

Stubbo Solar Biodiversity Management Plan

Version 5.0: 29 July 2026



ACEN Australia

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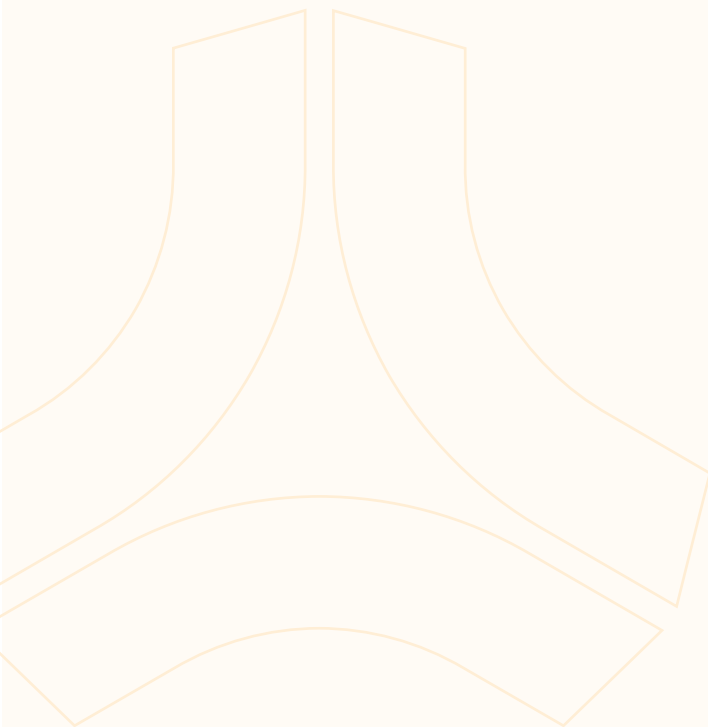
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Acknowledgement

ACEN Australia and OzArk acknowledge Traditional Owners of the area to which this plan applies and pay respect to their beliefs, cultural heritage and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

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Acronyms and Abbreviations

BAM	Biodiversity Assessment Method (BAM)
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
<u>BCS</u>	<u>Biodiversity Conservation Science Division (former)</u>
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
CPHR	Conservation Program, Heritage and Regulation
<u>DPIE</u>	<u>Department of Planning, Industry and Environment (former)</u>
<u>DPE</u>	<u>Department of Planning and Environment (former)</u>
<u>DoEE</u>	<u>Department of the Environment and Energy (former)</u>
DPHI	Department of Planning, Housing and Infrastructure (current)
DoCCEEW (NSW)	Department of Climate Change, Energy, the Environment and Water (NSW)
DoCCEEW (CW)	Department of Climate Change, Energy, the Environment and Water (Cth)
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
EPC	Engineering, Procurement and Construction
GMP	Grazing Management Plan
Habitat tree	A tree containing hollows or nests
HSE	Health, Safety and Environment
IFC	Issued for Construction
NPW Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
O&M	Operation and Maintenance
<u>OEH</u>	<u>Office of Environment and Heritage (former)</u>
PCT	Plant Community Type
POEO Act	<i>Protection of the Environment Operations Act 1997</i> (NSW)
SSD	State Significant Development
SWMP	Soil and Water Management Plan
WIRES	Wildlife rescue organisation

1 Introduction

1.1 Preamble

This Biodiversity Management Plan (BMP) provides biodiversity and land management measures in relation to the Stubbo Solar Project (the project). The project is located approximately 10 kilometres (km) northeast of Gulgong, NSW, within the Mid-Western Regional Council local government area (LGA) boundaries.

ACEN Australia Pty Ltd (ACEN Australia; formerly UPC/AC Renewables Australia), received Development Consent from the Minister for Planning and Public Spaces for the project, approved as State Significant Development (SSD) 10452, on 29 June 2021.

On 29 June 2021, the Executive Director, Energy, Resources and Industry Assessments granted consent to the development application for the Stubbo Solar Farm subject to conditions, under delegation from the Minister for Planning and Public Spaces and section 4.38 of the *Environmental Planning and Assessment Act 1979* (the Act) (EP&A Act).

In a letter dated 24 August 2022, the Secretary approved the Applicant's proposal to develop the project in two stages, comprising:

Stage 1: Road upgrades including construction of the main site access; and

Stage 2: Construction of the solar farm.

In a subsequent letter dated 10 May 2023, the Secretary approved the Applicant's request dated 8 May 2023 seeking the Planning Secretary's approval to revise the staging of the Stubbo Solar Project under Condition 3 of Schedule 4 of SSD 10452, and to develop the project in four stages comprising:

- Stage 1: Road upgrades (Blue Springs Road) and construction of the main site access.
- Stage 2: Solar project construction and operation including:
 - Stage 2a: Construction and commissioning of the solar facilities including solar array, substation and all ancillary infrastructure, including the switchyard and transmission line connection to be constructed by Transgrid.
 - Stage 2b: Operation of the Stubbo Solar Project.
- Stage 3: Construction, commissioning and operation of the Battery Energy Storage System (BESS), including substation and switchyard expansion (within the development footprint).
- Stage 4: Decommissioning of the Stubbo Solar Project at end of life.

This management plan is for Stage 2b of Stubbo Solar, as approved by the Secretary in the letter dated 10 May 2023.

Key activities for Stage 2b include:

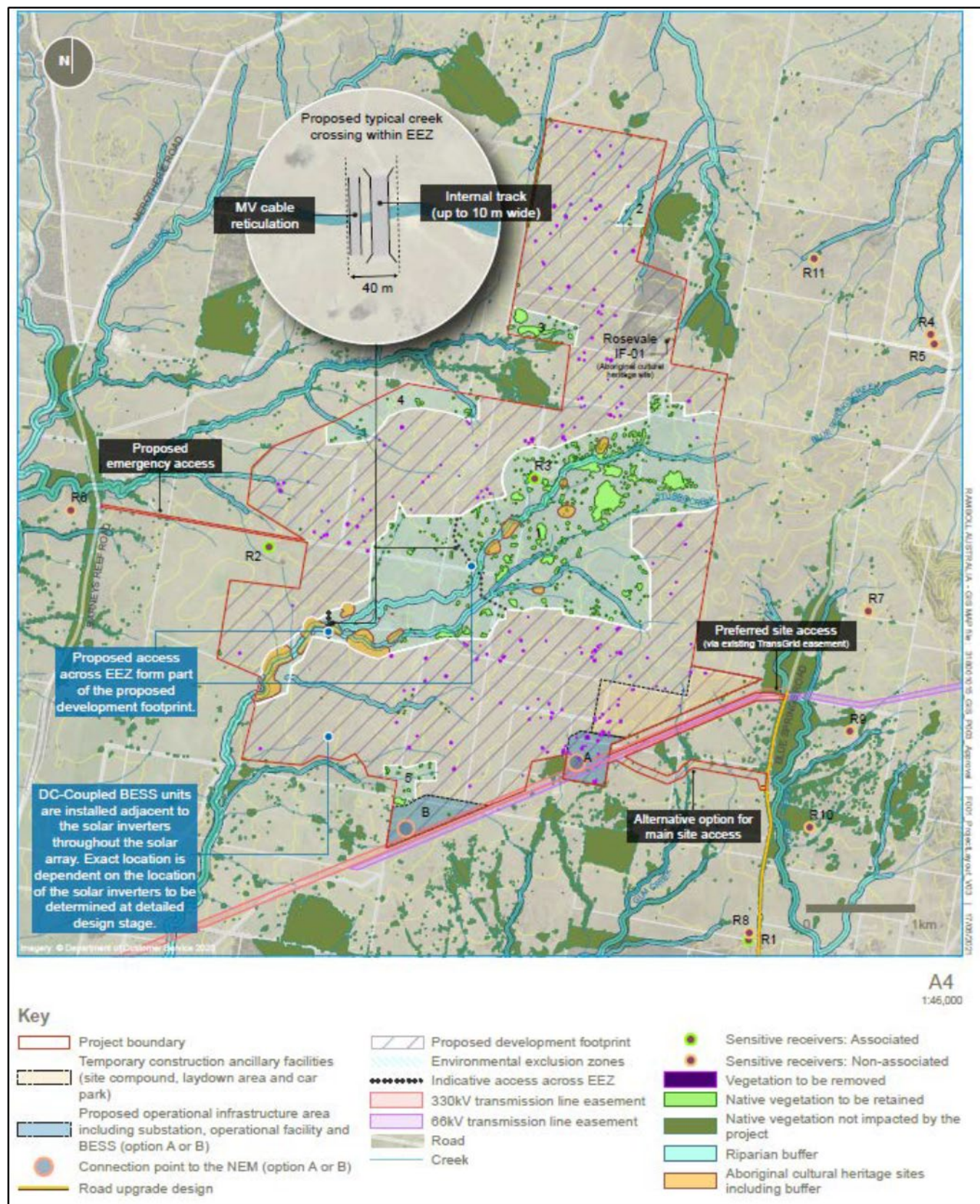
- Operation and Maintenance of the facility

Both O&M Contractor and ACEN Australia will ensure contractors conform to the requirements of this BMP.

The BMP for Stage 1 and Stage 2a has been approved by the DPHI. As such, this BMP applies only to Stage 2b (operation and maintenance) of the project. The BMP boundary relevant to Stage 2 is shown on **Figure 1-1**. There will be no impacts outside this boundary.

References to the management of the Environmental Exclusion Zone (EEZ), BAM plots, and associated indicators have been removed as these provisions applied to construction. References to the EEZ associated with approvals documentation remain.

Figure 1-1: General layout of development (source: Appendix 1 of Development Consent).



1.2 Scope

This BMP has been prepared as a tool to give consideration to and manage biodiversity related issues during the operation of the project. This BMP does not cover the decommissioning phase of the project. The BMP will be revised prior to the commencement of decommissioning to incorporate this phase. This BMP will be used by all project employees, contractors, subcontractors and visitors as the first point of reference for biodiversity related issues. This BMP also serves to inform the public on how matters relating to biodiversity will be dealt with on the project site in compliance with the conditions of Development Consent.

1.3 Purpose

The purpose of this BMP is to document the strategies to be employed for the management of remnant vegetation, fauna and their habitat on the project site and ensure compliance with the Conditions of Consent for SSD 10452.

In accordance with Schedule 2, Condition 1, ACEN Australia, as the Applicant, commits to meeting the specific environmental performance criteria established under SSD 10452, and will implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, upgrading or decommissioning of the development.

ACEN Australia is the project owner and has engaged PCL Constructors Pacific Rim Pty Ltd (PCL) as the operations and maintenance (O&M) contractor to manage the operations and maintenance works for the 400 MW AC solar project along with substation and ancillary facilities for the first two years of operation. During operations phase, PCL will employ a subcontractor who will maintain the solar farm equipment which includes the substation. Transgrid will only take care of their switch yard. After two years, ACEN Australia will appoint a subsequent long-term operations and maintenance (O&M) contractor.

The BMP has been prepared to meet the requirements of Condition 12 (Land Management) and Condition 15 (Biodiversity) in Schedule 3 of the Development Consent SSD 10452.

Table 2-2 identifies where each requirement is addressed in this BMP.

Additionally, Conditions 13 (Vegetation Clearance) and Condition 14 (Biodiversity Offsets) are also referenced within this document.

1.4 Project Overview

The project, approved as SSD 10452, comprises a utility scale renewable energy project which aims to generate up to 400 MW of electricity (enough to power approximately 185,000 homes) through a new solar project. Depending upon the final installation capacity, up to one million megawatt hours of electricity are expected per year. The project also includes provision for a 200 MWh battery energy storage system, meaning it can provide energy during peak hours and improve grid stability.

The solar project will consist of ground mounted solar photovoltaic (PV) modules, known more commonly as PV modules or solar panels. The panels will be mounted in rows on a single axis tracking system that follows the path of the sun and installed between 5 and 12 metres apart. This will allow for safe access for maintenance and provide grassfire protection. Development of associated infrastructure, including a grid connection, future battery storage facilities and temporary construction facilities (such as material storage yards and a site compound) are also proposed within the site. Stubbo Solar will connect to the existing 330 kV transmission line operated by Transgrid.

The project is currently transitioning to the operational phase.

1.5 The Applicant

ACEN Australia is the project owner (proponent) for the Stubbo Solar Project and has engaged PCL Constructors Pacific Rim Pty Ltd (PCL) as the operations and maintenance (O&M) contractor to manage the operations and maintenance works for the 400 MW AC solar project along with substation and ancillary facilities for the first two years of operation. During operations phase, PCL will employ a subcontractor who will maintain the solar farm equipment which includes the substation.

In the future, ACEN Australia will appoint a subsequent long-term operations and maintenance (O&M) contractor.

Transgrid will manage their switch yard for the life of the project.

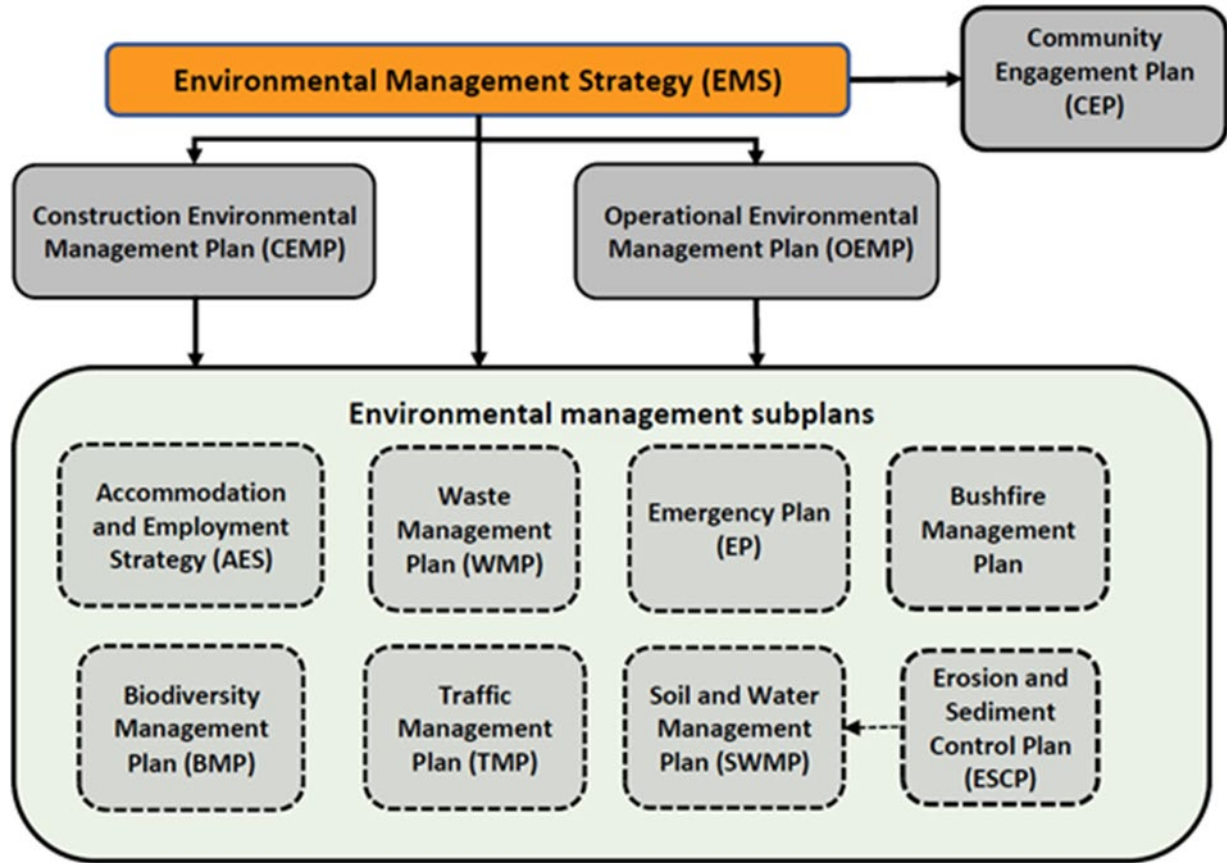
1.6 PCL Environmental Management Documentation

ACEN Australia is the Proponent and ultimately takes responsibility for compliance with SSD 10452. This responsibility is reflected in the management plans, programs and strategies developed for the project.

PCL have been contracted by ACEN Australia to undertake the operation and maintenance of the Stubbo Solar Project, and have adopted environmental and related policies/standards that comply with, and where possible exceed, the minimum standards set by ACEN Australia in the BMP and EMS.

The purpose of the EMS is to provide a framework for compliance with the Conditions of Consent and the management of environmental issues associated with the project. The EMS includes a number of plans and strategies that have been put in place to manage environmental impacts that may arise from the construction and/or operation of the project – including this BMP – as shown in **Figure 1-2**.

Figure 1-2: Flowchart of the environmental management system



1.7 Other Reference documents

The Biodiversity Development Assessment Report (BDAR) (Eco Logical Australia Pty Ltd 2020) was used substantially in the development of this BMP.

This iteration of the BMP also includes key components of the Grazing Management Plan (GMP) prepared by Ecosite Solutions (2026). The GMP is included as Appendix F.

1.8 Roles and responsibilities

1.8.1 Construction Phase (REMOVED)

Table 1-1 – Construction roles and responsibilities (REMOVED)

1.8.2 Operational Phase

During the operational phase, the following roles and responsibilities as shown in Table 1-2 will apply. The contact details of the O&M staff will be provided closer to O&M phase commencing.

Table 1-2 – Operational roles and responsibilities

Role	Responsibility	Contact details of staff (to be updated regularly)
ACEN Australia r Operations Site Manager	- Overall accountability for the compliance with the Development Consent conditions - Overall accountability for ensuring ACEN Australia and PCL comply with the with the Development Consent conditions and the Management Protocols - Responsible for external reporting of incidents, non-compliances and complaints Note: Non-compliances which have been notified as an incident do not need to also be notified as a non-compliance.	Name: Justin Odd Number: 0448 383 936 Email: justin.odd@acenrenewables.com.au
PCL Senior Engineering and Commissioning Manager	- Overall accountability for the implementation of the BMP - Ensure that all works on site are undertaken in compliance with the BMP. - Ensure monitoring responsibilities in accordance with the BMP - Undertake consultation with relevant organisations or the Subcontractor - Project Ecologist regarding operational activities which may impact biodiversity values (e.g. weed control, tree trimming) - Ensure that all training, auditing, reporting and incident management requirements are met	Name: Jack Somers Number: 0403 679 272 Email: JMSomers@pcl.com

Role	Responsibility	Contact details of staff (to be updated regularly)
PCL O&M Contractors	- Ensure the implementation of the BMP with respect to their specific work practices - Act in accordance with the management procedures or protocols outlined in the BMP - Ensure any potential or actual issues, including environmental incidents, are reported to the immediate supervisor - Organise fence monitoring - Coordinate review of the BMP - Protocols 3,5,6,7,8,9,10,11,12,13,14	To be managed by PCL Senior Engineering and Commissioning Manager
Subcontractor – Project Ecologist	- Partake in fence monitoring - Monitor fauna mortality - Monitor remnant vegetation - BMP review in consultation with PCL Senior Engineering and Commissioning Manager and ACEN - Protocols 3,5,6	To be engaged separately or activities completed by O&M Contractor (currently PCL) when required

1.8.3 Document Review

The BMP will be reviewed three years after operation of the Stubbo Solar Project commences, as required under Condition 2 of Schedule 4 of the Development Consent SSD 10452. This will be undertaken by the Project Ecologist, O&M Operator and ACEN Australia.

The BMP will be:

- (a) updated to the satisfaction of the Planning Secretary prior to carrying out any upgrading or decommissioning activities on site; and
- (b) reviewed and, if necessary, revised to the satisfaction of the Secretary within 1 month of the:
 - submission of an incident report under Condition 7 of Schedule 4 of the Development Consent SSD 10452;
 - submission of an audit report under Condition 9 of Schedule 4 of the Development Consent SSD 10452; or
 - any modification to the conditions of Development Consent SSD 10452.

1.9 CPHR (DPHI) Consultation

In accordance with Condition 15 of Schedule 3 of Development Consent SSD 10452, the Conservation Programs, Heritage and Regulation (CPHR) within the Department of Climate Change, Energy, the Environment and Water (DCCEEW) was consulted in January 2023 by the subcontractor OzArk Environment & Heritage on behalf of PCL in regard to the required contents for this BMP. OzArk provided DPHI with a copy of proposed maps of vegetation clearance for their review on 2 February 2023 (see section 3.3). CPHR received a draft of the BMP to review on 8 February 2023. OzArk Environment & Heritage has incorporated the BCS

review comments into the BMP (**Appendix C**).

Additional consultation with CPHR occurred during May 2026 during the review process for Stage 2b.

2 Legal and Other Regulatory Requirements

2.1 Project Consent Conditions

As stated in Section 1, this BMP is a condition of the Development Consent SSD 10452 granted on 29 June 2021. Conditions of Development Consent relevant to the BMP are provided in **Table 2-1**.

Table 2-1 details the biodiversity conditions relevant to SSD 10452, with condition 15 listing the requirements for the Biodiversity Management Plan.

Table 2-1: Relevant consent conditions.

Condition of Approval	Requirements	BMP Section
Schedule 2 Condition 1	OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT In meeting the specific environmental performance criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, upgrading or decommissioning of the development.	Section 1.3
Schedule 2 Condition 2	TERMS OF CONSENT The applicant must carry out the development: generally in accordance with the EIS; and in accordance with the conditions of this consent [SSD 10452]; <i>Note: The general layout of the development is shown in Appendix 1 [of SSD 10452].</i>	Section 2.2
Schedule 3 Condition 12	LAND MANAGEMENT The Applicant must maintain the agricultural land capability of the site, including: (a) establishing the ground cover of the site within 3 months following completion of any construction or upgrading; (b) properly maintaining the ground cover with appropriate perennial species and weed management; and (c) maintaining grazing within the development footprint, where practicable, unless the Planning Secretary agrees otherwise.	Section 1.4 Section 3.1 Section 4.5 Section 4.10 Section 6.5
Schedule 3 Condition 13	BIODIVERSITY <i>Vegetation Clearance</i> The Applicant must not clear any native vegetation or fauna habitat located outside the approved disturbance areas described in the EIS.	Section 2.2 Protocol 13
Schedule 3 Condition 15	BIODIVERSITY <i>Biodiversity Management Plan</i> Prior to commencing road upgrades, the Applicant must prepare a Biodiversity Management Plan for the development in consultation with BCS, and to the satisfaction of the Planning Secretary. This plan must:	A separate Biodiversity Management Plan was prepared for Stage 1 Road Upgrades and approved by DPE on 29 September 2022. A copy of

	the DPE approval is provided in Appendix E.
include a description of the measures and timeframes that would be implemented for:	
protecting vegetation and fauna habitat outside the approved disturbance areas;	Section 1.8, Section 4 (including Tables 4-1, and 4-3) Protocol 3 Protocol 5 Protocol 6 Protocol 7 Protocol 8 Protocol 9 Protocol 10 Protocol 11 Protocol 12 Protocol 13 Protocol 14
managing the remnant vegetation and fauna habitat onsite;	Section 1.8, Section 4 (including Tables 4-1, and 4-3) Protocol 3 Protocol 5 Protocol 6 Protocol 7 Protocol 8 Protocol 9 Protocol 10 Protocol 11 Protocol 12 Protocol 13 Protocol 14
minimising clearing and avoiding unnecessary disturbance of vegetation that is associated with the construction and operation of the development;	Section 1.8, Section 4 (including Tables 4-1, and 4-3) Protocol 3 Protocol 4 Protocol 7 Protocol 9 Protocol 13
minimising the impacts to fauna on site and implementing fauna management protocols;	Section 1.8, Section 4 (including Tables 4-1, and 4-3) Protocol 3 Protocol 5

	Protocol 6 Protocol 7 Protocol 9 Protocol 10 Protocol 12 Protocol 13
include a program to monitor and report on the effectiveness of mitigation measures; and	Section 1.8, Section 4 (including Tables 4-1, and 4-3)
include details of who would be responsible for monitoring, reviewing and implementing the plan.	Section 1.8, Section 4 (including Tables 4-1, and 4-3) Protocol 3 Protocol 5 Protocol 6 Protocol 7 Protocol 8 Protocol 9 Protocol 10 Protocol 11 Protocol 12 Protocol 13 Protocol 14
Following the Planning Secretary's approval, the Applicant must implement the Biodiversity Management Plan. <i>Note: If the biodiversity credits are retired via a Biodiversity Stewardship Agreement, then the Biodiversity Management Plan does not need to include any of the matters that are covered under the Biodiversity Stewardship Agreement.</i>	

2.2 Project Commitments

In addition to the consent conditions, a number of commitments were made in the BDAR (Eco Logical 2020) as part of the Environmental Impact Statement (EIS), and as the EIS was the basis for Development Consent, these commitments must be adhered to. The commitments that pertain to biodiversity management are presented in **Table 2-2**. The table identifies all the commitments relating to biodiversity impact and identifies where in the BMP individual requirements have been addressed.

Table 2-2: Consolidated EIS and Amendment report commitments relevant to BMP (operational phase).

