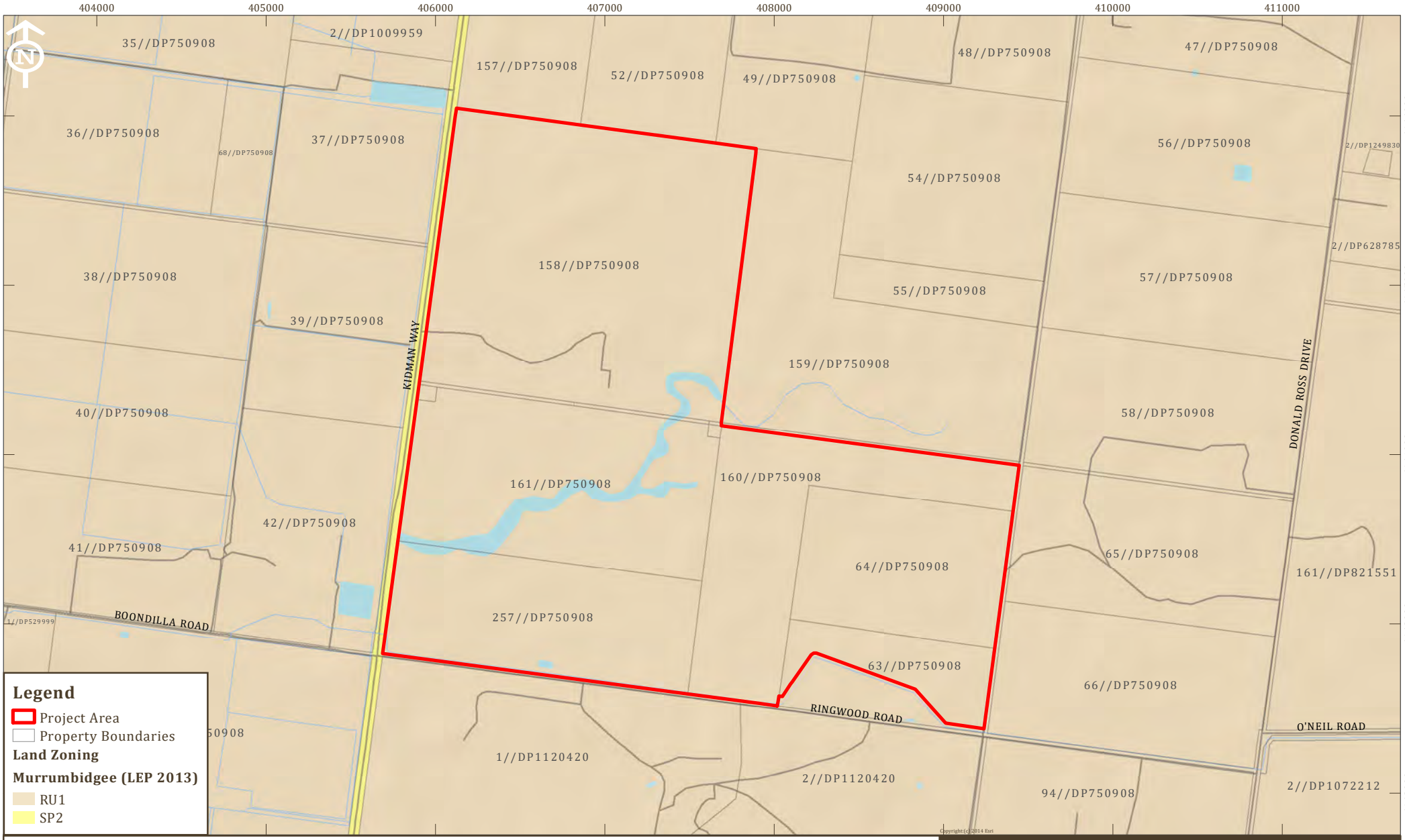
The key infrastructure item assisting agricultural market access and cost of production is the transport network servicing the Riverina region. Underlining the importance of this issue, total freight costs from farm to port can be as much as 30% of the value of the crop being marketed depending on Australian and world commodity prices in a given season. The Riverina Murray is a key transport hub for the distribution of goods across south-eastern Australia with rail freight, roads and airport links within reach of major markets. Situated to the south-west of the ACT and bordering Victoria, the region has extensive commercial links to the ACT and Victoria, as well as Sydney and Adelaide.

The main transport route for the Project locality is the Kidman Highway which connects to the Sturt Highway and Newell Highway, with several minor roads transecting the locality (e.g., Ringwood Road, Donald Ross Drive). The Sturt Highway is used for intra-regional transportation consisting of agricultural trucks, freight trucks and local farming traffic as well as low levels of tourist traffic, between the towns of Darlington Point and Balranald. The highway links Adelaide with the Hume Highway 20km past Wagga Wagga.

In proximity to the Project Area, the agricultural service centre of Griffith (40 km north) allow access to businesses providing agricultural equipment and supplies, including animal fencing, animal vaccinations, livestock ID, stock supplements, seed, fertiliser and crop protection.

Wagga Wagga is the focal centre of the Riverina regions beef and sheep industry and is the location of the Wagga Wagga Livestock Marketing Centre (LMC), one of the key livestock exchange facilities in NSW with a reputation as the largest selling centre for sheep in Australia. In the year of 2021/2021, the LMC sold 2,005,091 sheep, representing 30% of the sheep sold in NSW, and 107,274 head of cattle, representing 11% of the cattle sold in NSW (MLA, 2022).

Other infrastructure critical to agricultural production includes energy needs (gas and electricity), telecommunications services, irrigation water infrastructure and urban water and wastewater services. General agricultural improvements such as stock fences, stock yards, shedding, dams and access tracks are widespread throughout the Project locality which reflects the historical and current development of the local lands for livestock grazing.



GDA2020 MGA Zone 55

0 125 250 500 Meters

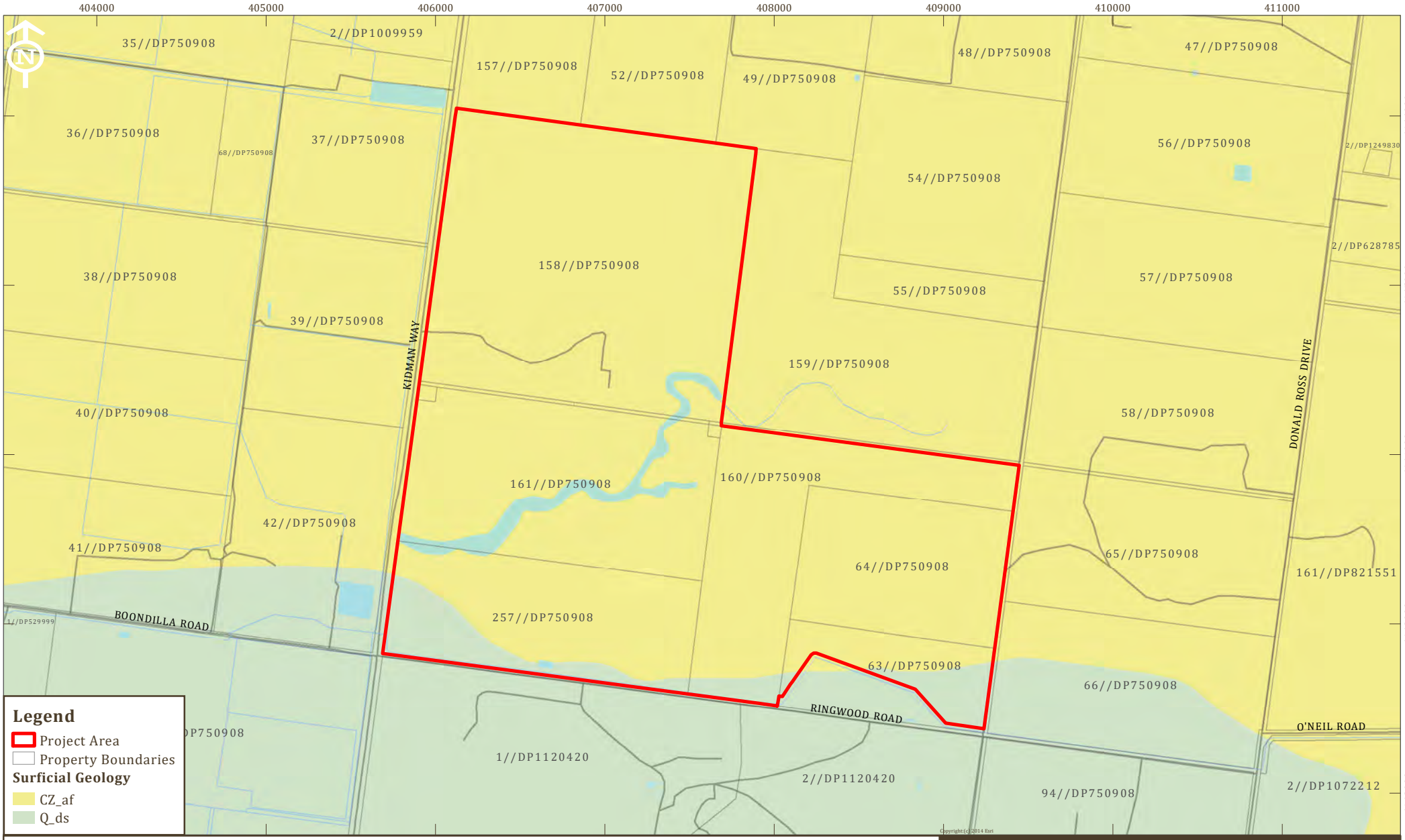
Scale 1:30000 at A4

MINESOILS
LAND & REHABILITATION SPECIALISTS

Zoning

FIGURE 4

MS131_004_Zoning 14/08/2024 7:11:49 PM



MINESOILS
LAND & REHABILITATION SPECIALISTS

MS131_005_Geology 14/08/2024 7:12:37 PM

3 SITE CHARACTERISTICS AND LAND USE

3.1 SITE CHARACTERISTICS

3.1.1 LANDSCAPE

A site inspection was undertaken by Minesoils in March 2024. The Project Area was determined to be a generally stable, largely treeless, open plain landform. At the time of inspection there was no surface cover over areas subject to cropping (approximately 60% of the Project Area), as shown in **Plate 1**, and 60 - 100% surface cover over areas subject to livestock (approximal 30% of the Project Area), predominantly in the form of low shrubs and native pasture for grazing (**Plates 2**). Areas that remain timbered in native vegetation occupy approximately 10% of the Project Area and are partially associated with minor drainage depressions.

The flat nature of the plains within which the Project Area lies is highlighted of **Figure 6**, which shows minimal elevation change (approximately 124 m Australian height Datum (AHD) to 127 m AHD in a general west to east trend). The Project Area landscape is generally level, although contains a minor presence subtle depressions (refer **Figure 6**).

There are no major watercourses within the Project Area. The Project Area is located approximately 4.5 kilometres south east of the Murrumbidgee River and immediately north of an irrigation channel (**Plate 4**).

Existing Transgrid 132 kV and 220kV transmission lines run through the eastern portion of the Project Area.

3.1.2 AGRICULTURAL LAND USE

The agricultural land within the Project Area is dominated by broadacre cropping with some livestock grazing. Cropping has primarily consisted of wheat and canola over the past five years. Pastures support Merino sheep and Hereford cattle, which are grazed at a low stocking rate on native pastures for breeding and fattening.

Livestock are watered through two surface dams, which are filled with pumped water.

The Project Area under cropping is typically subject to the following fertilizer applications

- 50kg/ha of treated seed.
- 50kg/ha of starter (MAP or DAP starter fertiliser, more likely DAP as more stable); and
- 50-100kg/ha of urea during favourable seasons.

General agricultural improvements are present, including stock fences and gates (**Plate 4**), stock yards (**Plate 5**), shedding for farm equipment and hay storage (**Plate 6**), and unsealed access tracks.

At the time of inspection, neighbouring properties in the immediate vicinity were observed to be used for a range of agricultural uses, such as poultry farming (immediately south and east of the Project Area), broadacre cropping (immediately west of the Project Area) and grazing (immediately north and west of the Project Area). Intensive irrigated cropping, irrigated horticulture cultivation, and grazing on native and irrigated improved pastures are commonplace in the wider locality (refer **Figure 6**).

Similar agricultural improvements (e.g. irrigation infrastructure, cattle grids, stock yards, stock fences, dams and existing access tracks) are widespread throughout the locality which reflects the historical and current development of the local lands for intensive irrigated agriculture land use.

Darlington Point Solar Farm is located approximately 2km to the north east of the Project Area.

Plate 1: The Project Area contains open plains with exposed soils subject to broadacre cropping.

Plate 2: The Project Area contains areas of native pasture subject to livestock grazing.

Plate 3: The Project Area contains areas of native vegetation partially correlating with ephemeral drainage lines.

Plate 4: Irrigation channel immediately to the south of the Project Area.

Plate 5: Agricultural infrastructure within the Project Area includes a stockyard.

Plate 6: Agricultural infrastructure within the Project Area includes shedding.

3.1.3 AGRICULTURAL PRODUCTIVITY

Agricultural productivity is subject to long term climate and rainfall variables, as well as changes in economic, social and policy frameworks, often at a scale well beyond the Project Area. There is no set agricultural productivity value for land under agricultural use.

The NSW Department of Primary Industries (DPI) (2023) *Gross Margin Budgets for Livestock* can be used to provide a broad estimation of the potential productivity of the land for grazing that is subject to change as a result of the Project. Based on modelling conservative enterprises of Merino ewes (20 micron) – Merino rams as a stocking rate of 2 DSE/ha, the estimated productivity of the Project Area is $79,379 per annum as summarised in **Table 7**.

An alternative method by which to estimate the potential productivity of the Project Area that accounts for the land and soil capability and best reflects current land use, is by analysing the information presented from the last agricultural census of 2020 – 2021 in Section 2.3 (ABS 2022a and 2022b). This information shows that within the Murrumbidgee LGA 338,237 ha of land was used for grazing activities, of which 99% of the gross commodity value of livestock slaughtered and livestock products (totalling $101,686,573) can be attributed that area, resulting in an annual $/ha ratio of $300/ ha. For broadacre cropping within the Murrumbidgee LGA, 180,156 ha of land was used for cereals and other cropping activities (ABS, 2022a), of which 100% of the gross commodity value of broadacre cropping (totalling $232,010,404) can be attributed that area, resulting in an annual $/ha ratio of $1,287/ ha.

By modelling a combination of cropping and grazing enterprises over the Project Area based on the approximate area of land attributed to each type of agriculture at the time of inspection, the potential productivity of the Project Area is estimated to be up to $811,155 per year, as shown in **Table 8**.

Table 7: Estimated Potential Productivity of Agricultural Land within the Project Area

Enterprise	Estimated Gross Margin ($/DSE/year)*	Stocking Rate (DSE)	Project Area (ha)	Project Area Gross Margin ($/year)
Merino ewes (20 micron) – Merino rams	46.97	2	845	79,379

*Source: DPI, 2023

Table 8: Estimated Potential Productivity of the Project Area based on LGA Data

Enterprise	Estimated Gross Value in LGA ($/ha/year)	Project Area (ha)	Estimated Productivity ($/year)
Grazing	300	280	84,000
Broadacre Cropping	1,287	565	727,155
		Total	811,155

3.2 SOIL SURVEY AND SITE VERIFICATION

3.2.1 EXISTING SOILS INFORMATION

The following section presents the NSW state government regional mapping data for soil types, inherent soil fertility and LSC as applied to the Project Area (NSW and Department of Planning, Industry and Environment, 2022).

Soil Types

The NSW regional soil mapping indicates the dominant soil types within the Project Area are Vertosols and Rudosols as per Australian Soil Classification (ASC) (Isbell, R. F.,2021) (refer **Figure 7**).

Vertosols are defined as soils with the following:

1. A clay field texture or 35% or more clay throughout the solum except for thin, surface crusty horizons 30 mm or less thick and
2. When dry, open cracks occur at some time in most years. These are at least 5 mm wide and extend upward to the surface or to the base of any plough layer, peaty horizon, self-mulching horizon, or thin, surface crusty horizon; and
3. Slickensides and/or lenticular peds occur at some depth in the solum.

Rudosols are defined as soils with little, if any, (rudimentary) pedologic organisation apart from (a) minimal development of an Al horizon or (b) the presence of less than 10% of B horizon material (including pedogenic carbonate) in fissures in the parent rock or saprolite. The soils are apedal or only weakly structured in the A1 horizon and show no pedological colour changes apart from the darkening of an A1 horizon. There is little or no texture or colour change with depth unless stratified or buried soils are present.

Inherent Soil Fertility

NSW regional mapping provides an estimation of the inherent fertility of soils in NSW. It uses the best available soils and natural resource mapping developed for LSC dataset. The mapping describes soil fertility in NSW according to a five-class system: Low (1), Moderately Low (2), Moderate (3), Moderately High (4), High (5).

Soils with 'Low' fertility, due to their poor physical and/or chemical status, only support limited plant growth. Soils with 'Moderately Low' fertility can generally only support plants suited to grazing; large inputs of fertiliser are required to make the soil suitable for arable purposes. Soils with 'Moderate' fertility usually require fertilisers and/or have some physical restrictions for arable use. Soils with 'Moderately High' fertility have a high level of fertility in their virgin state which is significantly reduced after a few years of cultivation (Murphy *et al*., 2007).

The Project Area is dominated by soils with Low (1) and Moderate (3) fertility (refer **Figure 8**).

Land and Soil Capability

Land capability, as detailed in LSC Scheme, is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. Failure to manage land in accordance with its capability risks degradation of resources both on- and off-site, leading to a decline in natural ecosystem values, agricultural productivity, and infrastructure functionality.

The scheme uses the biophysical features of the land and soil to derive detailed rating tables for a range of land and soil hazards. The scheme consists of eight classes, which classify the land based on the severity of long-term limitations. The LSC classes are described in **Table 9** and their definition has been based on two considerations:

- The biophysical features of the land to derive the LSC classes associated with various hazards.
- The management of the hazards including the level of inputs, expertise and investment required to manage the land sustainably.

The biophysical features of the land that are associated with various hazards are broadly soil, climate and landform, specifically noted as slope, landform position, acidity, salinity, drainage, rockiness; and climate. The eight hazards associated with these biophysical features that are assessed by the LSC scheme are:

1. Water erosion
2. Wind erosion
3. Soil structure decline
4. Soil acidification
5. Salinity
6. Water logging
7. Shallow soils and rockiness
8. Mass movement

Each hazard is assessed against set criteria tables, as described in the LSC Guideline, with each hazard ranked from 1 through to 8 with the overall ranking of the land determined by its most significant limitation.

Table 9: Land and Soil Capability Classification

Class	Land and Soil Capability
Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation)	
1	**Extremely high capability land**: Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.
2	**Very high capability land**: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
3	**High capability land**: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)	
4	**Moderate capability land**: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	**Moderate–low capability land**: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture)	
6	**Low capability land**: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.
Land generally incapable of agricultural land use (selective forestry and nature conservation)	
7	**Very low capability land**: Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.

Class	Land and Soil Capability
8	**Extremely low capability land**: Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.

The NSW regional based maps of LSC indicate the Project Area consists of LSC class 4: moderate capability land, and LSC class 6: low capability land (refer **Figure 9**).

Strategic Regional Land Use Policy Mapping

The 'NSW Government's Strategic Regional Land Use Policy' (the Policy) defines and identifies strategic agricultural land across NSW. Strategic agricultural land includes land with unique natural resource characteristics, known as biophysical strategic agricultural land (BSAL), and clusters of significant agricultural industries known as critical industry clusters (CICs). The Policy has been developed to achieve balanced land use outcomes, specifically between mining, coal seam gas and agriculture.

There is no BSAL or CICs mapped within the Project Area or the Project locality. The nearest BSAL is located approximately 120 km east of the site.

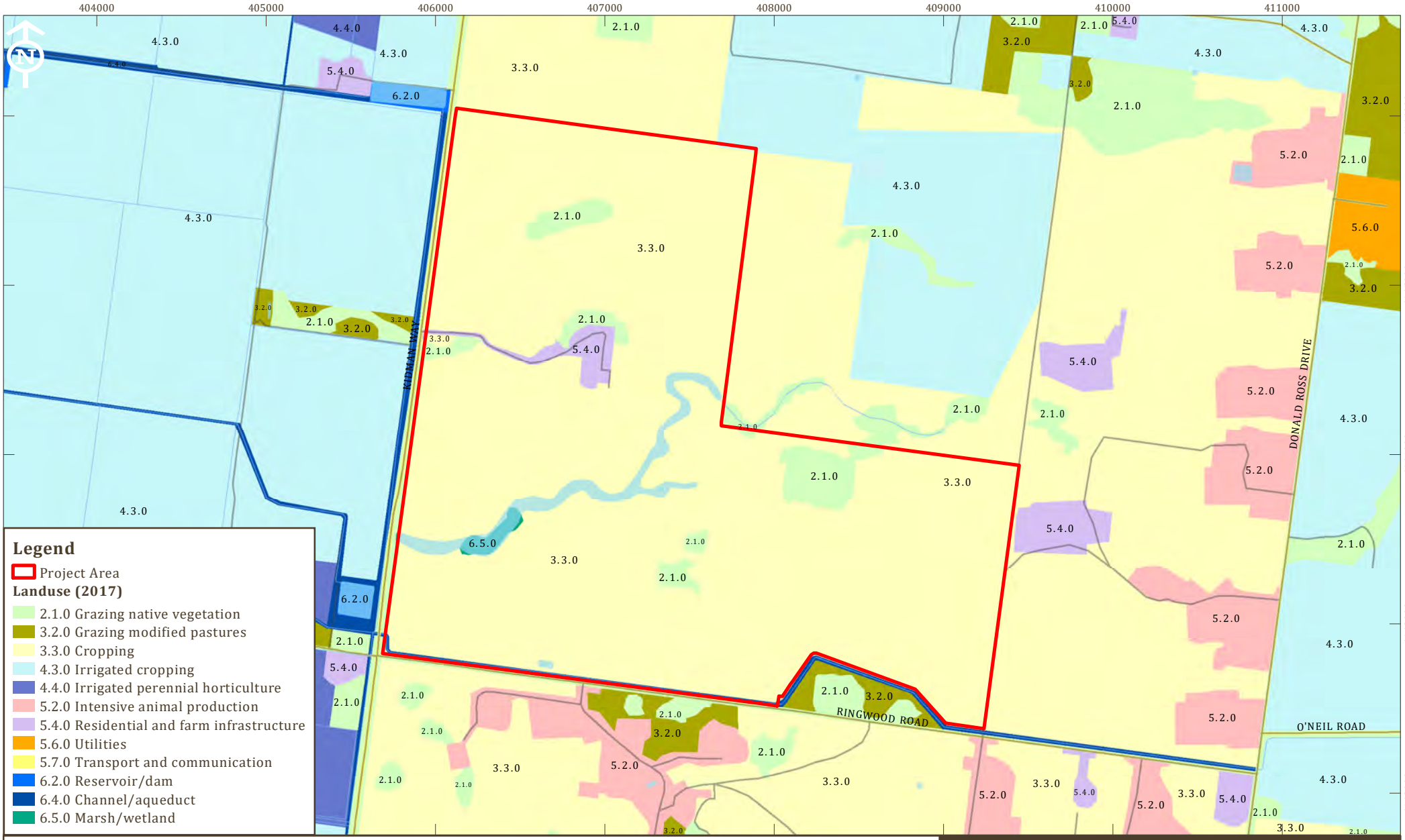
State Significant Agricultural Land

The NSW Department of Primary Industries is undertaking a mapping program to identify State Significant Agricultural Land (SSAL). A map of SSAL is an essential component of agricultural land use planning, enabling clearer local planning with informed prioritisation of future land uses.

SSAL is not mapped within the Project Area. Properties immediate to the north and the west of the Project Area are mapped as SSAL.

There is presently no method to verify SSAL, nor is there a contextual framework for how SSAL should be considered and assessed (as there is for LSC and BSAL).

Consideration of SSAL is not a requirement *LSSE Guidelines*.



