Sapphire Solar Farm

Biodiversity Management Plan

May 2021

Delivering Energy, Powering Communities.

Document Control

Report Name	Date	Purpose of Revision	Author	Reviewer	CWP Reviewed and Approved By	Milestone
181016_SSF_BMP_D01	30/10/18	-	MF/PM (CWP)	MF (CWP)	EM	Submitted for OEH & DoE review and approval
181016_SSF_BMP_D02	26/11/18	Response to OEH and DoE comments on D01	MF (CWP)	EM (CWP)	EM	Submitted for OEH & DoE secondary review and approval
181016_SSF_BMP_D03	4/12/18	Response to OEH and DoE comments on D02	MF (CWP)	EM (CWP)	EM	Submitted for OEH & DoE tertiary review and approval
181016_SSF_D04	7/12/18	Finalised draft noting agency acceptance	MF (CWP)	EM (CWP)	EM	Submitted for DPE Secretary's review and approval
181016_SSF_D05	28/3/19	Response to DPE comments on D04	MF (CWP)	EM (CWP)	EM	Submitted for DPE Secretary's review and approval
190605_SSF_BMP_v01	5/6/19	Response to DPE comments on D05	MF/PM (CWP)	MF (CWP)	PM	Submitted for DPE Secretary's review and approval Version received Secretary approval
201214_SSF_BMP_v02	14/12/2020	Amendment to BMP for staging	LC	MF	EM	Submit for Secretary approval Version received Secretary approval
210512_SSF_BMP_v03	12/5/2021	Amendment to BMP for MOD 1	MH	LC	LC	Submit for Secretary approval

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Key Terms used in this Plan

Term	Definition
BC Act	Biodiversity Conservation Act (NSW)
BMP	Biodiversity Management Plan (this document)
BSC	Biodiversity, Conservation and Science Directorate within the Department
CEEC	Critically Endangered Ecological Community
CWPR	CWP Renewables Pty Ltd
Development footprint	The area within which it is permissible that impacts can occur. The area is shown in Figure 1-1.
DNG	Derived Native Grassland
DAWE	Commonwealth Department Agriculture, Water and the Environment and Energy (previously Commonwealth Department of the Environment)
DPIE	NSW Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning and Assessment Act (NSW)
EPBC Act	Environment Protection and Biodiversity Conservation Act (Cth)
EPC	Engineering, procurement, and construction
PCT	Plant Community Type
Priority Weeds	Defined as the Priority Weeds for the Northern Tablelands listed at (NSW DPI 2018): https://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=73
Project	Sapphire Solar Farm (SSF)
Proponent	Sapphire Solar Farm Pty Ltd
Proposed development	The Sapphire Solar Farm as described in the EIS.
Site	Area shown in Figure 1-1
SSF	Sapphire Solar Farm

1 Introduction

The Proponent (Sapphire Solar Farm Pty Ltd) has obtained development approval for the Project (Sapphire Solar Farm (SSF); shown in Figure 1-1). The Project involves the construction, operation and decommissioning of a utility-scale photovoltaic (PV) solar farm and battery-based storage at Kings Plains, within the Inverell Shire Local Government Area (LGA) 30 km east of Inverell in northern NSW.

The project has an approved generating capacity of approximately 180 megawatts (MW) and approval to build a battery storage facility with a capacity of 50 MW/100 MW hours.

The project is located on a 2,423 hectare (ha) site that is situated within and adjacent to the Sapphire Wind Farm. The Project will utilise some of the existing wind farm infrastructure including access roads and the grid connection point (the existing Sapphire Wind Farm substation which connects into the 330 kilovolt (kV) TransGrid transmission line).

The site is located within the New England Bioregion and the Glen Innes Guyra Basalts of the Macintyre River Catchment. The landform is gently undulating and has been extensively cleared for grazing, cropping and mining purposes. The approved development footprint within the site covers 458.5 ha and is irregular in shape as it was designed to largely avoid remnant native vegetation and watercourses, and to align with Sapphire Wind Farm infrastructure.