ID	Management/Mitigation measure – biodiversity	Section in this BMP
B2	A qualified ecologist/licenced wildlife handler will supervise tree removal in accordance with best practise methods.	Protocol 3 – Management of Displaced Fauna
B4	Monitoring will be undertaken within the environmental exclusion zones to ensure biodiversity values are not significantly affected by indirect impacts. This may include: - comparison against EIS baseline monitoring - consideration of natural seasonal variation - development of trigger values for the commencement of adaptive management actions - details of proposed adaptive management actions to reduce or eliminate recorded impacts.	Table 4-3: Trigger, Action, Response, Monitoring and reporting requirements during Operation. Please note any actions relating to this section have been removed in BMP Stage 2b as these provisions applied to construction.
	Commence revegetation within 10 days of completion of any construction or upgrading activities and establish ground cover within 3 months to minimise the risk of erosion (see SWMP)	Protocol 9 – Dust Control / Rehabilitation Section 4.10
B8	All machinery will be cleaned prior to entering and exiting the study area to minimise the transport of weeds to vegetated areas to be retained.	Protocol 12 – Vehicle Hygiene Procedure
	Weeds that are present within the study area that are listed under the <i>NSW Biosecurity Act 2015</i> will be managed.	Protocol 5 – Weed Management
B9	All personnel working on the project will undertake an environmental induction as part of their site familiarisation. This will include:	
	site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing and noxious weeds)	Protocol 1 – Vegetation Clearing Procedure (Construction only removed from this Plan version) Protocol 2 – Habitat Tree Removal (Construction only removed from this Plan version) Protocol 3 – Management of Displaced Fauna Protocol 4 – Stockpiles and Re-using Resources as Woody Debris Protocol 5 – Weed Management Protocol 7 – Fence Construction and Management

		Protocol 8 – Erosion and Sediment Control
		Protocol 12 – Vehicle Hygiene Procedure
		Protocol 13 – Exclusion Fencing/Exclusion Zones
	what to do in case of environmental emergency (e.g. chemical spills, fire, injured fauna)	Protocol 11 – Chemical Management Emergency Plan Section 4.3.1
	key contacts in the case of an environmental emergency.	Table 4-3. Response Agency Contact Details.
B10	A Traffic Management Plan will be developed which includes speed limits and controls to reduce risk of fauna strike. Any vehicle strike incidents will be recorded.	Traffic Management Plan Protocol 3 – Management of Displaced Fauna
B11	A strategy will be developed and implemented to protect vegetation and habitat adjacent to the project. This will outline the following:	
	rubbish disposal guidance	Protocol 13 – Exclusion Fencing / Exclusion Zones Waste Management Plan
	prohibition of wood collection	Protocol 13 – Exclusion Fencing / Exclusion Zones
	prohibition of lighting of fires	Protocol 13 – Exclusion Fencing / Exclusion Zones
	exclusion zones for native vegetation outside the development footprint	Protocol 13 – Exclusion Fencing / Exclusion Zones
	speed limits on the surrounding road network	Traffic Management Plan
B12	Suitable species will be used as ground cover species in any revegetation areas. This will ensure compliance with the principles of site rehabilitation contained in Kovac and Briggs (2013).	Protocol 9 – Dust Control / Rehabilitation Section 4.10
LU1	Land management within the study area will include measures to minimise impacts to surrounding agricultural land use with reference to DPI's publication Infrastructure proposals on rural land (Kovac, M and Briggs, G, 2013). These measures will also be implemented during operation of the project and will include strategies to minimise impacts of aerial spraying. The land management measures will aim to minimise impacts on:	A Land Use Conflict Risk Assessment was undertaken during the preparation of the EIS, which addressed the issues covered in Kovac and Briggs 2013.
	land and soil capability within the development footprint	Section 3.1
	biosecurity both at a local and regional level	Protocols 5 and 12
	soil erosion	Addressed in SWMP
	surface water runoff	Addressed in SWMP

- agricultural activities on neighbouring properties. Addressed in EIS

LU2	Biosecurity management will include:	
	• measures to manage the impacts of weeds, disease and pest animals during construction, operation, and decommissioning activities. Livestock biosecurity is managed by Grazing Licences.	Protocol 5 – Weed Management Protocol 12 – Vehicle Hygiene Procedure
	• biosecurity response measures where impacts are identified. Livestock biosecurity is managed by Grazing Licences.	Protocol 5 – Weed Management Protocol 12 – Vehicle Hygiene Procedure Table 4-2
	• contingency measures in the event that existing measures are inadequate in managing the risk/impact.	Protocol 5 – Weed Management Protocol 12 – Vehicle Hygiene Procedure Table 4-2
LU4	Consultation will continue to be undertaken with participating landholders to minimise disruption to agricultural activities during construction and operation.	ACEN Australia and the participating landholders are in constant dialogue regarding the project to minimise impacts to agricultural activities such as fencing realignment plans and has entered into grazing licences to facilitate this.
LU5	Options will be further investigated to consider the feasibility of grazing within the study area throughout operation, in consultation with landholders.	Grazing will be undertaken in line with the “Australian guide to agrisolar for large-scale solar for proponents and farmers” and in consultation with the host landholders
LU6	A decommissioning and rehabilitation plan will be prepared and submitted to Mid-Western Regional Council for approval within 5 years of the commencement of operation that outlines the rehabilitation objectives and strategies to return the study area to its pre-existing condition for agricultural land use. This will include but not be limited to: • rehabilitation objectives and strategies • describing the design criteria of the final land use and landform • performance indicators to be used to guide the return of the land back to agricultural production • expected timeline for the rehabilitation program. The plan will be reviewed every 5 years, so that it is readily available should operations cease earlier than planned.	This BMP is for Stage 2b – Operation only. A separate decommissioning and rehabilitation plan is to be prepared within 5 years of commencement of operation and submitted to Mid-Western Regional Council.

2.3 Legislation

O&M Contractor will conduct the project consistent with the requirements of the Development Consent and any other legislation that is applicable to an approved State Significant Development under the EP&A Act.

In addition to the statutory obligations described in Section 2.1, the following NSW Acts (and their Regulations) may be applicable to the conduct of the Project:

- *Biodiversity Conservation Act, 2016 (BC Act)*
- *Biosecurity Act 2015*
- *Crown Lands Management Act 2016*
- *Contaminated Land Management Act 1997*
- *Dangerous Goods (Road and Rail Transport) Act 2008*
- *Electricity Supply Act 1995*
- *Electricity Supply (Safety and Network Management) Regulation 2014*
- *Energy and Utilities Administration Act 1987*
- *Environmental Planning and Assessment Act 1979 (EP&A Act)*
- *Fisheries Management Act 1994*
- *Protection of the Environment Operations Act 1997 (POEO Act)*
- *Roads Act 1993*
- *Soil Conservation Act 1938*
- *Water Management Act 2000*
- *Work Health and Safety Act 2011*

Commonwealth Acts which may also be applicable to the conduct of the project include:

- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act); and*
- *Native Title Act 1993.*

On 13 May 2022 the then Department of the Agriculture, Water and the Environment (DAWE) determined that the project is not a controlled action under the EPBC Act. This means that the project does not require further assessment and approval under the EPBC Act.

Guidelines and Standards

- *Guidelines for Controlled Activities on Waterfront Land (NRAR, 2018), or its latest version*
- *Policy and Guidelines for Fish Habitat Conservation and Management (2013), or its latest version.*
- *Policy and Guidelines for Fish Friendly Waterway Crossing (DPI, n.d.) or its latest version*
- *Infrastructure proposals on rural land (Kovac, M and Briggs, G, 2013), or its latest version*
- *Managing Urban Stormwater: Soils and Construction (Landcom, 2004) or its latest version*

3 Existing environment

3.1 Land Use History

The project site has a long history of agricultural land use, including both cropping and grazing. As such, a large percentage of the area proposed to be developed has previously been cleared and is significantly modified. The site was mapped as Land Capability Class V, which is land that is suitable for grazing and may require soil conservation measures including pasture and grazing management to maintain soil structural integrity.

Impacts on surrounding agricultural land use will be managed and minimised with reference to the DPI Primefact document *Infrastructure proposals on rural land* (Kovac and Briggs 2013). Management measures will include:

- timing construction activities and planning the location / design of temporary fencing and temporary access routes to minimise impacts on farm operations and livestock as far as practical
- engaging with adjacent landholders regarding any proposal to undertake aerial spraying of weeds and notifying them at least 48 hours before spraying is to be undertaken
- ensuring that any spraying of weeds is undertaken by suitably accredited and experienced practitioners on days of low wind speed
- implementing the additional weed and biosecurity measures set out in the BMP
- implementing the livestock management measures set out in the land management section of the Construction Environmental Management Plan (CEMP)
- implementing the bushfire management measures set out in the Bushfire Management Plan
- minimising soil erosion risk and managing site runoff in accordance with the Erosion & Sediment Control Plan (ESCP) (Appendix C of ESCP)
- undertaking progressive site rehabilitation in accordance with Section 4.10 of the BMP and ESCP (Appendix C of ESCP).

3.2 Landform, Geology and Soils

The project site falls within the South Western Slopes Bioregion and the Inland Slopes Subregion (**Table 3-1**). The elevation within the project site ranges from 550m (east) to 450m (west).

Table 3-1: Inland Slopes Subregion Description.

Geology	Characteristic landforms	Typical soils	Vegetation
Ordovician to Devonian folded and faulted sedimentary sequences with inter-bedded volcanic rocks and large areas of intrusive granites.	Steep, hilly and undulating ranges and granite basins. Occasional basalt caps, confined river valleys with terrace remnants.	Shallow stony soils on steep slopes, texture contrast soils grading from red subsoils on upper slopes to yellow subsoils on lower slopes. Alluvial sands, loams and clays.	Open forests and woodlands. Red stringybark on upper slopes with black cypress pine, kurrajong, red ironbark, white gum, white box, yellow box and Blakely's red gum on lower slopes. Merging west to yellow box, grey box and white cypress pine. Rough-barked apple on flats with river oak on upper tributaries and river red gum on lower and larger streams.

Two Mitchell Landscapes occur within the project site: the Talbragar-Upper Macquarie Terrace Sand and Cope Hills Granite (**Figure 3-1, Table 3-2**). Note that **Figure 3-1** is from the 2020 BDAR and does not show the second creek crossing.

Figure 3-1: NSW (Mitchell) Landscapes, IBRA Regions, Watercourses and other key geographic features within the project site (Source: Eco Logical 2020). (Please note that the second creek crossing is not shown on this diagram.)

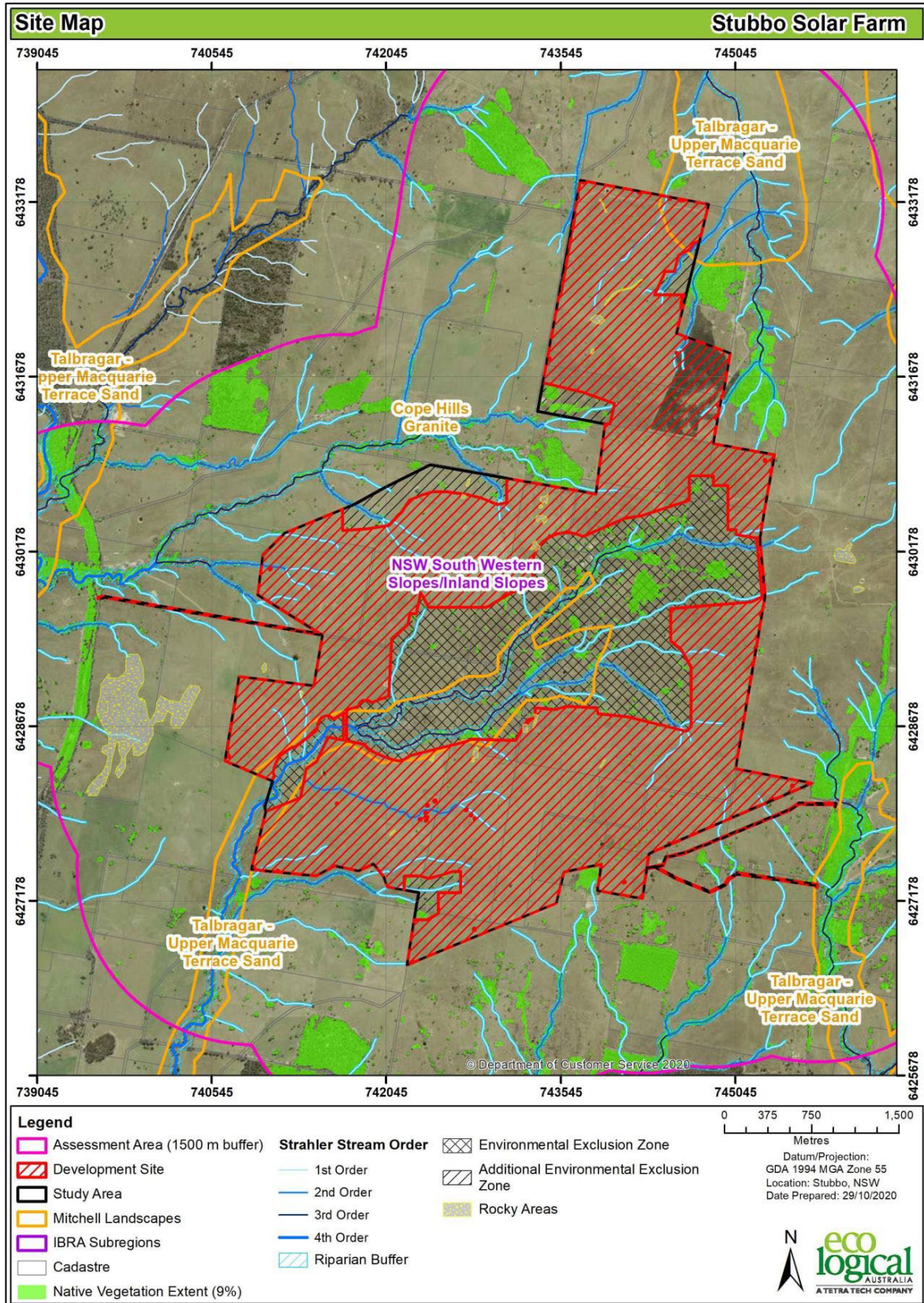


Table 3-2: NSW (Mitchell) Landscapes within the project site (Source: Ramboll 2020)

Mitchell (NSW) Landscape	Description
Talbragar - Upper Macquarie Terrace Sands and Gravels (Tab)	Sandy Quaternary alluvial sediments on the floodplains and terraces of the Talbragar River, general elevation 350 to 500m, local relief 30 to 40m. Red-brown and red-yellow earthy sands with some yellow texture-contrast soils on the valley margins. River red gum (<i>Eucalyptus camaldulensis</i>) along the channels, yellow box (<i>Eucalyptus melliodora</i>) and rough-barked apple (<i>Angophora floribunda</i>) with white cypress pine (<i>Callitris glaucophylla</i>) on the plain.
Cope Hills Granite (Cop)	Undulating and rolling hills on Carboniferous granite and granodiorite, general elevation 500 to 740m, local relief 150m. Gritty gradational red earth and red texture-contrast soils. Forest of yellow box (<i>Eucalyptus melliodora</i>), Blakely's red gum (<i>Eucalyptus blakelyii</i>), red stringybark (<i>Eucalyptus macrorhyncha</i>), apple box (<i>Eucalyptus bridgesiana</i>), mountain gum (<i>Eucalyptus dalrympleana</i>) and black cypress pine (<i>Callitris endlicheri</i>).

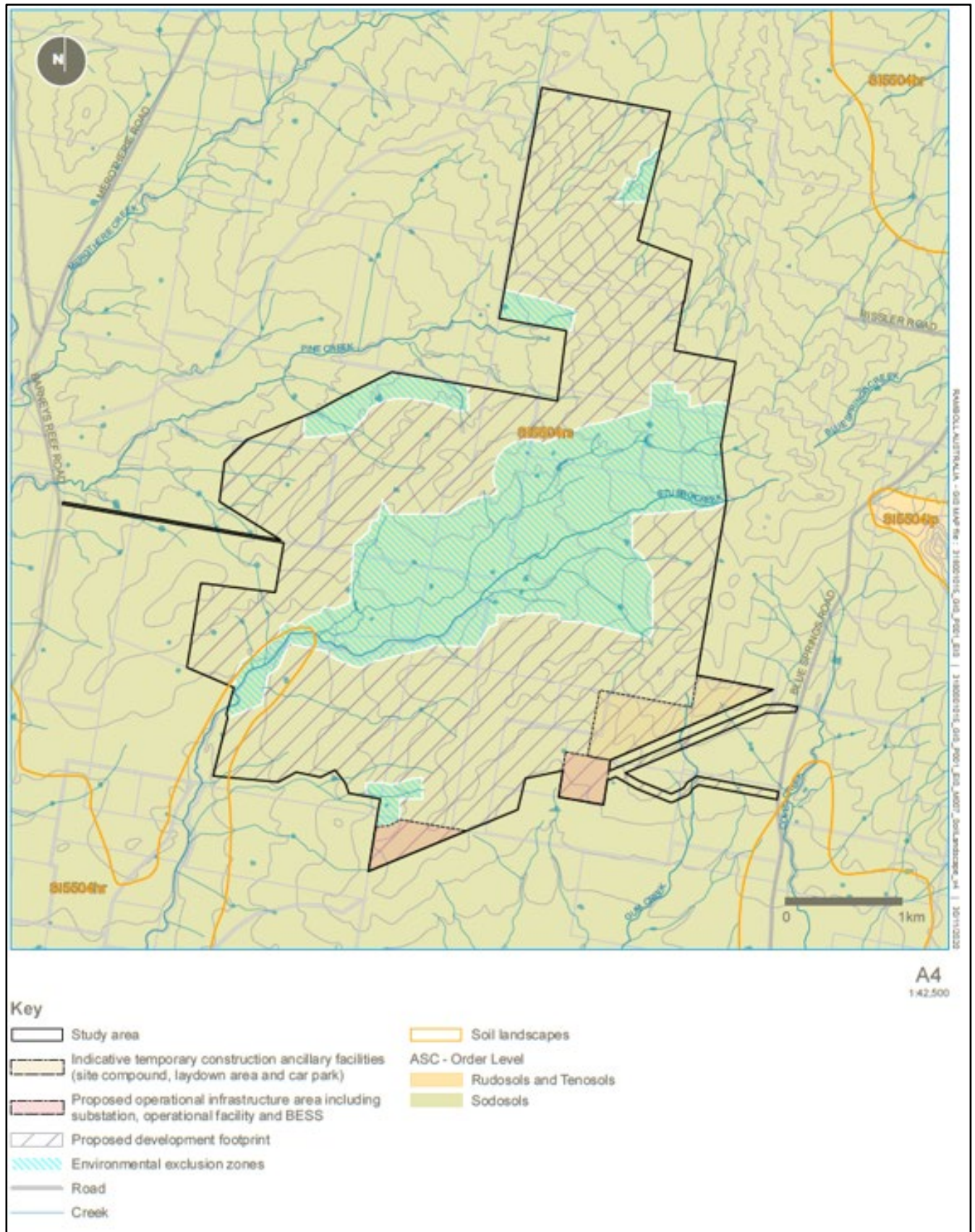
Desktop soil mapping and field observations of the site conducted by Ramboll in 2020 identified that the project site is consistent with the Rouse soil landscape. Two primary soil types were identified on the project site. The soils identified on the project site are detailed in **Table 3-3** and illustrated in **Figure 3-2**.

Table 3-3: Soil types within the project site.

Soil type	Location	Characteristics
Siliceous sands	Mid-slopes and upper slopes	Topsoils are dark brown to brown loamy sand to clayey sand Very weak structure Slightly acidic Typically extends to 200 mm depth
Yellow solodic soils / soloths	Northern and southern portion of the project site	Topsoils have a brown to dull yellowish-orange to yellowish-brown coarse sandy loam Circumneutral pH levels Weak structure

In addition to the soils identified on the project site, Basic Paralithic Black-Orthic Tenosols were also identified approximately 900 m north of the project site. Tenosols have a weakly developed soil profile (sandy without distinct horizons), is not strongly acid and is not calcareous. There were no identified occurrences of acid sulphate soils within the study area.

Figure 3-2. Map illustrating soil types occurring on the project site (Source: Ramboll 2020)



3.3 Biodiversity

A BDAR prepared by Ecological Australia to support the Environmental Impact Statement (EIS) for the project found the following:

- Stubbo Creek – a 4th order waterway, an unnamed second order drainage line and one unnamed first order drainage line.
- The location of the western cable crossing of Stubbo Creek is mapped as Key Fish Habitat (**Figure 3-9**). No significant impacts are expected to occur to the KFH.
- A number of small farm dams are present on the project site, none of which contain significant amounts of aquatic vegetation or high quality wetland habitat. One dam is within the development area.
- Paddock areas represent over 99% of the project site. These no longer comprise native plant communities due to historical agricultural use.
- Extensive vegetation clearing has (evidently) occurred for agricultural development. At the time of the BDAR the project site was planted to oats. The remaining native vegetation prior to development consists principally of isolated paddock trees. Vegetation corridors are present at the periphery of the development site along public road reserves.
- Two Plant Community Types (PCTs) were recorded:
 - PCT 281 - Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion (5.29 ha)
 - PCT 1770 - Narrow-leaved Ironbark - Red Stringybark - Black Pine woodlands on sandstone substrates of the Brigalow Belt South (0.24 ha)
- PCT 281 can conform to White Box - Yellow Box - Blakely's Red Gum Grassy Woodland, a Critically Endangered Ecological Community (CEEC) listed under the BC Act and EPBC Act. All 5.29 ha of PCT 281 within the development site has been conservatively assessed to meet the CEEC threshold at a State level. Within the development site 0.17 ha was assessed as meeting the condition thresholds for the CEEC listed under the EPBC Act.
- Appendix A and Appendix B provides information relating to the original BAM plots and examples of the PCT.
- Two threatened fauna species were recorded within or adjacent to the project site (**Figure 3-8**):
 - Black Falcon (*Falco subniger*) was recorded on the south west of the study area
 - Barking Owl (*Ninox connivens*) was recorded incidentally 500m south of the study area
- Important habitat features for fauna species within the project site included:
 - Habitat trees containing hollows
 - Rock outcrops

- Dams providing potential habitat for waterfowl passing through the site

Figure 3-3, Figure 3-4, Figure 3-5, Figure 3-6 and Figure 3-7 show existing vegetation, riparian buffer and vegetation to be removed

Figure 3-3: Existing native vegetation, riparian buffer and vegetation to be removed within the project site (whole site).

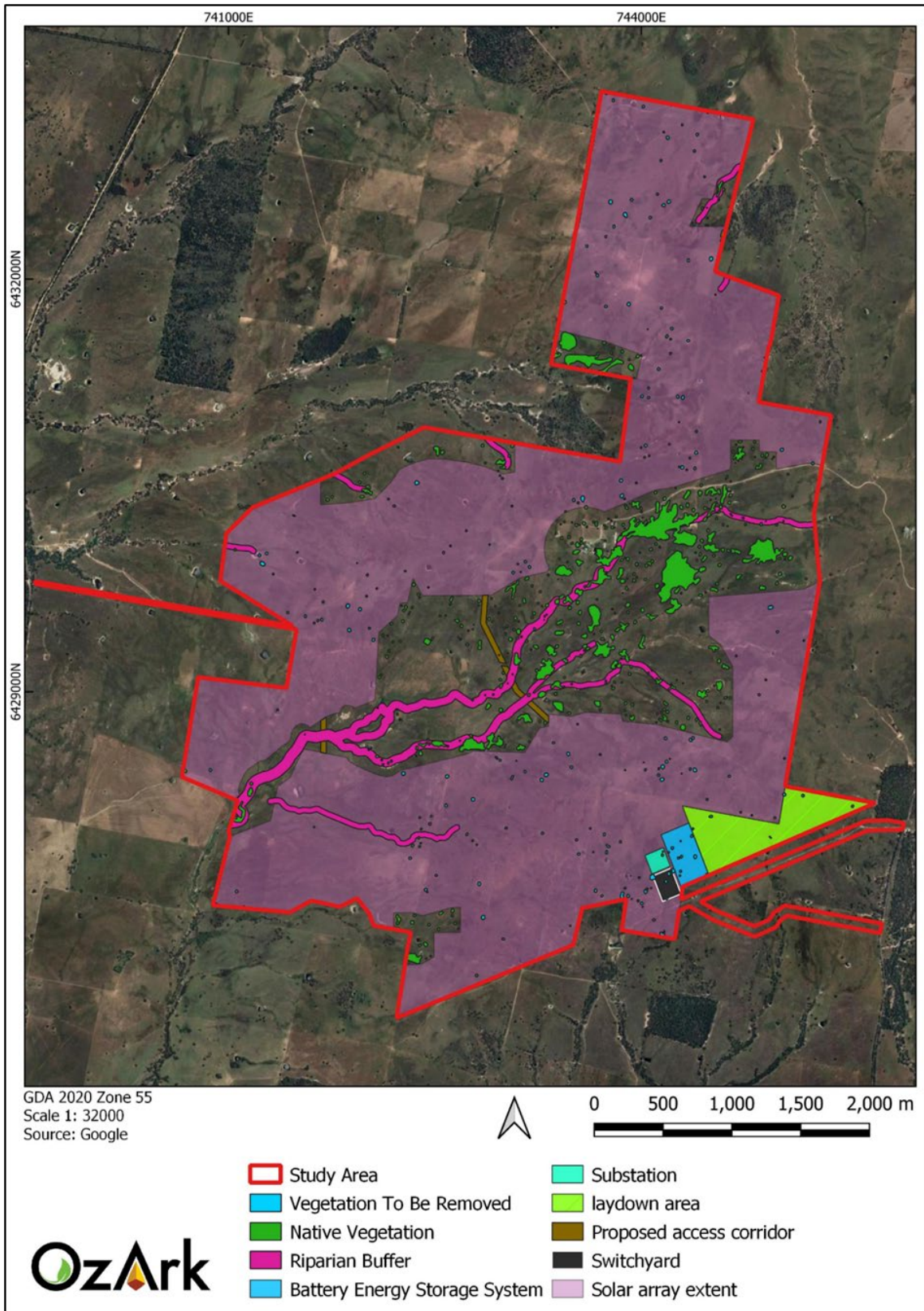


Figure 3-4: Existing native vegetation, riparian buffer and vegetation to be removed – eastern section.