GDA2020 MGA Zone 55

Meters
0 125 250 500

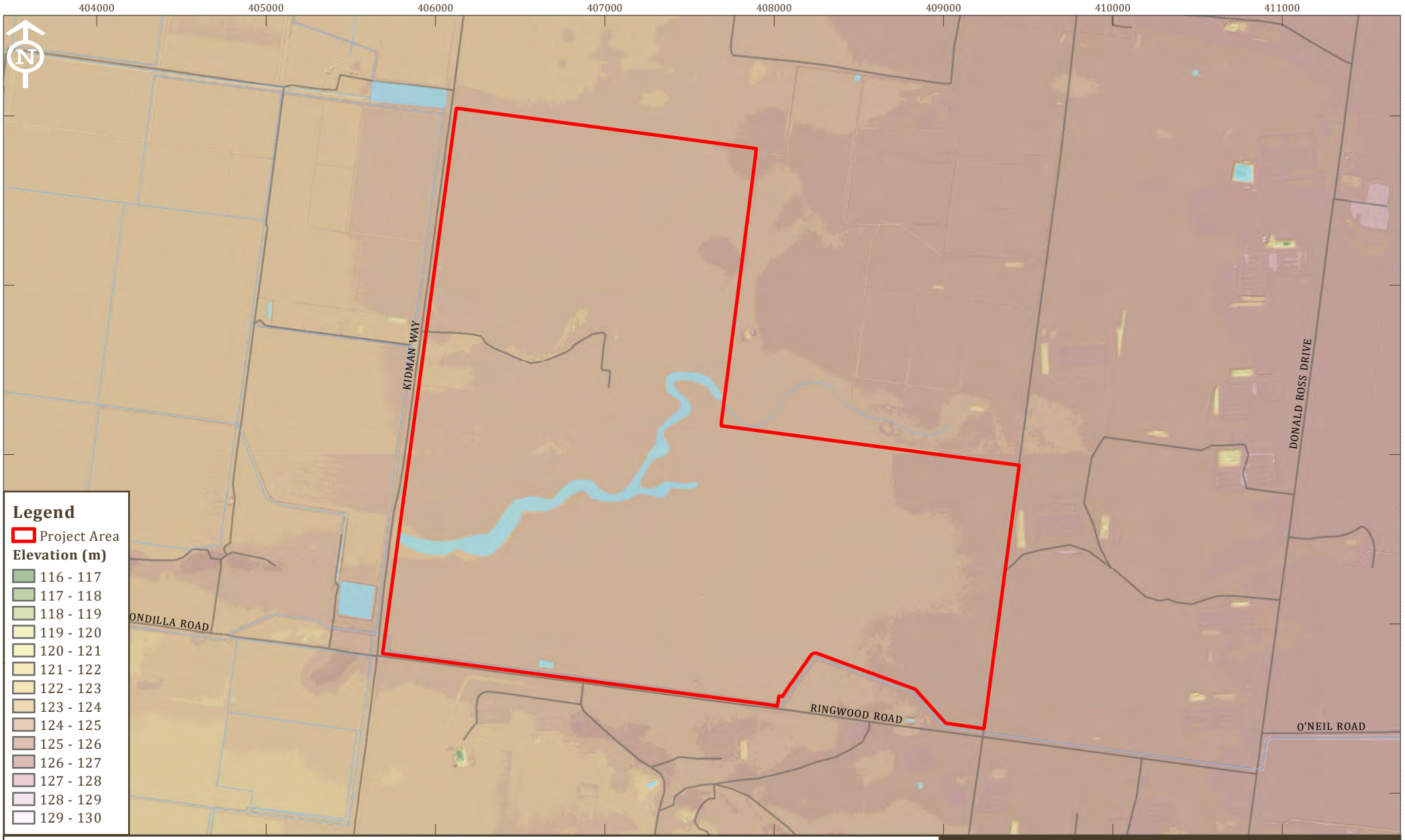
Scale 1:30000 at A4

MINESOILS
LAND & REHABILITATION SPECIALISTS

Landuse

FIGURE 6

MS131_006_Landuse 14/08/2024 7:13:23 PM



MINESOILS
LAND & REHABILITATION SPECIALISTS

GDA2020 MGA Zone 55

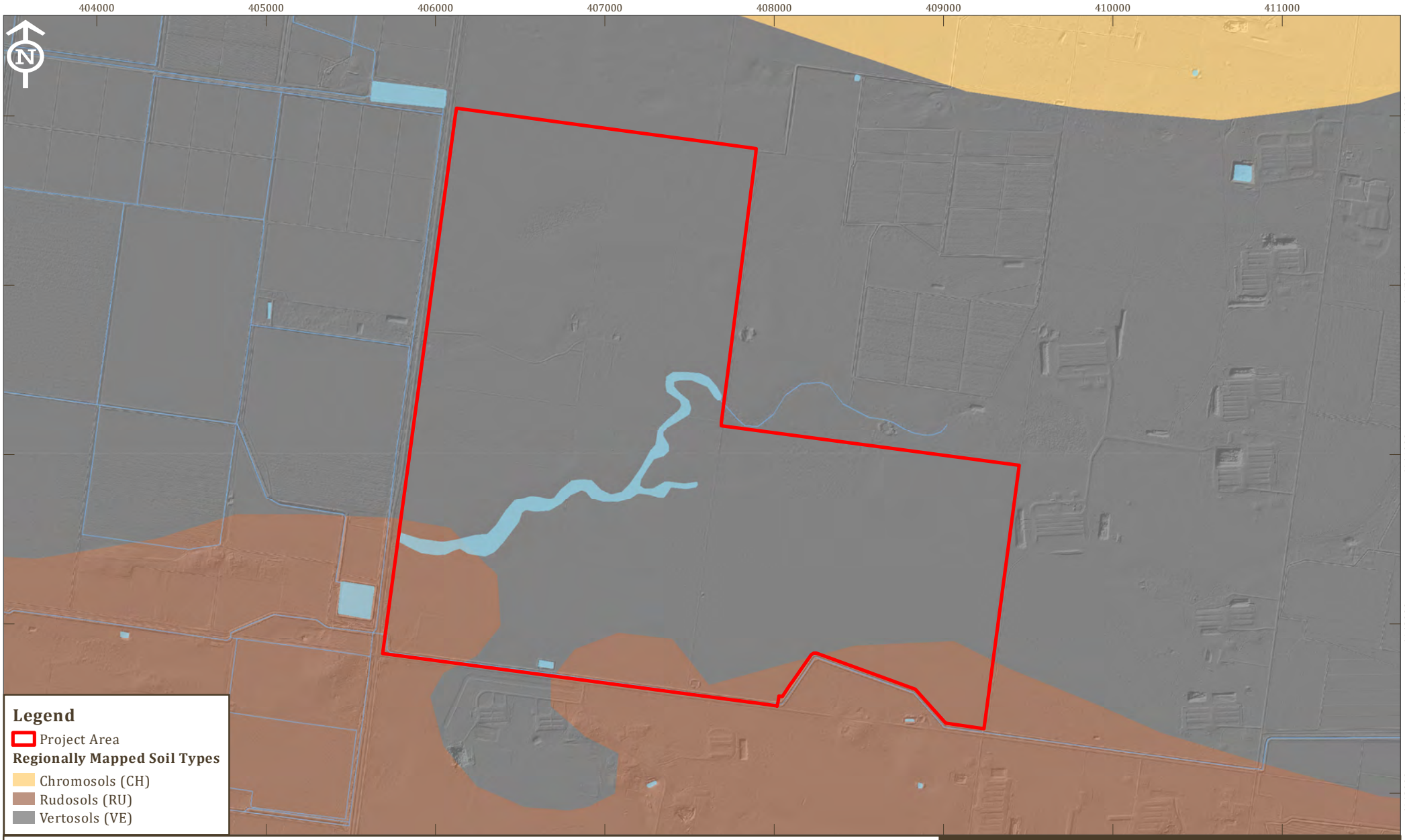
0 125 250 500 Meters

Scale 1:30000 at A4

Topography

FIGURE 7

MS131_007_Topography 14/08/2024 7:14:07 PM



GDA2020 MGA Zone 55

0 125 250 500 Meters

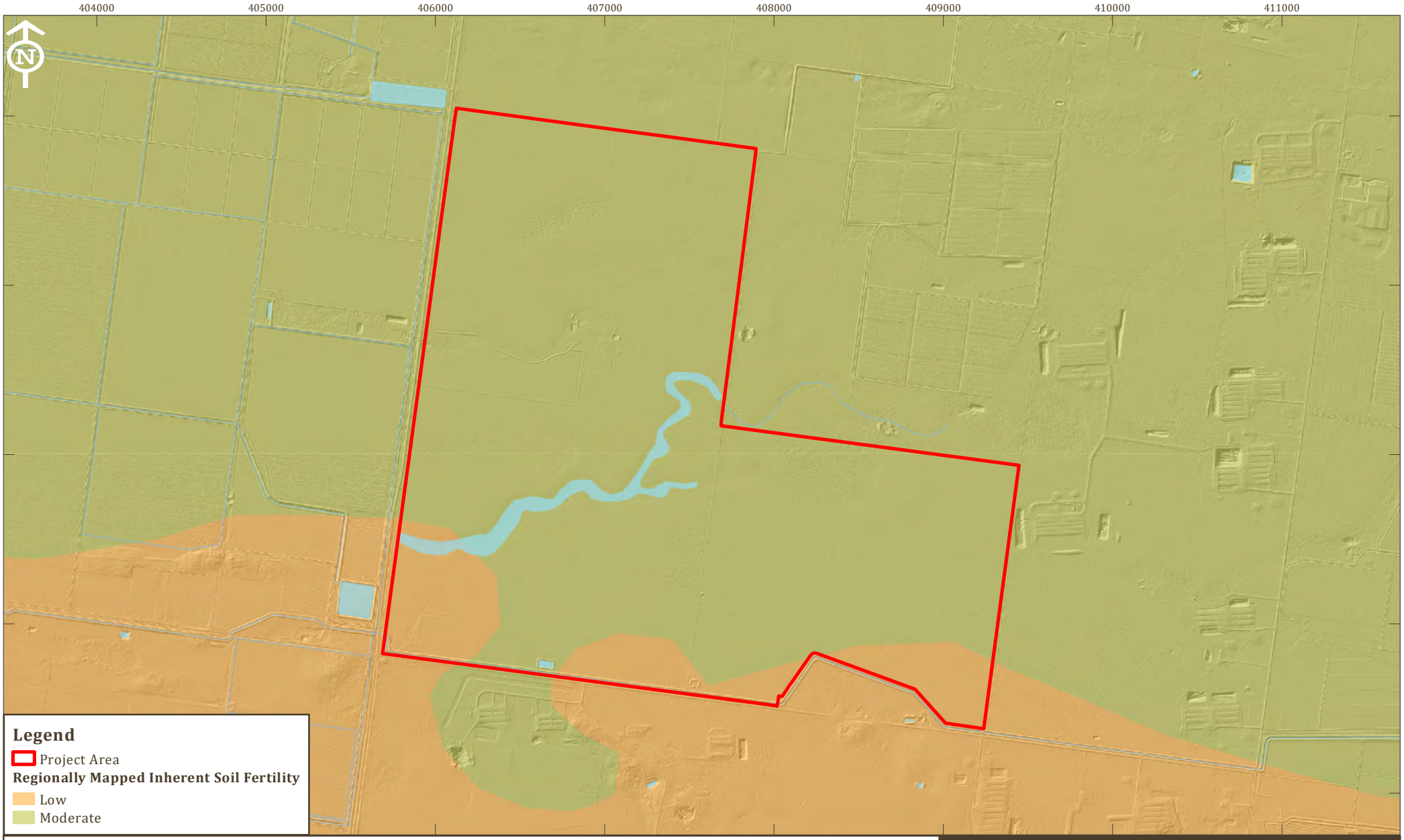
Scale 1:30000 at A4

MINESOILS
LAND & REHABILITATION SPECIALISTS

Regionally Mapped Soil Types

FIGURE 8

MS131_008_RegionalSoilTypes 14/08/2024 7:15:15 PM



GDA2020 MGA Zone 55

0 125 250 500 Meters

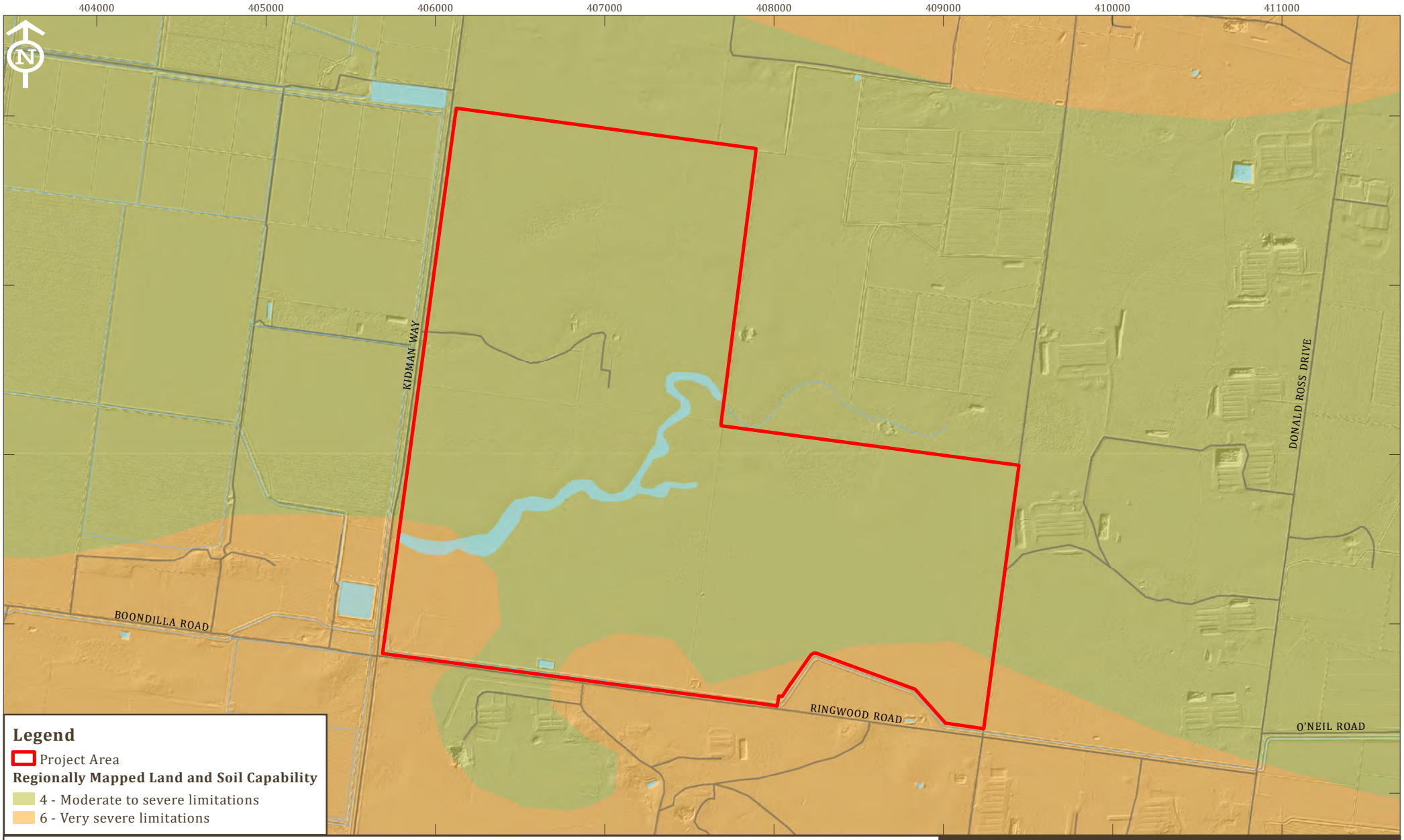
Scale 1:30000 at A4

MINESOILS
LAND & REHABILITATION SPECIALISTS

Regionally Mapped Inherent Soil Fertility

FIGURE 9

MS131_009_RegionalFertility 14/08/2024 7:16:31 PM



GDA2020 MGA Zone 55

0 125 250 500 Meters

Scale 1:30000 at A4

MINESOILS
LAND & REHABILITATION SPECIALISTS

Regionally Mapped Land and Soil Capability

FIGURE 10

MS131_010_RegionalLSC 15/08/2024 7:47:07 AM

3.2.2 SOIL SURVEY METHODOLOGY

Minesoils undertook a soil and land resource survey to inform the following tasks to be undertaken throughout the EIS process:

- Soil assessment, identifying soil units, soil qualities and risks including erosion, acid sulfate soils (ASS) risk and salinity.
- Land and soil capability (LSC) verification.
- Management and mitigation measures for mitigating soil erosion during construction, operations and decommissioning.

The objective of the Minesoils fieldwork program was to satisfy the field assessment, sampling and testing requirements related to soil and land resources of the LSSE Guideline. The fieldwork plan outlined below was designed to satisfy the following requirements:

- Soil survey and mapping: This was undertaken at a 1:25,000 survey intensity (1 site every 25 ha), and requires collection of landform pattern and element information, soil profile data, and taxonomic parameters to distinguish soil units according to the Australian Soil Classification criteria, within the Project Area.
- LSC verification: The information required for the LSC assessment was collected during both the desktop assessment and verified on the ground during the field program. The LSC system requires data on biophysical features from in situ measurements regional mapping.
- Soil qualities and risks: Additional information was recorded in the field on erosion and evidence of potentially erosive soils including tunnelling, rill, gully and sheet erosion, which may require specific handling and management techniques during construction or operational activities, and the consequences of this on stripping and rehabilitation. Observations were made on risks of ASS and salinity.

The field program was designed as an integrated free survey. An integrated survey assumes that many land characteristics are interdependent and tend to occur in correlated sets (NSCT, 2008). Survey points are irregularly located according to the survey teams' judgement to enable the delineation of soil boundaries. Soil boundaries can be abrupt or gradual, and catena and toposequences are used to aid the description of gradual variation. Soil cores were excavated by a soil corer to a depth of approximately 0.8 – 1.0m or to a point of refusal. Site clearances and dial before you dig (DBYD) plans were undertaken as part of the safety planning requirements and found underground service running through the centre of the Project Area which were avoided during excavation activities.

The survey was over the full 845 ha of the Project Area. A total of 36 sites were assessed, resulting in a survey intensity of 1 site per <25 ha. Soil profiles within the Project Area (refer to **Figure 11**) were assessed in accordance with the 'Australian Soil and Land Survey Field Handbook soil classification procedures' (NCST, 2009). Detailed soil profile descriptions were recorded covering the major parameters specified in **Table 10**. Soil profile logging was undertaken in the field using Minesoils' soil data sheets, including GPS recordings and photographs of the landforms and soil profiles. Soils were keyed out in accordance with the Australian Soil Classification (ASC) Third Edition (2008) (Isbell, R. F.,2021).

Soil samples were collected at each of the assessment site's soil horizons to a depth of 1 m, with a total of 108 samples collected. Minesoils chose 33 of these samples that were considered representative to be subject to laboratory testing. The laboratory testing suite for these sites is detailed in the **Table 11**.

Duplicate samples at every site were collected during the fieldwork and stored until the EIS is finalised.

Table 10: Detailed soil profile description parameters

Detailed Field Assessment Parameters	
Horizon depth including distinctiveness and shape	Pan presence and form
Field texture grade	Permeability and drainage
Field colour (Munsell colour chart)	Field pH
Pedality structure, grade and consistence	Field moisture
Soil fabric and stickiness	Surface condition
Stones (abundance and size)	Landform pattern / element
Mottles (amount, size and distinctiveness)	Current land use and previous disturbance
Segregations (abundance, nature, form and size)	Vegetation

Table 11: Soil Sample Laboratory Analysis

Lab Analysis	
Analyte	**Methodology**
pH (1:5 water & CaCl)	Rayment & Lyons 2011-4A1
Electrical Conductivity (EC) and Chloride	Rayment & Lyons 2011-3A1
Cation Exchange Capacity (CEC) & ESP and Ca:Mg Ratio	Rayment & Lyons 2011-15J1
Particle Size Analysis (PSA) (Select samples)	ISSS Hydrometer plus 0.2 and 2.0 mm Sieving (CSIRO 'Yellow Book')
Emerson Aggregate Test (EAT) (Select samples)	AS1289.3.8.1-2017

3.2.3 SOIL SURVEY FINDINGS

Soil Mapping Units

The soil survey undertaken by Minesoils found the Project Area to one dominant mapping unit, characterised by the Vertosol soil type, as shown on **Figure 11**, and presented in **Table 12**:

Vertosols are soils with the following:

- A clay field texture or 35% or more clay throughout the solum except for thin, surface crusty horizons 30 mm or less thick and
- When dry, open cracks occur at some time in most years. These are at least 5 mm wide and extend upward to the surface or to the base of any plough layer, peaty horizon, self-mulching horizon, or thin, surface crusty horizon; and
- Slickensides and/or lenticular peds occur at some depth in the solum.

The Vertosol soil unit is characterised by clay soil profiles with strong pedality and vertic properties, seen in the grazing lands portion of the Project Area as surface cracking. pH ranges from slightly acidic to very strongly alkaline, often increasing with depth, and salinity levels range from non-saline at the surface to moderately saline at depth. These soils are consistently sodic at depth, are moderately well drained, have high permeability and are very deep.

Representative sites for this unit, which include detailed laboratory data, consist of sites 1, 4, 6, 10, 11, 14, 18, 24, 32.

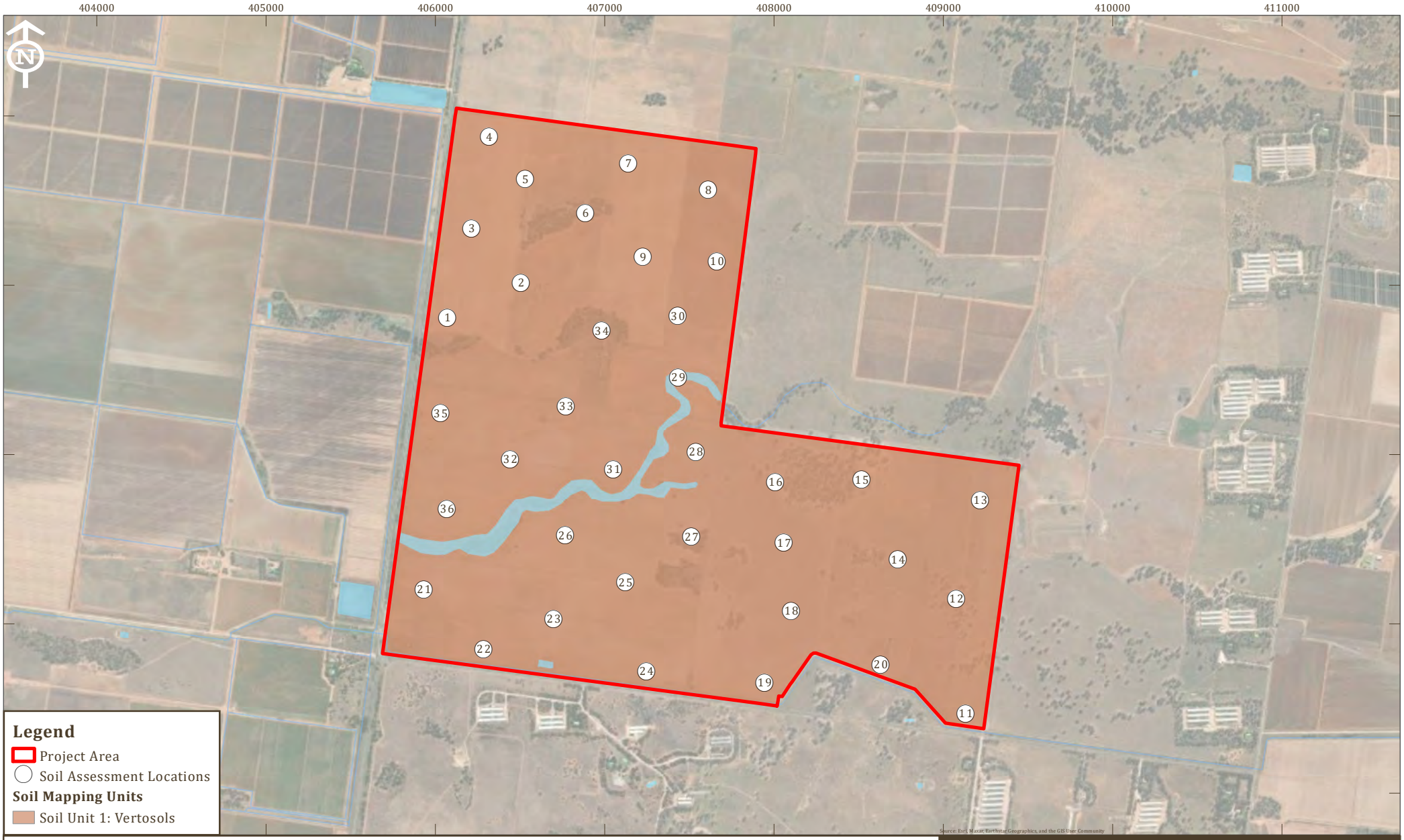
Two subdominant soil types occur within the Vertosol soil mapping unit: a Chromosol (site 21) and a Dermosol (site 29). These soils have physical and chemical characteristics that result in soils that are generally behaviourally similar to the Vertosols in the Project Area, and represent areas too small to warrant additional soil mapping units.

Chromosols are soils other than Hydrosols with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B2t horizon (or the major part of the entire B2t horizon if it is less than 0.2 m thick) is not sodic and not strongly acid. Soils with strongly subplastic upper B2t horizons are also included even if they are sodic.

Dermosols other than Vertosols, Hydrosols, Calcarosols and Ferrosols which:

1. Have B2 horizons that have grade of pedality greater than weak1 throughout the major part of the horizon, and
2. Do not have clear or abrupt textural B horizon.

Full soil profile descriptions are included as **Appendix 2**. Laboratory certificates of analysis are included as **Appendix 3**.



GDA2020 MGA Zone 55

Meters

0 125 250 500

Scale 1:30000 at A4

MINESOILS

LAND & REHABILITATION SPECIALISTS

Soil Mapping Units

FIGURE 11

MS131_011_SMU 14/08/2024 7:17:52 PM

Table 12: Soil Mapping Units and Soil Units Summary

Site #	Soil Profile - Australian Soil Classification	ASC Family Criteria
1	Haplic Epipedal Brown Vertosol	EQRY
2	Epipedal Grey Vertosol	-
3	Epipedal Brown Vertosol	-
4	Haplic Epipedal Brown Vertosol	ERRY
5	Epipedal Black Vertosol	-
6	Haplic Epipedal Grey Vertosol	ESRY
7	Epipedal Black Vertosol	-
8	Epipedal Brown Vertosol	-
9	Epipedal Brown Vertosol	-
10	Haplic Epipedal Red Vertosol	EQRY
11	Haplic Epipedal Grey Vertosol	EQRY
12	Epipedal Grey Vertosol	-
13	Epipedal Red Vertosol	-
14	Haplic Epipedal Black Vertosol	ERRY
15	Epipedal Grey Vertosol	-
16	Epipedal Back Vertosol	-
17	Epipedal Brown Vertosol	-
18	Haplic Epipedal Grey Vertosol	ERRY
19	Epipedal Grey Vertosol	-
20	Epipedal Grey Vertosol	-
21	Sodic Eutrophic Black Chromosol	BEMNYNR
22	Epipedal Brown Vertosol	-
23	Epipedal Grey Vertosol	-
24	Haplic Epipedal Brown Vertosol	ESSY
25	Epipedal Brown Vertosol	-
26	Epipedal Brown Vertosol	-
27	Epipedal Grey Vertosol	-

Site #	Soil Profile - Australian Soil Classification	ASC Family Criteria
28	Epipedal Black Vertosol	-
29	Mottled Eutrophic Grey Dermosol	BELMY
30	Epipedal Brown Vertosol	-
31	Epipedal Red Vertosol	-
32	Haplic Epipedal Red Vertosol	ERSY
33	Epipedal Brown Vertosol	-
34	Epipedal Brown Vertosol	-
35	Epipedal Red Vertosol	-
36	Epipedal Red Vertosol	-

Soil Erodibility

Soil aggregate stability refers to the stability of soil structural units (aggregates) when immersed in water. Instability may be indicated by slaking or clay dispersion. A soil with low aggregate stability is likely to be less resilient to mechanical impacts, more likely to be compacted and poorly structured, or be susceptible to tunnelling if used for earthworks. The Emerson Aggregate Test (EAT) classifies the behaviour of soil aggregates, when immersed, on their coherence in water. **Table 13** shows the EAT class and the dispersion degree during testing and resulting risk of dispersion for that soil.