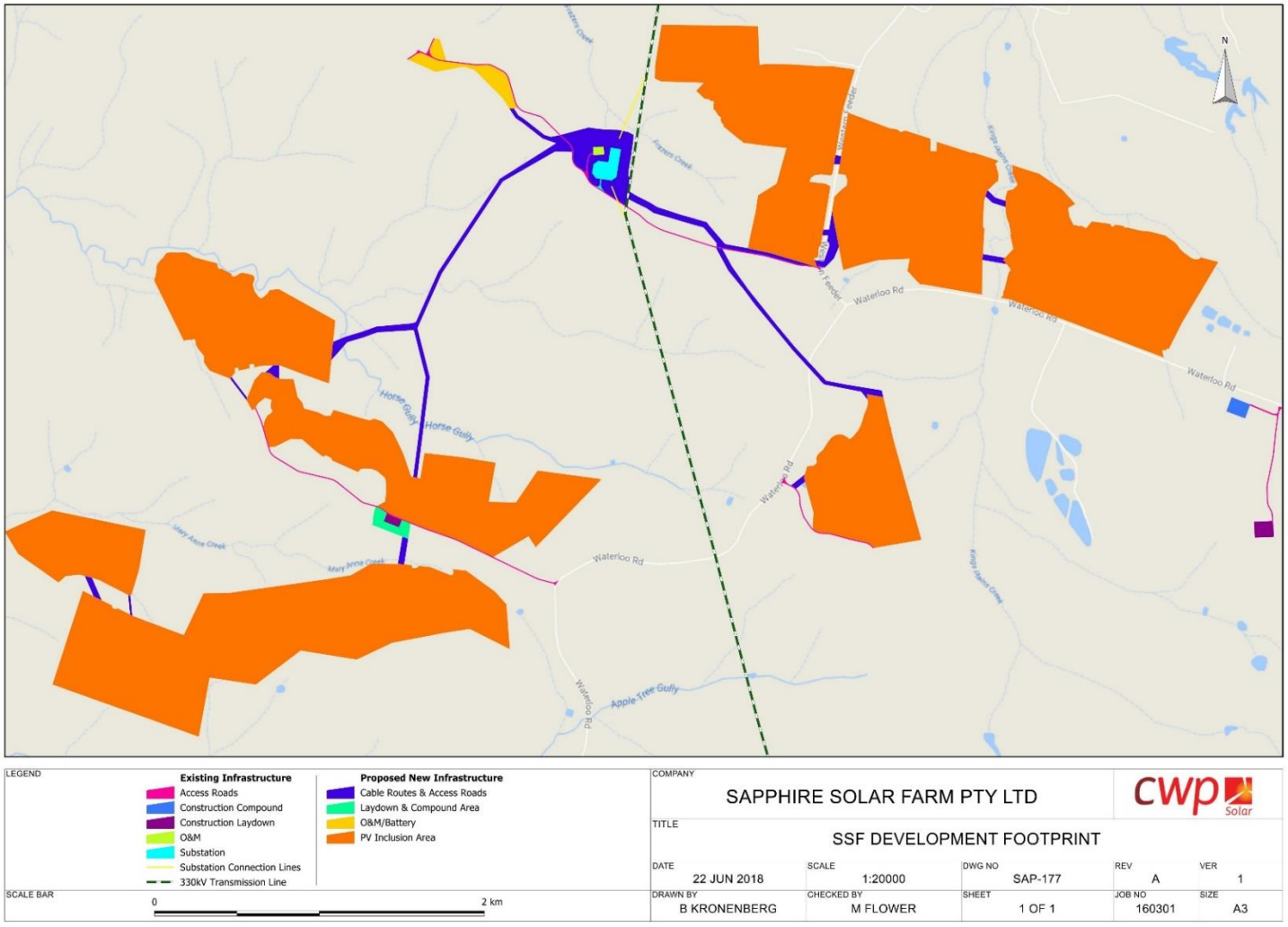
The Project was granted development consent by the DPIE under the EP&A Act on 16/8/18. It was also granted consent by the Minister for the Environment (according to the *Environment Protection and Biodiversity Conservation Act* (EPBC Act)) on 15/10/18.

The development approval is therefore conditional based on the consent conditions:

- NSW EP&A Act Development Consent SSD8643; and
- Commonwealth EPBC Act Approval 2017/8121.

This document is the Biodiversity Management Plan (BMP) required by, and addressing elements of, those approval conditions for construction and operation related to biodiversity management.

Figure 1-1 Project Layout



1.1 Project Staging

It is intended that SSF will be constructed and operated in stages.