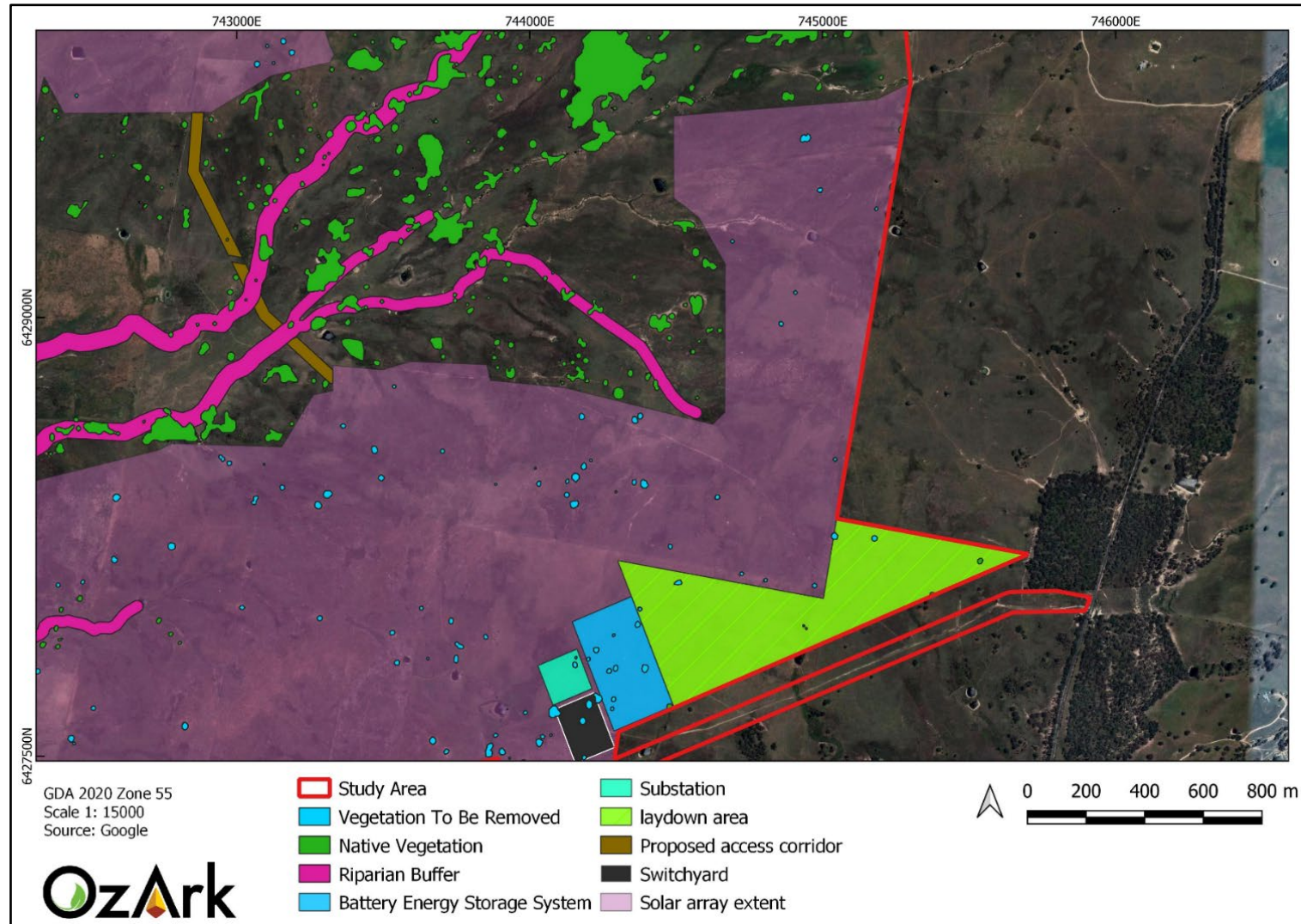


Figure 3-5: Existing native vegetation, riparian buffer and vegetation to be removed – western section.

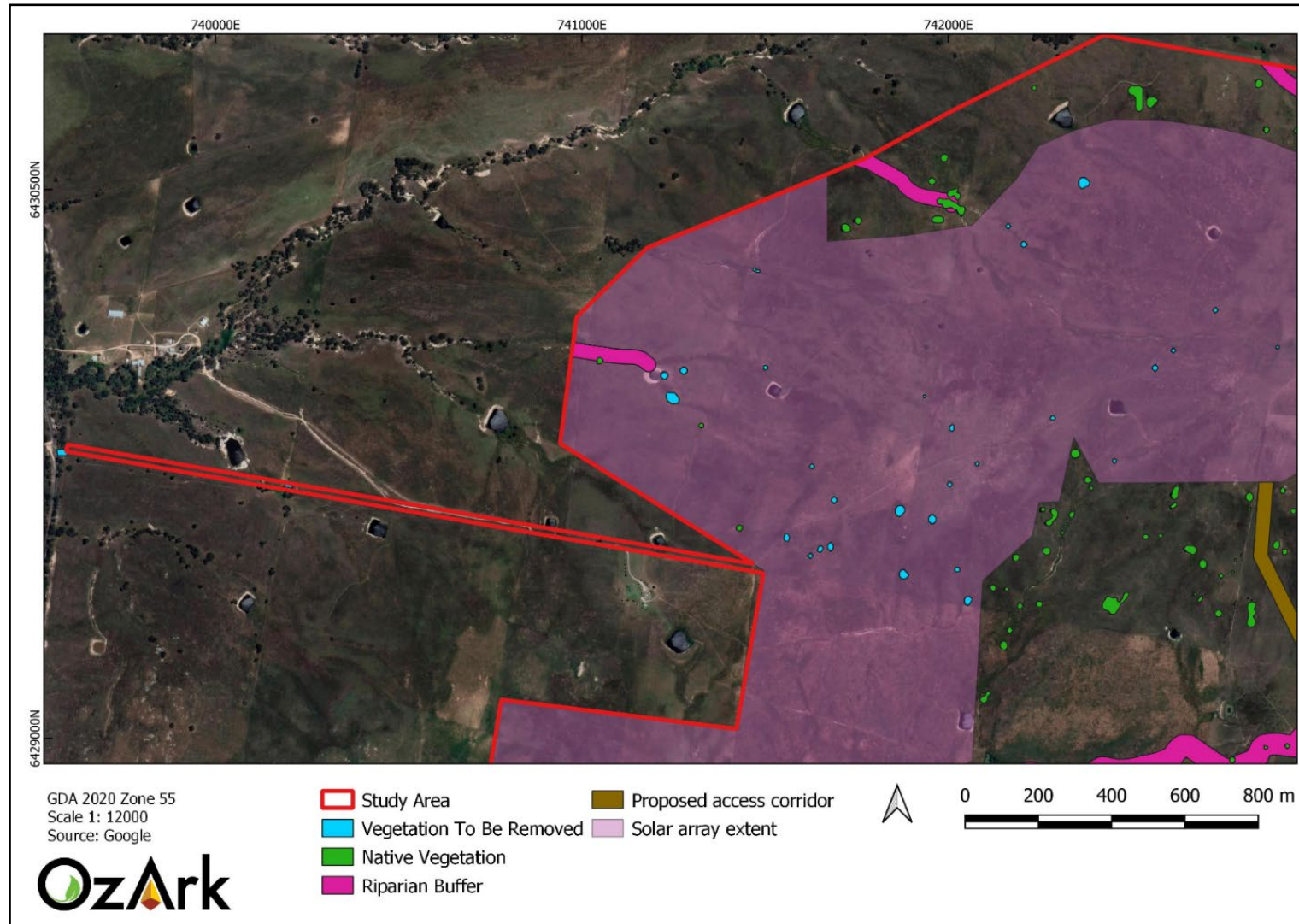


Figure 3-6: Existing native vegetation, riparian buffer and vegetation to be removed – southern section.

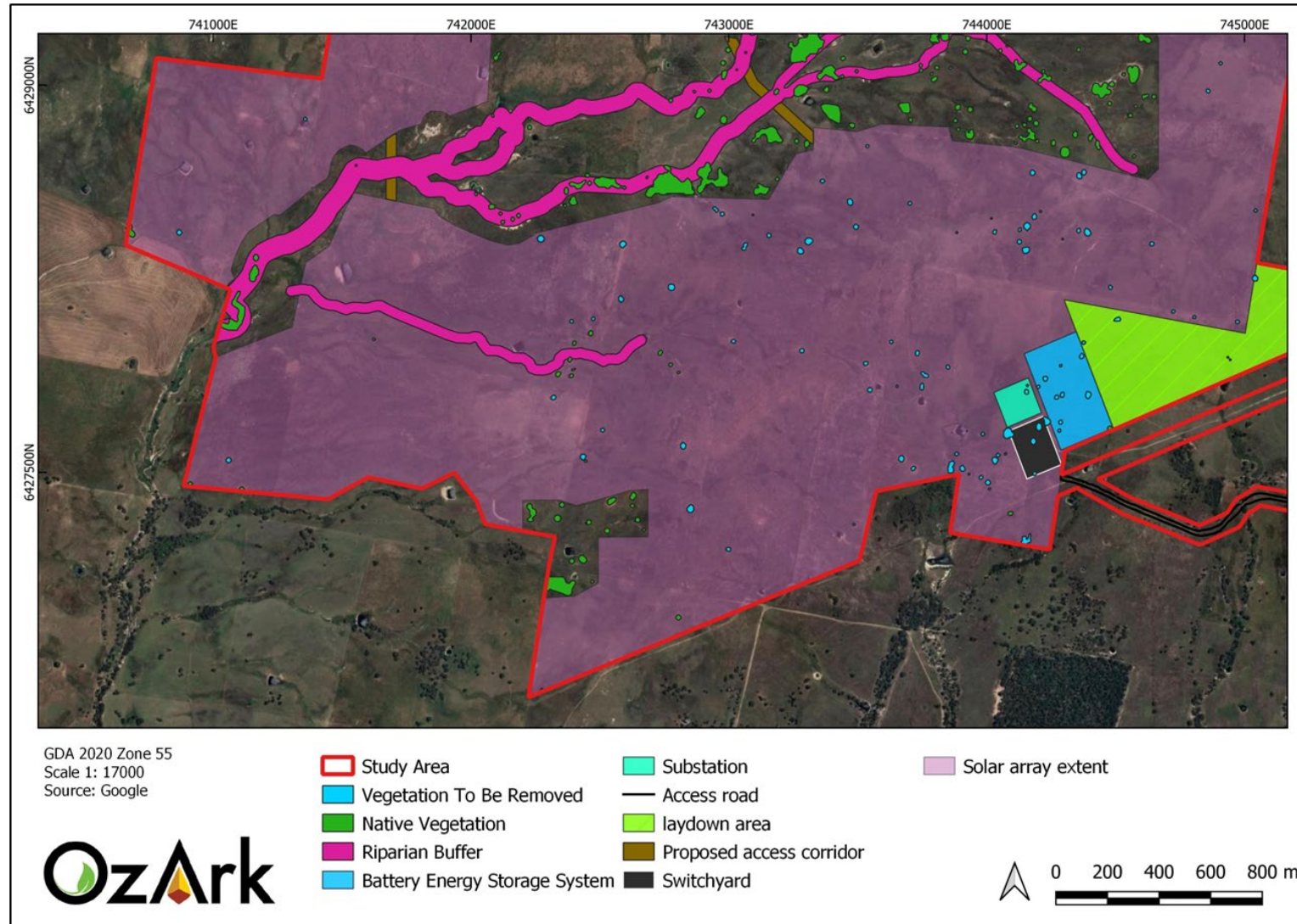


Figure 3-7: Existing native vegetation, riparian buffer and vegetation to be removed – northern section.

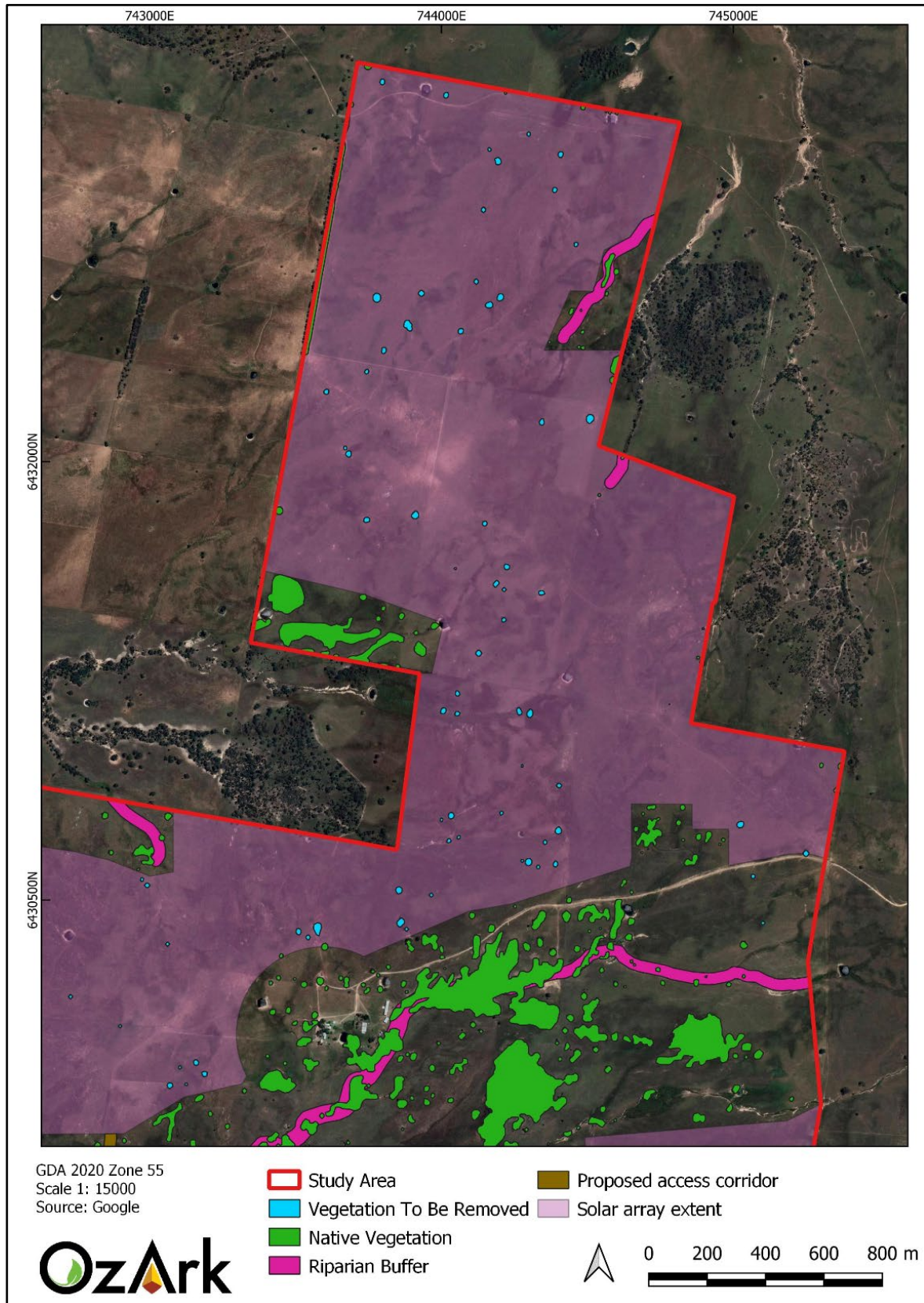


Figure 3-8: Location of Recorded Threatened Species (Source: Ecological Australia, 2020). (Please note that the second creek crossing is not shown on this diagram.)

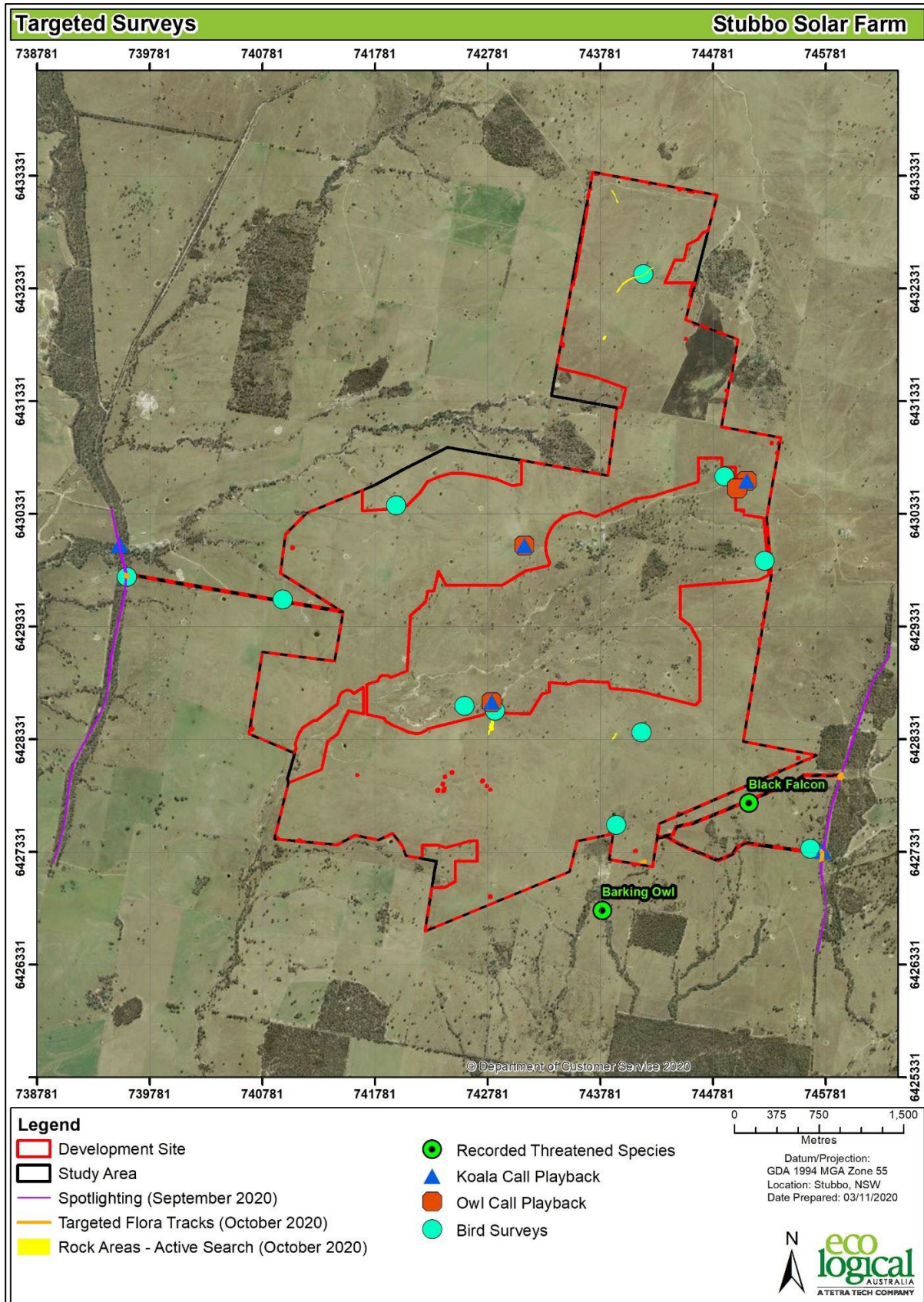
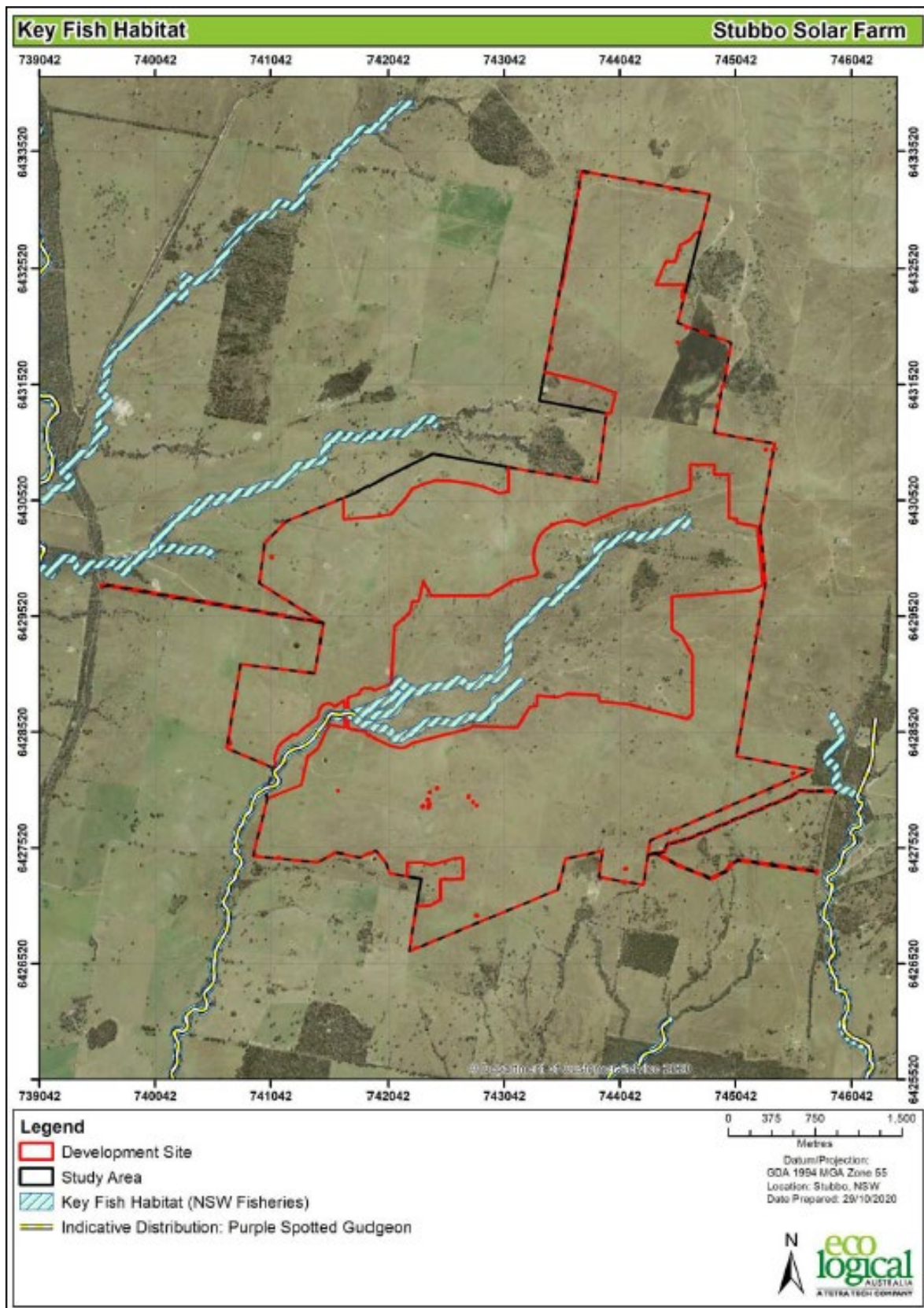


Figure 3-9: Key fish habitat and threatened species distribution (Source: Ecological Australia, 2020)



3.4 Recorded Weed and Pest Species

The BDAR (Eco Logical 2020) includes the following weed species gathered as part of the BAM plots required for the assessment process. **Appendix B** provides details of location of weed species within the PCT Descriptions. Additionally, a pre-construction weed survey was completed in early May 2023 to provide baseline information and weed control treatments for priority weeds as shown in **Table 3-4**.

Weed species (BDAR) (Ecological Australia 2020)

- *Arctotheca calendula* (Cape Dandelion)
- *Trifolium* spp. (Clovers)
- *Medicago* sp. (Medic)
- *Echium plantagineum* (Paterson's Curse)
- *Lolium* sp. (Rye Grass)
- *Eragrostis cilianensis* (Stinkgrass)
- *Avena* sp. (Oats)
- *Spergularia rubra* (Red Sandspurry),
- *Lepidium* spp. (Peppergrasses).
- *Acetosella vulgaris* (Sheep Sorrel)
- *Hypochaeris radicata* (Flatweed)

Pest mammal species (BDAR 2020) (Ecological Australia 2020)

- *Oryctolagus cuniculus* (European Rabbit)
- *Sus scrofa* (Pig)
- *Vulpes vulpes** (Red Fox)

Table 3-4: Significant weeds recorded during the pre-clearance weed survey, May 2023.

Family	Scientific name	Common name	HTE	WoNS	PW	Management Category
Amaranthaceae	<i>Alternanthera pungens</i>	Khaki Weed	Yes	No	No	
Asteraceae	<i>Bidens</i> sp.	Beggars Tick	Yes	No	No	
Asteraceae	<i>Carthamus lanatus</i>	Saffron Thistle	Yes	No	No	
Asteraceae	<i>Cineraria lyratiformis</i>	African Marigold	No	No	No	+Community Concern
Asteraceae	<i>Xanthium spinosum</i>	Bathurst Burr	Yes	No	No	
Cyperaceae	<i>Cyperus eragrostis</i>	Umbrella Sedge	Yes	No	No	
Fabaceae	<i>Robinia pseudoacacia</i>	Black Locust	Yes	No	No	
Pinaceae	<i>Pinus radiata</i>	Radiata Pine	Yes	No	No	
Poaceae	<i>Cenchrus clandestinus</i>	Kikuyu Grass	Yes	No	No	
Poaceae	<i>Paspalum dilatatum</i>	Paspalum	Yes	No	No	
Polygonaceae	<i>Acetosella vulgaris</i>	Sheep Sorrel	Yes	No	No	
Rosaceae	<i>Rosa rubiginosa</i>	Sweet briar	Yes	No	No	+Community Concern
Rosaceae	<i>Rubus fruticosus</i> sp. agg.	Blackberry	Yes	Yes	Yes	*Asset Protection
Salicaceae	<i>Salix babylonica</i>	Weeping Willow	Yes	No	No	
Solanaceae	<i>Lycium ferocissimum</i>	African Boxthorn	Yes	Yes	Yes	*Asset Protection

*Asset Protection: To prevent the spread of weeds to key/assets of high economic, environmental and social value, or to reduce their impact on these sites if spread has already occurred.

+Community Concern: It is not feasible to contain or eradicate these species, however minimising their impacts is reasonably practicable.

The recommended control techniques for priority weeds are outlined below.

- An experienced, qualified operator is recommended for herbicide applications.
- Refer to <https://weeds.dpi.nsw.gov.au/> for herbicides options and their rates.
- If using herbicides near waterways, the herbicide must be approved for use near water.

More information on permits or product labels can be found at the Australian Pesticides and Veterinary Medicines Authority website www.apvma.gov.au.

To aid with management, the site has been divided into zones based on weed occurrence. This will aid in management and enable what areas to be prioritised.

Table 3-5: Priority weeds and recommended control techniques.

Target Weed Species	Control Techniques
African Boxthorn (<i>Lycium ferocissimum</i>)	Physical removal: Mechanical removal of large plants and thickets is the preferred way to remove large infestations where access is practicable. New regrowth can be sprayed. Foliar herbicide: Using herbicides preferably in cooler months after rain when actively growing. Reapplication may be required.
Blackberry (<i>Rubus fruticosus</i> sp. agg.)	Physical removal: large plants and thickets can be mechanical removed all year round. Foliar herbicide: Spray with a broadleaf selective herbicide from spring to early summer.
African Marigold (<i>Cineraria lyratiformis</i>)	A new weed to the area. Given its invasive tendencies it is likely to become more abundant and widespread over time. Grazing: Livestock can provide effective control for this species. Foliar herbicide: Spray with a broadleaf selective herbicide from spring to summer. Registered herbicides for this species are limited.
Sweet Briar (<i>Rosa rubiginosa</i>)	Physical removal: Plants can be mechanical removed all year round. Foliar herbicide: Spray with a broadleaf selective herbicide when plants are actively growing. Insufficient herbicide coverage will not be effective.