Table 13: Dispersion Degree and Risk Correlation to EAT Class

EAT Class	Dispersion	
	Degree	Risk
1	Complete dispersion	Very High
2	Partial dispersion	High
3	Complete or partial dispersion after remoulding	Moderate
4 - 8	Well aggregated with no dispersion after remoulding	Negligible

Source: Adapted from Hazelton and Murphy (2011)

Emerson Class Numbers of 1 and 2 indicates a high to very high potential for the soil to disperse when inundated with water. These classes represent the greatest erosion and sediment control hazard to surface disturbance works.

Emerson Class Numbers of 3 indicate that while the soil is only slightly dispersive, the remoulding and breaking down of soil bonds can result in increased dispersive behaviour. Remoulding of the soil at a moisture content near the optimum for compaction (simulating the use of these soils in a filling and compaction operation) does not

increase the potential for dispersive behaviour, however further breakdown of the soil may occur, by water turbulence or concentrated rapid water flow. Under these circumstances this class of soil may disperse.

Emerson Class Numbers greater than 4 have a low potential for dispersive behaviour. Some swelling or slaking may occur but generally such soils are not readily dispersive.

Table 14 highlights the lowest Emerson Class Number recorded for select laboratory data representative sites of the Project Area, as an indicator of highest potential risk during disturbance activities.

Table 14: Potential Dispersion Risk

Site No.	Soil Depth (m)	EAT	Potential Risk
1	0 - 10	3	Moderate
	30 - 40	3	Moderate
	60 - 70	3	Moderate
10	0 - 10	3	Moderate
	30 - 40	3	Moderate
	60 - 70	3	Moderate
14	0 - 10	3	Moderate
	30 - 40	3	Moderate
	65 - 75	3	Moderate
29	0 - 10	3	Moderate
	30 - 40	3	Moderate
	60 - 70	2	High

Based on site observation, which included assessment for indicators of erodibility, it can be concluded that there is a no visible erosion and sedimentation risk associated with the topsoils currently present in the Project Area, due to the flat nature of the landscape. However, the representative laboratory tested soils indicate a moderate to high potential risk for dispersion. In addition, high levels of sodicity contribute to this risk.

Based on these results, there is a moderate to high potential risk for dispersion where soils are disturbed by Project construction efforts within the Project Area. Higher impact activities such as where earthworks are necessary for construction of sub-station pads or site facilities are very likely to result in increased dispersive behaviour when soil is remoulded, compacted or pulverised.

Due to flat nature of the landscape, the risk of soil erosion from surface water flows is very low, and while there is a moderate to high risk of dispersion where soils directly impacted, erosion and sediment control management options are available to mitigate this risk (refer Section 6.2.1). Therefore, the risk of erosion and sedimentation impacts on soils and agriculture as a result of the Project should be considered low.

Acid Sulphate Soils

Acid sulfate soils (ASS) have been classified into 5 different classes based on the likelihood of the ASS being present in particular areas and at certain depths (NSW Department of Planning and Environment, 2018):

- Class 1: ASS in a class 1 area are likely to be found on and below the natural ground surface.
- Class 2: ASS in a class 2 area are likely to be found below the natural ground surface.

- Class 3: ASS in a class 3 area are likely to be found beyond 1 metre below the natural ground surface.
- Class 4: ASS in a class 4 area are likely to be found beyond 2 metres below the natural ground surface.
- Class 5: ASS are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent class 1,2,3 or 4 land.

The Project Area does not contain any of the above classes on the NSW Acid Sulfate Soil Planning Map.

Assessing land elevation and distance from the coast, in conjunction with existing ASS mapping for NSW, the potential for ASS is considered a very low risk.

Further, there was no evidence of ASS indicators such as soil gleying, odour, marine sediments and organic materials recorded as part of the soils survey.

3.2.4 SITE VERIFICATION OF LSC

The 36 soil test sites within the Project Area have been subject to the site verification assessment of LSC, in accordance with the LSC Guideline and outlined in Section 3.2.1. Based on the results of the LSC verification assessment, it is concluded that the disturbance footprint contains one LSC class: LSC class 3: high capability land – covering 845 ha (**Figure 12**). The LSC verification assessment outcomes for the eight hazards group for the soil profiles assessed is presented in **Table 15**.

Class 3 land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation. The key limitations of this class within the Project Area are wind erosion, soil structure decline and salinity.

Table 15: LSC Parameters and Overall Class

		Hazard Criteria								
		1	2	3	4	5	6	7	8	Overall
		Water erosion	Wind erosion	Structure	Acidity	Salinity	Water-logging	Soil depth	Movement	Class
1	Haplic Epipedal Brown Vertosol	1	3	3	2	3	2	1	1	3
2	Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
3	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
4	Haplic Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
5	Epipedal Black Vertosol	1	3	3	1	3	2	1	1	3
6	Haplic Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
7	Epipedal Black Vertosol	1	3	3	1	3	2	1	1	3
8	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
9	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
10	Haplic Epipedal Red Vertosol	1	3	3	2	3	2	1	1	3
11	Haplic Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
12	Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
13	Epipedal Red Vertosol	1	3	3	1	3	2	1	1	3
14	Haplic Epipedal Black Vertosol	1	3	3	1	3	2	1	1	3
15	Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
16	Epipedal Back Vertosol	1	3	3	1	3	2	1	1	3
17	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
18	Haplic Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
19	Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
20	Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
21	Sodic Eutrophic Black Chromosol	1	3	3	3	3	2	1	1	3
22	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
23	Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
24	Haplic Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
25	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
26	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
27	Epipedal Grey Vertosol	1	3	3	1	3	2	1	1	3
28	Epipedal Black Vertosol	1	3	3	1	3	2	1	1	3
29	Mottled Eutrophic Grey Dermosol	1	3	3	3	3	3	1	1	3

		Hazard Criteria								
		1	2	3	4	5	6	7	8	Overall
		Water erosion	Wind erosion	Structure	Acidity	Salinity	Water-logging	Soil depth	Movement	Class
30	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
31	Epipedal Red Vertosol	1	3	3	1	3	2	1	1	3
32	Haplic Epipedal Red Vertosol	1	3	3	1	3	2	1	1	3
33	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
34	Epipedal Brown Vertosol	1	3	3	1	3	2	1	1	3
35	Epipedal Red Vertosol	1	3	3	1	3	2	1	1	3
36	Epipedal Red Vertosol	1	3	3	1	3	2	1	1	3

MS131_012_VerifiedLSC 14/08/2024 7:18:37 PM

4 LAND USE CONFLICT RISK ASSESSMENT

4.1 OVERVIEW

The Land Use Conflict Risk Assessment (LUCRA) (NSW Department of Primary Industries, 2011) is required as part of an Agricultural Impact Assessment as per the LSSE Guideline. The LUCRA is a system to identify and assess the potential for land use conflict to occur between neighbouring land uses. It helps land managers and consent authorities assess the possibility for and potential level of future land use conflict. LUCRA aims to:

- Accurately identify and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises.
- Objectively assess the effect of a proposed land use on neighbouring land uses.
- Increase the understanding of potential land use conflict to inform and complement development control and buffer requirements.
- Highlight or recommend strategies to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.

Land use conflicts occur when one land user is perceived to infringe upon the rights or impact the values or amenity of another. In rural areas land use conflicts commonly occur between agricultural and residential uses. However, land use conflicts can also occur between different agricultural enterprises and other primary industries.

Rural amenity issues are the most common land use conflict issues, followed by environmental protection issues. Rural amenity issues include impacts to air quality due to agricultural and rural industry (odour, pesticides, dust, smoke and particulates); use and enjoyment of neighbouring land e.g., noise from machinery; and visual amenity associated with rural industry e.g., the use of netting, planting of monocultures and impacts on views.

Environmental protection issues include soil erosion leading to land and water pollution, clearing of native vegetation, and stock access to waterways.

Direct impacts from neighbouring land uses on farming operations can also cause conflict, such as: harassment of livestock from straying domestic animals; trespass; changes to storm water flows or water availability; and poor management of pest animals and weeds.

4.2 APPROACH

The LUCRA as presented in **Appendix 1** compares and contrasts the Project against adjoining/surrounding land uses and activities for incompatibility and conflict issues based on the risks and impacts identified in Section 5, and the mitigation measures and controls presented in Section 6. Each potential conflict between the operation of the solar farm and adjacent land has been assessed and given a risk ranking based on probability and consequence as outlined in **Appendix 1**. Performance targets will be determined via management plans specified by the EIS (and specialist impact assessments) and development consent conditions (if approved). Monitoring will be undertaken in accordance with those management plans. Indicative performance targets are presents in **Appendix 1**.

Given the significant overlap between the agricultural impact assessment and land use conflict considerations, many agriculture-related risk items listed in the LUCRA are further detailed in Section 5.

4.3 FINDINGS

The following land use conflict risk items were identified for the Project:

- Construction ground disturbance;
- Construction noise and vibration;
- Construction dust;
- Construction traffic;

- Construction workforce;
- Construction work;
- Construction biosecurity;
- Visual amenity;
- Fire spread;
- Change in land use;
- Operational traffic;
- Operational noise;
- Waste;
- Property devaluation;
- Erosion and sedimentation;
- Livestock interaction;
- Electro-magnetic fields;
- Neighbouring operations;
- Public perception;
- Cumulative impacts; and
- Rehabilitation.

Within these risk item categories, 37 potential conflicts were considered as part of the LUCRA. The mitigation measures and controls outlined in this assessment and the wider EIS reduce the level of risk for the majority of considered potential risks with complaints or conflict being managed within normal operations. There are no high risk potential conflicts, however a number of items of potential conflict remain a moderate risk and may require further consultation and management in addition to standard operations. Note, these potential conflicts pertain to the wider locality and community, as well as to immediate neighbours. The moderate potential conflicts are summarised in **Table 16**. The LUCRA methodology including risk ranking matrix and full LUCRA assessment are included as **Appendix 1**.

Table 15: LUCRA Moderate Risk Items and Risk Controls Summary

Risk Item	Risk Reduction Controls
Land users in the locality, including neighbouring poultry farm businesses, may be concerned about biosecurity breaches including weed, plant pest, plant and animal disease or pest animal introduction and/or spread, as a result of the high volume of additional personnel, vehicles and materials entering the site and locality during Project construction.	The assessment of impacts to biodiversity will be undertaken via a BDAR. Consideration of the potential for pest species and other biosecurity threats to impact agriculture has been included in this assessment. Appropriate mitigation measures are considered readily available for implementation. Measures will be specified within the BDAR (and are specified in this assessment) to minimise the risk for biosecurity and pest species impacts within the site and locality. Ongoing consultation with stakeholders, including poultry farm operators, will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).
Stakeholders in the locality who wish to maintain views of the existing agricultural landscape may be concerned about the change in visual amenity resulting from the solar farm.	The assessment of visual impacts to surrounding amenity will be undertaken via a LVIA. Appropriate mitigation measures will be specified within the LVIA to minimise the risk of altered amenity for surrounding residents and public within the locality. Compliance with mitigation measures specified within the LVIA is anticipated to reduce the risk of conflict related to visual amenity. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).

Risk Item	Risk Reduction Controls
Land users in the locality may be concerned about the risk of fires occurring at the site and their potential to spread to surrounding land, infrastructure or livestock, including poultry farms.	Consideration of potential bushfire impacts will be undertaken as part of a Preliminary Hazard Analysis (PHA) informing the EIS. Appropriate mitigation measures will be specified within the bushfire assessment within the EIS to minimise the risk of bushfire incidents including their risk to people and potential to damage surrounding land. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).
Landowners and businesses in the locality may be concerned about potential devaluation of properties due to proximity to solar farm infrastructure	After delivering eight projects throughout Australia, including the largest solar and battery project in New South Wales, Edify is not aware of, and has not been presented with, any reliable, impartial research or evidence which establishes a correlation between declining real estate values and proximity to renewable infrastructure. Given the proximity to poultry farms, and the agri-industrial nature of the locality, it is considered unlikely the Project will impact the agricultural resources or production value of properties proximate to the Project Area. Further, the change in visual amenity is not anticipated to have any noticeable effect on property values. Ongoing consultation with stakeholders will identify and address concerns if they arise.
Public Authorities may have concerns regarding the potential for cumulative impacts arising from the proximity of other renewable energy state significant developments.	An assessment of potential cumulative impacts will be undertaken as part of the EIS. Appropriate mitigation measures (where required) will be specified in the EIS to minimise the potential for cumulative impacts to occur at or near the site.
Stakeholders may be concerned about the potential for poor rehabilitation outcomes and the resulting long term environmental and agricultural consequence.	A Decommissioning and Rehabilitation Management Plan will ensure the land can be successfully returned to pre-disturbance land and soil capability and final land use commitments following decommissioning.

5 IMPACTS ON AGRICULTURAL LAND

The impacts solar farm activities can have on land resources and agricultural productivity range from short term temporary impacts to long term and permanent impacts. Temporary impacts can include the removal of agriculture from disturbance areas over full the life of the Project, including during the construction, operation and decommissioning phases. Permanent impacts may include changes to land and soil capability and agricultural resources of the Project Area. Permanent impacts are irreversible and can be mitigated by the reinstatement of agricultural lands and land productivity to a pre-disturbance condition and productivity. Australian solar farming practices are generally presented as low risk of permanent and irreversible impacts to agricultural land.

This section identifies and describes the nature, duration and consequence of the potential impacts on agricultural land as a result of the Project, for the Project Area and in the wider region, across five risk areas:

- Changes in the amount of land used for agriculture.
- Changes to agricultural productivity and agricultural enterprises.
- Changes to agricultural resources.
- Other potential impacts to agriculture considered for the Project.
- Cumulative impacts of the potential for multiple large scale renewable projects within the region.

5.1 LAND USED FOR AGRICULTURE

The Project will be undertaken on an area of up to 845 ha of land that is currently subject to agriculture land use. The Applicant intends to use as much of the Project Area as possible for agricultural purposes during the operational phase of the Project. Land being used simultaneously for agriculture and the solar farm is known as agrisolar and is further described in Section 6.4. However, for the purpose of this assessment, it is assumed that the agriculture will cease within the Project Area for the duration of the Project.

Therefore, there will be a temporary decrease of up to 845 ha of land used for agriculture for the duration of the Project. It is anticipated that agricultural land use will be re-established over the entire 845 ha Project Area at the time of decommissioning and rehabilitation (unless otherwise agreed with the landowner and/or regulatory authorities). There will be no permanent decrease in land available for agriculture use.

This temporary is considered negligible impact in the context of the agricultural land use in the Murrumbidgee LGA as outlined in Section 2.4.2 (<0.2%).

Current agricultural land use immediate to the Project Area, and in the broader Project locality, will not change as a result of the Project, and there will be no fragmentation or displacement of existing agricultural industries.

5.2 PRODUCTIVITY AND ENTERPRISES

5.2.1 PRIMARY PRODUCTIVITY

The productivity of the Project Area is described in Section 3.1.3. For the purpose of this assessment, the impact of the Project on productivity of agricultural land based on the change in land use is up to $811,155 per year.

This is considered negligible impact in the context of the agricultural industry gross value of the Murrumbidgee LGA as outlined in Section 2.4.2 (<0.2%).

Due to the minimal disturbance to the landform, following the life of the Project, all land removed from agriculture will be returned to agricultural use, with anticipated mitigation controls available to ensure no reductions in land and soil capability. Agricultural enterprises can then re-commence at an equivalent agricultural productivity.

5.2.2 PRODUCTIVITY OF LAND WITHIN LOCALITY

Agricultural productivity of land outside of the Project Area will not be affected by the Project as the associated agricultural resources will not be affected. Therefore, the Project will not negatively impact any existing agricultural enterprise outside of the Project Area.

5.2.3 AGRICULTURE SUPPORT SERVICES

The Project will have a negligible impact on the viability local and regional agricultural services and employment. There will be minimal impacts experienced by employees, suppliers or contracting services currently engaged. Changes to the supply and viability of agricultural support services in the main service centres of Griffith and Narrandera are driven by social and market trends far exceeding the scale of the negligible reduction in agricultural land use and productivity as a result of the Project.

5.2.4 CRITICAL MASS THRESHOLDS

Due to the limited reduction in agricultural activity as a result of the Project, and given the nature and scale of the established agricultural industries within the region and wider state, there will be no impact to critical mass thresholds of agricultural enterprises needed to attract and maintain investment in agricultural industries and infrastructure.

5.3 AGRICULTURAL RESOURCES

5.3.1 SOILS

Over the majority of the Project Area, soils will be subject to minor disturbance as part of the construction or maintenance of solar arrays and electrical cabling trenches. In areas where earthworks are necessary for construction of the BESS, substation and switching station, site facilities or access tracks, soils will be subject to higher impact disturbance.

All soil that is proposed to be disturbed during the Project will be stripped and re-used during construction and/or rehabilitation in order to mitigate long term effects on soil resources during operation. Given the limited surface disturbance anticipated, any soil stripping and re-use will be localised; that is, soil may be stripped and stored adjacent to disturbance and respread from where it was stripped. This localised approach will promote reinstatement of the soil profile to its original condition.

Additionally, soils may be stripped only in areas where soil disturbance occurs. The depth of soil salvaged will be as deep as excavations or surface disturbance is required, or to a depth where parent material is encountered.

Impacts on soil biological balance and nutrient availability are linked to the status of vegetation beneath the panels. If grass cover is maintained across the site both between and under the panel rows to provide groundcover, there will be negligible soil composition and productivity impacts as a result of the panels.

However, if vegetation beneath the panels is significantly reduced or eliminated over long periods during operations, the soil may be temporarily sterilised and will require additional efforts and costs at the time of site decommissioning to restore the soil to a level of productivity equivalent to pre-disturbance conditions.

Overall, the impacts to the soils of the Project Area are expected to be minimal and temporary. There will be no direct or indirect impacts to the soil resources of the Project locality outside the Project Area.

Soil impact mitigation measures are outlined in Section 6.2.

5.3.2 LAND AND SOIL CAPABILITY

The Project will occur on 845 ha of LSC class 3 land. This represents 0.6% of LSC class 3 land within the Murrumbidgee LGA.

Due to the nature of the Project which will require only localised and sporadic landform modification including minor soil stripping (for excavation works and leveling), impacts on LSC are expected to be minor.

Following the end of life for the Project, disturbance footprints will be re-graded (where required) and any minor stockpiles of topsoil and subsoil be respread over disturbed areas and rehabilitated with either native vegetation or improved pastures depending on the intended final land use. This strategy, along with good soil management practices as outlined in Section 6.2 will facilitate the rehabilitation in returning the land to an equivalent LSC class.

Therefore, it is anticipated there will be no permanent impacts on LSC classes within the Project Area as a result of the Project.

5.3.3 WATER

The risk of groundwater impacts during solar farm construction activities are anticipated to be low as potential limited site levelling for the solar farm and substation foundations is expected to require excavation of no more than 0.40 – 0.60 m, and trenches for underground cables are expected to be no greater than 1.0 to 1.2 m deep. There are no impacts on groundwater anticipated and risks to water quality are expected to be readily manageable.

Water use during project construction and operation is expected to be minimal and water will be brought to site by tanker as required. No impacts are anticipated on the availability of current surface or groundwater resources used by local landholders.

A flooding and water assessment will be undertaken as part of the EIS.

5.3.4 EROSION AND SEDIMENTATION

There is a moderate to high potential risk for dispersion where soils are disturbed by Project construction efforts within the Project Area. Higher impact activities such as where earthworks are necessary for construction of sub-station pads or site facilities are very likely to result in increased dispersive behaviour when soil is remoulded, compacted or pulverised. Wind erosion must also be considered and soils exposed as a result of construction should be sown with grass and pasture species with starter fertiliser to provide stabilising ground cover.

However, due to the flat nature of the landform, the risk of erosion and sedimentation impacts on agriculture as a result of the Project is low.

With the implementation of mitigation measures detailed in Section 6.2, it is expected that direct and indirect erosion and sedimentation risks would be limited and manageable.

5.3.5 AGRICULTURAL INFRASTRUCTURE

The Project will have a negligible impact on local and regional agricultural infrastructure. There will be negligible impacts on the road and rail network that connects the agricultural industry to markets, services and suppliers (refer Section 5.4.4).

Within the Project Area, enough fences, dams and access tracks will be retained to accommodate potential agrisolar.

If dams within the Project Area are decommissioned during construction they will be reconstructed during the decommissioning phase of the Project. Adequate paddock fencing will be reinstated to suit post-Project land use. Upgrades to access tracks throughout the Project will benefit post-Project agricultural land uses and is considered a positive impact.

5.4 OTHER POTENTIAL IMPACTS ON AGRICULTURE

5.4.1 PEST SPECIES

Weeds and pest species could be inadvertently brought into the project area with imported materials, machinery, or allowed to invade naturally through removal or damage of current vegetation. The presence of weed species has

the potential to be a major long term hindrance to agricultural endeavours within the locality and region, as well as rehabilitation efforts within the project area.

The impacts of weeds and pest species on agriculture as a result of the Project are anticipated to be minor due to mitigation measures available, which are described in Section 6.3.

5.4.2 BIOSECURITY

Biosecurity is defined in the 'Draft NSW Biosecurity Strategy' (DPI, 2021) as 'the protection of the economy, environment and community from pests, diseases and weeds'. It includes measures to prevent new pests, diseases and weeds from entering our country and becoming established.

Given the available mitigation measures as described in Section 6.4, it is considered that biosecurity risks as a result the Project are low and impacts to agricultural resources and enterprises within the region are unlikely to be experienced.

5.4.3 AIR QUALITY AND DUST

Construction and decommissioning activities have the potential to increase dust through movement of traffic on unsealed roads on dry days, vegetation removal, and localised dust emissions generated by land disturbance (such as excavation activities required for infrastructure). Dust control measures will be detailed in a Construction environmental management plan (CEMP). With the implementation of the CEMP, it is expected that the construction and decommissioning activities would have a negligible impact on local air quality.

During operations, ongoing maintenance of infrastructure and land will result in very minor, localised vehicle emissions and generation of dust from vehicles travelling along unsealed internal access tracks. These impacts are unlikely to affect agriculture and standard dust suppression measures will be outlined in an Operational Environmental Management Plan (OEMP) to manage and control dust where required.

5.4.4 TRAFFIC

Agricultural enterprises can be impacted by increased traffic movements through an increase in noise and dust, and also through the cumulative impact of road transport being utilised by solar farm operations, leaving fewer transport options for agricultural enterprises.

The Kidman Way and Ringwood Road are anticipated to experience an increase in traffic volumes during the peak construction period. However, the traffic impacts of the Project are not likely to have material consequences on agricultural enterprises within the Project locality. Further, no increases in levels of noise and dust that could impact agriculture will result from increased traffic.

Therefore, the traffic impacts of the Project are not likely to have consequences on agricultural enterprises within the Project locality.

A Traffic Impact Assessment will be undertaken as part of the EIS.

5.4.5 NOISE AND VIBRATION

Background noise levels are expected to reflect the site's location in a rural setting away from population centres. Background noise sources would include traffic, farm equipment, wind through trees, birds and insects.

Noise levels during construction and operation are predicted to comply with noise criteria. It is expected that noise will be effectively managed and minimised through the adoption of standard management practices. The proponent will implement practicable measures to reduce noise impacts including for example, the careful location of noise generating components within the site to increase the distance to sensitive receivers. Supportive evidence is provided through a Noise Impact Assessment in the EIS.

Generally, agriculture is only impacted by noise when constantly high noise levels or sudden loud noise leads to a decrease in animal production through increased livestock stress. Cattle may tolerate moderate levels of noise and may easily adapt to an intensity level of 60-90 dB. Continuous exposure to noise above 90dB has been known to severely affect animals (Dairy Global, 2017).

Generally, agriculture is only impacted by noise when constantly high noise levels or sudden loud noise leads to a decrease in animal production through increased livestock stress. The predicted noise levels are anticipated to pose a negligible impact on agricultural activities.

Further, vibration issues are not expected to be significant during either construction or operation due to the distance between the site and the nearest sensitive receivers.

The assessment of potential noise impacts will be undertaken via a Noise and Vibration Impact Assessment as part of the EIS.

5.5 CUMULATIVE IMPACTS

The Project has the potential to generate cumulative impacts with numerous other existing, approved or proposed developments in the region, which are numerous and detailed in the EIS for the Project. These generally consist of solar farm and a wind farm projects, with few mining and infrastructure projects.

In the context of agriculture, increased cumulative impacts including changes to land used for agriculture, localised productivity, secondary productivity and some agricultural support services are likely to be experienced. This will be a result of agriculture land use being inhibited by landform modification and infrastructure, such as the development footprints for wind and solar farms. However, given the nature and scale of the established agricultural industries within the region that interfaces with renewable energy projects (that is, predominantly livestock grazing, with some broadacre cropping), as well as the generally low quality agricultural resources and low stocking rates for the broader region, significant impacts to regional agricultural businesses, industry critical mass thresholds and regional agricultural infrastructure are unlikely to occur in the foreseeable future.

In addition, the applicability of dual land use opportunities for solar and wind farm projects is especially relevant to the nearby South West Renewable Energy Zone given the suitable conditions for sheep grazing and the established sheep and lambing industries and infrastructure (as outlined in Section 2.4.3).

Therefore, given the majority of proposed development in the local and regional context of the Project are renewables developments, the cumulative impact on agriculture for the region is considered to be low given changes to agricultural land use and agricultural productivity are anticipated to be minor for each respective wind and solar Project.

Further, it should be noted that only a small percentage of the 26+ gigawatts of projects proposed in the nearby South West Renewable Energy Zone will proceed to construction and operation stages, noting that Project Energy Connect has less than 2GW of total capacity.