Stage 1 will involve construction and operation of the battery storage component of the solar farm. This Stage will include establishment of electrical cables between the battery and existing Transgrid substation, construction of a site compound and operational maintenance facility. Access to the site will be via Western Feeder Road and the existing internal roads of Sapphire Wind Farm will be used.

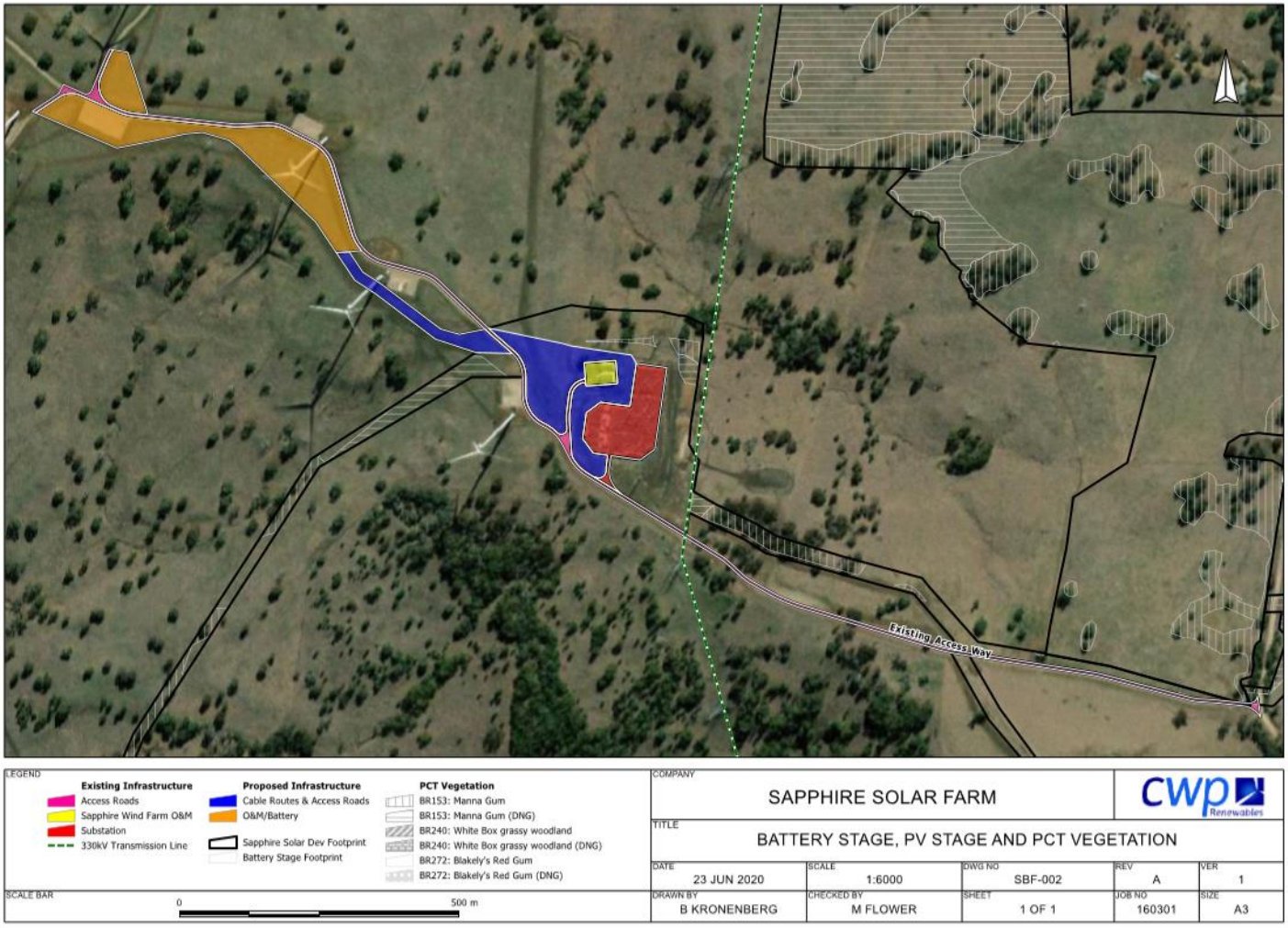
Construction is planned to commence in early 2021 and will take approximately 6 months. Once operational, the battery may be upgraded, added to and / or replaced.