4 Biodiversity Management Plan and Completion Criteria

The BMP covers the operation phase of the project. This BMP does not cover the decommissioning phase of the project, however the BMP will be revised by the Applicant prior to the commencement of decommissioning to incorporate this phase. Information relating to the direct and indirect impacts, strategies/mitigation measures from the BDAR and Development Consent conditions form the basis of the plan (**Table 4-1**). Monitoring and Reporting, along with Triggers and Responses are included as **Table 4-3 (operation)**. Management Protocols referred to in these tables are listed in **Section 6** and are based on the **mitigation measures** from the BDAR. They primarily apply only to the development area of the solar project. The environmental exclusion zone and associated activities have been removed from the BMP as ACEN Australia has no management authority on these areas during the operational phase of the project.

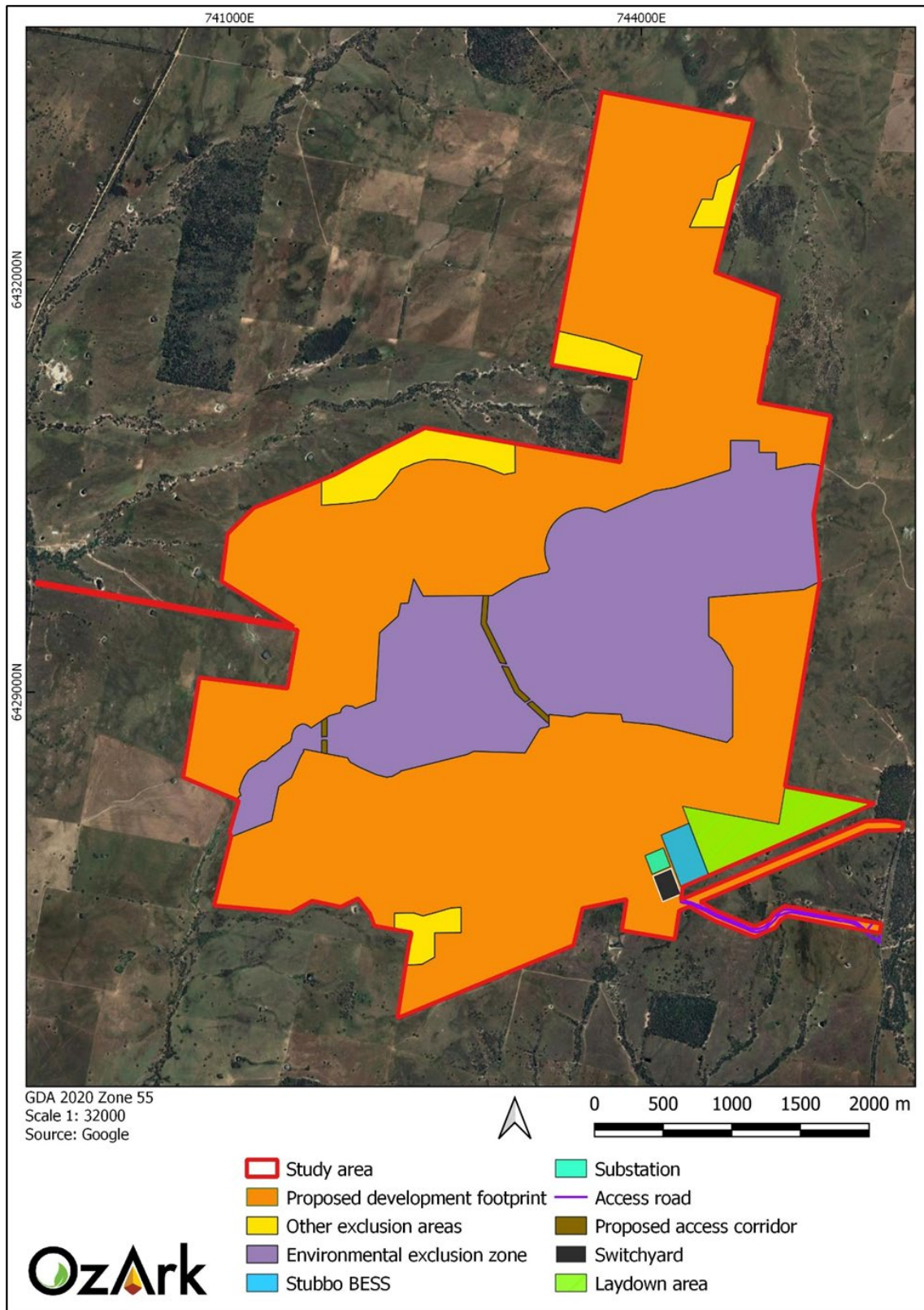
The requirements of the BMP should form a component of the site inductions that all contracted personnel are expected to undertake.

4.1 Project Design Impact

The project is situated on largely disturbed and cropped land that has low vegetation integrity. As a result, impacts of the project are limited to the following and broadly shown in **Figure 4-1**:

- the removal of paddock trees (some containing hollows) scattered over 1000 ha (the project's development footprint).
- indirect impact to two threatened avian species:
 - Black Falcon (*Falco subniger*) (recorded on the south west of the study area)
 - Barking Owl (*Ninox connivens*) (recorded incidentally 500m south of the study area)
- removal of rock outcrops
- removal of six farm dams that provide potential habitat for passing waterfowl.

Figure 4-1: Stubbo Solar development footprint, exclusion zones and other zones.



4.2 Impact and Mitigation Measures

Table 4-1 describes the risks and potential direct and indirect impacts of the project on biodiversity; it also outlines mitigation measures to be implemented to reduce these risks and potential impacts. Finally, it describes the monitoring responses and responsibility for implementing these measures.

Table 4-1: Site environmental risks, mitigation measures, monitoring responses and responsibilities.

Risk/Impact to be managed	Consequences	Mitigation Measures	Summary of Monitoring	Responsibility
DIRECT IMPACTS				
1.	Removed – construction phase			
2.	Removed – construction phase			
INDIRECT IMPACTS				
3. Changed management practices on Site.	Vegetation condition may decline over time due to increased abundance of weeds.	Protocol 5 – Weed Management Protocol 8 – Erosion and Sediment Control Protocol 13 – Exclusion Fencing/Exclusion Zones Completion of a baseline weed survey prior to construction.	Visual inspections to detect new weed germination in disturbed area.	PCL HSEQ Advisor
4. Increased traffic and visitation	Degradation and modification of retained habitat due to spread of weeds and feral pests.	Protocol 5 – Weed Management Protocol 6 – Feral Pest Management Protocol 9 – Dust Control / Rehabilitation Protocol 12 – Vehicle Hygiene Procedure	Visual inspections to detect new weed germination in disturbed area. Quarterly during operation.	PCL HSEQ Advisor



Risk/Impact to be managed	Consequences	Mitigation Measures	Summary of Monitoring	Responsibility
		Protocol 13 – Exclusion Fencing/Exclusion Zones	Vehicle hygiene procedure implemented and recorded. Implementation of Traffic Management Plan (TMP).	
5. Ground disturbance	Creation of dust and facilitation of waterborne sediment. Sedimentation could adversely affect the surrounding vegetation. Rehabilitation with respect to construction.	Works to be undertaken at an appropriate time of year to ensure survival of the planted species. Rehabilitation works should be completed within 3 months of the completion of construction as per Section 4.10. Dewatering of sediment basins onto ground surface within Project site as outlined in ESCP, if required.	Quarterly inspections of rehabilitated areas for two years after works; half-yearly inspections for the life of the project. Implement appropriate responses if rehabilitation fails.	PCL HSEQ Advisor
6. Light Spill	Light spill from artificial light may affect nocturnal species such as arboreal mammals, large forest owls and foraging microbats.	Protocol 10 – Lighting Design	Inspect site for potential light source spill against Australian Standard AS/NZS 4282:2019 at commencement of operation then annually.	PCL HSEQ Advisor
7. Pollution	Contamination of land and water from chemical spill.	Protocol 11 – Chemical Management Protocol 13 – Exclusion Fencing/Exclusion Zones	Monthly check of integrity during Operations due to reduced number of potential chemical and fuel sources. Check that vehicles involved in refuelling mobile plant away from a bunded area have spill kit and portable bund or drip tray. Contractors involved in weed spraying will ensure that in field chemical replenishment will adhere to Chemcert obligations.	PCL HSEQ Advisor



Risk/Impact to be managed	Consequences	Mitigation Measures	Summary of Monitoring	Responsibility
8. Grazing Management	Management of pasture growth, stock levels and infrastructure interaction	Management of stock levels and pasture growth Management of infrastructure to limit interaction with sheep	Landholder to complete monthly monitoring of paddocks	Landholder PCL Senior Engineering and Commissioning Manager

4.3 Trigger, Action, Response, Monitoring and Reporting – (NB Table 4-2 related to construction and has now been removed)

Monitoring and reporting commitments are summarised below in **Table 4-3 (Operation)**. Reports will be provided to the Applicant and DPHI. Any recommendations or changes to the ecological aspects of the monitoring should be acted upon by the Applicant. All monitoring actions/inspections will be recorded and used to meet reporting requirements.

Table 4-2: Construction monitoring and reporting requirements (deleted)

Table 4-3: Operational monitoring and reporting requirements

Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
OPERATIONS								
1 Removal of Native Vegetation	Trapped fauna may exhaust food resources and water supply, causing death.	1	Inspect for trapped fauna. Maintain a log of salvaged animals and actions taken to relocate them.	No trapped fauna	Monitor for trapped fauna	Monthly for first three months of operations, then quarterly for the remainder of the year. Then annually or incident based.	PCL Senior Engineering and Commissioning Manager and Project Ecologist to undertake monitoring. PCL Senior Engineering and Commissioning Manager to report any fauna mortalities to ACEN Australia for reporting to DPHI.	PCL Senior Engineering and Commissioning Manager Project Ecologist
		2	Inspect for trapped fauna.	Fauna being trapped.	Implement Protocol 3 – Management of Displaced Fauna.	Monthly for first three months of operations, then	PCL Senior Engineering and Commissioning	PCL Senior Engineering and



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
			Maintain a log of salvaged animals and actions taken to relocate them.	Fauna deaths (less than one in a continuous three month period)	Implement Protocol 7 – Fence Construction and Management Protocol 13 – Exclusion Fencing/Exclusion Zones	quarterly for the remainder of the year. Then annually or incident based.	Manager and Project Ecologist to undertake monitoring. PCL Senior Engineering and Commissioning Manager to report any fauna mortalities to ACEN Australia for reporting to DPHI.	Commissioning Manager Project Ecologist ACEN Australia Site Operations Manager
		3	Inspect for trapped fauna. Maintain a log of salvaged animals and actions taken to relocate them.	Fauna being trapped. Fauna deaths (two or more a continuous three month period)	Replace and / or repair missing fencing, Implement Protocol 7 – Fence Construction and Management Protocol 13 – Exclusion Fencing/Exclusion Zones Investigate cause of death or injury and record details Review fencing design if investigation identifies improvement required	Monthly for first three months of operations, then quarterly for the remainder of the year. Then annually or incident based.	PCL Senior Engineering and Commissioning Manager and Project Ecologist to undertake review of Protocol 7 and update where necessary. PCL Senior Engineering and Commissioning Manager to report any fauna mortalities to ACEN Australia for reporting to DPHI immediately.	PCL Senior Engineering and Commissioning Manager Project Ecologist ACEN Australia Site Operations Manager

Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
		1	Monitoring the approved creek crossings and access tracks within the environmental exclusion zones to ensure access is confined to approved areas.	All access confined to approved access tracks and creek crossings	Monitor for evidence of vehicle tracks outside approved tracks and crossings. Implement Protocol 7 – Fence Construction and Management Protocol 13 – Exclusion Fencing/Exclusion Zones	Monthly	PCL Senior Engineering and Commissioning Manager and Project Ecologist to undertake monitoring. PCL Senior Engineering and Commissioning Manager to report any unauthorised access to the exclusion zones to ACEN Australia for reporting to DPHI.	PCL Senior Engineering and Commissioning Manager Project Ecologist
		2	Monitoring the approved creek crossings and access tracks within the environmental exclusion zones to ensure access is confined to approved areas	Evidence of one-off unauthorised vehicle movements off the approved access tracks and crossings detected in monthly inspections such as fresh wheel tracks, fencing damage that wasn't present the month before.	Implement Protocol 7 – Fence Construction and Management Protocol 13 – Exclusion Fencing/Exclusion Zones. Toolbox talk / education of workers regarding usage of access tracks and crossings within the exclusion zones.	Monthly	PCL Senior Engineering and Commissioning Manager and Project Ecologist to undertake monitoring of tracks and crossings. PCL Senior Engineering and Commissioning Manager to any unauthorised access to the	PCL Senior Engineering and Commissioning Manager Project Ecologist ACEN Australia Site Operations Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
							exclusion zones to ACEN Australia for reporting to DPHI.	
		3	Monitoring the approved creek crossings and access tracks within the environmental exclusion zones to ensure access is confined to approved areas	Evidence of continued unauthorised access to exclusion zones detected in monthly inspections such as new tracks, deliberately compromised fencing.	Replace and / or repair missing fencing, Implement Protocol 7 – Fence Construction and Management Protocol 13 – Exclusion Fencing/Exclusion Zones Investigate cause of death or injury and record details Review fencing design if investigation identifies improvement required. Reinduction of workers accessing the exclusion zones.	Monthly	PCL Senior Engineering and Commissioning Manager and Project Ecologist to undertake review of Protocol 7 and update where necessary. PCL Senior Engineering and Commissioning Manager to any unauthorised access to the exclusion zones to ACEN Australia for reporting to DPHI. Suspension of driving rights on site for repeated infringements. PCL Senior Engineering and Commissioning Manager to undertake a fresh	PCL Senior Engineering and Commissioning Manager Project Ecologist ACEN Australia Site Operations Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
							induction site workers.	
2 Constructio n of solar panels and perimeter fencing	Trapped fauna may cause degradation of retained native vegetation.	1	Inspect and maintain fencing. Maintain a log of salvaged animals and actions taken to relocate them. Maintain log of feral pest animals.	Fencing intact Salvaged animals relocated. Feral pest animals managed	Regular monthly inspections and maintenance of fencing for the first three months post-construction, then quarterly for the remainder of the first-year post-construction. Then annually, provided fauna deaths are infrequent. Protocol 3 – Management of Displaced Fauna Protocol 6 – Feral Pest Management Implement Protocol 7 – Fence Construction and Management Protocol 13 – Exclusion Fencing/Exclusion Zones	Monthly for first three months of operations, then quarterly for the remainder of the year. Then annually or incident based.	PCL Senior Engineering and Commissioning Manager and Project Ecologist to undertake monitoring.	PCL Senior Engineering and Commissioning Manager Project Ecologist
		2	Inspect and maintain fencing.	Fencing is damaged or not being maintained.	Repair fencing	Monthly for first three months of operations, then	PCL Senior Engineering and Commissioning	PCL Senior Engineering and



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
			Maintain a log of salvaged animals and actions taken to relocate them.	Injured or deceased fauna is identified along or near fencing.	Implement Protocol 7 – Fence Construction and Management	quarterly for the remainder of the year. Then annually or incident based.	Manager to report any fauna mortalities to ACEN Australia Operations Manager for reporting to DPHI	Commissioning Manager
			Maintain log of feral pest animals.	Decline in vegetation integrity.	Protocol 3 – Management of Displaced Fauna			ACEN Australia Site Operations Manager
				Presence of feral animals.	Protocol 6 – Feral Management Protocol			
					Protocol 13 – Exclusion Fencing/Exclusion Zones			
					Protocol – 9 – Dust Control/Rehabilitation			
		3	Inspect and maintain fencing.	Fencing is missing and has not been repaired.	Replace and / or repair missing fencing	Monthly for first three months of operations, then quarterly for the remainder of the year. Then annually or incident based.	PCL Senior Engineering and Commissioning Manager to report any fauna mortalities to ACEN Australia Operations Manager for reporting to DPHI immediately	PCL Senior Engineering and Commissioning Manager
			Maintain a log of salvaged animals and actions taken to relocate them.	Fauna deaths	Implement Protocol 7 – Fence Construction and Management			ACEN Australia Site Operations Manager
				Significant decline in vegetation integrity	Protocol 13 – Exclusion Fencing/Exclusion Zones			
			Maintain log of feral animals.	Presence of feral animals.				



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
					Investigate cause of death or injury and record details Review fencing design if investigation identifies improvement required. Protocol 3 – Management of Displaced Fauna Protocol 6 – Feral Pest Management Protocol 3 – Management of Displaced Fauna Improve vegetation integrity by implementing rehabilitation protocol. • In the event of continued large scale fauna incursions consideration will be given to installing passive fauna monitoring in consultation with the Project Ecologist.			

Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
	Security fences may obstruct the movement of larger terrestrial species such as kangaroos, wallabies and other fauna species.	1	Inspect and maintain fencing. Maintain a log of salvaged animals and actions taken to relocate them. Maintain a log of vehicle strikes. Implementation of TMP.	Fencing intact. No fauna detected. No vehicle strikes.	Regular monthly inspections and maintenance of fencing for the first three months post-construction, then quarterly for the remainder of the first-year post-construction. Then annually, provided fauna deaths are infrequent. Maintain a log of vehicle strikes. Implementation of TMP. Salvaged animals relocated. Implement Protocol 7 – Fence Construction and Management Protocol 13 – Exclusion Fencing/Exclusion Zones.	Monthly for first three months of operations, then quarterly for the remainder of the year. Then annually or incident based.	PCL Senior Engineering and Commissioning Manager and Project Ecologist to undertake monitoring. PCL Senior Engineering and Commissioning Manager to maintain log of strikes.	PCL Senior Engineering and Commissioning Manager Project Ecologist
		2	Inspect and maintain fencing.	Fencing is damaged or not being maintained.	Regular monthly inspections and maintenance of fencing	Monthly for first three months of operations, then	PCL Senior Engineering and Commissioning	PCL Senior Engineering and

Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
			Maintain a log of salvaged animals and actions taken to relocate them.	Injured or deceased fauna is identified along or near fencing or within the site.	for the first three months post-construction, then quarterly for the remainder of the first-year post-construction. Then annually, provided fauna deaths are infrequent.	quarterly for the remainder of the year. Then annually or incident based.	Manager to report any fauna mortalities to ACEN Australia Operations Manager for reporting to DPHI.	Commissioning Manager
			Maintain a log of vehicle strikes.		Inspect and maintain fencing.		PCL Senior Engineering and Commissioning Manager to maintain log of strikes.	ACEN Australia Site Operations Manager
			Implementation of TMP.		Maintain a log of salvaged animals and actions taken to relocate them.			
					Implement Protocol 7 – Fence Construction and Management			
					Protocol 13 – Exclusion Fencing/Exclusion Zones.			
		3	Inspect and maintain fencing.	Fencing is missing and has not been repaired.	Regular monthly inspections and maintenance of fencing for the first three months post-construction, then quarterly for the remainder of the first-year post-construction.	Monthly for first three months of operations, then quarterly for the remainder of the year. Then annually or incident based.	PCL Senior Engineering and Commissioning Manager to report any fauna mortalities to ACEN Australia Operations	PCL Senior Engineering and Commissioning Manager
			Maintain a log of salvaged	Fauna trapped.				



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
			animals and actions taken to relocate them.	Fauna deaths. Listed Threatened Species trapped inside the perimeter fence.	Then annually, provided fauna deaths are infrequent. Replace and / or repair missing fencing. Investigate cause of death or injury and record details. Review fencing design if investigation identifies improvement required. Review Protocol 7 – Fence Construction and Management Review Protocol 13 – Exclusion Fencing/Exclusion Zones		Manager for reporting to DPHI immediately. PCL Senior Engineering and Commissioning Manager to maintain log of strikes.	Site Operations Manager
	Vehicle strike causing injury to fauna on internal roads.	1	Maintain a log of salvaged animals and actions taken to relocate them.	Nil vehicle strikes within Project site. Nil animal salvage within the site.	Maintain logs.	Incident based	PCL Senior Engineering and Commissioning Manager to maintain log.	PCL Senior Engineering and Commissioning Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
			Maintain a log of vehicle strikes.					
		2	Maintain a log of salvaged animals and actions taken to relocate them. Maintain a log of vehicle strikes.	Occasional vehicle strikes occurring (less than one in a three continuous month period). Animals requiring salvage within the site. Listed Threatened Species injured.	Investigate cause of death or injury and record details. Review Traffic Management Plan and Site Induction. Undertake training with site staff regarding safe driving habits. Update if investigation identifies improvement required.	Incident based	PCL Senior Engineering and Commissioning Manager to report any fauna mortalities to ACEN Australia Operations Manager for reporting to DPHI	PCL Senior Engineering and Commissioning Manager ACEN Australia Site Operations Manager
		3	Maintain a log of salvaged animals and actions taken to relocate them. Maintain a log of vehicle strikes.	Repeated vehicle strikes resulting in animal fatalities, Increased number or animals requiring salvage (more than two in a continuous three month period)	Investigate cause of death or injury and record details. Review Traffic Management Plan and Site Induction. Undertake training with site staff regarding safe driving habits.	Incident based	PCL Senior Engineering and Commissioning Manager to report any fauna mortalities to ACEN Australia Operations Manager for reporting to DPHI immediately	PCL Senior Engineering and Commissioning Manager Site Operations Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
				Listed Threatened Species killed.	Update if investigation identifies improvement required.			
3. Changed management practices on Site.	Vegetation condition may decline over time due to increased abundance of weeds.	1	Visual inspection by vehicle for weeds	No new weeds within Project site compared to pre baseline survey.	Monthly inspection	Monthly (project site)	Project Ecologist to report weeds to O&M Manager	Project Ecologist
		2	Visual inspection by vehicle for weeds	Increase in weed density and distribution from baseline weed survey of up to 10%.	At 10% weed cover, weed control is to be undertaken at rosette stage/prior to flowering. Implement control measures in Protocol 5 – Weed Management Implement Protocol 12 – Vehicle Hygiene O&M Manager to engage weed spraying contractor	Monthly (project site) Annual weed inspection as outlined in Protocol 5 (project site and exclusion zone).	Project Ecologist to report weeds to O&M Manager	Project Ecologist
		3	Visual inspection by vehicle for weeds	Increase in weed density and distribution from baseline weed survey by more than 10%.	At 10% weed cover, weed control is to be undertaken at rosette stage/prior to flowering.	Monthly (project site) Annual weed inspection as	Project Ecologist to report weeds to O&M Manager.	PCL Senior Engineering and Commissioning Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
				Establishment of priority weeds (Declared Noxious Weeds).	Implement control measures in Protocol 5 – Weed Management Implement Protocol 12 – Vehicle Hygiene Reporting of Priority Weeds (Declared Noxious Weeds) to ACEN Australia and Local Lands Service. O&M Manager to engage weed spraying contractor	outlined in Protocol 5 (project site and exclusion zone)	PCL Senior Engineering and Commissioning Manager to report Priority Weeds to ACEN Australia Operations Manager. ACEN Australia Operations Manager to report Weeds of Priority to Local Lands Service	Site Operations Manager
4. Increased traffic and visitation	Degradation and modification of retained habitat due to spread of weeds and feral pests.	1	Inspect for the presence of feral pests (rabbit, fox and pig) on the project site. Inspect for weeds along access tracks through retained habitat areas	No feral pests (rabbit, fox and pig) on project site.	Implement management actions in Protocol 6 – Feral Pest Management. Implement Protocol 12 – Vehicle Hygiene Implement control measures in Protocol 5 – Weed Management	Opportunistic sightings and Quarterly Site Inspection.	PCL Senior Engineering and Commissioning Manager to report progress to ACEN Australia Operations Manager	PCL Senior Engineering and Commissioning Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
		2	Inspect for the presence of feral pests (rabbit, fox and pig) on the project site.	Feral pests (rabbit, fox and pig) are detected within the disturbance zone.	Implement management actions in Protocol 6 – Feral Pest Management.	Opportunistic sightings and Quarterly Site Inspection	PCL Senior Engineering and Commissioning Manager to report progress to ACEN Australia Operations Manager.	PCL Senior Engineering and Commissioning Manager
			Inspect for weeds along access tracks through retained habitat areas	Weeds within the retained habitat zones	Implement Protocol 12 – Vehicle Hygiene Implement control measures in Protocol 5 – Weed Management Review and update Feral Pest Management Protocol to include new or improved management techniques.			
		3	Inspect for the presence of feral pests (rabbit, fox and pig) on the project site.	New feral pest species detected within the disturbance zone, (eg Deer, feral cat or wild dog).	Implement management actions in Protocol 6 – Feral Pest Management.	Opportunistic sightings and Quarterly Site Inspection	PCL Senior Engineering and Commissioning Manager to report progress to ACEN Australia Operations Manager to approve Protocol update	PCL Senior Engineering and Commissioning Manager ACEN Australia Site Operations Manager
			Inspect for weeds along access tracks through retained habitat areas	Establishment of feral pest species found in previously pest free area.	Implement Protocol 12 – Vehicle Hygiene Implement control measures in Protocol 5 – Weed Management			



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
				Establishment of priority weeds (Declared Noxious Weeds).	Targeted control of priority weeds (Declared noxious Weeds). Reporting of Priority Weeds (Declared Noxious Weeds) to ACEN Australia and Local Land Services Review and update Feral Pest Management Protocol to include management techniques for new species.			
5. Ground Disturbance Rehabilitation	Monitor rehabilitated areas	1	Quarterly inspections of rehabilitated areas for two years after works; half-yearly inspections for the life of the project.	Maintenance of non-native vegetation or ground cover >70% in disturbance area.	Continued monitoring	Quarterly inspections of rehabilitated areas for two years after works; half-yearly inspections for the life of the project.	Project Ecologist to review results and report to PCL Senior Engineering and Commissioning Manager after each visit	Project Ecologist PCL Senior Engineering and Commissioning Manager
		2	Quarterly inspections of rehabilitated	Disturbed areas not meeting rehabilitation objectives.	Implement management actions in	Quarterly inspections of rehabilitated	Project Ecologist to review results and report to PCL	Project Ecologist