At the scale of NSW, the cumulative risk to agricultural land and productivity because of large-scale solar development is estimated to be very low (DPE 2022). The Australian Energy Market Operator estimates that NSW will need approximately 20,000 MW of large-scale solar generation by 2050. This would require approximately 40,000 ha of land or only 0.06% of rural land in NSW. Even in the highly unlikely scenario that all of NSW's solar generation were located on important agricultural land (this land covers around 13.8% of the state and is 6 to 7 times more agriculturally productive than the remaining 86.2% of the state) only 0.4% of this land would be required (DPE 2022).

6 MITIGATION MEASURES

The Project will include a number of measures to prevent, minimise and manage adverse impacts on agricultural resources. This incorporates procedural mitigation measures along with a land management process that ensures the Project has negligible impact on agricultural resources and enterprises.

In addition to the specific measures described in this assessment, all activities associated with the Project will be conducted in consideration of approval obligations and environmental management measures in development consent stipulated environmental management plans.

6.1 PROJECT DESIGN

The design of the Project will be the result of an iterative process that will be adapted progressively as information regarding site constraints, and the potential impacts and risks associated with the development of the Project, become available. Constraints related to biodiversity values, electricity network easements, visual impact, cultural heritage sensitivities and will been considered in developing the proposed layout.

The Project currently consists of a number of solar array areas or blocks comprised of PV modules arranged in a series of long rows. The modules are mounted on frames which are fixed to piles driven into the soil. This method of installation includes an ability to track the sun's path throughout the day, in order to maximise the electricity yield that is generated.

This design was chosen for its simplicity, maturity and cost-effectiveness, and because it allows retention of existing grassland vegetation in situ with minimal ground disturbance in order to facilitate agrisolar and minimise soil impacts. This design approach is a critical mitigation measure employed to potentially reduce the impacts to agriculture as a result of the Project, if agrisolar is implemented.

Given the negligible effect the Project will have on agricultural resources and enterprises, (as outlined in Section 5), no further design controls are recommended to address agricultural impacts.

The complete Project design consideration process, as well as an analysis of Project alternatives, will be presented in the EIS.

6.2 LAND AND SOIL DISTURBANCE MITIGATION

6.2.1 SOIL EROSION MANAGEMENT

Based on site observations, there are no significant erosion and sedimentation issues present at the Project Area. However, as the chemical analysis and dispersion risk status of the tested soils indicate, there is a potential moderate risk for dispersion for the soils within the Project Area, with one soil unit having a potentially high risk of dispersion, which would result in long term agricultural impacts.

Generally, channelised drainage patterns should be minimised and the Project should limit hard engineering solutions for erosion control and preference soft, vegetated structures.

The Project will prepare an erosion and sediment control plan (ESCP) that addressed specific soil dispersion risks based on disturbance activity and phase of the Project. The ESCP should include the following:

Construction Phase

- The Project should utilise the existing landform and not endeavour to undertake broad-scale re-contouring of the existing ground levels without referring to this soil and land resource assessments and implementing erosion and sediment control accordingly. As a result, the existing vegetative cover and soil structure will be maintained intact across much of the Project Area.

- Solar arrays are typically pole mounted, with the poles being supported on a driven or screw pile, so that there is no excavation required other than for electrical cabling.
- Construction areas should be progressively revegetated with grass and pasture species as installation of solar panels proceeds across the site.
- At locations where earthworks are necessary, such as for cable trenching, localised erosion and sediment controls will be placed in accordance with the Landcom (2004) guidelines.
- Preservation and stabilisation of drainageways and minimisation of the extent and duration of any surface disturbance will be prioritised during construction.
- Where sodic are subject to high impact disturbance activity, it is recommended to apply gypsum as an ameliorant to displace the sodium and provide the soil with a stronger aggregate and hold structure when wet.
- All areas disturbed during construction that are not in active use for over 3 months should be sown with grass and pasture species with starter fertiliser to provide stabilising ground cover and a healthy topsoil to provide long term protection against erosion.

Operation Phase

- Soil disturbance during operation of the Project should be minimal and limited to maintenance activities, involving very small, localised disturbance areas on an infrequent basis.
- Standard erosion and sediment control measures should be implemented to minimise the potential for sediment export within areas to be disturbed during operations. These measures would be developed on a case-by-case basis referring to this soil assessment and are likely to include measures such as sediment fencing, localised sediment traps, and progressive stabilisation with vegetation.
- During operation, mounted solar panels will change orientation during the day, with any rainfall runoff being distributed in the area around each panel, and not drained permanently to a single point on the ground.
- Measures to manage any bare areas and erosion that develop beneath the solar arrays over time should be included in an operational management plan for implementation during ongoing operation of the proposal.

Decommissioning and Rehabilitation Phase

- A detailed Decommissioning and Rehabilitation Plan should be prepared within 18 months of the planned closure of the Project. This plan will detail all aspects of decommissioning and removal of all infrastructure unwanted for post Project land use (some infrastructure may remain for post Project land use purposes i.e., constructed internal roads may be kept as part of the agricultural infrastructure), which may require temporary erosion and sediment control measures.
- During decommissioning, where potential erosive impacts have been identified due to the disturbance of sodic subsoils in locations of significant disturbance, soil amelioration should be undertaken as part of remediation earthworks. Standard temporary erosion and sediment control measures are to be put in place for high disturbance areas.

6.2.2 SOIL STRIPPING FOR REHABILITATION

The very minor amount of soil that is proposed to be disturbed during the Project will be stripped and re-used in construction and/or rehabilitation efforts in order to mitigate long term effects on the land and soil capability of the Project Area.

The entirety of the Project Area has been assessed to determine suitability for stripping and re-use. This will allow site managers to make decisions on soil stripping for re-use when the locations of soil disturbance for surface infrastructure have been finalised. This localised, fluid approach is an integral process for successful rehabilitation

of the Project. This section provides information on the following key areas related to the management of the topsoil resources for the area within the Project Area.

Soil Stripping Strategy

Laboratory soil analytical results (refer **Appendix 3**) were used in conjunction with the field assessment to determine the potential risk associated with soil material recovery and re-use. Structural and textural properties of soils, along with stones, dispersion potential, sodicity and high acidity are the most common and significant limiting factors in determining depth of soil suitability for re-use, however, given the limited surface disturbance and lack of a soil bank for the site, it is anticipated that all soil stripping and re-use will be localised; that is, soil will be respread from where it is stripped during construction, reinstating the soil profile to its original condition.

Additionally, soils will be stripped only in areas where soil disturbance occurs. The depth of soil salvaged should be as deep as excavations or surface disturbance is required, or to a depth where parent material is encountered.

Due to the sodic nature and dispersion risk of the soil, targeted controls must be implemented to manage the risk of surface water erosion with potential to occur once excavated. Upon respreading, clay subsoils that have been excavated for trenching will be used exclusively as a subsoil, and encapsulated by the more chemically stable topsoils with which they are currently capped.

Higher Impact Areas

It is recommended that proposed long term small scale stockpiles in areas associated with the higher impact activities where larger amounts of soil will be displaced should be stripped of topsoil. Then the excavated subsoil (only if requiring disturbance) should be placed on the exposed subsoil of the stockpile area to create a low-profile landform of subsoil. A thin layer of topsoil material from the stripped areas should be placed as a 'cap' over the subsoil stockpiles to promote vegetation growth. Topsoil materials should otherwise be stockpiled separately to subsoils. Sodic subsoils should be treated gypsum prior to stockpiling.

Topsoil and subsoil depths for these areas should be recorded in GIS and rehabilitated with target species to build up the seedbank over the years of stockpiling.

Stripped Soil Management

The following soil handling techniques are recommended to prevent excessive soil deterioration and dispersion. It is not anticipated the Project will involve major amounts of soil excavation requiring long-term stockpile solutions, however small scale potential soil stockpiling from trenched areas and hardstand locations should abide by the following measures where practicable:

- Strip soil material to maximum excavation depths only.
- Soil should ideally be stripped in a slightly moist condition, where practicable. Material should not be stripped in either an excessively dry or wet condition.
- Push soil into windrows or small stockpiles with graders. This technique is an example of preferential less aggressive soil handling. This minimises compression effects of the heavy equipment that is often necessary for economical transport of soil material.
- The surface of soil stockpiles should be left in as coarsely structured a condition as possible in order to promote infiltration and minimise erosion until vegetation is established, and to prevent anaerobic zones forming.
- Where necessary, a flow diversion bank or catch drain should be placed up-slope of a stockpile to direct surface water flows away. All stockpiles shall remain in a free-draining location to avoid long term soil saturation.
- Where necessary, silt fences or cleared vegetation should be installed around topsoil stockpiles or stripped areas as a form of erosion and sediment control. Mulch or wood chip from cleared vegetation can also be

applied as a veneer over topsoil stockpiles to slow erosion, weed establishment and to maintain moisture content.

- As a general rule, maintain a maximum stockpile height of 3 m. Clayey soils should be stored in lower stockpiles for shorter periods of time compared to coarser textured sandy soils.
- Seed and fertilise stockpiles as soon as possible. An annual cover crop species that produce sterile florets or seeds may be sown. A rapid growing and healthy annual pasture sward will provide sufficient competition to minimise the emergence of undesirable weed species. The annual pasture species will not persist in the rehabilitation areas but will provide sufficient competition for emerging weed species and enhance the desirable micro-organism activity in the soil. Final rehabilitation target species should be established on stockpiles to build up a desirable species seed bank in the topsoil.
- An inventory of available soil should be maintained to ensure adequate materials are available for planned rehabilitation activities when the time comes.
- Prior to re-spreading stockpiled topsoil onto the disturbance area, an assessment of weed infestation on stockpiles should be undertaken to determine if individual stockpiles require herbicide application and / or "scalping" of weed species prior to topsoil spreading.

Soil Re-spreading and Seedbed Preparation

The Project does not anticipate large volumes of topsoil to require significant stockpile and respreading management measures, however the following re-spreading and seedbank preparation techniques are recommended to prevent excessive soil deterioration and dispersion for any minor areas of topsoil removal.

- Topsoil should be spread to a depth that reflects pre-disturbance soil horizons.
- Topsoil should be spread, treated with fertiliser and seeded in one consecutive operation, to reduce the potential for topsoil loss to wind and water erosion. Thorough seedbed preparation should be undertaken to ensure optimum establishment and growth of vegetation.
- All topsoiled areas should be lightly contour ripped (after topsoil spreading or following removal of hardstand from topsoil areas) to create a "key" between the soil and material below. Ripping should be undertaken on the contour. Best results will be obtained by ripping when soil is moist and when undertaken immediately prior to sowing.
- The respread soil surface should be scarified prior to, or during seeding, to reduce run-off and increase infiltration. This can be undertaken by contour tilling with a fine-tyned plough or disc harrow.

6.2.3 SOIL MICROBIOLOGY MANAGEMENT

During the approximately 30 year life of the Project soil microbial processes may be impacted. In addition to reducing the landscape's ability to support ecosystem services during the solar facility's lifespan, these changes may leave legacy effects that persist long after the installation is removed, if effective rehabilitation is not undertaken post decommissioning.

Based on the intensity of the panel array layout and potential for stock to graze under the panels, the soil will be able to retain and store nutrients and support microbiology. Upon decommissioning the areas under the panels may be seen to have a short term decrease in microbiology productivity compared to adjacent areas, however commitments to achieve a groundcover level during the post operative period will be sufficient to increase soil microbiology biomass to match adjacent analogue areas.

Several mitigation measures are available for the operational phase to mitigate the long term impacts of the Projects on soil microbiological balance and nutrient availability. These include:

- Routine vegetation monitoring and maintenance.
- Erosion and sediment controls to preserve topsoil material.

- Routine monitoring and management of visible surface erosion, such as rilling caused by concentrated flows from infrastructure.
- Weed management strategies to promote continued presence of pasture species and seedbank within topsoil.

These should be incorporated into the Operational Environmental Management Plan, which will guide operational environmental management following the final design of the Project and would be approved by the relevant statutory authority.

Soil sterilisation, localised or widespread, remains a minor risk throughout the Project. However, soil rehabilitation measures at the decommissioning stage can be employed to restore soil biological balance and nutrient availability. Measures include the application of mulch and organic materials, fertilisers, soil ameliorants and regenerative farming practices. Further, the spacing between each of the solar panel rows are anticipated to remain biologically active and act as an established source of bioactivity for spreading into potentially sterilised islands following the removal of panels.

6.3 PEST SPECIES

Weeds in general will be managed across the site through a Pest and Weed Management Plan. This will include an ongoing effort to identify and eliminate existing weed populations on-site over the life of the Project. The spread of declared noxious weeds will be prevented by using site specific measures such as direct spraying.

Weed control, if required, will be undertaken in a manner that will minimise soil disturbance. Any use of herbicides will be carried out in accordance with the regulatory requirements. Records will be maintained of weed infestations and control programs will be implemented according to best management practice for the weed species concerned.

Feral animals may include foxes, rabbits, cats, pigs, and dogs and will be controlled in accordance with Livestock Health and Pest Authority procedures. Feral animal control may be undertaken in consultation with host and neighbouring landholders, as required. Programs to control feral animals will include the determination of appropriate control practices, consultation with appropriate authorities, obtaining appropriate approvals, implementing control practices, and undertaking follow-up monitoring and control as required. If a substantial increase in the numbers of any known feral fauna species, or the occurrence of a previously unrecorded feral fauna species, is discovered, advice will be sought from a suitably qualified and experienced person on the management and control options for that species and appropriate measures for mitigating any impacts caused by its management on native species.

6.4 BIOSECURITY

At the local level, the mitigation measures outlined for pest species will reduce biosecurity risks. On a regional level, any import of equipment or machinery from overseas will follow the standard procurement safeguards and quarantine procedures as per Australian requirements.

Further, an agricultural Biosecurity Management Plan detailing construction and operational risks and controls in relation to pests, weeds, and diseases will be prepared for the Project.

As DPI Agriculture has noted for other similar large scale renewables projects, the agricultural biosecurity management plan should include controls to address the current elevated threat of foot-and-mouth disease (FMD), a serious and highly contagious animal disease that affects all cloven-hoofed animals including cattle and sheep. An incursion of the virus would have severe consequences for Australia's animal health and trade. Key controls should include adherence to government FMD awareness, prevention and preparedness programs and guidance.

6.5 MONITORING PROGRAMS

Monitoring programs are instituted to assess predicted versus actual impacts as the Project progresses in order to implement controls where required. All operations associated with the Project undertaken in accordance with approved environmental management plans and strategies. The management plans will include environmental monitoring programs, where required. Key management plans, or chapters housed within a larger CEMP, that will assist in managing impacts on agricultural land will be stipulated in conditions of development consent.

These management plans, which will include mitigation measures to control impacts to soils and agriculture, will be reviewed and revised where necessary to incorporate the requirements associated with the Project prior to commencement.

6.6 AGRISOLAR

Agrisolar refers to co-developing the same area of land for both use as a solar farm as well as for agriculture activities (Clean Energy Council, 2021). By implementing complementary solar energy and agricultural production, impacts to existing agricultural land use and enterprises, including primary and secondary productivity, can be reduced.

Solar Farms typically require access to relatively flat or gently sloping land in sunny areas within proximity to electricity transmission networks, where biodiversity impacts can be avoided or minimised. This often means that land which has been previously cleared or zoned for agricultural use is well-situated to host solar farm developments.

Where solar farms are proposed and developed, there is increasing interest in exploring the opportunities for complementary agricultural activities which can benefit from a number of the valuable characteristics of solar arrays, including:

- the provision of partial shading and weather protection (including sun, rain, hail and wind).
- improved soil moisture retention, which can lead to improved vegetation growth beneath the panels.
- protection from predators for sheep.

Sheep grazing delivers benefits for the operation of solar farms, as the vegetation is maintained in a cost-effective and safe manner by reducing the need for mowing or spraying. This maintenance reduces the risk of fire hazard, protecting the solar assets and neighbouring properties. Further, agrisolar can strengthens relationships, communication and interaction with local landholders and farming communities and mitigate land use conflicts.

During the detailed design phase prior to construction commencing, the Project will consider design measures to enable the efficient movement of sheep between the solar farm areas and other paddocks. With the development of solar farms commencing in Australia from around 2015 onwards, the local experience of agrisolar practices is still developing and currently dominated by the practice of sheep grazing on solar farms (Clean Energy Council, 2021). By 2020, there were at least 13 large-scale solar farms grazing sheep in Australia. At the Gannawarra Solar and Battery project in Victoria, now in its operational phase, the Applicant has successfully integrated 500 merino sheep onto project site.

Plate 7: Edify Energy's Gannawarra Solar Farm (2020)

The Applicant is committed to exploring the integration of solar panel installation with the existing agricultural use at the Project Area as a means of mitigating the impacts to agriculture and anticipates that merino sheep can be introduced to graze within the Project Area during the operation phase of the Project, subject to necessary approvals and climate conditions permitting.

6.7 MITIGATION SUMMARY

The mitigation measures pertaining to soils and agriculture that have been referenced in this assessment will form part of the Project approval commitments. A summary of these is presented in **Table 17**.

Table 17: Summary of Mitigation Measures

Risk Category	Mitigation Measure
Agricultural Land Use	Consider implementing Agrisolar to reduce area of land removed from agricultural service. Agriculture land use will be re-established over the entire Project Area at the time of decommissioning (unless otherwise agreed with the landowner and/or regulatory authorities).
Agricultural Productivity	Consider implement Agrisolar at a suitable stocking rate. Project Area will be returned to an equivalent agricultural productivity following the Project.
Soil	All soil that is proposed to be disturbed during the Project will be stripped and re-used in construction and/or stockpiled for use in rehabilitation. Channelised drainage patterns should be minimised and the Project should limit hard engineering solutions for erosion control and preference soft, vegetated structures. All soil resources are to be managed throughout construction, operation and decommissioning phases of the Project in accordance with recommendations outlined in Section 6.2, and a site soil management plan.
LSC	Return disturbed land to an equivalent LSC class following the end of life for the Project, through site rehabilitation and good soil management practices as outlined in Section 6.2.
Erosion and Sedimentation	Suitable erosion and sedimentation controls, as outlined in Section 6.2, will be implemented in accordance with an ESCP prepared for the Project.
Agricultural Infrastructure	Stock fences, farm dams, and access tracks to be retained and maintained to accommodate Agrisolar.
Pest Species	Pest species will be managed in accordance with measures outlined in Section 6.3, and a Weed Management Plan prepared for the Project.
Biosecurity	Biosecurity will be managed in accordance with measures outlined in Section 6.4 and an Agricultural Biosecurity Management Plan prepared for the Project.

7 SUMMARY

There is a high level of certainty about the status of agricultural resources and enterprises in the Project Area, locality and broader region, based on the site verification assessment undertaken, consultation and desktop studies carried out. Further, there is a high level of confidence regarding the Project activities, surface disturbance requirements and commitments to returning land to pre-disturbance agricultural status following the life of the Project.

Based on these factors, the impacts on agriculture as a result of the Project are determined to be minor, temporary, and limited to the development footprint. These impacts can be summarised as the following:

- Temporary removal of up to 845 ha from agricultural land use within the Project Area for the duration of the Project.
- Temporary removal of potential agricultural primary productivity to the estimated value of up to $811,155 per year for the duration of the Project.
- Temporary impacts on soil resources within the Project Area where surface disturbance occurs.
- Temporary removal of 0.6% of LSC class 3 land in the Murrumbidgee LGA from highly productive land use activities such as cropping.

The temporary impacts on agriculture listed above are considered a negligible impact in the context of the gross commodity values and land use coverage of the agricultural industries operating within the Murrumbidgee LGA (<0.2%). Further, at the scale of the enterprises operating within the Project Area, impacts are considered offset as the involved landowners would be financially compensated.

Following construction and resting period of approximately one year, subject to the approval of Project stakeholders such as Rural Fire Service, Murrumbidgee Council and the Project's insurance providers, Edify anticipates that merino sheep can be introduced to graze within the Project boundary. This integrated land use of solar panels and livestock grazing offers the potential to enable the continuation of agricultural land usage and mitigate the above listed temporary impacts of the Project.

Further, it is anticipated that by adopting the principles of impact minimisation and targeted soil and erosion management during Project construction and operation, and implementing effective decommissioning and rehabilitation at the end of Project life, the Project will have no permanent negative impacts on agricultural resources or enterprises.

A summary of mitigation measures and management recommendations have been provided at Section 6.7 to eliminate the permanent risks and control the temporary risks of the Project on land and soil resources. The salvage of topsoil material for re-use purposes combined with sound erosion and sedimentation management practices during construction, operational and decommissioning phases of the Project, will ensure rehabilitation requirements are met and land is returned to a pre-disturbance agricultural status.

8 REFERENCES

Australian Bureau of Statistics (2022a), Agricultural Commodities, Australia. Year 2020-2021. https://www.abs.gov.au/statistics/industry/agriculture/agricultural-commodities-australia

Australian Bureau of Statistics (2022b), Value of Agricultural Commodities Produced, Australia. Year 2020–2021 https://www.abs.gov.au/statistics/industry/agriculture/value-agricultural-commodities-produced-australia

Bureau of Meteorology (2023). Climate statistics for Australian locations, Griffith Airport (site no. 075041) Australian Government. Accessed 22 March 2024: http://www.bom.gov.au/climate/averages/tables/cw_075041.shtml

Bureau of Meteorology and the CSIRO (2019) *Riverina Regional Weather and Climate Guides*

B. E. Butler, G. Blackburn, J. M. Bowler, C. R. Lawrence, J. W. Newell, S. Pels (1973) *A Geomorphic Map of the Riverine Plain of South-eastern Australia.* Australian National University Press Canberra

Elliot, G.L. and Reynolds, K.C. *in* Charman, P.E.V. and Murphy, B.W. (2007) *Soils their Properties and Management* (Oxford University Press, Australia).

Geoscience Australia (2016) *GA Surface Geology of Australia* MapServer, Canberra.

Isbell, R. F. (2021) *The Australian Soil Classification Third Edition* (CSIRO Publication, Australia).

McKenzie, N.J, Grundy, M.J., Webster, R. and Ringrose-Voase, A.J. (2008) *Guidelines for Surveying Soil and Land Resources (2nd Ed)*. CSIRO Publishing, Melbourne.

Meat and Livestock Australia (MLA) (2022) National Livestock Reporting Service – Saleyard Survey 2021-2022.

Murrumbidgee Council (2013) *Murrumbidgee Local Environmental Plan 2013*

NSW Department of Planning, Industry and Environment (2022) Retrieved of following layers: soil landscapes, soil types, inherent soil fertility, land and soil capability. espade.environment.nsw.gov.au

NSW Department of Planning and Environment (2022) *Large-Scale Solar Energy Guideline*

NSW Department of Primary Industries (2011) *Land and Use Conflict Risk Assessment Guide.*

NSW Department of Primary Industries (2018) *Riverina Murray Region Agricultural Profile*

NSW Department of Industry & Investment (2021) *Biosecurity Strategy*

NSW Department of Primary Industries (2023) *Farm Enterprise Budget Series - Summary of gross margins for NSW beef enterprises*

NSW Office of Environment and Heritage and DPI-OAS&FS (2013). *Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land.*

NSW Office of Environment and Heritage (2012). *The land and soil capability assessment scheme: second approximation – A general rural land evaluation system for NSW.*

Appendix 1

Land Use Conflict Risk Assessment

Overview

LUCRA is a system to identify and assess the potential for land use conflict to occur between neighbouring land uses. It helps land managers and consent authorities assess the possibility for and potential level of future land use conflict.

The LUCRA compares and contrasts the Project against adjoining/surrounding land uses and activities for incompatibility and conflict issues based on the risks and impacts identified in Section 5, and the mitigation measures and controls presented in Section 6. Each potential conflict between the operation of the solar farm and adjacent land has been assessed and given a risk ranking based on probability and consequence as outlined in the following section.

Assumption

The current status of rural land use in the area is not considered likely to change significantly during the life of the Project. For example, due to the location of the Project Area relative to major regional towns, it is considered unlikely that surrounding properties will undergo subdivision to accommodate residential or small-block rural developments. Accordingly, it is not expected that future changes to land use will occur that will generate new land use conflicts in addition to those identified.

Methodology

A risk ranking matrix (**Table A1**) provided by the DPI (2011) is used to rank the identified potential land use conflicts. The risk ranking matrix assesses the economic, social and environmental impacts according to the probability of occurrence and consequence of the impact.

Table A1: Risk Ranking Matrix

	Probability				
Consequence	**A**	**B**	**C**	**D**	**E**
Level 1	25	24	22	19	15
Level 2	23	21	18	14	10
Level 3	20	17	13	9	6
Level 4	16	12	8	5	3
Level 5	11	7	4	2	1

(Source: DPI, 2011)

The risk ranking matrix yields a risk ranking from 25 to 1. It covers each combination of five levels of 'probability' (a letter A to E as defined in **Table A2**) and 5 levels of 'consequence', (a number 1 to 5 as defined in **Table A3**) to identify the risk ranking of each impact. For example, an activity with a 'probability 'of D and a 'consequence' of 3 yields a risk rank of 9. A rank of 25 is the highest magnitude of risk; a highly likely, very serious event. A rank of 1 represents the lowest magnitude of risk; an almost impossible, very low consequence event. Low risk is a ranking score of 10 or below.

Table A2: Probability Definitions

Level	Descriptor	Description
A	Almost Certain	Common or repeating occurrence.
B	Likely	Known to occur or it has happened.
C	Possible	Could occur or 'I've heard of it happening.'
D	Unlikely	Could occur in some circumstances but not likely to occur.
E	Rare	Practically impossible or 'I've never heard of it happening.'