Subsequent stage / s of the SSF will be the construction and operation of the solar photovoltaic (PV) component of the project.

Stage 1 will have a considerably reduced footprint and will not impact on any vegetation communities that require retirement of biodiversity credits.

Refer to Figure 1-2 for the general location of the Stage 1 infrastructure and proposed development footprint.

Figure 1-2 Stage 1 Project layout



2 Plan Purpose and Scope

2.1 Plan Context

This BMP has been prepared by CWP Renewables (CWPR) on behalf of the Project Proponent to:

- satisfy the requirements of the conditions of consent (detailed in Section 2.2); and
- enact commitments and management measures made in the Development Application (DA) (detailed in Section 2.3).

The content of the document has been guided by analyses and studies detailed in Section 2.4, as well as consultation required by the Conditions of Consent (Section 2.2).

The structure of the document is designed to create an efficient plan which presents the content required by the conditions of consent and proponent's commitments in DA documents, and links that to a clear and concise list of actions and responsibilities (refer to Sections 5 and 6).

2.2 Conditions of Consent

The consent conditions relevant to this plan, and the location at which they are addressed are demonstrated in Table 2-1.

Table 2-1 Conditions of Consent Relevant to this Plan and Plan Reference Location

Condition Number	Condition of Consent	Location in this Plan
NSW EP&A Act Development Consent SSD8643		
Schedule 3 Condition 9 **Restrictions on Clearing and Habitat**	The Applicant must:	-
	(a) avoid impacts to Bluegrass (*Dichanthium setosum*) and Austral toadflax (*Thesium australe*);	Section 4.1
	(b) minimise: - the impacts of the development on the Swift Parrot (*Lathamus discolour*); and - the clearing of native vegetation and key habitat within the approved development footprint.	Section 4.2
Schedule 3 Condition 11 **Biodiversity Management Plan**	Prior to the commencement of construction, the Applicant must prepare a Biodiversity Management Plan for the development in consultation with BCS and DAWE, and to the satisfaction of the Secretary. This plan must:	Biodiversity Management Plan (BMP): Whole document Consultation described in Table 2.4 Secretary satisfaction: Appendix A
	(a) include a description of the measures that would be implemented for:	-
	- minimising the amount of native vegetation clearing within the approved development footprint;	Section 4.2
	- minimising the loss of key fauna habitat;	Section 4.2

Condition Number	Condition of Consent	Location in this Plan
	- managing potential indirect impacts on threatened and migratory species, including:	-
	• flora species, including Bluegrass (*Dichanthium setosum*) and Austral toadflax (Thesium australe); and	Section 4.1
	• fauna species, including the Swift Parrot (*Lathamus discolour*);	Section 4.2
	- rehabilitating and revegetating temporary disturbance areas;	Section 4.3
	- protecting native vegetation and key fauna habitat outside the approved disturbance areas;	Section 4.2
	- maximising the salvage of vegetative and soil resources within the approved disturbance area for beneficial reuse in the enhancement or the rehabilitation of the site;	Section 4.4
	- controlling weeds and feral pests;	Section 4.5
	(b) include a seasonally-based program to monitor and report on the effectiveness of these measures against the detailed performance completion criteria; and	Section 5
	(c) include details of who would be responsible for monitoring, reviewing and implementing the plan, and timeframes for completion of actions.	Section 6
	Following the Secretary's approval, the Applicant must implement the Biodiversity Management Plan.	-
Commonwealth EPBC Act Approval 2017/8121		
Condition 1	To minimise the impacts of the action on protected matters	-
	a. The person taking the action must not clear more than 68.3 ha of Box Gum Woodland within the development footprint	Section 4.2
	b. The person taking the action must not clear more than 29.5 ha of woodland habitat for the Swift Parrot (*Lathamus discolor*) within the development footprint.	Section 4.2
	c. The person taking the action must not clear any bluegrass (*Dichantium setosum*) or Austral Toadflax (*Thesium australe*) within the site as recorded at Annexure B.	Section 4.1

Condition Number	Condition of Consent	Location in this Plan
Condition 2	The approval holder must comply with Conditions 1-4 of Schedule 2 and Condition 11 of schedule 3 of the state development consent where they relate to monitoring, managing, avoiding, mitigating, offsetting, recording or reporting on impacts to protected matters.	Regarding Condition 11, Schedule 3: Whole of this BMP

2.3 Development Application Commitments

In the various application documents the proponent made commitments in regard to environmental management. Table 2-2 presents the commitments made relevant to this plan and the location in this plan at which it is addressed.