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
			areas for two years after works; half-yearly inspections for the life of the project.	Failed vegetation patches less than 20m² Proliferation of non-native vegetation or ground cover <70%.	Protocol 8 – Erosion and Sediment Control Protocol 9 – Dust Control / Rehabilitation Section 4.10 Identify and implement control measures in Protocol 5 – Weed Management Failed vegetation patches less than 20m² to be actively managed within 30 days using the most appropriate method per the prevailing climatic conditions.	areas for two years after works; half-yearly inspections for the life of the project.	Senior Engineering and Commissioning Manager after each visit	PCL Senior Engineering and Commissioning Manager
		3	Quarterly inspections of rehabilitated areas for two years after works; half-yearly inspections for the life of the project.	Failed vegetation patches greater than 20m² Proliferation of weeds, non-native vegetation within rehabilitated areas or ground cover <70% in disturbance area.	Implement management actions in Protocol 8 – Erosion and Sediment Control Protocol 9 – Dust Control / Rehabilitation Section 4.10 Identify and implement control measures in	Quarterly inspections of rehabilitated areas for two years after works; half-yearly inspections for the life of the project.	Project Ecologist to review results and report to PCL Senior Engineering and Commissioning Manager after each visit	Project Ecologist PCL Senior Engineering and Commissioning Manager

Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
					Protocol 5 – Weed Management Failed vegetation patches less than 20m2 to be actively managed within 30 days using the most appropriate method per the prevailing climatic conditions.			
6. Light Spill	Light spill from artificial light may affect nocturnal species such as arboreal mammals, large forest owls and foraging microbats.	1	Inspect lighting in project site. Compliance with Conditions of Consent.	Works being undertaken in accordance with the Conditions of Consent and there is no light spill.	Implement management actions in Protocol 10 – Lighting Design in accordance with AS4282 Manage site in accordance with Dark Sky Planning Guideline.	Upon commencement of operation then annually.	PCL Senior Engineering and Commissioning Manager to manage hours of operation.	PCL Senior Engineering and Commissioning Manager
		2	Inspect lighting in project site. Compliance with Conditions of Consent	Works being undertaken in accordance with the Conditions of Consent and there is light generation.	Implement management actions in Protocol 10 – Lighting Design in accordance with AS4282. Manage site in accordance with Dark Sky Planning Guideline PCL Senior Engineering and Commissioning	Upon commencement of operation then annually.	PCL Senior Engineering and Commissioning Manager to manage hours of operation. PCL Senior Engineering and Commissioning Manager to report circumstances of non-compliance	PCL Senior Engineering and Commissioning Manager. ACEN Australia Site Operations Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
					Manager to investigate the circumstances regarding light generation and check for compliance with Conditions of Consent. If out of hours works are involved, then PCL Senior Engineering and Commissioning Manager and ACEN Australia to seek Secretary's Approval for such works.		with working hours to ACEN Australia Operations Manager. PCL Senior Engineering and Commissioning Manager to immediately report any incidents or non-compliances to ACEN Australia Operations Manager for reporting to DPHI as set out in the project EMS	
		3	Inspect lighting in project site. Compliance with Conditions of Consent	Works being undertaken in accordance with the Conditions of Consent and there is light spill	Implement management actions in Protocol 10 – Lighting Design in accordance with AS4282. Manage site in accordance with Dark Sky Planning Guideline Manager PCL Senior Engineering and Commissioning Manager to investigate light spill that doesn't	Upon commencement of operation then annually.	PCL Senior Engineering and Commissioning Manager to immediately report any incidents or non-compliances to ACEN Australia Operations Manager for reporting to DPHI as set out in the project EMS immediately	PCL Senior Engineering and Commissioning Manager. ACEN Australia Site Operations Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
					conform with Conditions of Consent (eg light shining above the horizontal). If out of hours works are required ACEN Australia to seek Secretary's Approval for such works			
7. Pollution	Contamination of land and water from chemical spill.	1	Inspect chemical storage areas	No spills.	Implement management actions in Protocol 11 – Chemical Management	Monthly	PCL Senior Engineering and Commissioning Manager to monitor.	PCL Senior Engineering and Commissioning Manager
		2	Inspect chemical storage areas	Minor spill, outside of definition of Incident in Conditions of Consent.	Stop work in the spill area. Clean up spill. Implement management actions in Protocol 11 – Chemical Management	Monthly	PCL Senior Engineering and Commissioning Manager to report circumstances of non-compliance to ACEN Australia Operations Manager. PCL Senior Engineering and Commissioning Manager to immediately report any incidents or non-compliances to ACEN Australia	PCL Senior Engineering and Commissioning Manager. ACEN Australia Site Operations Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
							Operations Manager for reporting to DPHI as set out in the project EMS	
		3	Inspect chemical storage areas	Spill which is considered an Incident	Stop work in the spill area. Clean up spill. Report the incident. Review and update management actions in Protocol 11 – Chemical Management if required.	Monthly	PCL Senior Engineering and Commissioning Manager to immediately report any incidents or non-compliances to ACEN Australia Operations Manager for reporting to DPHI as set out in the project EMS	PCL Senior Engineering and Commissioning Manager. ACEN Australia Site Operations Manager
8. Grazing Management	Control of groundcover growth and weed management	1	Pasture growth	Rates within range Pasture growth >3cm and <10 cm	Implement Appendix 6 - GMP	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager Landholder
		2	Pasture growth	Rates outside range Pasture growth >10cm and <15cm	Increase stocking rate	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager Landholder
		3	Pasture growth	Rates outside range	Increase stocking rate	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
				Pasture growth >15 cm				Landholder
	Control of groundcover in drought declared conditions	1	Pasture growth	Pasture growth >5cm and <10cm	Implement Appendix 6 - GMP	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager Landholder
		2	Pasture growth	Pasture growth >3 cm and < 5cm	Prepare to remove stock from paddocks	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager Landholder
		3	Pasture growth	Pasture growth < 3cm cm	Remove stock from paddocks until growth > 5cm	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager Landholder
	Solar Farm infrastructure considerations	1	Arrays being impacted by sheep	Sheep not interacting with infrastructure	Implement Appendix 6 - GMP	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager Landholder
		2	Arrays being impacted by sheep	Sheep interacting with infrastructure Wool being caught on moving parts	Prepare to remove stock from paddocks Installation of motor guards Secure cables	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager Landholder



Taken from Impact Table 4.1	Activity	Level	Monitoring Action	Decision Trigger	Action	Timing	Reporting	Responsibility
				Sheep getting tangled on exposed wiring				
		3	Arrays being impacted by sheep	Sheep interacting with infrastructure Wool being caught on moving parts Sheep getting strangled on exposed wiring	Prepare to remove stock from paddocks Installation of motor guards and additional guards as deemed necessary Secure cables and remove risk of strangulation	Monthly	Landholder to monitor.	PCL Senior Engineering and Commissioning Manager Landholder

4.3.1 Incident Management

As defined in the Development Consent SSD 10452 an incident is a set of circumstances that causes or threatens to cause material harm to the environment. Material harm is also defined in the Development Consent as harm that:

- involves actual or potential harm to the health and safety of human beings or to ecosystems that is not trivial; or
- results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).

Subsequent notification requirements will be given (**Table 4-4**), and reports submitted in accordance with the requirements set out in Appendix 7 of the Conditions of Approval (see below).

Table 4-4: Incident management process.

Incident level	Definition	Notification	Responsibility
Reportable	• Causes or threatens to cause material harm to the environment (see definition in Development Consent); • involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial; or • results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).	• Internal: to PCL HSEQ advisor, O&M Manager (immediately) • External: to ACEN Australia Site Operations Manager (immediately) • DPHI: to the Planning Secretary, (immediately after the ACEN Australia Site Operations Manager becomes aware of an incident)	• PCL O&M Manager • ACEN Australia Project Manager to report to DPHI, Planning Secretary

It is a mandatory requirement for any personnel working for or on behalf of PCL or ACEN Australia to report and respond to all hazards and events that have affected or have the potential to adversely affect the environment.

Examples of events include:

- fauna mortality
- fuel or chemical spill
- noise incidents
- bushfire
- complaint from a neighbour.

The first line of response is to take immediate actions to minimise risks to persons, equipment, fauna and the environment. These actions may include:

- stop work
- assess site and make the area safe
- notify other parties that may be affected by the hazard/event.

DPHI will be notified in writing via the Major Projects portal immediately after the Applicant becomes aware of an incident on site which has the potential to cause material environmental harm. Accordingly, the PCL HSEW Advisor, O&M Manager will notify the ACEN Australia Site Operations Manager immediately after a reportable incident occurs to enable prompt reporting by the ACEN Australia Site Operations Manager to the Planning Secretary.

The notification must identify the development, including the application number and the name of the development, and set out the location and nature of the incident. Examples of an environmental incident that results in 'material harm to the environment' could be:

- an uncontained spill into a water course resulting in harm to the health or safety of human beings or non-trivial harm to ecosystems
- the mortality of or serious injury to wildlife as a result of project activity

Response agencies need to be informed of pollution incidents quickly, so action can be coordinated to prevent or limit harm to the environment and human health generally. These are listed in **Table 4-5**.

Table 4-5: Response Agency Contact Details.

Response agency	Contact details
Environment Protection Authority NSW (EPA NSW)	131 555 or (02) 9995 5555
Ministry of Health NSW	(02) 9391 9000
SafeWork NSW	131 050
The local authority, Mid-Western Regional Council	(02) 6378 2850 24 hours
Fire and Rescue NSW	000 or 112 from mobile
Rural Fire Service Gulgong	000, or 112 from mobile

4.3.2 Non-compliance Reporting

A project non-compliance is a project condition that is not in compliance with the Development Consent conditions. Environmental non-compliances will be reported and actioned through the incident management procedures detailed below.

As per Schedule 4 Conditions 8, 9 and 10, as well as Appendix 7 of the Conditions of Consent, the Applicant (ACEN Australia) is required to inform the Department in writing via the Major Projects website within 7 days after becoming aware of any non-compliance with the conditions of this consent. Accordingly, the O&M Manager will notify the ACEN Australia Site Operations Manager no greater than 24 hours after a non-compliance is identified to enable prompt reporting by ACEN Australia to the Planning Secretary. As the Consent Holder ACEN Australia has the responsibility for reporting non-compliances to the Planning Secretary during operations.

The notification will identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been done, or will be, undertaken to address the non-compliance. A non-compliance notified as an incident does not need to be notified as a non-compliance.

4.3.3 Appendix 7: Incident Notification and Reporting Requirements

Written Incident Notification Requirements

1. A written incident notification addressing the requirements set out below must be submitted to the Planning Secretary via the Major Projects website within seven days after the Applicant becomes aware of an incident. Notification is required to be given under this condition even if the Applicant fails to give the notification required under condition 7 of Schedule 4 or, having given such notification, subsequently forms the view that an incident has not occurred.

2. Written notification of an incident must:

- (a) identify the development and application number;*
- (b) provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);*
- (c) identify how the incident was detected;*
- (d) identify when the applicant became aware of the incident;*
- (e) identify any actual or potential non-compliance with conditions of consent;*
- (f) describe what immediate steps were taken in relation to the incident;*
- (g) identify further action(s) that will be taken in relation to the incident; and*
- (h) identify a project contact for further communication regarding the incident.*

3. Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, the Applicant must provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested.

4. The Incident Report must include:

- (a) a summary of the incident;*
- (b) outcomes of an incident investigation, including identification of the cause of the incident;*
- (c) details of the corrective and preventative actions that have been, or will be, implemented*

to address the incident and prevent recurrence; and
(d) details of any communication with other stakeholders regarding the incident.

4.4 Construction period - summary of reporting (REMOVED)

4.5 BMP Performance

Analysis of Completion Criteria across all risk/impacts to determine performance of the BMP in managing biodiversity of the development. This will include:

- **Operation**
 - The site will be rehabilitated to its inherent Land Capability of Class V as identified within the EIS.
 - Maintain ground cover to 70% cover in the disturbance area with native pasture species for the life of the project (see Section 4.10).
 - Failed vegetation patches greater than 20m² to be actively managed within 10 days of issue being identified, using the most appropriate method per the prevailing climatic conditions.
 - Scours greater than 100 mm deep and 20 metres long to be actively managed within 10 days of issue being identified. This may include mulch, re-topsoiling, diversion of water and other methods as outlined in Landcom 2008.
 - Monitoring and reporting requirements as required in Table 4.2 met for life of the project.
 - Fencing requirements are maintained for the life of the project as per Protocol 7.
 - Management of weed cover when 10% cover is reached or 10% increase in baseline data over the life of the project.
 - Management of feral animals in disturbed areas leased by ACEN, will be done in consultation, and coordinated with, Local Lands Services so there is no net increase of presence of feral animals for the life of the project.

4.6 Independent Environmental Audit

An Independent Environmental Audit of the Stubbo Solar Project will be conducted in accordance with Schedule 4, Conditions 11-16 of the conditions of consent. Specifically, an audit will be undertaken:

- within 3 months of commencing construction
- within 3 months of commencement of operations
- or as directed by the Secretary of DPHI.

The audit will:

- be prepared in accordance with the relevant *Independent Audit Post Approval requirements* (2020)
- be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary

4.7 Review and Improvement

Continuous improvement of this BMP will be achieved by the ongoing evaluation of performance.

During operations, a review and evaluation of the BMP to identify opportunities for improvement will be completed by the PCL Senior Engineering and Commissioning Manager, and Project Ecologist.

This BMP will be reviewed and updated, if required, at the following times of the project:

- Prior to upgrading or decommissioning activities on site
- In accordance with Condition 2, Schedule 4, within 1 month of:
 - Submission of an incident report under condition 7 of Schedule 4
 - Submission of an audit report under condition 9 of Schedule 4
 - Any modifications to the conditions of this consent
- Within three years after the Stubbo Solar Project commences operations, then 5 years thereafter.
- The reviewed BMP will be provided to DPHI for the Secretary's approval of modified/updated plans

Part of the continuous improvement process will also include an annual meeting held during the operation phases of the project, and be designed to:

- identify areas of opportunity for improvement of environmental management and performance.
- determine the cause or causes of non-compliance and deficiencies.
- develop and implement a plan of corrective and preventative action to address any non-compliances and deficiencies.
- verify the effectiveness of the corrective and preventative actions.
- document any changes in procedures resulting from process improvement.
- make comparisons with objectives and targets.

Outcomes associated with the continuous improvement process will be distributed to relevant personal via PCL and ACEN Australia internal communication networks such as Toolbox Talks and Working Methods. The updates will also be uploaded to the project website.

4.8 Training

4.8.1 Induction

The Operations Site Induction will be administered by the O&M Manager.

This site will have Site Inductions and an induction register will be kept on-site, signed by inductees, with awareness of the requirements of the BMP highlighted.

As part of the induction for **operational** phase of the project, personnel and relevant subcontractors will become familiar with:

- the purpose of the BMP and all relevant Post approval plans
- the protocols of the BMP and environmental controls
- the processes for environmental emergencies
- key roles and responsibilities relevant to the BMP.

4.8.2 Project Ecologist

The independent Project Ecologist shall have an applicable tertiary qualification or similar. The ecologist shall be familiar with the scope of works proposed, the project objectives and have a clear knowledge of the ecology of the locality. The role of the ecologist will be subcontracted out on an as needs basis.

Proof of all licences, approvals and qualifications shall be provided at the commencement of the ecologist's involvement in this project.

4.9 Website

A website has been established for the project at <https://stubbosolar.com.au/>

This website will be maintained and kept up-to-date by the Applicant ACEN Australia. As the EPC, PCL will provide ACEN Australia with information as required to ensure the website has up-to-date information. In accordance with Schedule 4, Condition 17, of the conditions of consent, the website will make the following information publicly available at a minimum, as relevant to the stage of the development:

- The EIS
- the final layout plans for the development
- current statutory approvals for the development
- approved strategies, plans or programs required under the conditions of this consent
- the proposed staging plans for the development if the construction, operations or decommissioning of the development is to be staged
- how complaints about the development can be made

- any independent environmental audit, and the Applicant's response to the recommendations in any audit
- any other matter required by the Planning Secretary.

This information on the website will be kept up to date.

4.10 Rehabilitation

The areas disturbed by construction will be rehabilitated within 3 months of construction being completed. Rehabilitation includes the reshaping, spreading of topsoil and sowing of suitable species on disturbed areas. The earthworks associated with rehabilitation will commence within 10 days of the completion of construction activities. Revegetation will follow shortly after depending upon seasonal conditions and will be completed within 3 months. In some situations, a short-term seasonal sterile cover crop such as Rye Corn or Oats may be sown prior to the establishment of native species. This is to ensure land stability and minimise soil erosion, and is identified in the Erosion and Sediment Control Plan. It is recommended that the following list and supporting documents be used as a guide for providing the correct native species. 70% ground cover in accordance with the Landcom 2004 will be achieved in the disturbance area.

- *Themeda triandra* (Kangaroo Grass)
- *Rytidosperma caespitosum* (Ringed Wallaby Grass)
- *Microlaena stipoides* (Weeping Grass)
- *Bothriochloa macra* (Red Grass, Red-Leg Grass)
- *Poa labillardierei* (Poa Tussock)
- Common native grasses of Central West NSW by the Local Land Service LLS (https://www.lls.nsw.gov.au/__data/assets/pdf_file/0007/567628/native-grasses-guide.pdf)
- Grazing Management for Native Pastures on the North West Slopes of NSW (https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0018/162252/grazing-native.pdf)

Within 18 months of cessation of operations, as per Schedule 3, Condition 34, the applicant must rehabilitate the site to the satisfaction of the Planning secretary, as shown in **Table 4-6**. A detailed decommissioning and rehabilitation plan will be developed at the time of decommissioning.

A separate decommissioning and rehabilitation plan is to be prepared within 5 years of commencement of operation and submitted to Mid-Western Regional Council.

Table 4-6: Rehabilitation Objectives.

Feature	Objective
Site	• Safe, stable and non-polluting • Minimise the visual impact of any above ground ancillary infrastructure agreed to be retained for an alternative use
Solar project infrastructure	• To be decommissioned and removed, unless the Planning Secretary agrees otherwise
Land use	• Restore pre-existing land use so as to be consistent with Schedule 3, Condition 12
Community	• Ensure public safety at all times

5 Biodiversity Offsetting

The BMP has been prepared cognisant that offsetting biodiversity impacts of the development will be required under Schedule 3, Condition 14. Prior to commencing construction, unless the Secretary agrees otherwise, the Proponent must retire biodiversity credits of a number and class specified in Table 1 and Table 2 of Schedule 3, Condition 14 (see **Section 2.1**).

Following targeted biodiversity surveys, the biodiversity offset requirements under Condition 14 of Schedule 3 were revised, as confirmed in the Department of Planning and Environment's letter dated 7 June 2022 (reference SSD 10452-PA-1), a copy of which is attached in **Appendix D**.

ACEN Australia has retired the biodiversity credit liability for the project by acquiring 'biodiversity credits' within the meaning of the *Biodiversity Conservation Act 2016* or making payments into an offset fund that has been developed by the NSW Government. This was confirmed in the submission of Credit Purchases to the DPHI via the Major Projects Portal on 23 May 2023, a copy of which is attached in **Appendix D**.

6 Management Protocols

The following protocols have been developed to make the implementation of the BMP easier to manage for both the Construction and Operation phases.

6.1 Protocol 1 – Vegetation Clearing – REMOVED

6.2 Protocol 2 – Habitat Tree Removal - REMOVED

6.3 Protocol 3 – Management of Displaced Fauna

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager, Project Ecologist (subcontractor)

Operation

- All handling of fauna should be conducted by WIRES or other organisations trained to undertake fauna handling.
- Operational staff trained in snake handling, may undertake to relocate snakes if they are interfering with operational activities.

6.4 Protocol 4 – Stockpiles and Re-using Resources as Woody Debris and Bushrock Removal – REMOVED

6.5 Protocol 5 – Weed Management

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager, O&M Subcontractors, Project Ecologist (subcontractor). Inspections will be recorded and kept on site.

Standard operating procedures for weed management will be used by certified personal and records kept on site. This protocol will be incorporated into the induction process for the project.

Operation

- Weed control can include mechanical control (where appropriate, including grazing) and use of registered chemicals, including aerial spraying and drones and ground (by a suitably qualified person eg Chemcert certified).
- Where weed abundance and fuel load is managed through monitored sheep grazing, these regimes will be based upon the Grazing Management Plan (GMP), and annual vegetation surveys (weed survey plots).
- Sheep grazing management will be undertaken in accordance with the “Australian guide to agrisolar for large-scale solar for proponents and farmers” and adhere to recommendations regarding management of sheep. Sheep grazing will not occur on site until the completion of Stage 2a.
- A Grazing Management Plan (GMP) will be developed and submitted to DPHI at least three months prior to the commencement of Stage 2b. The GMP is appended to this document as Appendix F.
- Livestock exclusion fencing to be installed around areas of native vegetation to be retained (Protocol 13 – Exclusion Fencing/Exclusion Zones).
- Quarterly weed reconnaissance and reporting during normal operations and measures implemented to control new infestations.
- Any chemicals will be administered by authorised personnel with ChemCert accreditation – AQF 3 and in accordance label instructions; and activities recorded/kept by the O&M Manager during operation. If using chemicals near waterways, they must be approved for use near water.
- If on-site storage of chemicals is required, it will be undertaken in accordance with Section 6.6 of the Soil and Water Management Plan (SWMP).

6.6 Protocol 6 – Feral Pest Management

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager, Project Ecologist (subcontractor). Inspections will be recorded and kept on site.

Measures to control feral animals.:

- Conduct fence inspection prior to completion of fencing to reduce risk of animals being trapped within the project site.
- Keep a log of opportunistic sightings of feral pests in the project site, including location or sighting, species sighted, and any relevant details (e.g., damaged fence that they are entering through)
- Quarterly monitoring (via vehicular visual inspection) of project site will be used to determine presence of feral animals. Presence will be determined by using identification techniques such as burrows, roosts and scats. Activity levels of feral animals present will be recorded using a low, medium, high scale.
- Feral pest management activities to be in consultation, and coordinated with, Local Lands Service (LLS).
- Species management will be determined by species specific culling requirements, including, but not limited to the following.
 - Feral Rabbit: Combination of chemical (Pindone or 1080) and mechanical (ripping of burrows) (annual or on demand)
 - Feral Pig: Combination of chemical (1080 poisoning), ground shooting and trapping (when sighted)
 - Feral Foxes: Combination of chemical (1080 poisoning), ground shooting, trapping (when sighted)
- Any chemicals will be administered by authorised personnel with ChemCert accreditation – AQF 3 and in accordance label instructions; and activities recorded/kept by the O&M Manager during operations. If using chemicals near waterways, they must be approved for use near water.
- Additional management actions detailed in <https://www.dpi.nsw.gov.au/biosecurity/vertebrate-pests/pest-animals-in-nsw> may be implemented.
- If an overabundance of native species is found on site, then a separate management regime will be developed in consultation with the project ecologist.

- Recording fauna mortalities on the project site will be completed by PCL Senior Engineering and Commissioning Manager during operation using their management systems and subsequent notification to DPHI by ACEN Australia. Records will be kept onsite during operation and will be available upon request.
- Adjoining landholders will be notified by letterbox drop if and when baiting for feral animals is planned to be used and signage will be placed on boundary fences and gates.
- This protocol will be incorporated into the induction process for the project.
- Pets shall not be permitted within the environmental exclusion zone.

6.7 Protocol 7 – Fencing Construction and Management

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager.
Inspections will be recorded and kept on site.

To reduce the potential for impacts to fauna, the following fencing construction and management protocol be implemented. This protocol will be incorporated into the induction process for the project.

Biodiversity Conservation Trust's *Essential Conservation Fencing Infrastructure (Nov 2022)* to be considered by PCL and ACEN Australia when designing fences or when undertaking repairs, taking into consideration the definition of 'standard' and 'difficult' sites within the above-mentioned document.

6.7.1 Perimeter Fence and Exclusion Zones

- The perimeter fence will meet safety requirements, whilst taking into consideration biodiversity needs where practicable.
- Monthly inspection of perimeter fencing will be undertaken during operation for the first year of operation to identify any fauna incidents related to the fencing.
- In the event of continued large scale fauna incursions consideration will be given to installing passive fauna monitoring in consultation with the Project Ecologist.
- The perimeter fence is galvanized chain-link fence and post with barb wires at top and maximum height of 2.25 meters.
- Exclusion zones within the perimeter fence are demarcated by star pickets and flagging at 20 metre intervals with signage stating these are no-go-zone areas. There is only one instance of an exclusion zone contained within perimeter security fence.

6.7.2 Internal Fencing

- Internal fencing should be of a standard to allow stock movement and grazing.
- Internal fencing should be designed and constructed using the "Biodiversity Conservation Trust – Essential conservation fencing infrastructure" as a guide, where practicable, particularly in relation to any fencing located nearby of the exclusion zone.

6.8 Protocol 8 – Erosion and Sediment Control

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager
Refer to and implement the ESCP.

6.9 Protocol 9 – Dust Control / Rehabilitation

6.9.1 Dust control

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager

As per Condition 18, measures to minimise the generation of dust and associated impacts on adjacent natural environments are provided for in the ESCP. This will include reassessment of activities during adverse weather conditions to reduce excessive dust.

6.9.2 Rehabilitation

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager. Inspections will be recorded and kept on site.

Rehabilitation of disturbed ground will be completed using the following as a guide.

- Suitable local grass species will be used as ground cover in any rehabilitation areas to meet the requirements in Section 4.10.
- It is recommended that the following list and supporting documents be used as a guide for providing the correct native species. 70% ground cover in accordance with Landcom 2004 will be achieved across the disturbance area.
 - *Themeda triandra* (Kangaroo Grass)
 - *Rytidosperma caespitosum* (Ringed Wallaby Grass)
 - *Microlaena stipoides* (Weeping Grass)
 - *Bothriochloa macra* (Red Grass, Red-Leg Grass)
 - *Poa labillardierei* (Poa Tussock)
 - Common native grasses of Central West NSW by the Local Land Service LLS (https://www.lls.nsw.gov.au/__data/assets/pdf_file/0007/567628/native-grasses-guide.pdf)
 - Grazing Management for Native Pastures on the North West Slopes of NSW (https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0018/162252/grazing-native.pdf)

6.10 Protocol 10 – Lighting Design

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager

Operation

- During operation, lighting will continue to minimise light spill by ensuring external lighting associated with the development:
 - Does not shine above the horizontal
 - Complies with AS/NZS 4282:2019 – Control of Obtrusive Effects of Outdoor Lighting, and the Dark Sky Planning Guideline (DPE 2023) or their latest versions
 - Is directed away from the environmental exclusion zone where practicable.