(Source: DPI, 2011)

Table A3: Consequence Definitions

	Description	Example of Implications
Level 1		
Severe	• Severe and/or permanent damage to the environment • Irreversible • Severe impact on the community • Neighbours are in prolonged dispute and legal action involved	• Harm or death to animals, fish, birds or plants • Long term damage to soil or water • Odours so offensive some people are evacuated or leave voluntarily • Many public complaints and serious damage to Council's reputation • Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
Level 2		
Major	• Serious and/or long-term impact to the environment • Long-term management implications • Serious impact on the community • Neighbours are in serious dispute	• Water, soil or air impacted, possibly in the long term • Harm to animals, fish or birds or plants • Public complaints. Neighbour disputes occur. Impacts pass quickly • Contravenes the conditions of Council's licences, permits and the POEO Act • Likely prosecution
Level 3		
Moderate	• Moderate and/or medium-term impact to the environment and community • Some ongoing management implications • Neighbour disputes occur	• Water or soil known to be affected, probably in the short to medium-term (e.g. 1-5 years) • Management could include significant change of management needed for agricultural enterprises to continue
Level 4		
Minor	• Minor and/or short-term impact to the environment and community • Can be effectively managed as part of normal operations • Infrequent disputes between neighbours	• Theoretically could affect the environment or people but no impacts noticed • No complaints to Council • Does not affect the legal compliance status of Council
Level 5		
Negligible	• Very minor impact to the environment and community • Can be effectively managed as part of normal operations • Neighbour disputes unlikely	• No measurable or identifiable impact on the environment • No measurable impact on the community or impact is generally acceptable

(Source: DPI, 2011)

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction Noise and Vibration	Land users in the locality may be concerned construction activity disturbances may affect livestock behaviour and/or breeding, including at surrounding poultry farms.	D	3	9	The assessment of potential noise and vibration impacts will be undertaken via a Noise and Vibration Impact Assessment (NVIA). Appropriate mitigation measures will be specified within the NVIA to minimise noise and vibration impacts. Based on the preliminary separation distances and the mitigation proposed, adverse impacts from noise and vibration on neighbouring livestock and farmed poultry during construction and operation are not predicted. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to noise and vibration impacts on agricultural land users. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	4	5	Any complaints from neighbours regarding effects to livestock can be managed within normal operations. No exceedances of adopted noise policy.
Construction Dust	Land users in the locality may be concerned that dust generated by construction activities may have adverse health implications for neighbouring livestock, including farmed poultry, and land users (residents and workers) within the locality.	D	3	9	The assessment of potential dust impacts will be undertaken as part of the EIS. Appropriate mitigation measures will be specified within the EIS to minimise the risk for dust to spread throughout the site and onto neighbouring land. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to air quality impacts. Based on the preliminary separation distances and the mitigation proposed, adverse impacts from construction dust neighbouring farmed poultry and neighbouring land users during construction and operation are not predicted. Separation distances for dust originating from the development (if applicable) will be included as a management strategy. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	Any complaints from neighbours can be managed within normal operations. No exceedances of adopted dust criteria.

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction Noise	Increased noise generated by construction activities and heavy vehicle movements may be perceived as nuisance to surrounding land users (residents and workers).	D	3	9	The assessment of potential noise and vibration impacts will be undertaken via a Noise and Vibration Impact Assessment (NVIA). Appropriate mitigation measures will be specified within the NVIA to minimise noise and vibration impacts. Based on the preliminary separation distances and the mitigation proposed, nuisance impacts from noise and vibration during construction and operation are not predicted. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to noise and vibration impacts on agricultural land users. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	4	5	Any complaints from neighbours can be managed within normal operations. No exceedances of adopted noise policy.
Construction Ground Disturbance	Land users in the locality may be concerned about changes to water quality, quantity and surface water flows that may affect nearby creeks and irrigation channels, from surface disturbances during construction activities.	D	3	9	Consideration of impacts to surrounding water courses and water quality will be undertaken within the for the EIS. The flat nature of the landform indicates a low water erosion and sedimentation risk to local waterways, and irrigation channel banking protection suggests low risk to irrigation water quality. Appropriate mitigation measures will be specified within the EIS, including soil erosion and sedimentation controls within this report, to minimise impacts to watercourse health and quality. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to watercourse health and quality. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved), such as a soil management plan and an erosion and sediment control plan.	D	4	5	No reportable erosion or sedimentation within the Project Area.

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction Ground Disturbance	Stakeholders may have concerns that the construction and operation of the solar farm may alter and disturb existing soil properties, undermining the suitability of the land for future agricultural production.	C	2	18	The assessment of soil characteristics, erodibility and land and soil capability has been undertaken within this agricultural assessment. Anticipated impacts and appropriate mitigation measures are provided within this report. Compliance with mitigation measures is anticipated to reduce the risk of potential conflicts related to future land capability for agriculture. Implement all measures specified in this report and associated management plans identified in the EIS and/or consent conditions (if approved).	E	3	6	Stakeholders are informed of assessment findings and have no concern regarding impacts to soil and LSC. No observed erosion or degradation of soils or sedimentation of waterways
Construction Ground Disturbance	Stakeholders may be concerned about impacts to heritage items or values at the site and locality.	B	4	12	An assessment of impacts to heritage will be undertaken with the preparation of an Aboriginal Cultural Heritage Assessment Report (ACHAR) and Statement of Heritage Impact (SOHI). Appropriate mitigation measures will be specified within the ACHAR and SOHI to minimise impacts to heritage. Compliance with mitigation measures specified within the ACHAR and SOHI is anticipated to reduce the risk of conflict related to environmental features, culturally sensitive land, and heritage. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	D	4	5	No complaints from stakeholders regarding impacts to heritage items or values at the Project Area.
Construction Ground Disturbance	Stakeholders may be concern about potential impacts to biodiversity within the site and locality	B	3	17	The assessment of impacts to biodiversity will be undertaken via a BDAR. Impacts are anticipated to be minor, based on the current land use and the development footprint design mitigation controls. Further appropriate mitigation measures will be specified within the BDAR and this assessment to minimise the risk for impacts on biodiversity within the site and locality. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	D	4	5	No complaints from stakeholders regarding impacts to biodiversity at the Project Area.

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction Biosecurity	Land users in the locality, including neighbouring poultry farm businesses, may be concerned about biosecurity breaches including weed, plant pest, plant and animal disease or pest animal introduction and/or spread, as a result of the high volume of new personnel, vehicles and materials entering the site and locality during Project construction.	B	2	21	The assessment of impacts to biodiversity will be undertaken via a BDAR. Consideration of the potential for pest species and other biosecurity threats to impact agriculture has been included in this assessment. Appropriate mitigation measures are considered readily available for implementation. Measures will be specified within the BDAR (and are specified in this assessment) to minimise the risk for biosecurity and pest species impacts within the site and locality. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	D	3	9	Effectiveness of mitigation measures will be measured as part of the EMS, specifically Biodiversity Management Plan.
Construction Traffic	Use of surrounding roadways during construction of the solar farm may cause conflict by interacting with agricultural and/or local transport activities, and/or resulting in additional travel time for road users	C	4	8	The assessment of potential traffic impacts will be undertaken via a Traffic Impact Assessment (TIA). Appropriate mitigation measures will be specified within the TIA to minimise impacts to the traffic environment. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to traffic for local road users. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved)	D	2	4	No complaints from local agricultural enterprises during the construction phase.

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction Traffic	Land users in the locality may be concerned about the possibility of increased vehicles during construction on the Kidman Way and Ringwood Road may result in an incident involving other vehicles, farm machinery or wildlife on roads.	D	1	19	The assessment of potential traffic impacts will be undertaken via a Traffic Impact Assessment (TIA). Based on the volume of Traffic on these roads the anticipated additional traffic is expected to result in no increased risk of incidents. Appropriate mitigation measures will be specified within the TIA to minimise impacts to the traffic environment. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to traffic for local road users. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved)	E	3	6	No traffic incidents during construction that are directly related to the solar farm.
Construction Workforce	Public authorities may be concern about the increased demand for services and infrastructure that may result from the development, especially during the construction stage, including increased accommodation for workers, availability of medical facilities and capacity of surrounding waste facilities	C	5	4	The assessment of impacts related to the increased demand for surrounding services and infrastructure will be undertaken as part of the EIS. The scale of the nearby regional centre of Griffith is expected to accommodate additional infrastructure and service demands of workers associated with the Project. Levels of anticipated increased demand and appropriate mitigation measures will be specified within the EIS to minimise the risk for logistical issues associated with the increased demand for existing infrastructure and services. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	No unreasonable additional pressure on local services and infrastructure during the construction phase.
Construction Workforce	Stakeholders in the locality may be concerned about the effects on local and regional employment	C	1	4	Consideration of employment impacts will be undertaken as part of the EIS. Impacts are anticipated to be negligible and outweighed by the employment opportunities of the Project. This finding is presented in the EIS for stakeholder consideration.	E	1	1	No unreasonable additional pressure to local employment

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction Work	Stakeholders may have concerns that construction activities associated with the solar farm may damage existing infrastructure including transmission lines and public infrastructure.	C	4	8	Consideration of potential impacts to surrounding service provider infrastructure will be undertaken as part of the EIS. Appropriate mitigation measures will be specified within the EIS and will be detailed in a Construction Management Plan to minimise the risk of construction activities damaging existing infrastructure. Compliance with construction management measures anticipated to reduce the risk of conflict related to damaging existing infrastructure. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	D	4	5	No damage to existing infrastructure including transmission line during the construction phase.
Land Use Change	Stakeholders in the locality may be concerned about the reduction of land used for agricultural purposes or the reduction of productivity of the land	A	4	16	The assessment of the reduction of land used for agriculture and the productivity of land has been undertaken within this agricultural assessment. Anticipated impacts and appropriate mitigation measures (ie consideration of agrisolar) have been provided within this report for stakeholder consideration. A Rehabilitation and Decommissioning Management Plan will ensure the land can be successfully returned to agricultural production following decommissioning.	D	4	5	Stakeholders are informed of assessment findings and have no concern regarding change in land use
Land Use Change	Land users in the locality may be concerned about impacts to agricultural support infrastructure in the Project locality and wider region	D	4	5	The assessment of the impacts to agricultural support infrastructure in the Project locality and wider region have been undertaken within this agricultural assessment. Anticipated impacts are determined to be negligible and presented in this report for land user consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	Stakeholders are informed of assessment findings and have no concern regarding impacts to agricultural support infrastructure

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Operation Traffic	Land users in the locality may be concerned about an increase in traffic volume on the Kidman Way and Ringwood Road throughout the operational phase of the Project, which may cause conflict by interacting with agriculture activities or increasing travel times over the life of the Project.	D	4	5	The assessment of potential traffic impacts during the operational phase of the Project will be undertaken via a Traffic Impact Assessment (TIA). Anticipated impacts are anticipated to be negligible and presented in the EIS for land user consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	No complaints from agriculture enterprises regarding increased traffic
Operation Traffic	Land users in the locality may be concerned that dust generated by increased vehicle movements along access roads during the operational phase of the Project has the potential to impact air quality and may have adverse health implications for neighbouring livestock, including farmed poultry, and land users (residents and workers) within the locality.	D	3	9	The assessment of potential dust impacts during the operational phase of the Project will be undertaken as part of the EIS. Anticipated impacts are anticipated to be negligible and presented in the EIS for land user consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	E	3	6	No complaints from neighbours due to the solar farm activities. No exceedances of adopted dust criteria
Operation Noise	Land users in the locality may be concerned about an increase in noise levels generated from power inverters, transformer system, tracker motors and maintenance activities throughout the operational phase of the Project.	D	3	9	The assessment of potential noise and vibration impacts will be undertaken via a Noise and Vibration Impact Assessment (NVIA). Anticipated impacts are determined to be negligible and presented in the EIS for land user consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	No complaints from neighbours due to the solar farm activities. No exceedances of adopted noise policy.

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Change to Visual Amenity	Stakeholders in the locality who wish to maintain views of the existing agricultural landscape may be concerned about the change in visual amenity resulting from the solar farm.	B	3	17	The assessment of visual impacts to surrounding amenity will be undertaken via a LVIA. Appropriate mitigation measures will be specified within the LVIA to minimise the risk of altered amenity for surrounding residents and public within the locality. Compliance with mitigation measures specified within the LVIA is anticipated to reduce the risk of conflict related to visual amenity. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	C	4	8	No complaints from stakeholders regarding visual amenity
Change to Visual Amenity	The solar farm location and potential for glare and reflectivity has the potential to impact the amenity of surrounding residential properties	C	3	13	The assessment of glare and reflectivity impacts to surrounding residential properties will be undertaken via a LVIA. Based on Project design mitigation controls, anticipated impacts are anticipated to be negligible and presented in the EIS for stakeholder consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	3	6	No complaints from neighbouring properties regarding glare and reflectivity of panels
Pest Control	Land users in the locality may be concerned about weed, plant pest, plant and animal disease or pest animal introduction and/or spread during operation.	B	2	21	The assessment of impacts to biodiversity will be undertaken via a BDAR. Consideration of the potential for pest species to impact agriculture has been included in this assessment. Mitigation controls are considered readily available to implement. Appropriate mitigation measures will be specified within the BDAR and this assessment to minimise the risk for weeds and pests to spread throughout the site and onto neighbouring land. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	E	3	6	No spread of weed, plant pest, plant disease or pest animals onto neighbouring properties from the Project Area

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Pest Control	Neighbouring property owners may be concerned about sprays from weed control adversely affecting adjacent land	D	4	5	Weed mitigation measures will be undertaken as per methodology specified in management plans identified in the EIS and/or consent conditions (if approved), including spraying in a manner to prevent spray drift. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No complaints from neighbouring properties regarding overspray of herbicides
Waste	Land users in the locality may be concerned that waste generated by the development may increase the presence of pest animals and/or vermin which could impact agricultural productivity.	D	4	5	Consideration of waste related impacts will be undertaken as part of the EIS. Appropriate mitigation measures will be specified within the EIS to minimise the risk of attracting pest animals and/or vermin. Compliance with mitigation measures specified in the EIS is anticipated to reduce the risk of conflict related to pest animals and/or vermin. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No introduction of weed, plant pest, plant disease or pest animals onto the Project Area as a result of the Project, and no spread to surrounding properties
Waste	Land users in the locality may be concerned that waste generated by the development has the potential to enter surrounding residential land.	D	4	5	Consideration of waste related impacts will be undertaken as part of the EIS. Risk will be mitigated by implementing standard operation measures specified in management plans identified in the EIS and/or consent conditions (if approved). Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	5	1	No complaints from land users in the locality regarding waste.

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Erosion and Sedimentation	Land users in the locality may be concerned about changes to site run-off water quality during operational phases of the Project, especially where groundcover is reduced to below 70% during dry periods.	C	3	13	Consideration of impacts to surrounding water courses and water quality will be undertaken within the water impact assessment of the EIS. Appropriate mitigation measures will be specified within the EIS, including soil erosion and sedimentation controls within this report, to minimise impacts to watercourse health and quality. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to watercourse health and quality. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved), such as an erosion and sediment control plan.	D	4	5	No observed erosion of soils or sedimentation of waterways during operation
Fire Spread	Land users in the locality may be concerned about the risk of fires occurring at the site and their potential to spread to surrounding land, infrastructure or livestock, including poultry farms	C	2	18	Consideration of potential bushfire impacts will be undertaken as part of a Preliminary Hazard Analysis (PHA) informing the EIS. Appropriate mitigation measures will be specified within the bushfire assessment within the EIS to minimise the risk of bushfire incidents including their risk to people and potential to damage surrounding land. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	E	2	10	No occurrence of fires beginning on the Project Area and spreading to surrounding land

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Livestock Interaction	Neighbouring landowners may be concerned about livestock within Project Area entering adjacent properties	D	4	5	Operational management plans will include a provision to ensure boundary fence is maintained to a suitable standard. Regular inspection of fences should be conducted to assess the condition of the fence, and any issues rectified as soon as practical. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No breach of boundary fence.
Livestock Interaction	Neighbouring landowners may be concerned about their livestock entering the Project Area and becoming injured or causing damage	D	4	5	Operational management plans will include a provision to ensure boundary fence is maintained to a suitable standard. Regular inspection of fences should be conducted to assess the condition of the fence, and any issues rectified as soon as practical. If livestock enter the site, the surrounding landowners should be contacted. Efforts will be made to ensure the animal is not distressed and kept away from public roads. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No breach of boundary fence.
Electro-magnetic Fields	Land users in the locality may be concerned about electro-magnetic fields (EMF) resulting from electrical infrastructure associated with the Project.	D	2	14	Consideration of EMF impacts resulting from the development will be undertaken as part of the PHA and summarised in the EIS. The report is expected to conclude that EMF exposure levels will not exceed the International Commission on Non-Ionizing Radiation Protection reference level for the general public. No adverse impacts to human health at the site or in the locality are therefore anticipated. This finding is presented in the EIS for stakeholder consideration.	E	5	1	Stakeholders are informed of assessment findings and have no concern regarding EMF

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Neighbouring Operations	The placement of the solar farm on land that may be viable for sub-division may cause conflict with surrounding business operators interested in expanding production onto the site.	D	3	9	Existing consultation and engagement for the Project has not identified any intent for nearby enterprises to expand operations onto the site in the short term. The reversibility of the project would allow the site to be returned to its existing land use, therefore minimising potential for long term conflict.	E	3	6	Successful consultation addresses stakeholder concerns
Neighbouring Operations	The placement of the solar farm in proximity to agricultural business operators may affect insurance premiums for surrounding private property owners, especially in the context of potential fire damage.	C	3	13	Edify has its own insurance and would seek to make claim on that first in the event of fire damage to the solar power station. Notwithstanding, Edify recommends that neighbouring land users take all necessary precautions to prevent the ignition and spreading of fires, and seek advice from their insurance providers on individual insurance policy matters. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	3	6	Successful consultation addresses stakeholder concerns
Neighbouring Operations	Landowners and businesses in the locality may be concerned about potential devaluation of properties due to proximity to solar farm infrastructure.	B	3	17	After delivering eight projects throughout Australia, including the largest solar and battery project in New South Wales, Edify is not aware of, and has not been presented with, any reliable, impartial research or evidence which establishes a correlation between declining real estate values and proximity to renewable infrastructure. Given the proximity to poultry farms, and the agri-industrial nature of the locality, it is considered unlikely the Project will impact the agricultural resources or production value of properties proximate to the Project Area. Further, the change in visual amenity is not anticipated to have any noticeable effect on property values. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	2	10	Successful consultation addresses stakeholder concerns

Risk	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Neighbouring Operations	Landowners in the locality may be concerned about potential increase in council rates as a result of the change in land use of the Project Area.	C	3	13	The applicant has determined that council rates will not be expected to change in the locality as a result of the Project. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	3	6	Successful consultation addresses stakeholder concerns
Neighbouring Operations	Dispersion of dust and/or agricultural/ rural products from surrounding land uses, including adjacent poultry farms, cropping enterprises and Kidman Way traffic may impact the productivity of the solar farm panels, potentially causing conflict between agricultural land users and the solar farmland use.	C	4	8	Compliance with mitigation measures specified within the EIS together within the routine and event triggered cleaning of solar panels and site infrastructure, is anticipated to reduce the risk of conflict related to the functioning of the solar farm panels.	D	5	2	No impact to solar farm operations or infrastructure.
Public Perception	Stakeholders may have concerns regarding the ownership of the site i.e., whether it is a foreign-owned company	D	4	5	Engagement for the Project has introduced the Project and the applicant (Edify) to surrounding stakeholders. Notification to stakeholders outlined the applicant's ownership and consultation has provided an opportunity for stakeholders to provide feedback. No feedback will be provided regarding the ownership of the site.	E	4	3	Successful consultation addresses stakeholder concerns
Cumulative Impacts	Public Authorities may have concerns regarding the potential for cumulative impacts arising from the proximity of other renewable energy state significant developments.	B	3	17	An assessment of potential cumulative impacts will be undertaken as part of the EIS. Appropriate mitigation measures (where required) will be specified in the EIS to minimise the potential for cumulative impacts to occur at or near the site.	D	3	9	Successful consultation addresses stakeholder concerns
Rehabilitation	Stakeholders may be concerned about the potential for poor rehabilitation outcomes and the resulting long term environmental and agricultural consequence.	C	1	22	A Rehabilitation and Decommissioning Management Plan will ensure the land can be successfully returned to pre-disturbance land and soil capability and final land use commitments following decommissioning.	E	2	10	Fulfilment of rehabilitation objectives

Appendix 2

Soil Profile Descriptions

Site Description – Site 1				
Site Reference	1	**ASC Name**	Haplic Epipedal Brown Vertosol (EQRY)	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406069
Surface Condition	Disturbed	**Permeability**	High	Y: 6164809

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Brown (Munsell 10YR 5/3) Light Clay with strong pedality, rough fabric and strong consistence. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.15 – 0.55**	Dark brown (Munsell 7.5YR 3/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. Strongly alkaline pH, non-saline and sodic. No coarse fragments. Trace roots and moderately well drained. Gradual boundary.
B22	**0.55 +**	Brown (Munsell 7.5YR 4/4) Heavy Clay with moderate pedality, rough fabric and moderate consistence. Strongly alkaline pH, slightly saline and sodic. No coarse fragments. Trace roots and moderately well drained.

Sample Depth	ECe		pH(1-5water)		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.8	Non-saline	6.4	Slightly Acidic	1.6	Non sodic
0.30 – 0.40	1.5	Non-saline	8.7	Strongly Alkaline	8.3	Sodic
0.60 – 0.70	3.4	Slightly saline	8.4	Strongly Alkaline	12.8	Sodic

Site Description – Site 2				
Site Reference	2	**ASC Name**	Epipedal Grey Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406504
Surface Condition	Disturbed	**Permeability**	High	Y: 6165016

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Very dark greyish brown (Munsell 10YR 3/2) Medium Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.20 – 0.60**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	**0.60 +**	Brown (Munsell 7.5YR 4/4) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 3				
Site Reference	3	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406212
Surface Condition	Disturbed	**Permeability**	High	Y: 6165336

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Dark greyish brown (Munsell 10YR 4/2) Light Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.10 – 0.45**	Brown (Munsell 7.5YR 3/4) Heavy Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	**0.45 +**	Brown (Munsell 7.5YR 4/4) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 4				
Site Reference	4	**ASC Name**	Haplic Epipedal Brown Vertosol (ERRY)	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406316
Surface Condition	Disturbed	**Permeability**	High	Y: 6165877

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Brown (Munsell 7.5YR 4/4) Heavy Clay with strong pedality, rough fabric and strong consistence. Moderately alkaline pH, non-saline and non-sodic. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.20 – 0.50**	Brown (Munsell 7.5YR 4/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. Strongly alkaline pH, non-saline and non-sodic. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	**0.50 +**	Brown (Munsell 7.5YR 4/3) Heavy Clay with weak pedality, rough fabric and weak consistency. Strongly alkaline pH, non-saline and sodic. No coarse fragments. No roots and moderately well drained.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.6	Non-saline	8.0	Moderately Alkaline	4.6	Non sodic
0.30 – 0.40	0.8	Non-saline	8.6	Strongly Alkaline	5.8	Non sodic
0.60 – 0.70	1.9	Non-saline	8.7	Strongly Alkaline	10.4	Sodic

Site Description – Site 5				
Site Reference	5	**ASC Name**	Epipedal Black Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406530
Surface Condition	Disturbed	**Permeability**	High	Y: 6165626

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	0.00 – 020	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	0.20 – 0.50	Dark brown (Munsell 10YR 3/2) Heavy Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	0.50 +	Brown (Munsell 7.5YR 4/3)Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 6				
Site Reference	6	**ASC Name**	Haplic Epipedal Grey Vertosol (ESRY)	
Average Slope	0%	**Land Use**	Native Vegetation	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Depression	**Drainage**	Imperfect	X: 406886
Surface Condition	Disturbed	**Permeability**	High	Y: 6165427

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Dark greyish brown (Munsell 10YR 5/2) Heavy Clay with strong pedality, rough fabric and strong consistence. Moderately alkaline pH, non-saline and non-sodic. No coarse fragments. Common roots and well drained. Gradual boundary.
B21	**0.15 – 0.50**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and moderate consistence. Strongly alkaline pH, non-saline and non-sodic. No coarse fragments. Common roots and moderately well drained. Gradual boundary.
B22	**0.50 +**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with moderate pedality, rough fabric and moderate consistence. Strongly alkaline pH, non-saline and non-sodic. No roots and imperfectly drained.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	1.0	Non-saline	8.3	Moderately Alkaline	1.5	Non sodic
0.30 – 0.40	1.0	Non-saline	8.7	Strongly Alkaline	3.3	Non sodic
0.60 – 0.70	1.3	Non-saline	8.8	Strongly Alkaline	6.0	Non sodic

Site Description – Site 7				
Site Reference	7	**ASC Name**	Epipedal Black Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407139
Surface Condition	Disturbed	**Permeability**	High	Y: 6165721

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.25**	Dark grey (Munsell 7.5YR 4/1) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. Many roots and well drained. Gradual boundary.
B21	**0.25 – 0.65**	Dark brown (Munsell 7.5YR 3/2) Heavy Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	**0.65 +**	Brown (Munsell 7.5YR 4/2) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 8				
Site Reference	8	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407611
Surface Condition	Disturbed	**Permeability**	High	Y: 6165562

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.15 – 0.55**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.55 +**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 9				
Site Reference	9	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407224
Surface Condition	Disturbed	**Permeability**	High	Y: 6165166

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Greyish brown (Munsell 10YR 5/2) Medium Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.20 – 0.40**	Brown (Munsell 7.5YR 4/3) Heavy Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Trace roots and moderately well drained. Gradual boundary.
B22	**0.40 +**	Dark reddish brown (Munsell 5YR 3/4) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 10				
Site Reference	10	**ASC Name**	Haplic Epipedal Red Vertosol (EQRY)	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407662
Surface Condition	Disturbed	**Permeability**	High	Y: 6165142

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Strong brown (Munsell 7.5YR 4/6) Clay Loam with strong pedality, rough fabric and strong consistence. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. Trace roots and well drained. Gradual boundary.
B21	**0.15 – 0.55**	Dark reddish brown (Munsell 5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. Strongly alkaline pH, non-saline and sodic. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.55 +**	Yellowish red (Munsell 5YR 4/6) Heavy Clay with moderate pedality, rough fabric and moderate consistence. Strongly alkaline pH, moderately saline and sodic. No roots and moderately well drained.