Table 2-2 Development application commitments relevant to this plan and plan reference location

Document and Section	Commitment	Location in this Plan
EIS s8.1	The project's management plans will include:	-
	- Identification of the potential impacts of the Proposed Development and the measures identified to mitigate these impacts as described in Section 8.2 of this EIS;	Section 3
	- Details of how environmental safeguards are to be implemented;	Section 4
	- Details of the timing of the implementation of the mitigation measures;	Section 4
	- Clearly defined allocations of environmental responsibilities for all staff members and contractors;	Section 6
	- Monitoring and reporting requirements to demonstrate compliance with licensing and approval requirements; and	Section 5
	- Procedures for review and updating of the management plans.	Section 5
EIS s7.2.4: Table 7-7 EIS s8.2: Table 8-1 SoCs	The management plans will incorporate a biodiversity management plan that will specify controls to reduce impacts including:	Whole of this BMP
	- An induction and awareness program for construction workers;	Appendix B: Indicative Worker Induction – Biodiversity Content
	- Protocols for demarcating remaining vegetation (including signage) and clearing trees near remaining vegetation;	Section 4.2
	- Methodology for a two stage clearing process;	Section 4.2
	- Requirement for nest boxes;	Section 4.2

Document and Section	Commitment	Location in this Plan
	- Develop a plan for replanting and vegetation management (including soil stabilisation and rehabilitation);	Section 4.3
	- Develop a plan for on-going weed control; and	Section 4.5
	- Monitoring program focusing on on-going impacts, including erosion.	Section 4.3; Section 5
RtS Table 2.1	Commits to develop a procedure to: - avoid threatened flora (*Dichanthium setosum*), update impact assessment if impact required, and offset impacts via species credits; and	Section 4.1
	- provide a detailed procedure for marking out individuals in the field and avoiding.	Section 4.1
Additional Info July 2018	Referring to *D setosum* and *T australe*: - The presence of those threatened flora species will be avoided (consistent with the EIS), and can be managed via a Biodiversity Management Plan	Section 4.1
RtS Table 2.1	Commits to develop a procedure to: - review vegetation impact assessment where cable routes depart from the 'development footprint' using the assessment data held by the ecological consultants.	All impacts are to remain within the development footprint (per additional commitment presented in the Additional Information Memo). Approach to development footprint and adhering to clearing limits are in Section 4.2.
EIS s7.5.4 EIS s8.2: Table 8-1 SoCs	Weed management strategies will be included in the management plans and include strategies to prevent and minimise the spread of weeds, including:	Section 4.5
	- Management protocols for any declared priority weeds according to the stipulations of the Biosecurity Act (including identifying priority weeds in the area prior to construction); and	Section 4.5
	- Protocols for weed hygiene in relation to plant and machinery entering and leaving the Site, and the importation of fill.	Section 4.5

2.4 Relevant Previous Studies

This BMP builds on relevant information contained in studies and reports listed in Table 2-3.

Table 2-3 Relevant previous studies to the project

Report Name	Date	Author	Study Purpose	Summary
Sapphire Solar Farm Environmental Impact Statement (EIS)	January 2018	Eco Logical Australia (ELA)	Primary DA and environmental impact assessment document.	Contains detailed project description, environmental impact assessment, environmental management and mitigation measures.
Sapphire Solar Farm Response to Submissions Report (RtS)	March 2018	CWP Solar Pty Ltd	Response to submissions received during public exhibition.	Contains detailed response to all public and Government agency submissions.
Additional Information Memo	19 July 2018	CWP Solar Pty Ltd	Additional information requested by DPE to address items regarding the location and extent of the development footprint.	Contains a definite development footprint and review of all environmental impacts of that development footprint.

2.5 Consultation

The Conditions of Consent required consultation with RMS and the relevant Council(s). Table 2.4 demonstrates the consultation undertaken as part of developing this plan, including that required by the conditions of consent.