6.11 Protocol 11 – Chemical Management

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager

Refer to and implement the Soil and Water Management Plan (SWMP), particularly Section 6.6.

6.12 Protocol 12 – Vehicle Hygiene

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager.
Inspections will be recorded and kept on site.

The **Post Clearing** procedures will include:

1. Self-certification of cleanliness of the vehicle using the PCL supplied checklist prior to entering the site is required and will be spot checked. These records will be kept on site by the PCL HSE Advisor.
2. Vehicles found to have visible dirt or vegetation on them will be refused entry and directed to the car wash in Gulgong or Mudgee. Following return to the site the vehicle will be inspected by the PCL HSE Advisor or their delegate. The PCL HSE Advisor will be suitably qualified to identify weed species.
3. Any machinery or equipment that has been used in Queensland needs to adhere to the requirements of a Carrier Biosecurity Certificate in relation to Parthenium weed. Details are available at <https://www.dpi.nsw.gov.au/biosecurity/weeds/parthenium-greatest-threat>.

6.13 Protocol 13 – Exclusion Fencing/Exclusion Zones

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager.
Inspections will be recorded and kept on site.

To reduce the potential for impacts to existing flora and fauna, the following Exclusion Fencing/Exclusion Zones construction and management protocol will be implemented:

- Firewood collection is prohibited within the exclusion fencing/exclusion zones so as not to impact on PCT
- The lighting of fires is prohibited within the exclusion fencing/exclusion zones .
- No rubbish will be stored or disposed of within the exclusion fencing/exclusion zones
- No pets or stock are allowed in the exclusion zone
- This protocol will be incorporated into the induction process for the project.

6.14 Protocol 14 – Noise Management

Operational phase responsible position: PCL Senior Engineering and Commissioning Manager

The hours of construction, upgrading operation and decommissioning are contained in Condition 16 Schedule 3: Unless the Planning Secretary agrees otherwise, the Applicant may only undertake road upgrades, construction, upgrading or decommissioning activities between:

- (a) 7 am to 6 pm Monday to Friday;
- (b) 8 am to 1 pm Saturdays; and
- (c) at no time on Sundays and NSW public holidays.

The following construction, upgrading operation or decommissioning activities may be undertaken outside these hours without the approval of the Planning Secretary:

- The delivery of materials as requested by the NSW Police Force or other authorities for safety reasons; or
- Emergency work to avoid the loss of life, property and/or material harm to the environment.

Specific measures relating to the Noise Management include:

- Provide awareness training during site inductions and toolbox talks and-emphasise the importance of limiting noise generation during operation.
- Machinery, trucks and equipment will be restricted to designated parking areas away from existing vegetation.
- Minimise night works carried out on site to reduce impact to fauna.

6.15 Protocol 15 – Waterway Crossings - REMOVED

7 Bibliography

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8 Appendices

Appendix A – BAM Plot Data for the Subject Site (from BDAR)

BAM Vegetation Plot Locations and Data (pages 80-84) of the BDAR (Eco Logical 2020).

Table 47: Plot locations

Plot	PCT	Condition	Zone	Easting	Northing	Bearing
Plot 5	281	Low	55	744237	6427695	90
Plot 6	281	Low	55	741276	6430003	245
Plot 26	281	Low	55	744106	6427352	0
Plot 27	281	Low	55	742479	6428103	215
Plot 29	281	Low	55	744161	6428351	315
Plot 31	281	Low	55	743754	6431804	225
Plot 32	281	Low	55	744285	6430951	320
Plot 33	1770	Low	55	741940	6430054	5
Plot 3	281	Mod_good	55	745094	6427449	280
Plot 7	281	Mod_good	55	743146	6428587	305
Plot 8	281	Mod_good	55	742535	6428610	270
Plot 9	281	Mod_good	55	742742	6428623	72
Plot 10	281	Mod_good	55	743132	6428804	50
Plot 12	281	Mod_good	55	742038	6430432	300
Plot 13	281	Mod_good	55	742955	6430662	55
Plot 15	281	Mod_good	55	743046	6429239	20
Plot 16	281	Mod_good	55	743107	6429797	50
Plot 17	281	Mod_good	55	744949	6429993	330
Plot 20	281	Mod_good	55	743820	6431397	225
Plot 21	281	Mod_good	55	743692	6431393	265
Plot 22	281	Mod_good	55	743500	6431529	240
Plot 25	281	Mod_good	55	744993	6427385	158
Plot 30	281	Planted_windbreak	55	743579	6432609	190
Plot 4	n/a	Category1_land	55	744956	6427996	200
Plot 11	n/a	Category1_land	55	741528	6429407	168
Plot 14	n/a	Category1_land	55	742715	6429650	210
Plot 18	n/a	Category1_land	55	744501	6431165	170
Plot 23	n/a	Category1_land	55	743992	6432517	290
Plot 24	n/a	Category1_land	55	744366	6432506	255
Plot 28	n/a	Category1_land	55	741664	6428670	80

Table 48: Plot composition data

Plot	PCT	Condition	Tree	Shrub	Grass	Forb	Fern	Other
Plot 5	281	Low	1	1	7	5	1	1
Plot 6	281	Low	1	0	5	6	1	0
Plot 26	281	Low	1	1	7	10	1	0
Plot 27	281	Low	1	0	2	4	0	0
Plot 29	281	Low	1	0	4	8	0	0
Plot 31	281	Low	1	0	3	4	0	0
Plot 32	281	Low	1	0	0	4	0	0
Plot 33	1770	Low	1	0	4	3	0	0
Plot 3	281	Mod_good	2	4	5	12	1	1
Plot 7	281	Mod_good	1	0	6	10	1	1
Plot 8	281	Mod_good	1	1	16	16	1	2
Plot 9	281	Mod_good	1	1	6	11	0	0
Plot 10	281	Mod_good	2	2	11	16	1	2
Plot 12	281	Mod_good	1	0	16	15	1	0
Plot 13	281	Mod_good	1	1	4	8	0	0
Plot 15	281	Mod_good	1	0	10	19	1	0
Plot 16	281	Mod_good	1	1	10	15	1	0
Plot 17	281	Mod_good	2	2	7	19	1	2
Plot 20	281	Mod_good	2	0	9	15	1	1
Plot 21	281	Mod_good	1	8	11	16	1	2
Plot 22	281	Mod_good	2	1	6	9	0	0
Plot 25	281	Mod_good	1	1	4	8	0	0
Plot 30	281	Planted_windbreak	3	0	3	5	0	0
Plot 4	n/a	Category1_land	0	0	5	8	0	0
Plot 11	n/a	Category1_land	0	0	4	4	1	0
Plot 14	n/a	Category1_land	0	0	7	3	1	0
Plot 18	n/a	Category1_land	0	0	9	7	1	1
Plot 23	n/a	Category1_land	0	0	8	13	1	0
Plot 24	n/a	Category1_land	0	0	2	7	0	0
Plot 28	n/a	Category1_land	0	0	3	3	0	0

Table 49: Plot structure data

Plot	PCT	Condition	Tree	Shrub	Grass	Forb	Fern	Other
Plot 5	281	Low	20	2	3.5	1.4	0.1	0.2
Plot 6	281	Low	2.0	0.0	6.3	1.9	0.1	0.0
Plot 26	281	Low	10	1	3.7	2.9	0.1	0
Plot 27	281	Low	4.0	0.0	3.1	5.3	0.0	0.0
Plot 29	281	Low	15	0	1.4	2.7	0	0
Plot 31	281	Low	8	0	3.2	0.8	0	0
Plot 32	281	Low	3	0	0	0.4	0	0
Plot 33	1770	Low	5	0	1.7	2.6	0	0
Plot 3	281	Mod_good	20	1.8	4.3	2.2	0.1	0.1
Plot 7	281	Mod_good	8.0	0.0	2.0	1.3	0.5	0.5
Plot 8	281	Mod_good	5	0.1	15.1	9.3	0.3	0.2
Plot 9	281	Mod_good	15	0.1	38.7	14	0	0
Plot 10	281	Mod_good	3.8	0.2	28.9	10.8	0.6	0.2
Plot 12	281	Mod_good	1	0	16.3	12.5	0.2	0
Plot 13	281	Mod_good	10	0.1	1.6	55.7	0	0
Plot 15	281	Mod_good	1	0	38.6	3	2	0
Plot 16	281	Mod_good	2	0.1	24.1	11.3	1	0
Plot 17	281	Mod_good	4.4	0.9	57.4	7.9	1	0.3
Plot 20	281	Mod_good	13	0	29.5	4.7	0.1	0.1
Plot 21	281	Mod_good	6	3.6	24.9	2.6	2	0.2
Plot 22	281	Mod_good	9	0.5	35.8	3.9	0	0
Plot 25	281	Mod_good	4	1	2.7	1	0	0
Plot 30	281	Planted_windbreak	10	0	10.3	2.4	0	0
Plot 4	n/a	Category1_land	0.0	0.0	36.2	1.8	0.0	0.0
Plot 11	n/a	Category1_land	0	0	10.3	20.4	0.2	0
Plot 14	n/a	Category1_land	0	0	3.5	30.2	0.1	0
Plot 18	n/a	Category1_land	0	0	9.7	1	0.2	0.1
Plot 23	n/a	Category1_land	0	0	23.9	2.3	3	0
Plot 24	n/a	Category1_land	0	0	0.2	1.7	0	0
Plot 28	n/a	Category1_land	0	0	11.1	0.3	0	0

Appendix B – PCT Descriptions (from BDAR)

Table 13: PCT281_Low

PCT 281 Low			
Vegetation formation/class/structure	Western Slopes Grassy Woodlands / Grassy Woodlands / Woodland		
Conservation status	BC Act: CEEC. EPBC Act: Not listed due to not meeting condition thresholds.		
	This community occurs across the site as scattered individual remnant trees and some small clumps of trees within modified pasture.		
	The mid-storey is absent. Canopy regeneration is absent.		
	The groundcover contains a mix of exotic pasture species with fallen timber in some patches.		
	The groundcover is significantly degraded.		
Characteristic canopy trees	<i>Angophora floribunda</i> (Rough-barked Apple), <i>Eucalyptus blakelyi</i> (Blakely's Red Gum), <i>E. melliodora</i> (Yellow Box)		
Characteristic mid-storey	Absent.		
Characteristic groundcovers	<i>Austrostipa</i> spp., <i>Eragrostis</i> sp., <i>Aristida</i> sp.,		
Mean native richness	10		
Exotic species / HTW cover	<i>Arctotheca calendula</i> , <i>Echium plantagineum</i> , <i>Lolium</i> sp., <i>Medicago</i> sp. and <i>Trifolium</i> spp / 0.3		
Condition	Low		
Variation and disturbance	This zone is characterised by remnant canopy with a highly degraded understorey that contains a mixture of exotic and native species. This zone includes isolated trees within paddock and small groups of trees		
% cleared in NSW	67		
No. sites sampled	10 (only the 7 sites within the development footprint were used in calculating the vegetation integrity score)		
Threatened flora species	No present. This zone is considered too degraded for threatened flora to occur.		
Fauna habitats	Hollow bearing trees, flowering eucalypts. Fallen logs are present in some patches.		
Composition	Structure	Function	Vegetation Integrity Score
51	24.2	22.9	30.5

Table 14: PCT 281 Moderate - good

PCT 281 Moderate-good			
Vegetation formation/class/structure	Western Slopes Grassy Woodlands / Grassy Woodlands / Woodland		
Conservation status	BC Act: CEEC EPBC Act: CEEC where condition thresholds are met.		
		This zone is characterised by remnant canopy with a partly intact shrub and groundcover layer, although exotic species are also abundant. This zone within the development site has generally suffered from some level of historic clearing or disturbance but is regenerating. This zone occurs within the development site as narrow strips of road reserve vegetation and a small patch at the edge of the development site near the southern boundary where some regeneration and shrubs are present.	
Characteristic canopy trees	<i>Angophora floribunda</i> (Rough-barked Apple), <i>Eucalyptus blakelyi</i> (Blakely's Red Gum), <i>E. melliodora</i> (Yellow Box)		
Characteristic mid-storey	<i>Acacia implexa</i> , <i>Cassinia sifton</i> , <i>Acacia decora</i> , <i>Sannantha cunninghamii</i>		
Characteristic groundcovers	<i>Aristida ramosa</i> , <i>Austrostipa</i> spp., <i>Arundanella nepalensis</i> , <i>Calotis lappulacaea</i> , <i>Cheilanthes</i> sp, <i>Wahlenbergia</i> spp.		
Mean native richness	27		
Exotic species / HTW cover	<i>Arctotheca calendula</i> , <i>Lolium</i> sp, <i>Trifolium</i> spp. <i>Acetosella vulgaris</i> , <i>Hypochaeris radicata</i> / 0.16		
Condition	Low		
Variation and disturbance	Access road options have been selected in areas so that no trees will be impacted but where some mid-storey and groundcover is present.		
% cleared in NSW	67		
No. sites sampled	14. Plots utilised for calculations within this zone were taken from the study area as no plots were undertaken in the development site due to the small size of these areas i.e. could not fit a plot in. Vegetation in the study area was considered representative of the condition of the small areas of vegetation within PCT 281 Moderate-good, and in some cases is an overestimation of the condition within the development site.		
Threatened flora species	Not present, targeted survey did not detect potential threatened species within this zone in the development site.		
Fauna habitats	Patches within the development site do not contain hollow bearing trees or significant amounts of fallen timber. Patches within the broader study area contain hollow bearing trees, flowering eucalypts and fallen logs.		
Composition	Structure	Function	Vegetation Integrity Score
84.2	76.3	70.8	76.9

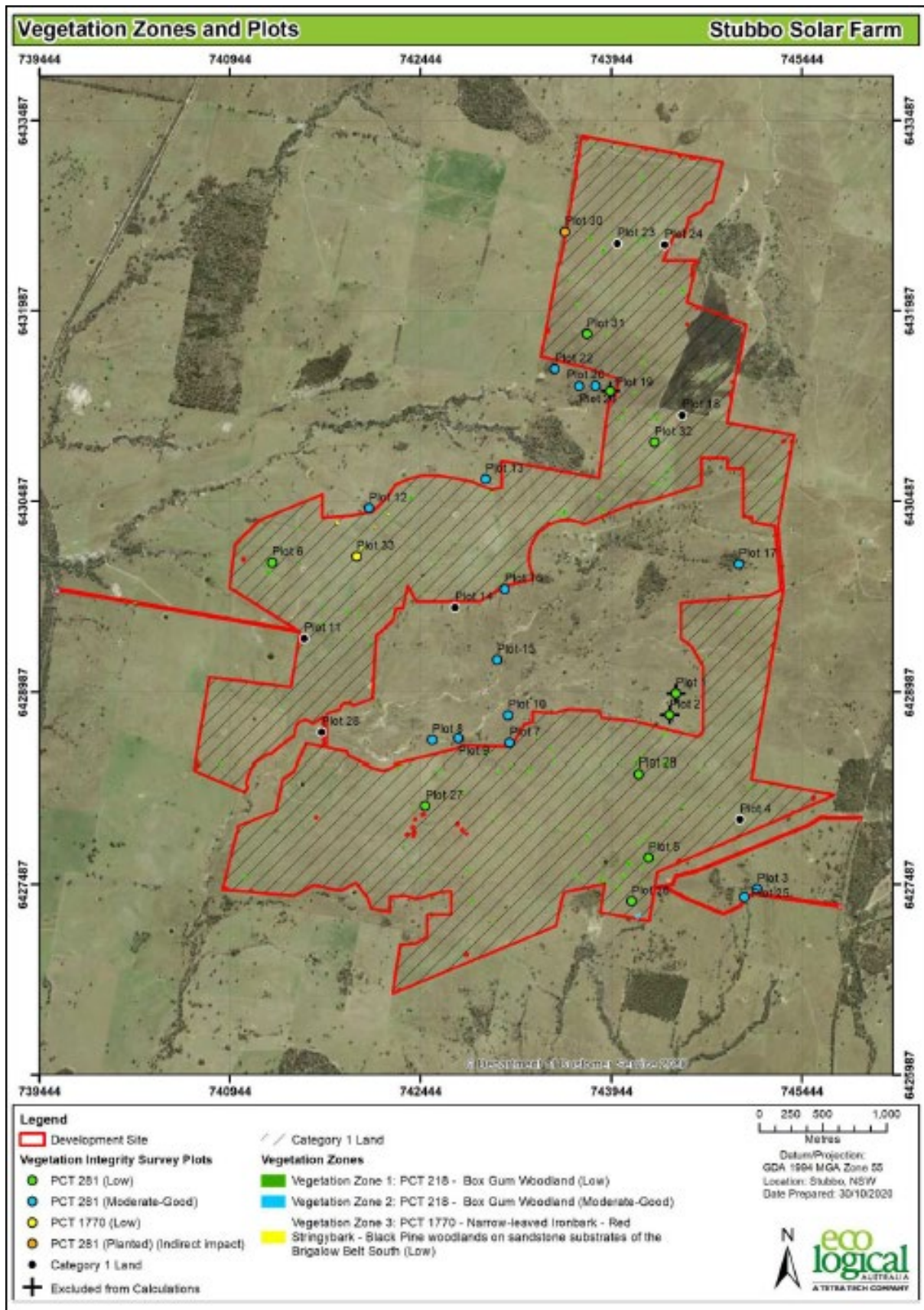
Table 15: PCT 1770 Low

PCT 1770 Low			
Vegetation formation/class/structure	Dry Sclerophyll Forest (Shrubby sub-formation) / Western Slopes Dry Sclerophyll Forest / Woodland		
Conservation status	BC Act: Not listed EPBC Act: Not listed		
		This community occurs as isolated remnant paddock trees of <i>Eucalyptus crebra</i> (Narrow-leaved ironbark) with a highly degraded understorey that contains a mixture of exotic and native species.	
Characteristic canopy trees	<i>Eucalyptus crebra</i> (Narrow-leaved Ironbark)		
Characteristic mid-storey	Absent		
Characteristic groundcovers	<i>Erodium crinitum</i> , <i>Austrostipa scabra</i> , <i>Cynodon dactylon</i> , <i>Chloris truncata</i> , <i>Rumex brownii</i> .		
Mean native richness	8		
Exotic species / HTW cover	<i>Arctotheca calendula</i> , <i>Spergularia rubra</i> , <i>Trifolium</i> spp. <i>Medicago</i> sp. / 0.1		
Condition	Low		
Variation and disturbance	This zone includes widely scattered remnant trees within exotic modified pasture.		
% cleared in NSW	11		
No. sites sampled	1		
Threatened flora species	No present. This zone is considered too degraded for threatened flora to occur.		
Fauna habitats	Hollow bearing trees, flowering eucalypts and fallen logs are present.		
Composition	Structure	Function	Vegetation Integrity Score
28.6	5.2	35.1	17.4

Table 16: Exotic pasture (Category 1 Land)

Exotic/modified pastures and cropland (Category 1 Land)			
Vegetation formation/class/structure	Not applicable		
Conservation status	Not listed		
		Areas of exotic/modified pasture within the development site no longer conform to any PCT. These areas have been cleared of canopy and mid-storey. The groundcover has been modified through pasture improvement, ploughed/sown, cropped and heavy grazing. Exotic pasture species dominate. Scattered native grasses and forbs are present, and the native species <i>Erodium crinitum</i> acts as a dominant pasture weed in some areas.	
Characteristic canopy trees	Not present.		
Characteristic mid-storey	Not present.		
Characteristic groundcovers	Exotics: <i>Arctotheca calendula</i> (Cape Dandelion), <i>Trifolium</i> spp. (Clovers), <i>Medicago</i> sp. (Medic), <i>Echium plantagineum</i> (Paterson's Curse), <i>Lolium</i> sp. (Rye Grass), <i>Eragrostis cilianensis</i> (Stinkgrass), <i>Avena</i> sp. (Oats), <i>Spergularia rubra</i> (Red Sandspurry), <i>Lepidium</i> spp. (Peppergrasses). Native: <i>Erodium crinitum</i> (Blue Storksbill), <i>Eragrostis</i> sp. (Lovegrass), <i>Austrostipa</i> spp (Speargrasses), <i>Aristida</i> spp. (Wiregrasses), <i>Crassula</i> sp. (Stonecrop).		
Exotic species / HTW cover	As listed above / 1.3		
Condition	Very low – not representative of a native plant community type		
Variation and disturbance	Includes modified pastures and cropland.		
% cleared in NSW	n/a		
No. sites sampled	6		
Threatened flora species	None present. This zone is considered too degraded for threatened flora to occur.		
Fauna habitats	Limited habitat opportunities.		
Similar PCTs	n/a		
Composition	Structure	Function	Vegetation Integrity Score
60	38.2	0.1	5.2

Figure 8-1: PCT Plot locations and zones (from BDAR).



Appendix C – Response to BCS comments

Contact timeframes with DPE.

Initial email to BCS requesting confirmation of additional information required: Jan 2023

Querying map suitability – 2 Feb 2023.

Submission of draft BMP – 8 Feb 2023

Comments from BCS received – 20 Feb 2023

Comments received have been incorporated into the BMP. The table following provides a response to where the comments were addressed within the BMP.

NOTE: Initial inquiries were made to Biodiversity, Conservation and Science Directorate of the then Department of Planning and Environment. Subsequent changes now apply, and the Conservation, Programs, Heritage and Regulation (CPHR) are now part of the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Additional comments were received from CPHR during the DPHI review of Stage 2b of the BMP.

**Department of Planning and Environment**

Our ref: DOC23/10847

Your ref: SSD 10452

Jane Book
Senior Environmental Scientist
OzArk
jane@ozarkehm.com.au

Dear Jane

Biodiversity management plan requirements – Stubbo Solar Farm

Thank you for your e-mail dated 10 January 2023 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment requesting our requirements for the Stubbo Solar Farm biodiversity management plan (BMP).

The BMP will need to fulfil all requirements of Schedule 3, condition 15 of the consent for SSD 10452.

In addition to the headings in the proposed table of contents, BCS recommends that the BMP specifically addresses:

- Protection of vegetation and fauna habitat outside the approved disturbance areas. This should include a map of vegetation to be removed, retained, and managed.
- Measures to minimise clearing and avoid unnecessary disturbance of vegetation.
- Timing of vegetation clearing, especially for hollow-bearing trees (ie avoiding clearing during spring).
- Rehabilitation and revegetation of temporary disturbance areas with locally endemic species. This should include a map showing areas to be revegetated.
- A trigger, action, response plan.

If you have any questions about this advice, please do not hesitate to contact me via liz.mazzer@environment.nsw.gov.au or (02) 6883 5325.

Yours sincerely



Liz Mazzer
A/Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

10 January 2023



Department of Planning and Environment

Jane Book
Senior Environmental Scientist
OzArk Environment & Heritage
jane@ozarkehm.com.au

Our ref: DOC23/10847
Your ref: SSD 10452

Dear Jane

Biodiversity Management Plan Review – Stubbo Solar Farm

Thank you for e-mail dated 8 February 2023 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment requesting comment on the Biodiversity Management Plan (BMP) for Stubbo Solar Farm.

The BMP requires revision in several key areas as outlined below and detailed in **Attachment A**:

- Ideally, the BMP should be a stand-alone document. It currently relies on other documents to provide important information (e.g. an Erosion and Sediment Control Plan). It is unclear whether these other documents that relate to the BMP have been completed. The BMP would benefit from a list of relevant documents that link to the BMP.
- Additional descriptions and mapping are requested to understand the baseline environment and to enable comparison for future monitoring and reporting against success criteria. This can be in the form of a Trigger Action Response Plan, which describes the following points for all actions:
 - baseline – what is currently on the site?
 - completion criteria – what is the ultimate target?
 - performance criteria – set targets for specified time intervals to ensure management actions are on track to achieve completion criteria
 - a detailed monitoring plan to track actual performance
 - a Trigger Action Response Plan (TARP) detailing corrective actions to be taken if performance or completion criteria are not met.
- The BMP lacks clearly defined monitoring plans. Specific details of how, when and where monitoring will occur are needed throughout the BMP, including measurable completion and success criteria. For example, weed management may include the “the complete removal of all (insert noxious weed)” and that “non-native groundcover not exceed 10%”.
- There are some inconsistencies between the BMP and development consent for this project.

BCS considers that successful management plans include tailored, quantitative performance measures and targets, completion criteria, monitoring, and trigger points for corrective action which adhere to the SMART principles (specific, measurable, achievable, realistic, timely).

Management targets should adhere to the SMART principles and must be measurable and expressed in a manner that assists in the evaluation of progress toward the strategic goals that define the completion criteria.

Examples of these could be:

Weed Management

Objective 1: Noxious and environmental weeds are identified and mapped.

Year 1: Undertake a detailed inspection of the wind farm area and accurately map weed extent.

Years 2 & 3: Undertake weed inspections, update GIS database with necessary changes.

Objective 2: A risk-based weed management plan is developed for the wind farm site.

Year 1: Develop a risk-based weed management program

Years 2 & 3: Implement weed management program, undertake weed inspections and schedule and undertake necessary weed treatment.

Objective 3: Reduce presence of noxious and environmental weeds.

Year 1: Implement management actions for high risk areas identified in the detailed weed inspection. Develop specific actions e.g. Targeted spraying of (insert weed) in (insert area)

Years 2 & 3: Implement weed management program. List specific actions.

If you require any further information regarding this matter, please contact Nikki Pridgeon, Senior Conservation Planning Officer, via nikki.pridgeon@environment.nsw.gov.au or (02) 5852 6807.