Sample Depth	ECe		pH(1-5water)		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.7	Non-saline	6.4	Slightly Acidic	4.1	Non sodic
0.30 – 0.40	1.7	Non-saline	8.8	Strongly Alkaline	8.2	Sodic
0.60 – 0.70	4.3	Moderately saline	8.6	Strongly Alkaline	13.7	Sodic

Site Description – Site 11				
Site Reference	11	**ASC Name**	Haplic Epipedal Grey Vertosol (EQRY)	
Average Slope	0%	**Land Use**	Cultivation/ Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 409133
Surface Condition	Disturbed	**Permeability**	High	Y: 6162472

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Dark greyish brown (Munsell 10YR 4/2) Light Clay with strong pedality, rough fabric and strong consistence. Neutral pH, non-saline and non-sodic. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.15 – 0.50**	Brown (Munsell 7.5YR 4/2) Heavy Clay with strong pedality, smooth fabric and strong consistence. Moderately alkaline pH, slightly saline and sodic. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	**0.50 +**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with moderate pedality, rough fabric and moderate consistence. Strongly alkaline pH, moderately saline and sodic. No coarse fragments. Few roots and moderately well drained.

Sample Depth	ECe		pH(1-5water)		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.7	Non-saline	7.0	Neutral	2.3	Non sodic
0.30 – 0.40	2.3	Slightly saline	8.3	Moderately Alkaline	10.1	Sodic
0.60 – 0.70	5.4	Moderately saline	8.5	Strongly Alkaline	14.6	Sodic

Site Description – Site 12				
Site Reference	12	**ASC Name**	Epipedal Grey Vertosol	
Average Slope	0%	**Land Use**	Cultivation/ Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 409076
Surface Condition	Disturbed	**Permeability**	High	Y: 6163149

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Very dark greyish brown (Munsell 10YR 3/2) Medium Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. Common roots and well drained. Gradual boundary.
B21	**0.10 – 0.35**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. Few roots and moderately drained. Gradual boundary.
B22	**0.35 +**	Brown (Munsell 10YR 4/3) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 13				
Site Reference	13	**ASC Name**	Epipedal Red Vertosol	
Average Slope	0%	**Land Use**	Cultivation/ Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 409218
Surface Condition	Disturbed	**Permeability**	High	Y: 6163732

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	0.00 – 0.20	Very dark greyish brown (Munsell 10YR 3/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	0.20 – 0.55	Dark reddish brown (Munsell 5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. Few roots and moderately drained. Gradual boundary.
B22	0.55 +	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 14				
Site Reference	14	**ASC Name**	Haplic Epipedal Black Vertosol (ERRY)	
Average Slope	0%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 408732
Surface Condition	Cracked	**Permeability**	High	Y: 6163380

Plate 1 – Soil Profile

Plate 2 –Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Dark greyish brown (Munsell 10YR 4/2) Medium Clay with strong pedality, smooth fabric and strong consistence. Neutral pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Gradual boundary.
B21	**0.15 – 0.55**	Very dark grey (Munsell 10YR 3/1) Medium Clay with strong pedality, smooth fabric and strong consistence. Moderately alkaline pH, non-saline and sodic. No coarse fragments. Common roots and moderately drained. Gradual boundary.
B22	**0.55 +**	Brown (Munsell 7.5YR 4/3) Heavy Clay with weak pedality, rough fabric and weak consistence. Strongly alkaline pH, slightly saline and sodic. No coarse fragments. Trace roots and moderately well drained.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.3	Non-saline	7.0	Neutral	4.8	Non sodic
0.30 – 0.40	0.4	Non-saline	7.8	Moderately Alkaline	7.2	Sodic
0.65 – 0.75	2.5	Slightly saline	8.5	Strongly Alkaline	12.7	Sodic

Site Description – Site 15				
Site Reference	15	**ASC Name**	Epipedal Grey Vertosol	
Average Slope	0%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 408517
Surface Condition	Cracked	**Permeability**	High	Y: 6163851

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Very dark greyish brown (Munsell 10YR 3/2) Medium Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Many roots and well drained. Gradual boundary.
B21	**0.10 – 0.60**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. Few roots and moderately drained. Gradual boundary.
B22	**0.60 +**	Greyish brown (Munsell 10YR 5/2) Heavy Clay with weak pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Site Description – Site 16				
Site Reference	16	**ASC Name**	Epipedal Back Vertosol	
Average Slope	0%	**Land Use**	Cultivation	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 408007
Surface Condition	Disturbed	**Permeability**	High	Y: 6163838

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Very dark grey (Munsell 3/1) Light Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.10 – 0.50**	Very dark greyish brown (Munsell 10YR 3/2) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.50 +**	Brown (Munsell 10YR 4/3) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Site Description – Site 17				
Site Reference	17	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 408058
Surface Condition	Cracked	**Permeability**	High	Y: 6163481

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.10 – 0.60**	Brown (Munsell 7.5YR 4/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	**0.60 +**	Brown (Munsell 7.5YR 4/3) Heavy Clay with moderate pedality, rough fabric and weak consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 18				
Site Reference	18	**ASC Name**	Haplic Epipedal Grey Vertosol (ERRY)	
Average Slope	0%	**Land Use**	Cultivation/ Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 408101
Surface Condition	Disturbed	**Permeability**	Cracked	Y: 6163075

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Brown (Munsell 10YR 5/3) Heavy Clay with strong pedality, rough fabric and strong consistence. Moderately alkaline pH, non-saline and non-sodic. Many roots and well drained. Gradual boundary.
B21	**0.15 – 0.50**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and moderate consistence. Strongly alkaline pH, non-saline and sodic. No coarse fragments. Few roots and moderately drained. Gradual boundary. 2% calcium carbonate nodules.
B22	**0.50 +**	Dark brown (Munsell 10YR 3/3) Heavy Clay with moderate pedality, rough fabric and moderate consistence. Strongly alkaline pH, slightly saline and sodic. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.5	Non-saline	8.0	Moderately Alkaline	3.5	Non sodic
0.30 – 0.40	1.1	Non-saline	8.9	Strongly Alkaline	7.0	Sodic
0.60 – 0.70	2.3	Slightly saline	8.8	Strongly Alkaline	11.3	Sodic

Site Description – Site 19				
Site Reference	19	**ASC Name**	Epipedal Grey Vertosol	
Average Slope	0%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407943
Surface Condition	Cracked	**Permeability**	High	Y: 6162653

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Few roots and well drained. Gradual boundary.
B21	**0.10 – 0.50**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. Few roots and moderately well drained. Gradual boundary. 5% calcium carbonate nodules.
B22	**0.50 +**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with strong pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Site Description – Site 20				
Site Reference	20	**ASC Name**	Epipedal Grey Vertosol	
Average Slope	0%	**Land Use**	Cultivation/ Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 408629
Surface Condition	Cracked	**Permeability**	High	Y: 6162758

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.25**	Very dark grey (Munsell 3/1) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. Many roots and well drained. Gradual boundary.
B21	**0.25 – 0.50**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and strong consistence. No coarse fragments. Few roots and moderately drained. 5% calcium carbonate nodules. Gradual boundary.
B22	**0.50 +**	Brown (Munsell 7.5YR 4/2) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Site Description – Site 21				
Site Reference	21	**ASC Name**	Sodic Eutrophic Black Chromosol (BEMNYNR)	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 405929
Surface Condition	Disturbed	**Permeability**	High	Y: 6163203

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Brown (Munsell 10YR 5/3) Sandy Clay Loam with strong pedality, rough fabric and strong consistence. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. No roots and well drained. Clear boundary.
B21	**0.10 – 0.45**	Very dark brown (Munsell 7.5YR 2.5/2) Light Medium Clay with strong pedality, smooth fabric and strong consistence. Moderately alkaline pH, non-saline and non-sodic. No coarse fragments. No roots and moderately drained. Gradual boundary.
B22	**0.45 +**	Brown (Munsell 7.5YR 4/4) Sandy Clay with weak pedality, rough fabric and weak consistence. Very strongly alkaline pH, non-saline and sodic. No coarse fragments. No roots and moderately well drained.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.4	Non-saline	6.5	Slightly Acidic	3.3	Non sodic
0.30 – 0.40	0.4	Non-saline	7.9	Moderately Alkaline	4.9	Non sodic
0.60 – 0.70	2.0	Non-saline	9.2	Very Strongly Alkaline	7.2	Sodic

Site Description – Site 22				
Site Reference	22	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406284
Surface Condition	Disturbed	**Permeability**	High	Y: 6162850

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Very dark greyish brown (Munsell 10YR 3/2) Light Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.15 – 0.55**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.55 +**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 23				
Site Reference	23	**ASC Name**	Epipedal Grey Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406698
Surface Condition	Disturbed	**Permeability**	High	Y: 6163031

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.15 – 0.55**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.55 +**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Site Description – Site 24				
Site Reference	24	**ASC Name**	Haplic Epipedal Brown Vertosol (ESSY)	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407245
Surface Condition	Disturbed	**Permeability**	High	Y: 6162720

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Brown (Munsell 10YR 4/3) Heavy Clay with strong pedality, rough fabric and strong consistence. Moderately alkaline pH, non-saline and non-sodic. Many roots and well drained. Gradual boundary.
B21	**0.15 – 0.50**	Brown (Munsell 7.5YR 4/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. Strongly alkaline pH, non-saline and sodic. No coarse fragments. Few roots and moderately well drained. Gradual boundary. 2% calcium carbonate nodules.
B22	**0.50 +**	Brown (Munsell 10YR 4/3) Heavy Clay with moderate pedality, rough fabric and moderate consistence. Strongly alkaline pH, slightly saline and sodic. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.5	Non-saline	8.2	Moderately Alkaline	2.5	Non sodic
0.30 – 0.40	1.1	Non-saline	8.9	Strongly Alkaline	7.7	Sodic
0.60 – 0.70	2.0	Slightly saline	8.7	Strongly Alkaline	11.9	Sodic

Site Description – Site 25				
Site Reference	25	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407121
Surface Condition	Disturbed	**Permeability**	High	Y: 6163247

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Greyish brown (Munsell 10YR 45/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.15 – 0.45**	Brown (Munsell 7.5YR 4/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.45 +**	Brown (Munsell 7.5YR 4/3) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 26				
Site Reference	26	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406766
Surface Condition	Disturbed	**Permeability**	High	Y: 6163524

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Brown (Munsell 7.5YR 5/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.15 – 0.50**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	**0.50 +**	Brown (Munsell 7.5YR 5/3) Heavy Clay with moderate pedality, rough fabric and weak consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 27				
Site Reference	27	**ASC Name**	Epipedal Grey Vertosol	
Average Slope	0%	**Land Use**	Native Vegetation	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407513
Surface Condition	Cracked	**Permeability**	High	Y: 6163515

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	0.00 – 0.15	Very dark grey (Munsell 7.5YR 3/1) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. Many roots and well drained. Gradual boundary.
B21	0.15 – 0.50	Very dark grey (Munsell 7.5YR 3/1) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. Common roots and moderately well drained. Gradual boundary.
B22	0.50 +	Very dark greyish brown (Munsell 10YR 3/2) Medium Clay with moderate pedality, rough fabric and weak consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 28				
Site Reference	28	**ASC Name**	Epipedal Black Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407538
Surface Condition	Disturbed	**Permeability**	High	Y: 6164014

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Dark greyish brown (Munsell 10YR 4/2) Light Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.20 – 0.35**	Very dark brown (Munsell 7.5YR 2.5/2) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.35 +**	Brown (Munsell 10YR 5/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 29				
Site Reference	29	**ASC Name**	Mottled Eutrophic Grey Dermosol (BELMY)	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Depression	**Drainage**	Imperfect	X: 407432
Surface Condition	Disturbed	**Permeability**	High	Y: 6164458

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Light brownish grey (Munsell 10YR 6/2) Loam with moderate pedality, rough fabric and strong consistence. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. No roots and imperfectly drained. Clear boundary.
B21	**0.15 – 0.60**	Light grey (Munsell 10YR 7/2) Loam with moderate structure, rough fabric and strong consistence. Neutral pH, non-saline and non-sodic. No coarse fragments. No roots and imperfectly drained. Clear boundary. 10% orange mottling.
B22	**0.60 +**	Light grey (Munsell 10YR 7/2) Loam with no pedality (bleached concretion). Neutral pH, non-saline and non-sodic. No coarse fragments. No roots and imperfectly drained.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.5	Non-saline	6.4	Slightly Acidic	1.0	Non sodic
0.30 – 0.40	0.3	Non-saline	7.2	Neutral	0.5	Non sodic
0.60 – 0.70	0.3	Non-saline	7.3	Neutral	0.6	Non sodic

Site Description – Site 30				
Site Reference	30	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407431
Surface Condition	Disturbed	**Permeability**	High	Y: 6164819

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Dark brown (Munsell 10YR 3/3) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.20 – 0.50**	Dark brown (Munsell 10YR 3/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.50 +**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with moderate pedality, smooth fabric and weak consistence. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Site Description – Site 31				
Site Reference	31	**ASC Name**	Epipedal Red Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 407049
Surface Condition	Disturbed	**Permeability**	High	Y: 6163913

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Dark red (Munsell 2.5YR 3/6) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.10 – 0.50**	Dark reddish brown (Munsell 5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.50 +**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with moderate pedality, smooth fabric and weak consistence. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Site Description – Site 32				
Site Reference	32	**ASC Name**	Haplic Epipedal Red Vertosol (ERSY)	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406441
Surface Condition	Disturbed	**Permeability**	High	Y: 6163975

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Reddish brown (Munsell 5YR 4/4) Heavy Clay with strong pedality, rough fabric and strong consistence. Moderately alkaline pH, non-saline and non-sodic. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.20 – 0.55**	Dark reddish brown (Munsell 5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. Moderately alkaline pH, moderately saline and sodic. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.55 +**	Brown (Munsell 7.5YR 4/4) Medium Clay with moderate pedality, rough fabric and moderate consistence. Strongly alkaline pH, slightly saline and sodic. No roots and moderately well drained.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.5	Non-saline	8.1	Moderately Alkaline	1.8	Non sodic
0.30 – 0.40	4.1	Moderately saline	8.3	Moderately Alkaline	7.2	Sodic
0.60 – 0.70	3.3	Slightly saline	8.5	Strongly Alkaline	11.3	Sodic

Site Description – Site 33				
Site Reference	33	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406770
Surface Condition	Disturbed	**Permeability**	High	Y: 6164286

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.15 – 0.60**	Dark brown (Munsell 10YR 3/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.60 +**	Dark brown (Munsell 10YR 3/3) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 34				
Site Reference	34	**ASC Name**	Epipedal Brown Vertosol	
Average Slope	1%	**Land Use**	Native Vegetation	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Minor depression	**Drainage**	Moderately Well	X: 406982
Surface Condition	Cracked	**Permeability**	High	Y: 6164732

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Dark greyish brown (Munsell 10YR 4/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.10 – 0.40**	Brown (Munsell 10YR 5/3) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.40 +**	Brown (Munsell 10YR 5/3) Heavy Clay with moderate pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 35				
Site Reference	35	**ASC Name**	Epipedal Red Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406030
Surface Condition	Disturbed	**Permeability**	High	Y: 6164245

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	0.00 – 0.20	Very dark brown (Munsell 7.5YR 2.5/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	0.20 – 0.60	Dark reddish brown (Munsell 5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	0.60 +	Dark reddish brown (Munsell 5YR 3/4) Heavy Clay with strong pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained.

Site Description – Site 36				
Site Reference	36	**ASC Name**	Epipedal Red Vertosol	
Average Slope	0%	**Land Use**	Cropping	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 406068
Surface Condition	Disturbed	**Permeability**	High	Y: 6163680

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Very dark brown (Munsell 10YR 2.5/2) Heavy Clay with strong pedality, rough fabric and strong consistence. No coarse fragments. No roots and well drained. Gradual boundary.
B21	**0.15 – 0.60**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with strong pedality, smooth fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. Gradual boundary.
B22	**0.60 +**	Dark brown (Munsell 7.5YR 3/4) Heavy Clay with strong pedality, rough fabric and moderate consistence. No coarse fragments. No roots and moderately well drained. 5% calcium carbonate nodules.

Appendix 3

Laboratory Certificates of Analysis

GRAIN SIZE ANALYSIS (hydrometer and sieving techniques)

33 soil samples supplied by Minesoils on 11th March, 2024 - Lab Job No. R1637
Analysis requested by Matt Hemingway. Job Ref. MS131 Boags
PO Box 11034 TAMWORTH NSW 2340

SAMPLE ID	Lab Code	MOISTURE CONTENT (% of water in sample)	TOTAL GRAVEL > 2 mm (% of total oven-dry equivalent)	GRAVEL > 4.75 mm (% of total oven-dry equivalent)	GRAVEL 2.00-4.75 mm (% of total oven-dry equivalent)	COARSE SAND 200-2000 µm (0.2-2.0 mm) (% of total oven-dry equivalent)	FINE SAND 20-200 µm (0.02-0.2 mm) (% of total oven-dry equivalent)	SILT 2-20 µm (% of total oven-dry equivalent)	CLAY < 2 µm (% of total oven-dry equivalent)
1 - 0-10	R1637/1	3.5%	0.0%	0.0%	0.0%	7.1%	40.3%	14.6%	38.0%
1 - 30-40	R1637/2	15.7%	0.5%	0.0%	0.5%	4.5%	20.6%	19.2%	55.3%
1 - 60-70	R1637/3	16.0%	0.3%	0.0%	0.3%	3.9%	21.9%	23.5%	50.4%
4 - 0-10	R1637/4	16.5%	0.2%	0.0%	0.2%	4.0%	22.9%	13.3%	59.7%
4 - 30-40	R1637/5	17.3%	0.4%	0.0%	0.4%	4.4%	20.6%	18.7%	55.9%
4 - 60-70	R1637/6	12.8%	0.2%	0.0%	0.2%	4.5%	23.4%	19.5%	52.5%
6 - 0-10	R1637/7	13.3%	1.0%	0.0%	1.0%	4.6%	19.1%	15.8%	59.4%
6 - 30-40	R1637/8	14.1%	1.5%	0.0%	1.5%	4.1%	21.6%	16.6%	56.2%
6 - 60-70	R1637/9	13.9%	0.5%	0.0%	0.5%	3.9%	20.2%	18.0%	57.4%
10 - 0-10	R1637/10	2.3%	0.0%	0.0%	0.0%	11.0%	46.2%	12.9%	29.9%
10 - 30-40	R1637/11	17.7%	0.4%	0.0%	0.4%	5.8%	23.1%	18.0%	52.7%
10 - 60-70	R1637/12	16.5%	0.5%	0.0%	0.5%	4.8%	22.4%	20.1%	52.2%
11 - 0-10	R1637/13	3.0%	0.5%	0.0%	0.5%	19.1%	33.0%	10.8%	36.6%
11 - 30-40	R1637/14	14.1%	0.0%	0.0%	0.0%	12.0%	21.8%	13.2%	53.0%
11 - 60-70	R1637/15	15.1%	0.2%	0.0%	0.2%	8.9%	26.2%	11.1%	53.6%
14 - 0-10	R1637/16	8.2%	0.3%	0.0%	0.3%	6.3%	32.9%	15.2%	45.3%
14 - 30-40	R1637/17	11.8%	0.6%	0.0%	0.6%	6.2%	30.4%	16.8%	46.0%
14 - 60-70	R1637/18	13.5%	0.2%	0.0%	0.2%	3.8%	22.9%	16.0%	57.0%
18 - 0-10	R1637/19	10.5%	0.4%	0.0%	0.4%	6.4%	29.8%	9.0%	54.4%
18 - 30-40	R1637/20	12.6%	0.8%	0.0%	0.8%	5.9%	25.9%	9.7%	57.7%
18 - 60-70	R1637/21	13.7%	0.7%	0.0%	0.7%	6.0%	31.1%	9.2%	53.0%
21 - 0-10	R1637/22	6.2%	0.0%	0.0%	0.0%	37.8%	38.2%	1.5%	22.5%
21 - 30-40	R1637/23	14.1%	0.0%	0.0%	0.0%	26.4%	26.3%	5.6%	41.7%
21 - 60-70	R1637/24	13.1%	0.7%	0.0%	0.7%	34.0%	27.5%	5.4%	32.5%
24 - 0-10	R1637/25	12.8%	0.0%	0.0%	0.0%	4.1%	23.9%	8.5%	63.4%
24 - 30-40	R1637/26	16.5%	1.0%	0.0%	1.0%	4.4%	24.2%	7.6%	62.8%
24 - 60-70	R1637/27	15.9%	0.2%	0.0%	0.2%	3.2%	34.5%	10.8%	51.2%
29 - 0-10	R1637/28	2.1%	0.3%	0.0%	0.3%	26.5%	39.8%	13.7%	19.7%
29 - 30-40	R1637/29	3.4%	11.3%	0.0%	11.3%	22.0%	38.2%	14.0%	14.4%
29 - 60-70	R1637/30	4.6%	7.5%	0.0%	7.5%	31.1%	29.1%	13.7%	18.6%
32 - 0-10	R1637/31	5.6%	0.0%	0.0%	0.0%	7.3%	22.5%	11.7%	58.5%
32 - 60-70	R1637/32	13.9%	0.1%	0.0%	0.1%	4.5%	16.5%	11.7%	67.1%
32 - 0-10	R1637/33	12.9%	0.5%	0.0%	0.5%	9.3%	20.7%	19.8%	49.6%

Note:

1: The Hydrometer Analysis method was used to determine the percentage sand, silt and clay,
modified from SOP meth004 (California Dept of Pesticide Regulation), using method of Gee & Bauder (1986),
in *Methods of Soil Analysis. Part 1* Agron. Monogr. 9 (2nd Ed). Klute, A., American Soc. of Agronomy Inc., Soil Sci. Soc. America Inc., Madison WI: 383-411.

2: Australian Standard 1289.3.8.1-1997 (see attached)

3. Analysis conducted between sample arrival date and reporting date.

4. This report is not to be reproduced except in full. Results only relate to the item tested.

5. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal).

6. This report was issued on 11/04/2024

Environmental Analysis Laboratory, Southern Cross University,
Tel. 02 6620 3678, website: scu.edu.au/eal

checked: .....
Graham Lancaster (Nata signatory)
Laboratory Manager

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 1	Sample 2	Sample 3
		Sample ID:	1 0 - 10	1 30 - 40	1 60 - 70
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/1	R1637/2	R1637/3
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.35	8.70	8.42
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.092	0.259	0.592
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	9.8	18	16
	Exchangeable Calcium (kg/ha)		4,416	8,103	7,286
	Exchangeable Calcium (mg/kg)		1,972	3,618	3,253
	Exchangeable Magnesium (cmol+/kg)		6.9	13	15
	Exchangeable Magnesium (kg/ha)		1,883	3,508	4,025
	Exchangeable Magnesium (mg/kg)		840	1,566	1,797
	Exchangeable Potassium (cmol+/kg)		1.8	0.73	0.65
	Exchangeable Potassium (kg/ha)		1,568	638	566
	Exchangeable Potassium (mg/kg)		700	285	253
	Exchangeable Sodium (cmol+/kg)		0.31	2.9	4.7
	Exchangeable Sodium (kg/ha)		159	1,485	2,398
	Exchangeable Sodium (mg/kg)		71	663	1,070
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	<0.01	0.01	0.02
	Exchangeable Aluminium (kg/ha)		1.4	2.6	3.9
	Exchangeable Aluminium (mg/kg)		<1	1.2	1.7
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	19	35	36
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	52	52	45
	Magnesium (%)		37	37	41
	Potassium (%)		9.5	2.1	1.8
	Sodium - ESP (%)		1.6	8.3	13
	Aluminium (%)		0.04	0.04	0.05
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	1.4	1.4	1.1
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	3	3	3
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10 YR 5/3 Brown	7.5 YR 3/3 Dard Brown	7.5 YR 4/4 Brown

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 1	Sample 2	Sample 3
	Sample ID:	1 0 - 10	1 30 - 40	1 60 - 70
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/1	R1637/2	R1637/3

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer SCU.edu.au/eal).
17. This report was issued on 5/04/2024.