Table 2-4 Consultation Required as Part of the Conditions of Consent

Agency Name	Date	Consultation Format	General Themes of Consultation	Summary of Consultation
OEH	October 2018	CWPR email to OEH regional contact	CWPR emailed OEH to seek input of plan content in addition to that outlined in the consent conditions	OEH responded identifying their main components of interest when reviewing the plan will be: - clear management and monitoring aims; - feasibility and detailed descriptions of proposed management actions and methods; and - inclusion of adaptive management principles (potential management issues and contingency measures). These components have been included in Section 5.

Agency Name	Date	Consultation Format	General Themes of Consultation	Summary of Consultation
OEH	October 2018	First draft report sent for comment	Agency review of plan content with regard to biodiversity management aspects of the project's EIS documentation and consent conditions.	OEH responded with comments on edits required in a letter. Included themes: - Clearer aims and objectives, monitoring, responsibilities and reporting - Modifications to pre-clearance surveys - Modification to clearance protocols - More detail of weed management - Amended amelioration measures - Inclusion of unexpected finds procedure
DoEE	October 2018	First draft report sent for comment	Agency review of plan content with regard to biodiversity management aspects of the project's EIS documentation and consent conditions.	DoEE responded with comments on edits required in a letter. Included themes: - Clearer aims and objectives, monitoring, responsibilities and reporting - Modifications to pre-clearance surveys - Modification to clearance protocols - More detail of weed and pest management - Amended amelioration measures - Inclusion of unexpected finds procedure
OEH	November 2018	Second draft report (D02) sent for comment	Second draft produced in response to agency comments on first draft	Changes to second draft mostly acceptable, however requested further changes to Sections 3.2.3.2 and 3.6.
DoEE	November 2018	Second draft report (D02) sent for comment	Second draft produced in response to agency comments on first draft	No further changes requested. Accepted and approved.
OEH	December 2018	Third draft report (D03)	Third draft produced in response to agency comments on second draft	No further changes requested. Accepted and approved.

Agency Name	Date	Consultation Format	General Themes of Consultation	Summary of Consultation
DPE	January 2019	Fourth draft report (D04)	Fourth draft produced following DoEE and OEH approval	DPE commented on consistency of the plan with the Development Consent conditions and the EIS commitments. Minor changes completed consistent with the comments.
DPE	January 2019	Fifth draft report (D05)	Fifth draft produced following DPE review and commentary	DPE made minor comments. Minor changes completed consistent with the comments.
DPE	June 2019	Version 01 (v01)	Plan prepared and submitted correcting minor errors for Secretary approval.	Secretary approved plan version.
DPIE	September and October 2020	Letter correspondence	Notification of staged approach to the Project and approval of staged credit retirement per condition 3.10.	DPIE acknowledged the staged approach to the Project and provided approval of the staged credit retirement.
DPIE	December 2020	Version 02 (v01)	Plan prepared and submitted including staging of the project	Secretary approved plan version.

3 Overview of the Existing Environment

This section contains key biodiversity information within the development footprint. Additional information can be found in the EIS available NSW DPE Major Project Website: (http://www.majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8643).

3.1 Native Vegetation Types

The development footprint covers 458.5 ha, of which 7.5 ha is existing infrastructure (including access tracks and hardstands shown in Figure 1-1). Of the remaining 451 ha, 107.3 ha is native vegetation. The PCTs, conservation status, and area calculations are shown in Table 3-1, Figure 3-1 and Figure 3-5.

All of the mapped PCTs within the Projects development footprint are consistent with the final determination for White Box Yellow Box Blakely's Red Gum Woodland under the BC Act; with 68.3 ha of the native vegetation consistent with the listing advice for White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland under the EPBC Act.

Stage 1 of the Project will avoid all of the mapped PCTs and therefore there will be no clearing of them.

Table 3-1 Native vegetation type and conservation status in the development footprint

Zone	PCT name	BC Act	EPBC Act	Area (ha)
1	BR240: White Box grassy woodland of the Nandewar Bioregion and Brigalow Belt South Bioregion	EEC	0.94 ha of the vegetation zone comply with the CEEC	2.9
2	BR240: White Box grassy woodland of the Nandewar Bioregion and Brigalow Belt South Bioregion – DNG	EEC	30.01 ha of the vegetation zone comply with the CEEC	41.8
3	BR272: Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	EEC	7.38 ha of the vegetation zone comply with the CEEC	9.9
4	BR272: Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion - DNG	EEC	0.18 ha of the vegetation zone comply with the CEEC	19.9
5	BR153: Manna Gum - Rough-barked Apple - Yellow Box grassy woodland/open forest of the New England Tableland Bioregion and NSW North Coast Bioregion	EEC	15.59 ha of the vegetation zone comply with the CEEC	16.7
6	BR153: Manna Gum - Rough-barked Apple - Yellow Box grassy woodland/open forest of the New England Tableland Bioregion and NSW North Coast Bioregion - DNG	EEC	14.2 ha of the vegetation zone comply with the CEEC	16.0
Total			68.3 ha Box Gum Woodland and Derived Native Grassland CEEC (includes 23.91 ha woodland and 44.39 ha derived native grassland)	**107.3**