Yours sincerely



Liz Mazzer
A/ Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

17 February 2023

BCS's recommendations – OzArk Responses

Stubbo Solar Farm – Biodiversity Management Plan

Section	Text	Recommendation	Response
Figure 1-1	Image	Ensure that environmental exclusion zones mapped in Figure 1-1 match those in Appendix 1 of the Development Consent for SSD 10452.	Image updated.
1 Introduction	N/A	BCS has records of a Stage 1 BMP associated with the road upgrades for this project. Please confirm if this BMP covers only Stage 2, (ie solely the solar farm), or if this BMP will also replace the Stage 1 BMP.	Clarified that the BMP only relates to Stage 2.
2.1 Project Consent Conditions	The BMP includes Schedule 3, Conditions 14 and 15 from the Development Consent	The text and table numbers in section 2.1 of the BMP differ from those in the Development Consent. BCS recommends that this section of the BMP be reviewed to ensure it is consistent with the Development Consent.	Development condition consents updated, including the revision approved by DPE on 7 June 2022. ▲
Table 2-2 Species Credit Requirements	Project site credits	Number of credits on the project site for Tumut Grevillea and Silky Swainson-pea do not match the Development Consent. BCS recommends that table 2-2 of the BMP be reviewed to ensure it is consistent with the Development Consent	Development condition consents updated, including the revision approved by DPE on 7 June 2022.
3.3 Biodiversity	Two Plant Community Types (PCTs) were recorded	Recommend including mapping, photographs and site-specific descriptions of quality and main features of each PCT. This will help with establishing the baseline vegetation quality to compare against for future reporting. Noting, this information can be an appendix.	Appendix B contains information relating to PCTs.
3.3 Biodiversity	N/A	It would be helpful to have a new section 3.4 listing recorded weed and pest species. Descriptions of abundance or areas of existing weed outbreaks (e.g. photos or maps showing the location/extent) would help with description of the baseline weed levels to compare against for future reporting.	Section 3.4 created that lists weed and pest species. A pre-construction weeds survey

Section	Text	Recommendation	Response
			will be undertaken.
Table 4-1 Site environmental risks, mitigation measures, monitoring responses and responsibilities	N/A	Protocol 15 has not been included in this table. Please list under the relevant sub-headings	Table updated.
Table 4-1 Site environmental risks, mitigation measures, monitoring responses and responsibilities	Rehabilitation planting is likely to use something similar to “Hunter Nude Seed Mix”. And Rehabilitate and revegetate temporary disturbance areas with species that are endemic to the area.	More detail is needed here or in a relevant protocol. For example, specifying management zones or mapping where the rehabilitation plantings will occur. Likewise for Summary of Monitoring column, where frequency and target of monitoring of the rehabilitation actions need to be specified. More information is provided in the recommendation for Section 4.10 Rehabilitation.	Rehabilitation throughout BMP now refers to Condition 12 Schedule 3, return site to agricultural use and grazing. Monitoring frequency updated.
Table 4-1 Site environmental risks, mitigation measures, monitoring responses and responsibilities	Regular (fortnightly) inspection and maintenance of fencing during construction and monthly during first year of operation.	Recommend updating fencing inspections to be conducted twice a week during construction to increase chances of locating and rescuing any injured fauna.	Updated to weekly due to size of the site and staged approach to fencing.
Table 4-1 Site environmental risks, mitigation measures, monitoring responses and	N/A	Will there be any fire management practices occurring within/around the vegetated no go zone? If so, create a new fire management row in Table 4- 1 and an associated protocol.	Section 6.13 now states “Lighting of fires is prohibited within the exclusion fencing/exclusion zones”

Section	Text	Recommendation	Response
responsibilities			
Table 4-2 Monitoring and reporting requirements	N/A	It is unclear where some of these monitoring actions will occur e.g. across the whole site, versus only within the main or all environmental exclusion zones. Please specify in the introductory text or split up table to show if actions will be different between certain zones across the project site. Provide additional mapping to show different management zones if required.	The monitoring will occur in the development area. Explanatory sentence added to Section 4.
Table 4-2 Monitoring and reporting requirements	Increase in weed density and distribution from baseline	Increase by how much specifically? Include a numerical threshold which would trigger an action. Is there a secondary threshold, for example emergence of certain priority weed species which could also trigger additional actions?	Table updated to incorporate numerical thresholds.
Table 4-2 Monitoring and reporting requirements	Feral pests are detected within the project site. And Feral pests are detected.	Does this mean any feral pest sighting is to be reported/actioned, or only specific species? Other refinement options could include restricting to evidence of new or increasing pest activities. Such as sightings of new pests, burrows/breeding activity or pests found in previously pest free areas.	Table updated with known feral species. Table updated to include potential new species.
Table 4-2 Monitoring and reporting requirements	Quarterly for first three years of operation then as required.	Recommend continued monitoring at specified intervals until revegetation goals are met, rather than after three years regardless of success. This would require success and performance criteria to be established in this BMP as mentioned in other comments.	Updated to include half-yearly inspections for the life of the project.
Section 4.4 Summary of Reporting	Performance in relation to carrying out works in accordance with this BMP.	There are no performance criteria for this BMP. Short, medium and/or long term goals to measure success against are required. Include SMART goals for all relevant actions e.g. "Increase groundcover species diversity by 10% by 2025 in Management Zone A."	Section 4.5 has been included to address this comment.

Section	Text	Recommendation	Response
Section 4.6 Review and Improvement	Continuous improvement of this BMP will be achieved by the ongoing evaluation of performance...	Recommend also specifying a timeframe for periodic review of BMP i.e. every X years.	Addressed in re-numbered section 4.7.
Section 4.10 Rehabilitation	The entire area will be re-seeded after construction using locally endemic seeds.	More detail is required, unless completely deferring any rehabilitation to a secondary end of operations BMP. Information can be detailed in the management protocol and Monitoring/Reporting sections, including: - Completion timeframe post construction - Locations (Is this just the project site i.e. not the vegetation exclusion zone?) - Will re-seeding be to achieve a certain PCT or agricultural pasture as per Schedule 3 condition 12 of the Development Consent? - What is the end goal e.g. certain ground cover percentage of native species. More detail of the intended species to be planted in overstory, shrub layer, understorey etc. - Are there any exclusions? - What are the triggers for additional revegetation e.g. loss of certain percentage of tube stock, additional plantings post fire/drought to maintain a certain baseline etc.	Section 4.10 revised and updated to align with Schedule 3, condition 12.
Section 6.2 Protocol 2 – Habitat Tree Removal	The contractor should wait a minimum of two minutes between shaking the tree and felling the tree to allow time for fauna to emerge.	Recommend that tree shaking occurs multiple times before beginning to fell tree.	Included in protocol.

Section	Text	Recommendation	Response
Section 6.2 Protocol 2 – Habitat Tree Removal	Felling will involve gently pushing the tree and lowering or felling using a forestry harvester to avoid sudden falling as this is likely to injure or kill wildlife.	Recommend staged felling of trees where possible. Removal of non-hollow bearing limbs should occur first.	Included in protocol.
Section 6.4 Protocol 4 – Stockpiles and Re-using Resources as Woody Debris	N/A	Recommend also including parameters for reuse of bushrock – see Guide 5 for examples https://roads-waterways.transport.nsw.gov.au/business-industry/partners-suppliers/documents/guides-manuals/biodiversity_guidelines.pdf	Included in protocol.
Section 6.5 Protocol 5 – Weed Management	Weed abundance and fuel load to be managed through monitored sheep grazing... And ... with regimes based on annual vegetation surveys (BAM plots).	More detail is required around sheep management e.g. where this can/can't occur, maximum stock densities, any limitations (e.g. cannot occur in drought conditions of when groundcover drops below X%). The type and frequency of monitoring, and requirement for refining of any grazing strategy, should be specified in relevant sections of Part 4 of the BMP.	Sheep management included. Pre-construction weed survey will be completed and provide additional information.
Section 6.6 Protocol 6 – Feral Pest Management	Measures to control feral and overabundant native herbivores:	Are there separate steps which are intended to be included for overabundant native herbivores other than erecting fencing? If not, suggest deleting this reference.	Reference deleted.
Section 6.6 Protocol 6 – Feral Pest Management	Species management will be determined by species specific culling requirements as follows:	Please define at the start of this protocol, which pest species are intended to be controlled under this BMP. Then include any other species-specific controls required, for example foxes, cats or birds in dot point below. See 'PestSmart' website for further details	Known species included.

Section	Text	Recommendation	Response
		https://pestsmart.org.au/	
Section 6.8 Protocol 8 – Erosion and Sediment Control	Install erosion and sediment control measures prior to any works.	Are any permanent/temporary controls needed for specific watercourses? General control descriptions are fine as detail will be in the Erosion and Sediment Control Plan.	Protocol now refers directly to ESCP.
Section 6.8 Protocol 8 – Erosion and Sediment Control	Avoid stockpiling of materials adjacent to native vegetation, use cleared/disturbed areas.	Recommend also expanding this sentence to include near watercourses.	Protocol now refers directly to ESCP.
Section 6.13 Protocol 13 – Exclusion Fencing/No-Go Zones	To reduce the potential for impacts to existing flora and fauna, it is recommended that the following exclusion fencing/ No-Go Zones construction and management protocol be implemented:	Additional controls needed for rubbish disposal, prohibition of wood collection and lighting of fires are needed here, as per commitments in Table 33 of BDAR.	Additional controls added.

Appendix D – CPHR (previously BCS) Letter re Revised Biodiversity Offsetting requirements and Confirmation of Retirement of Credits

On 7 June 2022, the Biodiversity Offsetting Targets of Condition 14 of Schedule 3 were revised, as set out in the letter below. On April 16 2023, ACEN Australia provided payment into the Biodiversity Conservation Fund to meet its' offset obligations (to this revised Condition 14 of Schedule 3).

Department of Planning and Environment



Our ref: Stubbo Solar (SSD-10452-PA-1)

Mr Cedric Berge
Development Manager
UPC/VAC Renewables Australia
Suite 2 Level 2
15 Castray Esplanade
Battery Point TAS 7005

Via email

07/06/2022

Subject: Review of biodiversity offset requirements

Dear Mr Berge

I refer to your letter dated 12 April 2022 requesting revision of the biodiversity offset requirements under condition 14 of Schedule 3 of development consent SSD 10452, following targeted biodiversity surveys.

The Department has carefully reviewed the information provided and notes that:

- project works have not yet commenced at the site;
- the request is supported by a Targeted Species Survey Report (Eco Logical Australia, 13 December 2021), including an updated Biodiversity Assessment Method Calculator (BAM-C) and updated spatial data;
- targeted survey work demonstrated absence of a number of species credit species for which presence was initially assumed (without targeted survey) for the project site;
- the Department's Biodiversity Conservation and Science Directorate (BCS) supports the proposed changes to biodiversity offset requirements noting the results of the survey work.

Accordingly, the Planning Secretary accepts the revised biodiversity offset requirements under condition 14 of Schedule 3, as set out in tables below.

Table 1: Ecosystem Credit Requirements

PCT ID	Credits Required	
	Road Upgrades	Project Site
81	40	-
266	2	-
281	111	354
1177	19	-
1770	-	2

Table 2: Species Credit Requirements

Species Credit Species	Credits Required	
	Road Upgrades	Project Site
Barking Owl (<i>Ninox connivers</i>)	-	195

If you wish to discuss the matter further, please contact Javier Canon on 02 9373 2821 or at Javier.Canon@planning.nsw.gov.au

Yours sincerely



Nicole Brewer
Director
Energy Assessments

Appendix E – CPHR (previously BCS) Letter re BMP Stage 1 Approval.

Department of Planning and Environment Our ref: SSD-10452-PA-4 Mr Cedric Berge Development Manager ACEN Australia 15 Castray Esplanade Battery Point, Tasmania 7004 29/09/2022 Biodiversity Management Plan (Stage 1) for Stubbo Solar Farm (SSD-10452) Dear Mr Berge I refer to your submission requesting approval of the Biodiversity Management Plan (Stage 1), which was submitted in accordance with Condition 15 of Schedule 3 for the development consent for the Stubbo Solar Farm. The Department has carefully reviewed the document and is satisfied that it addresses the requirements of Condition 15 of Schedule 3 of the development consent. Accordingly, as nominee of the Planning Secretary, I approve the Biodiversity Management Plan (Stage 1) (version 2, dated 27 September 2022). You are reminded that if there are any inconsistencies between the approved document and the conditions of approval, then the conditions of approval prevail. Please ensure you make the document and this approval letter publicly available on the project website. If you wish to discuss the matter further, please contact Javier Canon on (02) 9373 2821 or at Javier.Canon@planning.nsw.gov.au. Yours sincerely  Nicole Brewer Director Energy Assessments As nominee of the Planning Secretary	
4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150 www.dpie.nsw.gov.au 1 Locked Bag 5022, Parramatta NSW 2124	

Appendix F – Grazing Management Plan



Stubbo Solar Stage 2b

Grazing Management Plan



VersionV6		
Issued to:		
Prepared by	Reviewed by	Approved by
Patric Millar Director, Ecosite Solutions Pty Ltd	Helen Barby-Millar Director, Ecosite Solutions Pty Ltd	Patric Millar, Director, Ecosite Solutions Pty Ltd
Revisions		
Version No.	Version date	Version type
V1	20/05/2024	Issued for internal review
V2	24/05/2024	Issued to Accent for review
V3	19/03/2025	Issued to ACEN for review
V4	28/05/2025	Issued to ACEN for Distribution
V5	16/09/2025	Issued to ACEN for Distribution following review
V6	21/01/2026	Final version following ACEN Review

ACEN Australia

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Appendices

Appendix A – MLA Pasture Ruler

1

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Abbreviations

Abbreviation	Explanation
Accent	Accent Environmental Pty Ltd
ACEN	ACEN Australia Pty Ltd
BESS	battery energy storage system
BMP	Biodiversity Management Plan
CoC	condition of consent
DPE	Department of Planning and Environment (now DPHI)
DPHI	Department of Planning, Housing and Infrastructure (formerly DPIE or DPE)
EIS	environmental impact statement
EMS	Environment Management Strategy
EP	Emergency Plan
ESCP	erosion and sediment control plan
HSEQ	Health, Safety, Environment and Quality
km	kilometre
kV	kilovolt
MW	megawatt
NSW	New South Wales
O&M	operations and maintenance
OEMP	Operations Environmental Management Plan
PCL	PCL Constructors Pacific Rim Pty Ltd
PV	photovoltaic
Ramboll	Ramboll Australia Pty Ltd
SMC	Safety Management Centre
SWMP	Soil and Water Management Plan
WMP	Waste Management Plan

Definitions

Unless the contrary intention appears, the meanings of the terms used in this Grazing Management Plan are set out below:

Activities	means checking on the welfare of the stock, moving the stock to and from the Licensed Area, vaccinating the stock and installing temporary yards on the Licensed Area to assist in undertaking the aforementioned activities;
Approved Personnel	means employees, officers, agents, contractors and invitees;
Grazing Protocol	means Stubbo Grazing Protocol;
Lease	has the meaning given to it in the Licence;
Leased Area	has the meaning given to it in the Licence;
Licence	means the licence agreement between the Licensee and Stubbo 1 to which the Grazing Protocol is annexed;
Licensee	has the meaning given to it in the Licence;
Licensed Area	has the meaning given to it in the Licence;
O&M Building	means the operations and maintenance building located on the Solar Farm;
O&M Contractor	means PCL Constructors Pacific Rim Pty Ltd ACN 140 877 782] and thereafter, a contractor advised by Stubbo 1 to be the operations and maintenance contractor for the Solar Farm;
Solar Farm	means a series of solar photovoltaic modules, associated mounting structures (being fixed or tracking in nature), inverters and transformers interconnected to an electricity grid via a substation, associated roads, fencing, cabling and other works (including battery storage) situated on the Leased Area (and includes any of the Solar Farm Equipment) used for the Solar Farm under the Lease;
Solar Farm Equipment	means each fixture, fitting, furnishing, plant, equipment, conduits, cables, pipes and any other item which is in the Leased Area (where applicable), which the Licensee does not own, lease or provide Stubbo 1 and includes any solar monitoring equipment, data recording equipment, solar modules and solar mounting structures (fixed and / or tracking in nature), solar inverters, transformers, switchgear, maintenance facility, energy storage system, (if required), appropriate site drainage, fencing and any other associated equipment situated in or upon the Leased Area, whether installed prior to, on or after the commencing date of the Lease;

Stubbo 1	means Stubbo 1 Pty Ltd (ACN 658 322 457) as trustee of the Stubbo 1 Solar Project Trust (ABN 52 921 406 762) as licensor under the Licence;
Stubbo O&M Team	means the following Approved Personnel of the Stubbo 1 team performing operations and maintenance services for the Solar Farm (which may change from time to time at the direction of Stubbo 1): • Site Manager • Field Services Supervisor • Site Operations Manager WHS Advisor, Heritage and Grazing Liaison
Term	has the meaning given to it in the Licence.



1 Introduction

The Stubbo Solar Project (Stubbo Solar) is a 400 megawatt (MW) alternating current (AC) development with an allowance for future battery storage of up to 200 MW/2 hour. The project is located between Blue Springs Road and Barneys Reef Road, approximately 10 km North of Gulgong and 85 km east of Dubbo in New South Wales (NSW).

ACEN is the project owner and has engaged PCL Construction Pacific Rim Pty Ltd (PCL) as the engineering, procurement and construction (EPC) contractor to manage the Works for the 400 MW AC solar farm, solar farm substation, ancillary operational facilities and earthworks bench for the future battery storage. PCL will manage ongoing operation and maintenance services in the first two years of operations.

The Development Consent (DC) - Application Number: SSD-10452 – requires the preparation, approval and implementation of a Biodiversity Management Plan which will contain a Grazing Management Plan for the operation of phase of the Project. Commitments were also made by ACEN in the environmental impact statement (EIS) and the response to submissions (RTS) report to manage grazing the Project during operations.

1.1 Purpose and scope of this document

The purpose of this Grazing Management Plan (GMP) is to provide an overarching framework for the management of grazing within the Project during the operation of the Stubbo Solar. It is designed to provide guidance to both the Stubbo O&M Team and the Grazing Licensees to meet the obligations of the SSD 10452. The GMP covers the operational phase of the Project which will initially be undertaken by PCL. Grazing on the Site will be managed through a Grazing Protocol between ACEN and the Grazing Licensee.

2 Grazing Management Objectives

Grazing of livestock is undertaken to achieve a range of outcomes. Traditionally, this is focussed on livestock production outcomes such as:

- Meat production, and
- Wool production.

Additionally in a solar farm setting the following outcomes are required:

- Groundcover management for erosion control,
- Effective weed management, and
- Vegetation management for fire hazard reduction.

Grazing management is achieved through a combination of the following factors:

- Balancing forage growth and use so that land condition is improved,
- Accurate assessment of pasture quality and quantity,
- Accurate assessment of animal demand for forage,
- Optimisation of water point distribution and paddock design, and
- Management of stocking rates to reach production and land condition targets.

Grazing of the land associated with solar farms is increasing in popularity in Australia. The reason being that ground mounted panels allows sufficient space for animals such as sheep to graze underneath (Clean Energy Council 2021). This reduces the reliance on mechanical or chemical means for vegetation control. Figure 1 shows sheep grazing in a solar farm.

Figure 2 – Sheep grazing within Solar Farm (Copyright ACEN Australia)



Grazing on the Site will be managed through a Grazing Protocol between ACEN and the Licensee.

2.1 Livestock types

Grazing of livestock within the Gulgong region is dominated by cattle and sheep enterprises. There is also opportunistic grazing of goats. Grazing of cattle within solar farms is generally not undertaken. This is because cattle are large beasts, and they can damage panels and other infrastructure. Similarly, goats are not suitable for grazing within solar farms because of their tendency to climb on panels and eat exposed items such as wiring.

Sheep grazing is the preferred livestock management tool for grazing within solar farms. Sheep have been successfully grazed in solar farms within Australia and the United States. Grazing has been achieved on many solar farms in Australia where panels are attached to fixed axis arrays on a 20-degree tilt, where the height of its panels sits as low as 30 cm above ground level (Downer 2019).

2.2 Grazing Management options

There are several approaches to grazing in the landscape. These include rotational grazing, set stocking, resting pastures for seed production, and supplementary feeding. When settling on a grazing technique it is important to understand why grazing is being undertaken. An effective grazing strategy addresses all or some the following landscape outcomes:

- Improved pasture quality,
- Increased livestock production,
- Weed control,
- Reducing fire risk through dry matter reduction, and
- Reducing environmental damage.

2.2.1 Set stocking

Set stocking involves grazing livestock for a set period of time in a particular paddock without any resting phase. This is quite common on small properties where landholders have low stock numbers and production is not a major objective.

Where a property consists only of one main grazing area, and has not been subdivided into smaller paddocks, the landholder often has no choice but to apply set stocking. In this case the overall stocking rate is generally calculated so that area of land will carry a set number of livestock for the year.

A common problem with set stocking is the potential for the build-up of weeds and a decline in pasture quality. Livestock tend to consume palatable pasture species and leave the unpalatable species, which in many cases are weeds. This is known as 'selective feeding'. In this situation, the seed set of weeds increases and the balance of the pasture changes as weeds begin to dominate the pasture.

A recommended set stocking rate will depend on the quality of the available pasture. A range of 2.5 to 5 Dry Sheep Equivalent (DSE) per hectare is recommended (Evergraze no Date). A DSE is used as a method of standardising an animal unit and is the amount of feed required by a two year old, 50 kg Merino wether to maintain its weight.

2.2.2 Rotational grazing

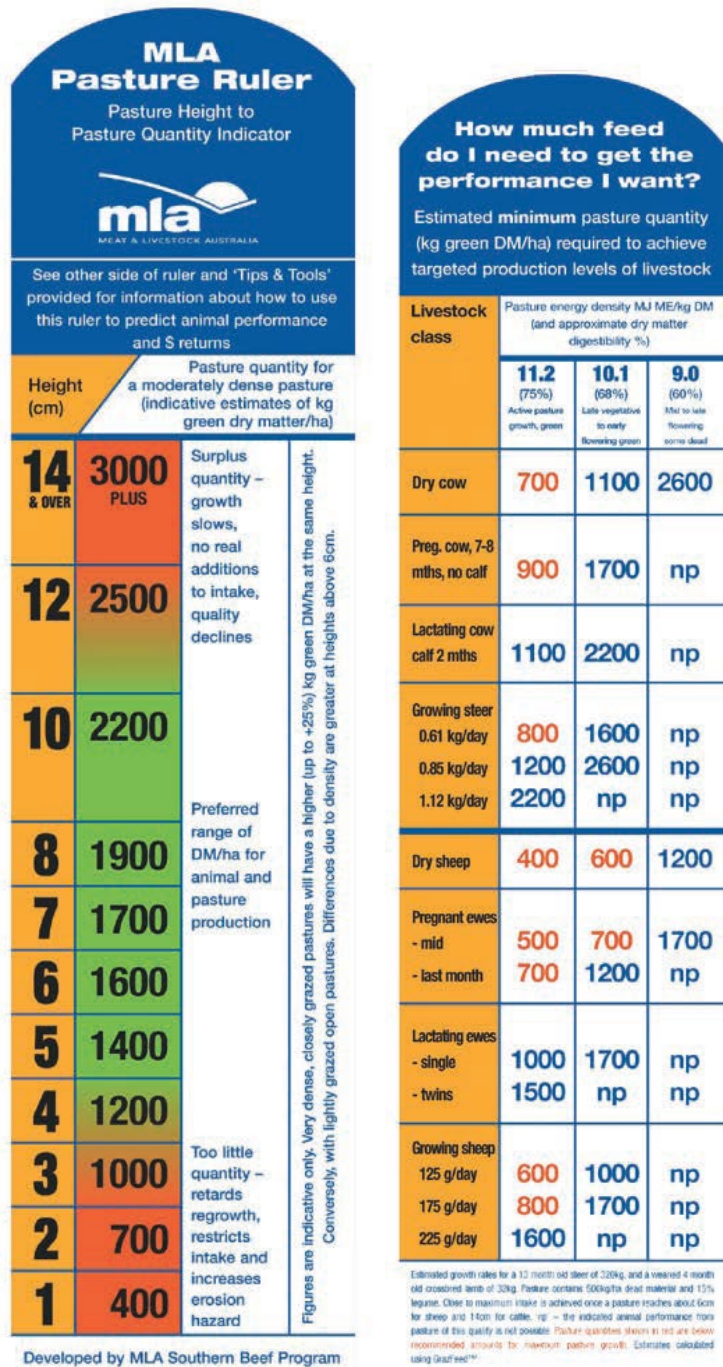
Rotational grazing is a practice where livestock are grouped together and rotated through a number of paddocks in order to rest pastures. Resting pastures is a vital practice if landholders

wish to improve pasture quality, reduce weeds, and increase productivity. This process relies on the rest period being long enough to allow sufficient pasture growth so that grazing can begin again.

Rotational grazing can increase stocking rates by up to 20% compared with set stocking. Under these circumstances grazing pressure is higher than under set stocking and relies on more intensive grazing of the vegetative pasture phase. Livestock graze less selectively when grazing pressure is high which helps to keep weeds under control.

Rotational grazing helps to reduce 'patch' grazing and livestock camps, minimises broadleaf weeds and annual grasses. It also provides a more even distribution of manure and urine to the pasture. If managed appropriately ground cover over summer will be improved. It is essential that paddocks are not grazed for too long since this will result in plants not recovering as quickly as they should. The height at which pastures are grazed is a critical part of the success of this grazing strategy. Pasture utilisation is best when plants are growing between 5 cm and 12 cm. The use of a pasture ruler such as the one designed by the Meat and Livestock Authority (MLA) is helpful when estimating pasture height (Figure 2). A full explanation of the MLA Pasture Ruler is contained in Section 2.6.

Figure 3 – MLA Pasture Ruler



2.3 Intensive rotational grazing

This grazing system involves stock being rotated frequently (every 3 – 10 days) through a large number of paddocks (up to 20). Intensive rotational grazing systems are also referred to as:

- high density grazing
- short duration grazing
- block grazing
- strip grazing
- cell grazing.

Intensive grazing is a very efficient method of utilizing pasture and relies on rotations being planned around the most desirable plant species in the pasture which grow actively in different seasons.

Stocking densities are very high and so grazing periods are short. They can be as low as one day depending on pasture growth rates and stock numbers. Stocking densities of 100 Dry Sheep Equivalent (DSE) per hectare and higher are manageable provided paddock numbers and resting periods are carefully determined.

Dairy farmers have used intensive rotational grazing as an efficient grazing strategy for decades. The use of electric tape is effective, and animals quickly adapt to the system.