NATA
ACCREDITATION
Accreditation No. 14960
Accredited for compliance with ISO/IEC 17025 - Testing

Quality Checked: Kris Saville
Agricultural Co-Ordinator

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 4	Sample 5	Sample 6
		Sample ID:	4 0 - 10	4 30 - 40	4 60 - 70
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/4	R1637/5	R1637/6
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.02	8.58	8.66
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.097	0.133	0.330
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	15	16	14
	Exchangeable Calcium (kg/ha)		6,887	6,977	6,394
	Exchangeable Calcium (mg/kg)		3,075	3,115	2,855
	Exchangeable Magnesium (cmol+/kg)		12	13	14
	Exchangeable Magnesium (kg/ha)		3,165	3,519	3,754
	Exchangeable Magnesium (mg/kg)		1,413	1,571	1,676
	Exchangeable Potassium (cmol+/kg)		1.7	1.2	0.78
	Exchangeable Potassium (kg/ha)		1,478	1,086	683
	Exchangeable Potassium (mg/kg)		660	485	305
	Exchangeable Sodium (cmol+/kg)		1.4	1.8	3.3
	Exchangeable Sodium (kg/ha)		709	945	1,719
	Exchangeable Sodium (mg/kg)		317	422	768
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.01	0.01
	Exchangeable Aluminium (kg/ha)		3.0	3.0	2.5
	Exchangeable Aluminium (mg/kg)		1.4	1.3	1.1
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	30	32	32
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	51	49	44
	Magnesium (%)		39	41	43
	Potassium (%)		5.6	3.9	2.4
	Sodium - ESP (%)		4.6	5.8	10
	Aluminium (%)		0.05	0.05	0.04
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	1.3	1.2	1.0
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	7.5 YR 4/4 Brown	7.5 YR 4/3 Brown	7.5 YR 4/3 Brown

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 4	Sample 5	Sample 6
	Sample ID:	4 0 - 10	4 30 - 40	4 60 - 70
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/4	R1637/5	R1637/6

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_c/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator KS

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 7	Sample 8	Sample 9
		Sample ID:	6 0 - 10	6 30 - 40	6 60 - 70
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/7	R1637/8	R1637/9
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.32	8.73	8.82
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.181	0.173	0.219
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	30	27	23
	Exchangeable Calcium (kg/ha)		13,594	12,138	10,296
	Exchangeable Calcium (mg/kg)		6,069	5,419	4,597
	Exchangeable Magnesium (cmol+/kg)		12	14	14
	Exchangeable Magnesium (kg/ha)		3,154	3,729	3,745
	Exchangeable Magnesium (mg/kg)		1,408	1,665	1,672
	Exchangeable Potassium (cmol+/kg)		1.5	1.1	1.2
	Exchangeable Potassium (kg/ha)		1,353	968	1,034
	Exchangeable Potassium (mg/kg)		604	432	462
	Exchangeable Sodium (cmol+/kg)		0.65	1.4	2.4
	Exchangeable Sodium (kg/ha)		337	736	1,236
	Exchangeable Sodium (mg/kg)		150	329	552
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.01	0.02
	Exchangeable Aluminium (kg/ha)		4.4	2.8	4.1
	Exchangeable Aluminium (mg/kg)		2.0	1.3	1.8
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	44	43	40
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	69	62	57
	Magnesium (%)		26	32	34
	Potassium (%)		3.5	2.6	2.9
	Sodium - ESP (%)		1.5	3.3	6.0
	Aluminium (%)		0.05	0.03	0.05
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	2.6	2.0	1.7
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10 YR 5/2 Grayish Brown	10 YR 4/2 Dark Grayish Brown	10 YR 4/2 Dark Grayish Brown

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 7	Sample 8	Sample 9
	Sample ID:	6 0 - 10	6 30 - 40	6 60 - 70
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/7	R1637/8	R1637/9

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 cmol$_c$/kg = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator KS

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 10	Sample 11	Sample 12
		Sample ID:	10 0 - 10	10 30 - 40	10 60 - 70
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/10	R1637/11	R1637/12
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.44	8.79	8.57
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.077	0.298	0.733
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	6.2	20	16
	Exchangeable Calcium (kg/ha)		2,777	9,107	7,366
	Exchangeable Calcium (mg/kg)		1,240	4,066	3,289
	Exchangeable Magnesium (cmol+/kg)		4.4	14	15
	Exchangeable Magnesium (kg/ha)		1,197	3,729	4,030
	Exchangeable Magnesium (mg/kg)		534	1,665	1,799
	Exchangeable Potassium (cmol+/kg)		1.3	0.59	0.77
	Exchangeable Potassium (kg/ha)		1,168	521	671
	Exchangeable Potassium (mg/kg)		521	232	300
	Exchangeable Sodium (cmol+/kg)		0.50	3.1	5.1
	Exchangeable Sodium (kg/ha)		260	1,589	2,617
	Exchangeable Sodium (mg/kg)		116	709	1,168
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.01	0.02	0.02
	Exchangeable Aluminium (kg/ha)		2.6	3.3	3.6
	Exchangeable Aluminium (mg/kg)		1.1	1.5	1.6
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	12	38	37
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	50	54	44
	Magnesium (%)		35	36	40
	Potassium (%)		11	1.6	2.1
	Sodium - ESP (%)		4.1	8.2	14
	Aluminium (%)		0.10	0.04	0.05
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	1.4	1.5	1.1
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	3	3	3
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	7.5 YR 4/6 Strong Brown	5 YR 3/4 Dark Reddish Brown	5 YR 4/6 Yellowish Red

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 10	Sample 11	Sample 12
	Sample ID:	10 0 - 10	10 30 - 40	10 60 - 70
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/10	R1637/11	R1637/12

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 cmol$_+$/kg = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator KS

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 13	Sample 14	Sample 15
		Sample ID:	11 0 - 10	11 30 - 40	11 60 - 70
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/13	R1637/14	R1637/15
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	7.01	8.32	8.53
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.079	0.390	0.931
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	11	16	19
	Exchangeable Calcium (kg/ha)		4,790	7,039	8,439
	Exchangeable Calcium (mg/kg)		2,139	3,143	3,768
	Exchangeable Magnesium (cmol+/kg)		5.9	12	15
	Exchangeable Magnesium (kg/ha)		1,609	3,306	4,104
	Exchangeable Magnesium (mg/kg)		718	1,476	1,832
	Exchangeable Potassium (cmol+/kg)		1.7	0.48	0.56
	Exchangeable Potassium (kg/ha)		1,473	416	487
	Exchangeable Potassium (mg/kg)		658	186	217
	Exchangeable Sodium (cmol+/kg)		0.44	3.2	5.9
	Exchangeable Sodium (kg/ha)		225	1,643	3,043
	Exchangeable Sodium (mg/kg)		100	733	1,358
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.01	0.02	0.01
	Exchangeable Aluminium (kg/ha)		2.8	3.1	2.0
	Exchangeable Aluminium (mg/kg)		1.3	1.4	<1
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	19	32	40
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	57	50	47
	Magnesium (%)		32	39	37
	Potassium (%)		9.0	1.5	1.4
	Sodium - ESP (%)		2.3	10	15
	Aluminium (%)		0.07	0.05	0.02
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	1.8	1.3	1.2
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10 YR 4/2 Brown	7.5 YR 4/2 Dark Grayish Brown	7.5 YR 3/4 Dark Brown

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 13	Sample 14	Sample 15
	Sample ID:	11 0 - 10	11 30 - 40	11 60 - 70
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/13	R1637/14	R1637/15

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_c/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator KS

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 16	Sample 17	Sample 18
		Sample ID:	14 0 - 10	14 30 - 40	14 65 - 75
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/16	R1637/17	R1637/18
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.96	7.82	8.47
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.040	0.056	0.424
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	10	14	17
	Exchangeable Calcium (kg/ha)		4,710	6,372	7,572
	Exchangeable Calcium (mg/kg)		2,103	2,845	3,381
	Exchangeable Magnesium (cmol+/kg)		5.8	7.9	11
	Exchangeable Magnesium (kg/ha)		1,568	2,145	2,984
	Exchangeable Magnesium (mg/kg)		700	958	1,332
	Exchangeable Potassium (cmol+/kg)		0.82	0.55	0.60
	Exchangeable Potassium (kg/ha)		718	485	528
	Exchangeable Potassium (mg/kg)		321	216	236
	Exchangeable Sodium (cmol+/kg)		0.86	1.8	4.1
	Exchangeable Sodium (kg/ha)		445	907	2,131
	Exchangeable Sodium (mg/kg)		199	405	951
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.01	0.02	0.02
	Exchangeable Aluminium (kg/ha)		2.8	3.5	4.2
	Exchangeable Aluminium (mg/kg)		1.3	1.5	1.9
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	18	24	33
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	58	58	52
	Magnesium (%)		32	32	34
	Potassium (%)		4.6	2.3	1.8
	Sodium - ESP (%)		4.8	7.2	13
	Aluminium (%)		0.08	0.07	0.06
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	1.8	1.8	1.5
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	3	3	3
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10 YR 4/2 Dark Grayish Brown	10 YR 3/1 Very Dark Gray	7.5 YR 4/3 Brown

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 16	Sample 17	Sample 18
		Sample ID:	14 0 - 10	14 30 - 40	14 65 - 75
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/16	R1637/17	R1637/18

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator KS

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 19	Sample 20	Sample 21
		Sample ID:	18 0 - 10	18 30 - 40	18 60 - 70
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/19	R1637/20	R1637/21
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.03	8.89	8.83
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.084	0.193	0.392
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	18	19	17
	Exchangeable Calcium (kg/ha)		8,023	8,448	7,729
	Exchangeable Calcium (mg/kg)		3,582	3,772	3,451
	Exchangeable Magnesium (cmol+/kg)		9.1	12	12
	Exchangeable Magnesium (kg/ha)		2,486	3,172	3,201
	Exchangeable Magnesium (mg/kg)		1,110	1,416	1,429
	Exchangeable Potassium (cmol+/kg)		1.2	0.63	0.65
	Exchangeable Potassium (kg/ha)		1,022	550	565
	Exchangeable Potassium (mg/kg)		456	246	252
	Exchangeable Sodium (cmol+/kg)		1.0	2.3	3.8
	Exchangeable Sodium (kg/ha)		520	1,206	1,939
	Exchangeable Sodium (mg/kg)		232	538	866
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.02	0.02
	Exchangeable Aluminium (kg/ha)		3.0	3.6	3.0
	Exchangeable Aluminium (mg/kg)		1.4	1.6	1.4
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	29	33	33
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	61	56	52
	Magnesium (%)		31	35	35
	Potassium (%)		4.0	1.9	1.9
	Sodium - ESP (%)		3.5	7.0	11
	Aluminium (%)		0.05	0.05	0.04
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	2.0	1.6	1.5
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10 YR 5/3 Brown	10 YR 4/2 Dark Grayish Brown	10 YR 3/3 Dark Brown

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 19	Sample 20	Sample 21
	Sample ID:	18 0 - 10	18 30 - 40	18 60 - 70
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/19	R1637/20	R1637/21

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator KS

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 22	Sample 23	Sample 24
		Sample ID:	21 0 - 10	21 20 - 30	21 50 - 60
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/22	R1637/23	R1637/24
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.50	7.94	9.24
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.044	0.046	0.227
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	6.2	9.7	19
	Exchangeable Calcium (kg/ha)		2,797	4,356	8,348
	Exchangeable Calcium (mg/kg)		1,249	1,945	3,727
	Exchangeable Magnesium (cmol+/kg)		4.8	9.4	11
	Exchangeable Magnesium (kg/ha)		1,306	2,558	2,986
	Exchangeable Magnesium (mg/kg)		583	1,142	1,333
	Exchangeable Potassium (cmol+/kg)		0.99	0.58	0.42
	Exchangeable Potassium (kg/ha)		868	505	369
	Exchangeable Potassium (mg/kg)		387	225	165
	Exchangeable Sodium (cmol+/kg)		0.40	1.0	2.3
	Exchangeable Sodium (kg/ha)		208	526	1,201
	Exchangeable Sodium (mg/kg)		93	235	536
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.01	0.01	0.01
	Exchangeable Aluminium (kg/ha)		2.8	2.5	2.0
	Exchangeable Aluminium (mg/kg)		1.3	1.1	<1
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	12	21	32
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	50	47	58
	Magnesium (%)		39	45	34
	Potassium (%)		8.0	2.8	1.3
	Sodium - ESP (%)		3.3	4.9	7.2
	Aluminium (%)		0.11	0.06	0.03
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	1.3	1.0	1.7
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10 YR 5/3 Brown	7.5 YR 2.5/2 Very Dark Brown	7.5 YR 4/4 Brown

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 22	Sample 23	Sample 24
	Sample ID:	21 0 - 10	21 20 - 30	21 50 - 60
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/22	R1637/23	R1637/24

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 25	Sample 26	Sample 27
		Sample ID:	24 0 - 10	24 30 - 40	24 65 - 75
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/25	R1637/26	R1637/27
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.20	8.92	8.71
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.087	0.183	0.352
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	24	24	22
	Exchangeable Calcium (kg/ha)		10,847	10,693	9,987
	Exchangeable Calcium (mg/kg)		4,843	4,774	4,459
	Exchangeable Magnesium (cmol+/kg)		9.4	11	11
	Exchangeable Magnesium (kg/ha)		2,565	2,879	2,973
	Exchangeable Magnesium (mg/kg)		1,145	1,285	1,327
	Exchangeable Potassium (cmol+/kg)		0.91	0.67	0.80
	Exchangeable Potassium (kg/ha)		797	583	699
	Exchangeable Potassium (mg/kg)		356	260	312
	Exchangeable Sodium (cmol+/kg)		0.88	2.9	4.6
	Exchangeable Sodium (kg/ha)		452	1,497	2,362
	Exchangeable Sodium (mg/kg)		202	668	1,054
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.02	0.02
	Exchangeable Aluminium (kg/ha)		4.7	3.7	3.4
	Exchangeable Aluminium (mg/kg)		2.1	1.6	1.5
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	35	38	39
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	68	63	58
	Magnesium (%)		27	28	28
	Potassium (%)		2.6	1.8	2.1
	Sodium - ESP (%)		2.5	7.7	12
	Aluminium (%)		0.07	0.05	0.04
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	2.6	2.3	2.0
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10 YR 4/3 Brown	7.5 YR 4/3 Brown	10 YR 4/3 Brown

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 25	Sample 26	Sample 27
	Sample ID:	24 0 - 10	24 30 - 40	24 65 - 75
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/25	R1637/26	R1637/27

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 28	Sample 29	Sample 30
		Sample ID:	29 0 - 10	29 30 - 40	29 60 - 70
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/28	R1637/29	R1637/30
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.41	7.23	7.29
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.054	0.030	0.027
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	6.5	4.5	4.8
	Exchangeable Calcium (kg/ha)		2,934	2,020	2,144
	Exchangeable Calcium (mg/kg)		1,310	902	957
	Exchangeable Magnesium (cmol+/kg)		1.9	1.5	1.9
	Exchangeable Magnesium (kg/ha)		529	420	506
	Exchangeable Magnesium (mg/kg)		236	187	226
	Exchangeable Potassium (cmol+/kg)		0.99	0.64	0.73
	Exchangeable Potassium (kg/ha)		868	561	638
	Exchangeable Potassium (mg/kg)		387	251	285
	Exchangeable Sodium (cmol+/kg)		0.10	<0.065	<0.065
	Exchangeable Sodium (kg/ha)		50	<33	<33
	Exchangeable Sodium (mg/kg)		22	<15	<15
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	<0.01	0.01	<0.01
	Exchangeable Aluminium (kg/ha)		1.1	2.3	1.3
	Exchangeable Aluminium (mg/kg)		<1	1.0	<1
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	9.6	6.7	7.4
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	68	67	64
	Magnesium (%)		20	23	25
	Potassium (%)		10	9.5	9.8
	Sodium - ESP (%)		1.0	0.49	0.64
	Aluminium (%)		0.06	0.17	0.08
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	3.4	2.9	2.6
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	3	3	2
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10 YR 6/2 Light Brownish Gray	10 YR 7/2 Light Gray	10 YR 7/2 Light Gray

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 28	Sample 29	Sample 30
	Sample ID:	29 0 - 10	29 30 - 40	29 60 - 70
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/28	R1637/29	R1637/30

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_c/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Sample 31	Sample 32	Sample 33
		Sample ID:	32 0 - 10	32 30 - 40	32 60 - 70
		Crop:	N/G	N/G	N/G
		Client:	Edify	Edify	Edify
	Parameter	Method reference	R1637/31	R1637/32	R1637/33
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.11	8.33	8.52
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.079	0.180	0.440
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	20	16	14
	Exchangeable Calcium (kg/ha)		8,858	7,212	6,332
	Exchangeable Calcium (mg/kg)		3,955	3,220	2,827
	Exchangeable Magnesium (cmol+/kg)		8.6	11	11
	Exchangeable Magnesium (kg/ha)		2,354	3,089	3,078
	Exchangeable Magnesium (mg/kg)		1,051	1,379	1,374
	Exchangeable Potassium (cmol+/kg)		1.1	0.64	0.53
	Exchangeable Potassium (kg/ha)		926	558	463
	Exchangeable Potassium (mg/kg)		413	249	207
	Exchangeable Sodium (cmol+/kg)		0.55	2.2	3.3
	Exchangeable Sodium (kg/ha)		281	1,114	1,696
	Exchangeable Sodium (mg/kg)		126	497	757
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.02	0.02
	Exchangeable Aluminium (kg/ha)		3.0	3.3	3.7
	Exchangeable Aluminium (mg/kg)		1.4	1.5	1.7
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	30	30	29
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	66	53	48
	Magnesium (%)		29	38	39
	Potassium (%)		3.5	2.1	1.8
	Sodium - ESP (%)		1.8	7.2	11
	Aluminium (%)		0.05	0.05	0.06
	Hydrogen (%)		0.00	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	2.3	1.4	1.2
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	5 YR 4/4 Reddish Brown	5 YR 3/4 Dark Reddish Brown	7.5 YR 4/4 Brown

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

		Sample 31	Sample 32	Sample 33
	Sample ID:	32 0 - 10	32 30 - 40	32 60 - 70
	Crop:	N/G	N/G	N/G
	Client:	Edify	Edify	Edify
Parameter	Method reference	R1637/31	R1637/32	R1637/33

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_c/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator

Environmental Analysis Laboratory

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

				Heavy Soil	Medium Soil	Light Soil	Sandy Soil
			Sample ID:				
			Crop:				
			Client:	Clay	Clay Loam	Loam	Loamy Sand
	Parameter		Method reference	Indicative guidelines - refer to Notes 6 and 8			
	pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.5	6.5	6.3	6.3
	Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.200	0.150	0.120	0.100
	Exchangeable Calcium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	15.6	10.8	5.0	1.9
		(kg/ha)		7000	4816	2240	840
		(mg/kg)		3125	2150	1000	375
	Exchangeable Magnesium	(cmol+/kg)		2.4	1.7	1.2	0.60
		(kg/ha)		650	448	325	168
		(mg/kg)		290	200	145	75
	Exchangeable Potassium	(cmol+/kg)		0.60	0.50	0.40	0.30
		(kg/ha)		526	426	336	224
		(mg/kg)		235	190	150	100
	Exchangeable Sodium	(cmol+/kg)		0.3	0.26	0.22	0.11
		(kg/ha)		155	134	113	57
		(mg/kg)		69	60	51	25
	Exchangeable Aluminium	(cmol+/kg)	**Inhouse S37 (KCl)	0.6	0.5	0.4	0.2
		(kg/ha)		121	101	73	30
		(mg/kg)		54	45	32	14
	Exchangeable Hydrogen	(cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	0.6	0.5	0.4	0.2
		(kg/ha)		13	11	8	3
		(mg/kg)		6	5	4	2
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	20.1	14.3	7.8	3.3
	Calcium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	77.6	75.7	65.6	57.4
	Magnesium (%)			11.9	11.9	15.7	18.1
	Potassium (%)			3.0	3.5	5.2	9.1
	Sodium - ESP (%)			1.5	1.8	2.9	3.3
	Aluminium (%)			6.0	7.1	10.5	12.1
	Hydrogen (%)						
	Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol+/kg)	6.5	6.4	4.2	3.2
	Emerson Aggregate Test (EAT)		**AS1289.3.8.1-2017	Class 3–8			
	Moist Munsell Colour		**Inhouse Munsell Soil Colour Classification	..			
				..			

Southern Cross University
PO Box 157 Lismore NSW 2480
P: +61 2 6620 3678
E: eal@scu.edu.au
www.scu.edu.au/eal
ABN: 41 995 651 524

AGRICULTURAL SOIL ANALYSIS REPORT

33 samples supplied by Minesoils Pty. Ltd. on 11/03/2024. Lab Job No.R1637

Analysis requested by Matt Hemingway. Your Job: MS131 Boags

PO Box 11034 TAMWORTH NSW 2340

			Heavy Soil	***Medium Soil***	***Light Soil***	***Sandy Soil***
		Sample ID:				
		Crop:				
		Client:	*Clay*	*Clay Loam*	*Loam*	*Loamy Sand*
	Parameter	**Method reference**	**Indicative guidelines - refer to Notes 6 and 8**			

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013,
   Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium,
    122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/04/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator

Appendix I Community Engagement Plan

Boags Creek Solar Farm

Community Consultation and Engagement Plan

August 2024

1. Introduction

1.1 The Project

Edify Energy Pty Ltd (ABN 85 606 684 995; Level 1 34-35 South Steyne Manly 2095) proposes to develop a Solar Farm (300MW) with integrated battery energy storage system (BESS) in the Murray Riverina region of NSW. To be known as the Boags Creek Farm (referred to as **the Project**).

The objective of the Project is to generate new and dispatchable carbon-free electricity supply for NSW. Subject to necessary approvals, Edify Energy (Edify) anticipates construction to commence in 2026.

The proposal occupies up to approximately 845 hectares, not considering various exclusion zones, effecting thirteen (13) Lots of 7346 Kidman Way, Darlington Point and Ringwood Road, Darlington Point. The Development Footprint will be a portion of the 845 ha, confirmed following further constraints investigations.

The project area is generally flat terrain sitting at around 135m AHD, a small creek is mapped in the southeastern corner of Lot 151 and, two (2) farm dams and a constructed irrigation channel along the southern boundary.

The project is approximately 25km east of the Southwest Renewable Energy Zone (SW REZ)

The Project includes infrastructure such as solar panel arrays, inverters, transformers, overhead lines, underground cabling, an integrated battery storage system (up to 300MW / 600MWh), site office and maintenance building, access tracks, road and electrical easement crossings, perimeter security fencing, and a substation to connect the Project via easement to the Darlington Point Substation.

This Community Consultation and Engagement Plan has been prepared to summarise engagement activities undertaken during the planning phase of the project.

This plan is a living document, which is intended to evolve over the life of the Project and will inevitably vary throughout the stages of the Project.

It has been developed with consideration of the recommendations and guidance of IAP2 Australasia (Figure 1).

Table of Contents

This document will be managed by Edify's project manager, which will evolve as the project matures. In turn, this document will guide community consultation activities during the post-approval (pre-construction), construction and operation phases of the Project.

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problems, alternatives and/ or solutions.	To obtain public feedback on analysis, alternatives and/or decision.	To work directly with the public throughout the process to ensure that public issues and concerns are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and issues are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for direct advice and innovation in formulating solutions and incorporate your advise and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.
EXAMPLE TOOLS	• Fact sheets • Websites • Open houses	• Public comment • Focus groups • Surveys • Public meetings	• Workshops • Deliberate polling	• Citizen Advisory committees • Consensus building • Participatory Decision-making	• Citizen juries • Ballots • Delegated Decisions

Figure 1 - IAP2 Australasia Spectrum

1.2 About Edify Energy

Edify is a proudly 100% Australian owned renewable energy and storage company, leading the industry in the deployment and operation of new energy generation, storage and grid infrastructure to support Australia's energy transition.

Delivering more than $2 billion of investment in Australia, Edify has successfully developed and financed over 1 GW of utility-scale solar farms and battery energy storage systems and, in addition to projects currently in construction, is managing the operations of 6 solar farms and 4 battery energy storage systems that it has developed, financed and constructed. Collectively, its utility-scale solar farms produce enough electricity to power over 281,000 Australian homes and its battery storage systems provide system strength to the grid and are capable of powering 680,000 homes for up to 2 hours.

The Edify business model supports the full lifecycle of renewable energy and storage project development and operation, including greenfield development, project structuring and financing, construction management and a full operational asset management offering.

Edify has a strong pipeline of renewable energy projects, including solar, storage, hybrid and hydrogen projects across the NEM states in various stages of development that the successful candidate will have a key role in developing.

www.edifyenergy.com

2. Community Profile

Understanding the makeup and values of the community is essential to finding effective ways to reach the community as well as appreciating ways that the project may impact the community. This section provides a broad overview of the Murrumbidgee LGA, and the political profile of the region.

2.1 Local Government Authorities

The Project is located within the Murrumbidgee Shire LGA (Figure 2). The Project is approximately 8km South of Darlington Point which borders the Murrumbidgee River and 40km South of Griffith New South Wales. The Murrumbidgee LGA covers 6,880 km² with a population of 3,353 people the township of Darlington Point consists of a population of 868 as at the 2021 Census (ABS 2021).

The landscape around Darlington Point typically consists of expansive farmlands, dotted with crops such as wheat, barley, rice, and various other agricultural produce. The river itself not only provides a scenic backdrop but also serves as a vital water source for irrigation and sustenance of the local flora and fauna.

2.1.1 Population

The median age of persons in Murrumbidgee Regional LGA is 45, which is higher than the Australian average of 38 (ABS 2021). The 2021 census records state that 8.6% of the population are Aboriginal and Torres Strait Islander people (ABS 2021). A large portion, 82.8% of the community were born in Australia. In addition, the community in the work force full time represent 64% of the population, with the top employment industries being grain growing, cattle farming and Local government.

2.1.2 Regional Area

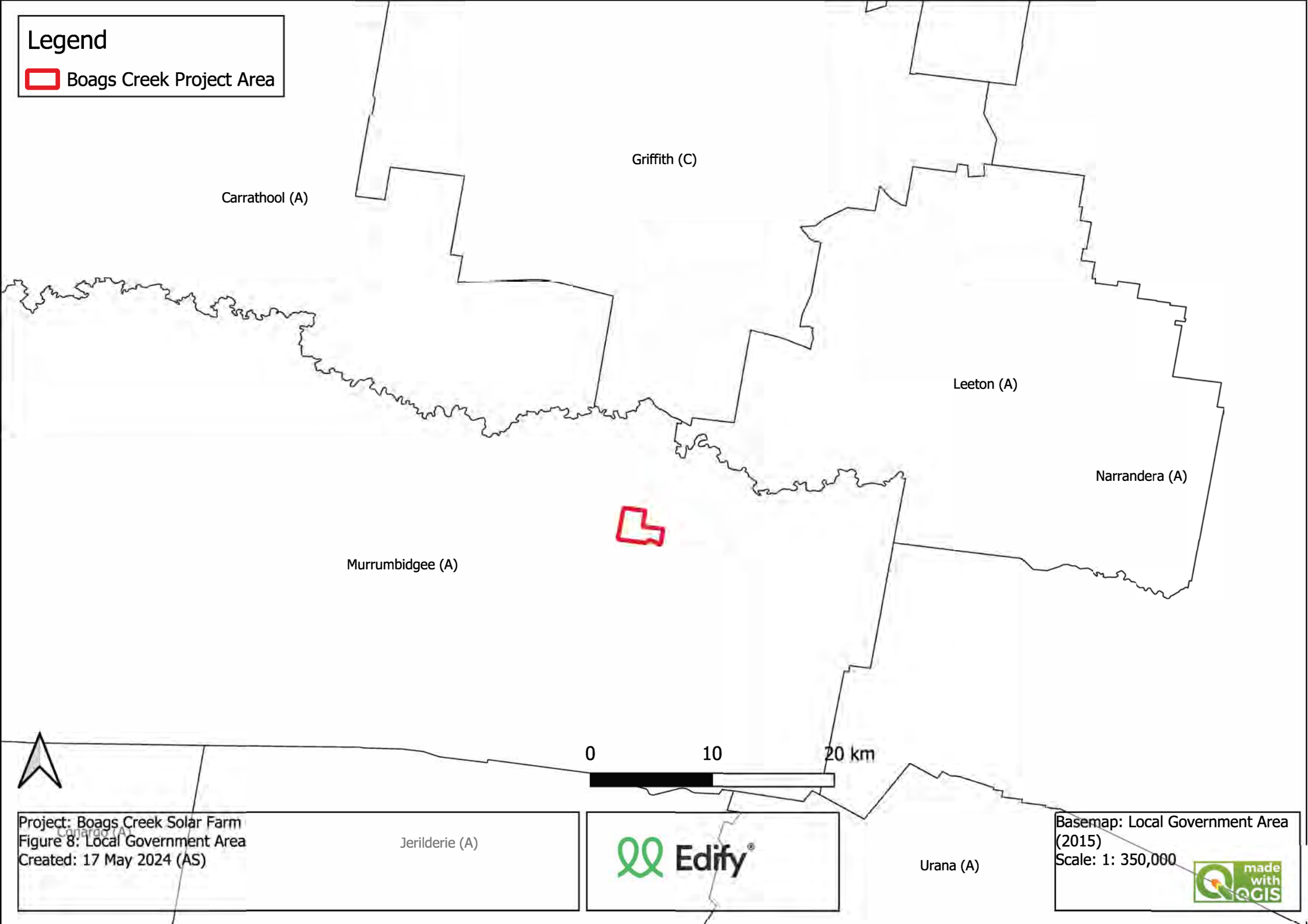
The closest major towns to Darlington Point, New South Wales, include:

1. Griffith: Located approximately 35 kilometres northeast of Darlington Point, Griffith is one of the largest towns in the Riverina region. It serves as a major commercial and cultural hub, known for its vibrant multicultural community, especially with Italian heritage. Griffith offers a range of amenities, including shopping centres, restaurants, schools, and recreational facilities.