Figure 3-1 Native vegetation zones in the development footprint (south)

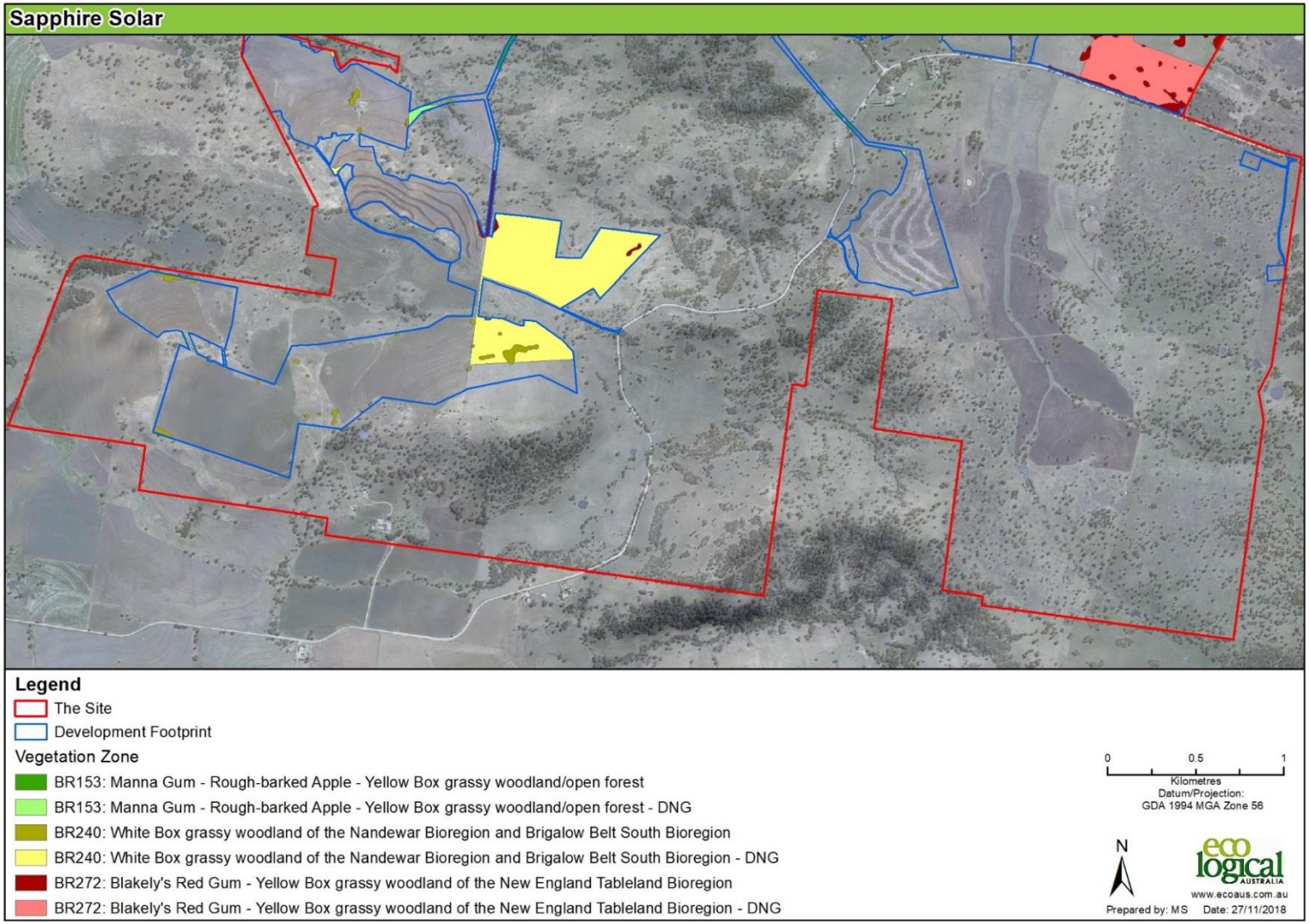


Figure 3-2: Native vegetation zones in the development footprint (north)