Speeding up the rotation when growth is rapid is important to ensure pasture can be maintained in the vegetative state with plenty of leafy grasses and a high legume content. During spring some paddocks will need to be dropped out of the rotation and used for silage or hay production if they cannot be kept to below 10 cm in height to align it to the provisions of the Stubbo Operational Emergency Management and Operations Plan. Avoid grazing pastures lower than 4 cm if using this system and monitor pastures to avoid overgrazing.

2.4 Grazing to manage pasture species

During the construction phase the site was sown with a range of perennial grass pastures species. Given the placement of panels and other infrastructure the ability to resow areas that may become degraded for some reason are limited. Degradation of pasture species may occur due to poor management, adverse climatic conditions or overgrazing from feral animals. Particular care needs to be taken during flowering and seed set, and during establishment because pastures are particularly vulnerable to overgrazing at these stages.

Grazing undesirable species to prevent seed set, or resting desirable species to encourage seed production are two key strategies to maintain pasture quality.

Lack of attention to grazing management is the cause of common problems in grazing land ecosystems, such as:

- The loss of desirable pasture plants, which are usually replaced by undesirable ones,
- Forage supply being out of balance with forage demand,
- Livestock not meeting production targets,
- Declining land condition, and
- Uneven use of pasture, with some areas of paddocks grazed out and others hardly touched.

2.5 Weed management

There are six principles of weed management.

The following principles provide a basis for managing weeds.

1. Awareness—be aware of existing and potential weed problems.
2. Detection—be on the lookout for new weed infestations before they become too large and difficult to contain.
3. Planning—prioritise efforts and plan a strategy for successful control.
4. Prevention—is better than a cure, so preventing new weed infestations and containing spread of existing weeds will make life easier.
5. Intervention—and do it early. Controlling weeds now rather than later will prevent them spreading out of control.
6. Control and monitor—as always, monitoring is a critical component in weed management. Managers need to gauge how well they are controlling weeds and re-plan their efforts for the future.

Managers need an understanding of weed ecology to prevent introduction of new weeds and contain existing weeds. The knowledge of a weed's life cycle can help to identify the weed's strengths and weaknesses. This assists the formulation of plans to attack the weed's weaknesses and avoid its strengths.

Important facts to know:

- how weeds are transported and how they spread
- the preferred habitats of a species and what grazing management regime encourages its growth
- the relative life of seeds of different species

Good property weed hygiene is essential. Early intervention is also critical, knowing the location of weeds on the property and prioritising actions to control them as soon as possible can prevent any future outbreaks. Weed management is addressed in the Biodiversity Management Plan but may include strategic grazing or herbicide application. Maintaining high standards of vehicle hygiene will also minimise weed incursion.

It is important to know where weed outbreaks have occurred in order to monitor the success of initial control measures.

Follow-up management is also important. Monitoring suspect areas and areas where weeds were previously controlled will help to prioritise weed management. Ensure that grazing management enhances land condition to help reduce weed problems and recognise that failure to manage early weed problems leads to major outbreaks.

2.6 Measuring pasture cover

In this system, the total area to be grazed (i.e., the solar farm unit) is managed by use of temporary electric fences to provide paddocks. Animals will be confined to each paddock for a specified residency period, i.e., the number of consecutive days of grazing before being moved to a new paddock. This approach allows the remainder of the pasture a rest period to regrow. The rest period necessary for grass to recover to grazing height is dependent on climatic conditions. This may be between 30 and 60 days. It will generally be faster in early spring, and slower in late summer/autumn, and is influenced by soil characteristics and weather variability. The sheep are managed in a controlled manner and not allowed to freely roam or continuously

graze. This approach should inhibit weed growth, improve the health of pasture, sustain healthy vegetation, and improve sheep health.

There are several methods to measure pasture growth. It is recommended that the Meat and Livestock Australia (MLA) Pasture Ruler is adopted as the pasture measurement tool for Stubbo Solar. The tool is easy to use and is well supported within industry. See Figure 3 for typical use of the tool. A copy of the MLA Pasture Ruler can be obtained from the MLA at <https://www.mla.com.au/> A full set of instructions for using the MLA Pasture Ruler is contained in Appendix A.

Figure 4 – Usage of the MLA Pasture Ruler



2.7 Stubbo Solar sheep grazing

To achieve the objectives outlined above, a rotational sheep grazing system is proposed, and a grazing plan has been designed as a template for the potential grazier(s). It is proposed to divide Stubbo Solar into eight discrete Licensed Areas based on the Grazing Licensee, further subdivision of these areas will be at the discretion of the Grazing Licensee. . In order to minimise disruption to site operations any internal temporary fencing should follow internal roads. The current Grazing Area layout is shown in table 1. This system will be subject to ACEN and the Grazing Licensee and the Grazing Protocol.

Table 7 – Grazing Licensees.

Licensed Area	Panel Blocks	Grazing Area (ha)
LA1 South	16 - 18	122
	23 - 28	
LA1 North 1	11 - 15	73
	Part 7.4, 8.3, 8.4, 9.3, 9.4	

Licensed Area	Panel Blocks	Grazing Area (ha)
LA1 North 2	1 – 6 (Part 7.1, 7.2, 7.3, 8.1, 8.2, 9.1, 9.2) 53 – 54 Part 55 (part 3) 58 – 61 Part 62 (Parts 1 and 3)	191
LA2	19 – 22 29 – 38 70 - 72	241
LA3 South	63 – 69 75 - 77	147
LA3 North	48 – 52 Part 55 (Parts 1, 2 and 4) 56 – 57 Part 62 (Parts 2 and 4)	107
LA4	40 - 47	95
LA5	39	12

The aim of the grazing regime on Stubbo Solar is to ensure that pasture growth under and adjacent to the panels does not exceed 10 cm in height to align it to the Bushfire Management Plan. Conversely it should not be allowed to drop below 2 cm in height. Initially it is planned to graze the paddocks for a period of two weeks grazing followed by four weeks of rest. However, regardless of the length of the planned grazing period, the actual movement of stock or rotation to a new paddock is based on plant height thresholds between 3 cm to 10 cm. This equates to a range of 1,000 and 2,200 KG green matter/ha and may vary with seasonal conditions. The goal is to maintain pasture height between 3cm and 10cm year-round. This may lead to shorter rotations during high growth periods and longer rotations during low growth periods. See figure 4 for indicative four paddock grazing pattern.

Figure 5 – Suggested grazing rotation pattern for a four paddock setup.



If the pasture growth begins to exceed 10 cm in height an increase in stocking rate will be required until the pasture height drops to 3 cm at which point stock can be removed and the pasture is allowed to recover. Then rotate stock around the four paddocks in a general program of two week grazing and six weeks rest.

Over time the pasture mix may move towards one dominated by native pasture species. Once this occurs it is possible to change the paddock configuration to two paddocks with a four weeks grazing followed by four weeks rest or a four-paddock rotation with four weeks grazing and twelve weeks resting.

As the pasture at Stubbo Solar was not fully established at the time of writing this plan no stocking rate has been recommended. Once the pasture is established the stocking rate will be determined in consultation with the relevant Grazing Licensee and will be guided by assessment of several sites using the MLA Pasture Ruler to determine the amount of green feed available. Once this amount exceeds an average of 5 cm growth or 1,400 kg green matter per ha then it is recommended that the MLA stocking rate tool be used to determine an initial stocking rate. The stocking rate tool is available here: <https://etools.mla.com.au/src/?v=4&r=18&linking=1#/sheep> and follow the prompts for paddock size, starting green matter, finishing green matter, pasture growth and stocking days. Initially use the default value for pasture growth, finishing green matter of 1,000 kg/ha and a grazing time of 7 days.

To get a rotational grazing system underway it is recommended that the pasture is growing at a rate of 800-1000 kg/ha. Depending on seasonal conditions and location, this may take 3-4 weeks. The rotational grazing system can then start with one week grazing on each paddock gradually increasing to reach two weeks grazing, six week rest over winter.

After a trial period, modifications may be required to the system to match pasture growth. It is a flexible system that will require monitoring as outlined in Section 2.6. The aim is to graze down to 3 cm pasture height then allow the pasture to regrow.

The rotational grazing system will also take into account animal health issues which may necessitate varying the duration of rotations. Pastures may need to be rested to minimise parasite burden such as worms, which will impact the length of the grazing period. This will be determined by the Grazing Licensee.

2.8 Drought management and supplementary feeding

Droughts are a natural occurrence within the Australian grazing landscape. However, the management of grazing within Stubbo Solar must be dynamic and respond quickly. The trigger for moving stock is when the pasture height drops to 3 cm. If a prolonged dry period or drought occurs stock are not to be returned to the paddocks until an average of 5 cm growth or 1,400 kg green matter per ha is measured for the paddocks using the MLA stocking rate tool. At no stage can stock be fed within Stubbo Solar, unless it is a supplementary feed designed to maximise the palatability of standing dry feed to minimise fire risk.

2.9 Stubbo cattle grazing

Cattle and goat grazing will not be allowed to graze within the Licensed Area due their potential to damage solar farm infrastructure. However they may graze elsewhere within the property boundary. If cattle or goats are detected within the Licensed Area then the Grazing Licensee will be contacted to arrange their immediate removal.

2.10 Solar Farm infrastructure considerations

A solar farm is different to a typical agricultural grazing enterprise. The main reason being is the presence of the infrastructure associated with the solar farm including solar panels, tilt motors, cable trays, inverters, and electrical cabling. Sheep have been successfully grazed in solar farms within Australia and the United States. The Clean Energy Council (2021) provides a number of examples of how sheep grazing has been integrated into Solar Farm developments.

The use of axial tracking systems has the potential to trap sheep's wool. However, most axial - tracking systems have installed motor guards to prevent the sheep's wool from being caught in the moving parts and universal joints of the motors which drive the solar array trackers. Motor guards also prevent sheep from hitting the equipment, including pressing the emergency stop buttons. Motor guards have been fitted to the axial – tracking system at Stubbo Solar.

The other potential issue with sheep within solar farms is the risk of sheep getting tangled on exposed wiring. Cables should be tightly secured to the rear of modules to minimise the risk of interference with module cabling or, at the extreme, the chance of strangulation (Clean Energy Council 2021).

3 Infrastructure

3.1 Temporary fencing

The Stubbo Solar site is fenced into eight Licensed Areas as detailed in Table 1. Each of these areas align closely to the cadastral boundaries, the Project's Boundary fence and block layout. They are fenced with security fencing and have strategically placed gates to allow for access. Where appropriate suitable temporary fencing may be installed by the Grazing Licensee to optimise grazing management. The use of electrified temporary fencing is encouraged to maximise grazing potential and access to stock watering points. If used, then it should consist of at least three electrified wires (Figure 5 and 7) or equivalent powered by either a battery or solar powered energiser. The exact location and style of any temporary fencing will be determined prior to the commencement of grazing operations and will be agreed to by ACEN and the relevant Grazing Licensee to ensure access to Solar panels and associated infrastructure is not impeded.

Figure 6 – Typical temporary three wire electric fence used for sheep grazing.



Figure 7 – Temporary electric fence between solar arrays.



Solar arrays are configured in long rows with occasional breaks within the row where cross-fencing can be located. The panel arrangement will dictate paddock dimensions and ideally should be along breaks between arrays such as internal roads. Electrified fencing should be posted to prevent accidental shocking of people and must be properly installed to function effectively.

3.2 Water supply

Sheep require a constant supply of clean water. The provision of stock water is the responsibility of the Grazing Licensee. There are thirteen existing farm dams on site which may be used for stock water, alternatively the Grazing Licensee may supply their own portable tanks and troughs. All water will be secured within the provisions of the Basic Landholder Rights as defined by the *Water Management Act 2000 (NSW)*. The water requirements vary according to stock type and feed quality. Average water requirements are shown in Table 2.

Table 8 – Average stock water requirements (MLA)

Stock type	Consumption per head per day (L)
Weaners – average all feeds	2–6
Adult dry sheep – grassland	4–12
Adult dry sheep – saltbush	4–10
Ewes with lambs – dry feed	2–4

An example of an existing farm dam is shown in Figure 7. It is ideal to have multiple water sources so that the proposed rotational grazing can be easily implemented. This will require the reticulation of additional watering points within the Grazing Areas. The exact location and type of the watering points will be determined prior to the commencement of grazing operations and will be agreed to by ACEN and the relevant Grazing Licensee to ensure access to Solar panels and associated infrastructure is not impeded. Sheep grazing at an existing dam on a Solar Farm is shown in Figure 8. A typical permanent concrete watering trough is shown in Figure 9 and a temporary PVC trough is shown in Figure 10.

Figure 8 – Existing dam Stubbo Solar.



Figure 9 – Sheep grazing at existing dam New England Solar (Copyright ACEN Australia).



Figure 10 – Example of concrete watering trough.



Figure 11 – Example of shared temporary PVC watering trough.



Stock do best on water that is fresh, cool and clean. Water should be low in salt (5,000–10,000 mg/L), low in organic matter (<20 mg/litre Dissolved Organic Carbon (DOC)), low in suspended clay (<200 Nephelometric Turbidity Unit (NTU)) and free of other toxic substances, such as blue green algae (NSW DPI 2014). Avoid using water that looks or smells bad. Water should be tested if there is any question of its suitability for stock. The major threat to water quality during drought is high levels of salt, although algae and animal manure can foul water following heavy summer rains or strong winds (Department of Economic Development, Jobs, Transport and Resources 2018). Annual testing of proposed water supplies is recommended. The use of tanks and troughs is recognised as the best mechanism to preserve water quality by ensuring that stock only drink at the trough and don't defecate or urinate in it.

3.3 Stock handling

Access to stock handling facilities will be required to undertake successful grazing on Stubbo Solar. Well-designed handling systems for animal checks, parasite monitoring and treatment are essential. They allow for the stock manager to undertake a range of animal management activities such as drenching, drafting, loading for transport and general health inspections. It is anticipated that the Grazing Licensee will utilise their current facilities and muster stock out of the Licensed Area for animal management activities. If temporary handling facilities are required, the exact location of these facilities will be determined by the Grazing Licensee and ACEN prior to the installation of facilities and the commencement of grazing operations. However, installation will only occur once there is written agreement between AECN and the

Grazing Licensee. Depending on the Grazing Protocol in place it may be possible to muster stock out of the Licensed Area into an adjoining paddock or property without the need for stock handling facilities to be installed.

4 Conclusion

A rotation grazing system for weed, fire and groundcover management is recommended for Stubbo Solar. Grazing should commence once construction has been completed and the pasture growth on site exceeds an average of 5 cm growth or 1,400 kg green matter per ha.

A successful grazing rotation on Stubbo Solar with sheep will be achieved through:

- Initial, planned grazing rotation
- Experience and ability to observe when the rotation days and stocking density must be adjusted throughout the season
- A well-managed and clean, healthy flock deployed on pasture
- Stringent treatment protocols for flock specific health issues
- Fulfilled nutritional requirements
- Access to feed supplements when required and clean and fresh water 24/7
- Pasture hygiene (limited faecal contamination, moving of high frequency areas like water and mineral)
- Health checks on every rotation cycle
- Well-designed handling systems for animal checks and parasite monitoring and treatment

The final stocking rate and paddock design will be determined by negotiation between ACEN and each Grazing Licensee and detailed in the Grazing Protocol.

■

5 References

Australian Government Department of Agriculture, Fisheries and Forestry, 2006 *'The Structure and Dynamics of Australia's Sheep Population'*, Office of the Chief Veterinary Officer

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Meat & Livestock Australia Limited *Improving pasture use with MLA Pasture Ruler* Factsheet FP03

Natural Resources Adelaide and Mt Lofty Ranges 2017 *Best practice land management guidelines for small grazing properties*

NSW Department of Primary Industries 2014 *Prime Fact 326 Water requirements for sheep and cattle 3rd Edition*

Appendix A – MLA Pasture Ruler

This 'Improving pasture use with the MLA Pasture Ruler' factsheet is provided under Creative Commons Licence CC-BY-SA 4.0
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tips&tools

FP03

FEEDBASE AND PASTURES

Improving pasture use with the MLA Pasture Ruler

The MLA Pasture Ruler provides the basis for a quick and easy way to estimate pasture mass (quantity) and quality. These estimates become a guide to the performance you can expect from your grazing animals.

The quantity of green feed on offer is related to a combination of pasture height, pasture density and percentage of dry matter (the non-water component).

Why assess pasture

Pasture assessment is the key to making better grazing decisions. To get the benefit of feed budgeting you need to know:

- **Quantity:** the mass of pasture available to your livestock; and
- **Quality:** the feed value of your pasture.

From this you can estimate the number of stock you can carry, for how long, and how well they are likely to grow. With feed budgeting you can determine when and how many stock you need to buy or sell with changing seasonal conditions; or alternatively how much supplementary feed will be needed.

Key benefits

- Increase your productivity by making better grazing decisions.
- Better manage stock numbers to increase the utilisation of available pasture.
- Learn to use the MLA Pasture Ruler to predict animal performance and dollar returns.

Pasture mass (kg green DM/ha)

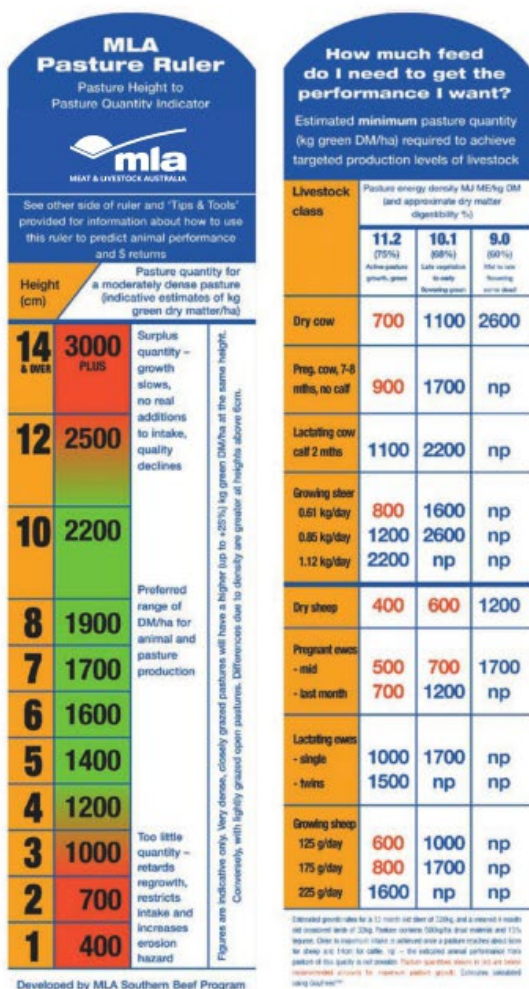
The quantity of green feed on offer has a big effect on how much pasture an animal can eat. If there is not enough pasture available (ie it is too short), animals spend more time and energy walking and grazing but may not be able to eat enough to achieve the performance you want. In contrast, when there is too much pasture for the number of grazing animals, pasture is wasted and quality declines. This reduces future intake and therefore the future performance of your stock.

The amount of green material present in a pasture is measured as kilograms of green dry matter per hectare (kg green DM/ha). This amount also affects the ability of the pasture to grow to its potential. When pastures are too short, there is insufficient leaf to capture sunlight and the energy for growth. If it is too long the lower leaves are shaded and plant growth declines.



1

Figure 1. The MLA Pasture Ruler



Measuring pasture height and converting to pasture mass:

1. Place the MLA Pasture Ruler vertically onto the soil surface. Do not push it into the ground or sit it on top of dead pasture.
2. Slide your thumb down the ruler until it touches green leaves. This measured height will generally be less than that of the taller leaves in the pasture.
3. Do not measure dead stems or leaves or unpalatable weeds like onion grass, as stock do not readily eat these. If no green pasture is present, height is recorded as zero.
4. Measure the height of the green pasture at an appropriate number of sites to get a good representative sample of the pasture availability. Depending on the physical characteristics of the paddock (eg slopes and aspect), the best method might be to walk across the paddock in a zigzag pattern, tossing the ruler out in front of you as you go (to account for variations in pasture height and density), taking measurements where the ruler lands and recording the observations.
5. To convert from the average pasture height in the paddock to kilograms of green dry matter per hectare, simply read the kg green DM figure from the adjacent column on the MLA Pasture Ruler.
6. For information on how to adjust for pasture density and percentage of dry matter, refer to the text below.

Pasture height

Simply by measuring pasture height an estimate can be made of the amount of green feed available in a paddock. Although approximate, this is a quick and easy way to assess the pasture mass.

The MLA Pasture Ruler is specifically designed to help with this assessment. With practice, this assessment can be made 'by eye', assessing the height and density of the pasture and estimating the amount of available herbage (kg green DM/ha). If pasture height is measured in an ungrazed area of the paddock at intervals of a week or so, an estimate can be made of how fast the pasture is growing.

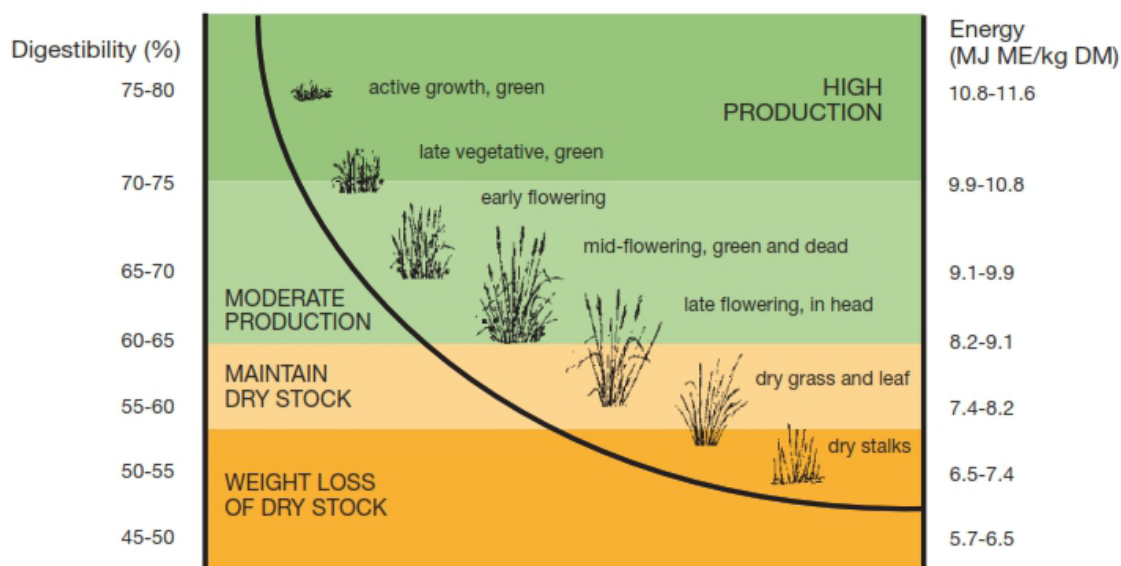
Pasture density

The MLA Pasture Ruler is a guide to pasture quantity for a **moderately dense pasture**. Adjust the estimate of pasture mass (up or down) according to the pasture density. Very dense, closely grazed pastures will have a high (up to 25%) kg green DM/ha at the same height. Conversely with lightly grazed open pastures.

Dry matter percent

The amount of moisture in plant material varies between species, growth phases, seasons and even weeks. There is a tendency to overestimate herbage mass in young actively growing pasture that may contain over 80% water (ie less than 20% dry matter), but as plants mature, dry matter content increases.

Figure 2. A guide to digestibility decline as temperate pastures mature



Pasture quality and animal needs

When pasture mass is assessed, stock numbers can be managed to increase the utilisation of available pasture as long as the quality and quantity is at or above the minimum benchmark for that class of livestock or performance level.

Pasture quality directly influences animal intake and production. This occurs in two ways:

- by influencing the amount of pasture consumed; and
- through determining how much of the feed consumed is converted into animal product.

There is no single measure of pasture quality. It is a combination of the proportion of legume, green and dead material, and digestibility – all of which affect pasture energy content.

Pasture energy content is the main driver of animal production and is measured as megajoules (MJ) of metabolisable energy (ME) per kilogram of dry matter (and is related to digestibility of the pasture). The higher the quality (and therefore energy content) the less the amount animals need to eat to achieve the same growth rate or level of milk production. Also, pasture of high energy (and therefore digestibility) takes less time to break down and moves quickly through the rumen. This allows more pasture to be eaten and therefore used for production.

Green, actively growing pasture is of the highest quality. Legumes such as clover are of higher quality than grasses at the same stage of development.

Figure 2 shows that as pastures mature the energy available for livestock production declines. This means that as pastures mature, animals need to eat more to achieve the same production level. However, it takes longer to go through the rumen so less pasture is consumed and animal production is reduced.

Developing skills in pasture assessment and feed budgeting enables estimation of the amount of feed available and calculation of the stocking rate for a known grazing period. By using the MLA booklet, 'Pasture tools for a profitable beef enterprise', you will be able to:

- Estimate stocking rate over short periods;
- Make better tactical grazing decisions about the short-term stocking rate per hectare;
- Plan seasonal pasture and animal performance to achieve targets; and
- Calculate the gross financial benefit to the grazing business.

This information enables the grazing operation to be more precisely managed and is highly applicable and useful to both cattle and sheep producers.

Balancing performance of both pasture and stock

How can quality and quantity of pasture be managed to maximise intake of nutrients by livestock? In general this is achieved by keeping high quality pasture within the band of 1,500 to 2,500 kg green DM/ha for growing cattle and 1,000 to 1,700 kg green DM/ha for sheep.

The MLA Pasture Ruler provides guidelines for the combinations of quantity and quality required by different classes of stock. By ensuring the right quantity and quality is available, production targets can be achieved. The table on the MLA Pasture Ruler provides a guide to pasture benchmarks indicating how much green herbage mass is required to satisfy the nutritional requirements of stock at various stages of their reproductive cycle, and for growth. The benchmarks provide 'ball park' estimates for the minimum green pasture mass on which stock can graze and still maintain satisfactory levels of production.

Managing natural resources

Managing pastures for highest pasture and animal productivity is also sound natural resource management. If pasture mass is maintained above a total of 1,000 kg DM/ha (green and dead), the surface movement of water, nutrients and soil is greatly reduced. Also, deep drainage of water is least when pastures are growing rapidly.

Further information

Skills in pasture assessment can be developed by participating in a MLA EDGENetwork Grazing Land Management® workshop. Call 1800 023 100 for more information.



To order your free MLA Pasture Ruler
call 1800 023 100 or go to
www.mla.com.au/creative-commons

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