2. Leeton: Situated around 45 kilometres southeast of Darlington Point, Leeton is another significant town in the Riverina area. It is renowned for its role in irrigation and agriculture, particularly citrus fruit production. Leeton boasts a well-planned layout, with wide streets and tree-lined avenues. The town features various attractions, including historic sites, parks, and cultural events.

3. Narrandera: Approximately 60 kilometres southwest of Darlington Point lies Narrandera, a historic town nestled on the banks of the Murrumbidgee River. Narrandera offers a mix of heritage architecture, parks, and outdoor recreational opportunities. It serves as a stopover for travellers along the Newell Highway and provides essential services and facilities to both locals and visitors.

These major towns near Darlington Point contribute to the region's economic and social vitality, offering a diverse range of amenities, attractions, and services to residents and tourists alike. They also reflect the rich agricultural heritage and cultural diversity of the Riverina region.


Legend
Boags Creek Project Area
Griffith (C)
Carrathool (A)
Leeton (A)
Narrandera (A)
Murrumbidgee (A)
Conargo (A)
Jerilderie (A)
Urana (A)
0
10
20 km
Project: Boags Creek Solar Farm
Figure 8: Local Government Area
Created: 17 May 2024 (AS)
Edify
Basemap: Local Government Area (2015)
Scale: 1: 350,000
made with QGIS

2.2 State electorate.

The Murray electorate is a regional electoral district in the Australian state of New South Wales. The electorate extends along the Murray River from Barooga to the South Australian Border.

It encompasses several local government areas, namely Wentworth Shire, Balranald Shire, Carrathool Shire, the City of Griffith, Leeton Shire, Hay Shire, Murrumbidgee Shire, Murray River Council, Edward River Council, and Berrigan Shire.

The largest centres in the electorate are Deniliquin, Leeton, Griffith, Hay, Hillston, Balranald, Moama, and Wentworth, the electorate holds 59,132 voting members.

It is the state's second-largest electorate, covering 110,700km^2 or 13.8% of the state.

The current MP is Mrs Helen Dalton, MP. Mrs. Dalton is an Independent Member of the Legislative Assembly and has held this position since March 2019.

2.3 Federal electorate

The Federal Farrer electorate, also known as the Division of Farrer, covers an area of approximately 126,590km^2, and stretches along the Murray River from Albury to the South Australian border, including Corowa, Deniliquin, and Balranald.

The electorate is made up of the Shires of Albury, Balranald, Berrigan, Carrathool, Conargo, Corowa, Deniliquin, Greater Hume, Griffith, Hay, Jerilderie, Leeton, Murray, Murrumbidgee, Narrandera, Urana, Wakool, and Wentworth.

The electorate is named after William James Farrer (1805-1906), a noted wheat breeder and experimentalist.

The current member of parliament (as of 2022) for the Farrer electorate is Sussan Ley from the Liberal Party.

3. Key Stakeholders

See Appendix D for full Stakeholder Mapping

3.1 Near neighbours

Edify has established a Community Register for all members within 4km of the project boundary, totalling 39 residences (Figure 3). A summary of community members that reside within 500m of the project boundary is provided below.

Edify will establish consistent dialogue with local community members throughout the post approval (pre-construction) phase of the development. There will be ongoing consultation with these stakeholders, which will continue through to the construction phase, including via letterbox drops, telephone conversations, house visits and Community Information Sessions (refer Section 7, Section 9).

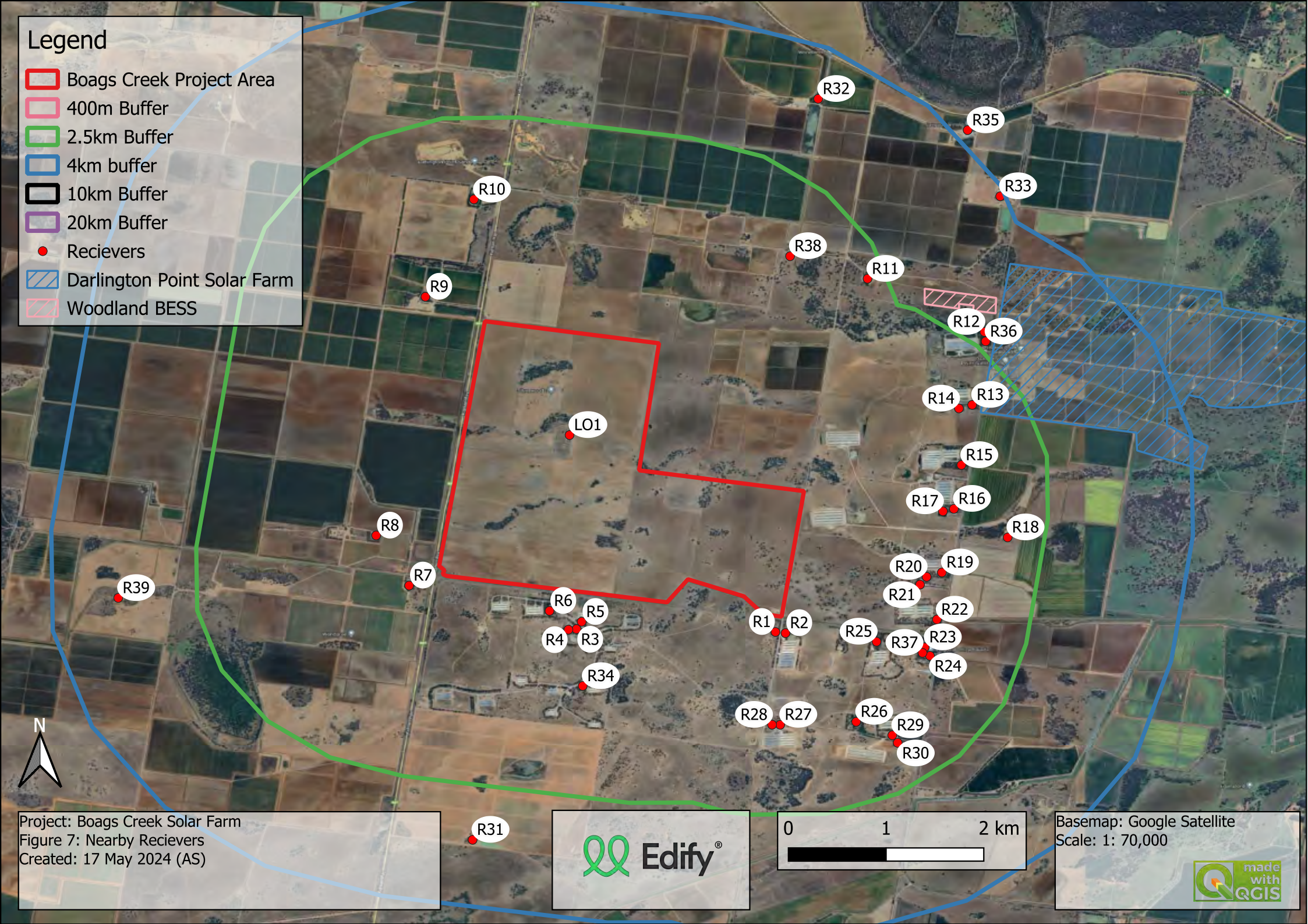
Receiver (R#)	Owner	Address	Distance to Project boundary (m)	Email / phone number
1		360 Ringwood Rd, Darlington Point, NSW	200	Confidential see Edify PM
2		808 Donald Ross Drive, Darlington Point	200	
3		122 Ringwood Road, Darlington Point	450	
4		As above	470	
5		As above	363	
6		As above	280	
7		19 Boondilla Road, Darlington Point	360	

**Edify's Project manager maintains engagement with near-neighbours on a regular basis, which extends beyond this summary of neighbours within 500m of the project boundary. This is summarised to provide indicative detail on the various methods of correspondence and means of engagement. Edify's ongoing engagement focuses particularly relating to key project milestones and 'nuisance activities' such as the potential commencement of construction noise and over-dimensional vehicular deliveries, etc. The complete community register can be provided upon request.*

3.2 Near Community Groups and Business's

Business's	*Community Groups*
Australia Post - Darlington Point LPO;	*Darlington Point Business Connect (Chamber of Commerce);*
BP Truckstop	*Darlington Point/Coleambally Junior Rugby League Football Club*
Darlington Point Accommodation Village	*Coleambally/Darlington Point Apex Club*

Darlington Point Riverside Caravan Park	*Darlington Point Men's Bowls*
Darlington Point Sports Club	*Darlington Point Mobile Pre-School*
Davis Supermarket	*Darlington Point Playgroup*
Gumview Café	*Darlington Point P&C*
Heath's Butchery	*Darlington Point Rural Fire Brigade*
Hutchins Agronomic Services	*Darlington Point Red Cross*
Massa Pharmacy	*Darlington Point Riverina Classic Catch & Release Fishing Competition*
Mobil	*Heritage Darlington Point*
Punt Hotel	*Darlington Point Church*
Rivadestra Pizza & Pasta	*Saint Pauls Anglican Church*
River Walk Coffee and Books	*Darlington Point Public School*
Sonder Hair+Co	
The Lott	
Tulluc Cottage	


Legend
Boags Creek Project Area
400m Buffer
2.5km Buffer
4km buffer
10km Buffer
20km Buffer
Recievers
Darlington Point Solar Farm
Woodland BESS
R32
R35
R10
R33
R38
R11
R9
R12
R36
R14
R13
LO1
R15
R17
R16
R8
R18
R20
R19
R7
R39
R21
R22
R6
R5
R1
R2
R25
R37
R23
R4
R3
R24
R34
R28
R27
R26
R29
R30
R31
N
0
1
2 km
Edify®
Project: Boags Creek Solar Farm
Figure 7: Nearby Recievers
Created: 17 May 2024 (AS)
Basemap: Google Satellite
Scale: 1: 70,000
made with QGIS

3.3 Council Representatives

The authority responsible for considering the Development Application was Murrumbidgee Council (the Council). The Council will continue to play a critical stakeholder role, which Edify's project manager and delivery team continue to engage with on a regular basis, throughout the life of the Project. During post approval (pre-construction) phase of the project, Edify will be collaborating further with Council during the preparation of the project's Workforce Accommodation Strategy and Local Participation Plan. Further, Council must also be consulted during the preparation of the Traffic Management Plan and Construction Environment Management Plan.

3.3.1 Murrumbidgee City Council

Council Offices
21 Carrington Street, Darlington Point New South Wales 2706 35 Jerilderie Street Jerilderie NSW 2716 39 Brolga Place, Coleambally NSW 2707

Councillor	Ward	Telephone Email[1]
Ruth McRae (Mayor)	Jerilderie	0428 861 767 / ruthm@murrumbidgee.nsw.gov.au
Robert Black (Deputy Mayor)	Murrumbidgee East	0428 696 102 / robertb@murrumbidgee.nsw.gov.au
Faith Bryce	Jerilderie	0438 108 809 / faithb@murrumbidgee.nsw.gov.au
Christine Chirgwin	Murrumbidgee East	0467 544 724 / christinec@murrumbidgee.nsw.gov.au
Robert Curphey	Murrumbidgee	0448 629 502 / robertc@murrumbidgee.nsw.gov.au
Gavin Gilbert	Murrumbidgee	0439 255 448 / gaving@murrumbidgee.nsw.gov.au
Troy Mauger	Jerilderie	0460 291 739 / troym@murrumbidgee.nsw.gov.au
Judy Saxvik	Murrumbidgee	0427 684 114 / judiths@murrumbidgee.nsw.gov.au
Timothy Strachan	Murrumbidgee East	0428 544 441 / tims@murrumbidgee.nsw.gov.au

[1] Phone and email if shown was taken from council website and therefore publicly available.

3.3.2 Complementary Members of Parliament

At present, no communication has occurred with any Members of Parliament regarding the Project. While it's currently deemed unnecessary to involve or inform MPs of key Project milestones during the planning phase, engagement strategies will be reevaluated as we progress into the post-approval (pre-construction) phase.

MPs		
Minister for Agriculture, Minister for Regional New South Wales, and Minister for Western New South Wales: Tara Moriarty 02 7225 6120	Minister for Climate Change, Minister for Energy, Minister for the Environment, and Minister for Heritage: Penny Sharpe 02 7225 6020	Minister for Planning and Public Spaces: Paul Scully 02 72256080

3.4 Emergency Services

NSW Fire and Rescue and Rural Fire Service will be engaged with during the life cycle of the Development, including during design development, Development Application and preparation of the required management plan. Edify continuously evaluates and improves emergency preparedness and response plans based on lessons learned from drills, incidents, and feedback from emergency services and the community.

Service	Address	Telephone
Fire and Rescue NSW	19 Wade Ave, Leeton	02 6929 5760
	11 Jondaryan Ave Griffith	02 6929 5711
	23 Twynam St Narrandera	02 6929 5750
NSW VRA (SES)	1 Bencubbin Ave Coleambally	02 6954 4244
NSW Ambulance	48 Kingfisher Ave, Coleambally	000

3.5 Traditional Owner Group

The local Indigenous community is represented by the Wiradjuri People, who are the traditional custodians of the land associated with the project.

The traditional boundaries of the Wiradjuri Nation (shown in Figure 4) are from the Great Dividing Range in the east, to the Murrumbidgee River in the south, and a line is drawn through the sites of the present towns of Hay, Nyngan and Gunnedah, forming the west and north boundaries. The eastern borders ran from north to south from above Mudgee, down to the foothills of the Blue Mountains east of Lithgow and Oberon, and east of Cowra, Young and Tumut and south to the upper Murray at Albury and east to about Tumbarumba. The southern border ran to Howlong. The boundary of the Wiradjuri Nation extends from Coonabarabran in the north, straddling the Great Dividing Range down to the Murray River and out to western NSW, including the townships of Dubbo, Condobolin, Orange, Bathurst, Wagga Wagga, Albury, Narrandera, and Griffith.

Contact	Responsibility	Address	Telephone	Email
	Griffith LALC	5 Wiradjuri Place, Griffith, NSW 2680	02 6962 6711	
Liz Carroll	Tirkandi Inaburra Cultural and Development Centre	Lot 84Kidman Way, Coleambally NSW 2707	02 6954 4800	www.tirkandi.org.au admin@tirkandi.org.au

Figure 4 Wiradjuri Land Map[2]

[2] National recognition for groundbreaking Wiradjuri language course in Wagga | About Regional

4. Engagement Protocols and Procedures

Community engagement with stakeholders will continue to be undertaken using five methods as follows:

1. continued direct contact with neighbours
2. the establishment of an online portal
3. regular meetings to be scheduled at various Project milestones
4. newsletters to coincide with meetings, and
5. open days with the public and school groups once operations have commenced.

As a general principal, all outward communications will include a description of how to access the latest information on the project so stakeholders can maintain an up-to-date understanding of progress and activities.

4.1 Communications management

4.1.1 Project Infoline, website and email

A project website will be established ahead of any construction activities with a direct link to the Edify Energy homepage.

The website contains project-specific contact details including a dedicated project hotline with contact name project email address.

4.1.2 Project contact database

A contact database has been used as the main reporting and monitoring tool for project communications. The outcomes of any contacts will be used to update ongoing stakeholder management information within this plan, to:

- record community and stakeholder contacts and interaction
- record the issue and distribution of letterbox drops, project updates and notifications
- act as a management tool for recording complaints, enquiries, issues and responses, and
- provide monthly reports on stakeholder and community contact and issues management.

4.2 Distributing information about the project

Information will be distributed via face-to-face meetings, phone calls or electronically from a project specific email address.

to be supplied separatelyto

4.3 Communicating with stakeholders about the potential impacts of the project

Messaging to stakeholders needs to be consistent and aligned with the messages outlined in this document.

4.4 Encouraging community and stakeholder feedback

Community and stakeholder feedback has been encouraged and the feedback email address and information line will be made freely available at any public interaction.

Where feedback is received and the contact details of the person leaving feedback are known, confirmation and, where appropriate, a response to that feedback should be made within 14 days.

4.5 Taking, recording and responding to community feedback, enquiries or complaints

All complaints received will be investigated and responded to within three (3) business days, where practical. At a minimum, confirmation of receipt of any complaint should be made within 48 hours and a response provided within 10 days.

For any complainant who provides their details, a written response to the complaint will be provided within 14 days.

A record of complaints will be made and reported on at an aggregate level.

A template Complaints Register is provided in Appendix B.

5. Activities Undertaken

5.1 Consultation Throughout Planning and Development Approval

See Appendix C for a Consultation log, noting that this is a live document.

5.1.1 Government

Edify has established and sustained regular communication channels with representatives from both the Murrumbidgee Council and the Department of Planning, Housing and Infrastructure (previously DPE) since 2017, with the approval of Edify's Darlington Point Solar Farm. These ongoing discussions have encompassed various subjects, including the utilization of Edify's financial contributions to benefit the community. Furthermore, dialogue has explored avenues for continued collaboration between Edify and the Council to support the community throughout the construction and operational phases.

5.1.2 TransGrid

Edify has maintained consistent engagement with the transmission network service provider, TransGrid, since 2017 on numerous Edify projects. Such engagement includes various teleconference meetings and numerous emails to clarify inverter model selection, power system model information, Generator Performance Standard package details and general technical details required to complete the project's Connection Application.

5.2 Proposed future Community and Stakeholder Consultation

5.2.1 Pre/Post DA Approval / Pre-construction engagement.

Through the Project's development, Edify proposes to undertake numerous community and stakeholder activities. This may include.

1. Public Meetings:
    - Host town hall-style meetings at accessible venues within the community (see Section 9).
    - Provide presentations outlining the project details, goals, and potential impacts.
    - Allocate time for Q&A sessions to address concerns and gather feedback.
2. Stakeholder Workshops:
    - Conduct focused workshops with key stakeholders, including local businesses, community groups, and government representatives.
    - Facilitate discussions on specific aspects of the project to gather targeted input.
    - Collaboratively explore potential opportunities and challenges.
3. Online Surveys:
    - Develop an online survey to reach a broader audience and gather feedback from those unable to attend in-person events.
    - Include questions regarding community priorities, concerns, and suggestions for project implementation.
4. Information Sessions:
    - Organise information sessions at local community centres, libraries, or other public spaces.
    - Display project materials, maps, and visual aids to provide accessible information to interested individuals.

- Offer opportunities for one-on-one discussions with project representatives.

5. Stakeholder Interviews:
    - Conduct individual or small group interviews with key stakeholders, including local leaders, business owners, and community advocates.
    - Use interviews to gain deeper insights into specific stakeholder perspectives and concerns.
6. Social Media Engagement:
    - Utilize social media platforms to disseminate project updates, event invitations, and relevant information.
    - Encourage community members to share their thoughts, questions, and feedback online.

These sessions will provide Edify's potential future project partners to:

- Provide opportunities for ongoing engagement and communication throughout the project lifecycle.
- Establish mechanisms for stakeholders to remain informed and involved in decision-making processes.
- Commit to transparency and accountability by addressing feedback and concerns in a timely manner.

By implementing this proposed consultation plan, Edify aims to ensure that the Project reflects the needs, priorities, and aspirations of the local community and stakeholders, ultimately fostering greater support and collaboration for its successful implementation.

5.2.2 Engagement leading into Construction.

Edify proposes to work with the EPC contraction to develop a consultation programme leading up to construction and during construction of the project.

This will be similar to the points noted in Section 5.2.1 but would expand on previous consultation undertaken and how community concerns have been addressed and key issues typically raised by communities during construction projects, including:

- Community Safety;
- Traffic congestion and traffic routes;
- Any proposed noise impacts;
- Visual Impacts; and
- Outline of environmental management.

6. Financial close and NTP activities

The following activities are contemplated to occur at or around the time of financial close.

6.1 Financial Close Media Release

A media statement will be released with key project partners to announce the financial close of the Project.

Edify Energy publishes all relevant press releases and links to partner media on its website (www.edifyenergy.com). Edify Energy shall also notify associated media and communications channels including but not limited to RenewEconomy, the Clean Energy Council, the local paper(s), and collaborate with project partners who are perhaps better connected in respect of the broader press.

Edify Energy notified the Council, local MP, the QLD Renewable Energy Advocate and related entities and take advantage of their own media and communications initiatives.

As always, Edify Energy personnel will seek to maximise coverage leveraging their own networks on LinkedIn, X, Instagram and Facebook.

6.2 Community Update, Supplier Forum and Job Notices

A formal presentation communicating key facts and project timelines would be more suitable than a drop-in session, and the event should be combined with a supplier forum, to attract and inform local businesses that may wish to participate in the services and various delivery aspects of the construction and operation of the project.

It is somewhat standard practice to hold a “supplier forum” in the local community with a view to maximising local content of project delivery. It would be most efficient to hold a single community update forum and supplier forum as a combined event.

Edify Energy’s own “database” of interested individuals and suppliers should be included on the invite list.

The event should be held jointly by Edify Energy and EPC Contractor, and the latter should be primarily responsible for fielding employment and supplier enquiries.

EPC Contractor should have in place prior to the forum, an appropriate online portal/body-hire agency which can be advertised as the means to registering an interest.

Council may also have the capability to advertise vacancies and tenders on its own website on behalf of the Project.

7. Ongoing Commitments

The following are contemplated throughout construction to commercial operation of the Project.

7.1 Monitoring and Updating the Plan

The plan will be monitored on an ongoing basis by the Edify project execution team and will be updated as required to ensure the document provides an accurate reflection of community consultation activities and outcomes as the project progresses. Once the pre-construction phase commences, Edify's project execution team will report regularly throughout construction to Edify's internal management, the project's equity partner and lenders.

Other regular reporting will be undertaken as required by our conditions of consent and any other relevant approvals. Refer to section 7.3 for details of our communication to community regarding key project milestones.

7.2 PR and media

7.2.1 Project Website

Irrespective of any media and PR requirements, it is good practice to maintain a project website which, throughout construction, will contain the following and be kept up-to-date:

- project plans
- planning permit conditions
- key milestones
- how suppliers and local members can participate in the project
- complaints register (Appendix B) and
- how complaints about the development can be made

7.2.2 Media

Otherwise from a PR perspective, the website should ideally be kept up to date with:

- key media announcements and press releases (e.g., financial close, commencement of construction, energisation/commissioning, COD, etc.)
- regular images and/or time-lapse photography through construction, and
- notices of community events, sponsorships etc.

7.3 Ongoing PR and Media

The following represents potential milestones for ongoing PR and media throughout Project construction:

Milestone	Funding Agreement Milestone	Edify Energy website & social media	Other stakeholder websites	General media release	Local press	Site event	Landlord/ neighbour updates
Financial Close	Notice to Proceed	✓	✓	✓	✓		✓
EPC mobilisation	NTP (shortly after)	✓	✓		TBC		✓
Ground-breaking	NTP (shortly after)	✓	✓		✓	✓	✓
First battery delivery	Delivery of Major Equipment	✓			TBC	TBC	
School visits	N/A	✓			✓	✓	
Final battery delivery	Delivery of Major Equipment				TBC	TBC	
Transformer delivery	Delivery of Major Equipment				✓		✓
Commence commissioning	Completion and Connection of the Project	✓		✓	✓	✓	
First generation	Completion and Connection of the Project	✓		✓	✓		
Full output	Completion and Connection of the Project	✓		✓	✓		
Commercial operation	Commercial Operations Commenced	✓	✓	✓	✓	✓	✓

7.4 Council Meetings

It would be prudent to keep Council aware of key milestones, particularly where they relate to approvals and certification requirements, such as access road works/inspections, management plan sign-off, over-size deliveries, issuance of construction and occupation certificates etc, so that Council is informed and expedient in its approvals. This can be achieved via ad-hoc email/telephone communication with Murrumbidgee Coucnil

It has been possible to request Council to submit general community updates on behalf of the Project, via its website and social media platforms.

8. Local Venues

The following local venues would be suitable for hosting events and forums in the local community:

Venue	Address	Telephone	Email	Capacity	Licenced	Catering
Murrumbidgee Shire Hall	Carrington Street, Darlington Point	Council		TBC	TBC	No

Appendix A Community Advertisement for Public Exhibition

To be developed

Appendix B – Complaints Register

Type text here

Date

Project BOAGS Creek Solar Farm
Issue type

Entered by	Project	Issue Number	Issue type	Date of Issue	Status	Responsible manager	Closeout manager	Date Closed	Description	Location	Action Taken	Summary of Findings

Appendix C -Consultation Log

to be supplied separately

Appendix D Stakeholder Mapping

to be supplied separately


Edify®