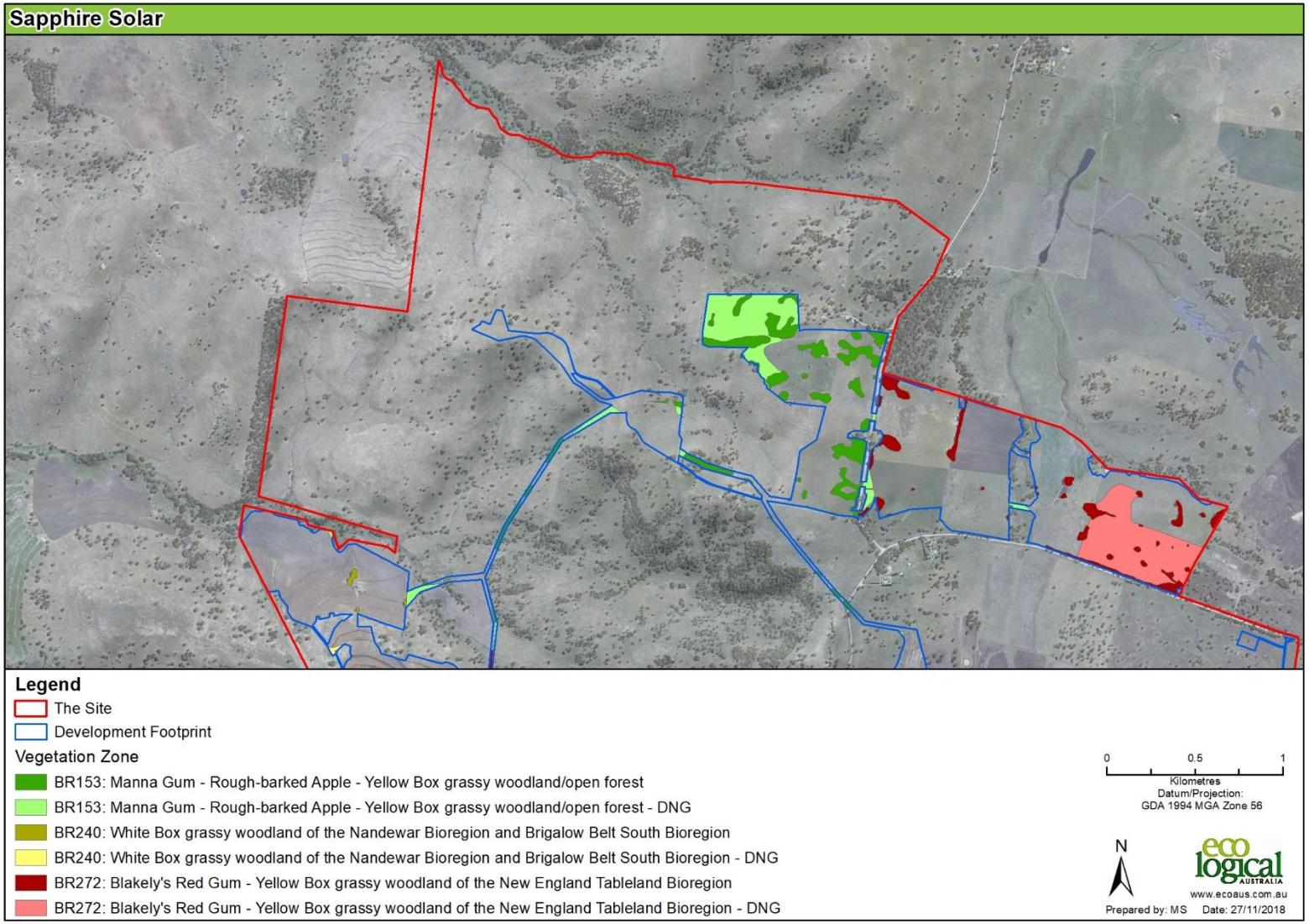


Figure 3-3: Threatened ecological communities in the development footprint (south)

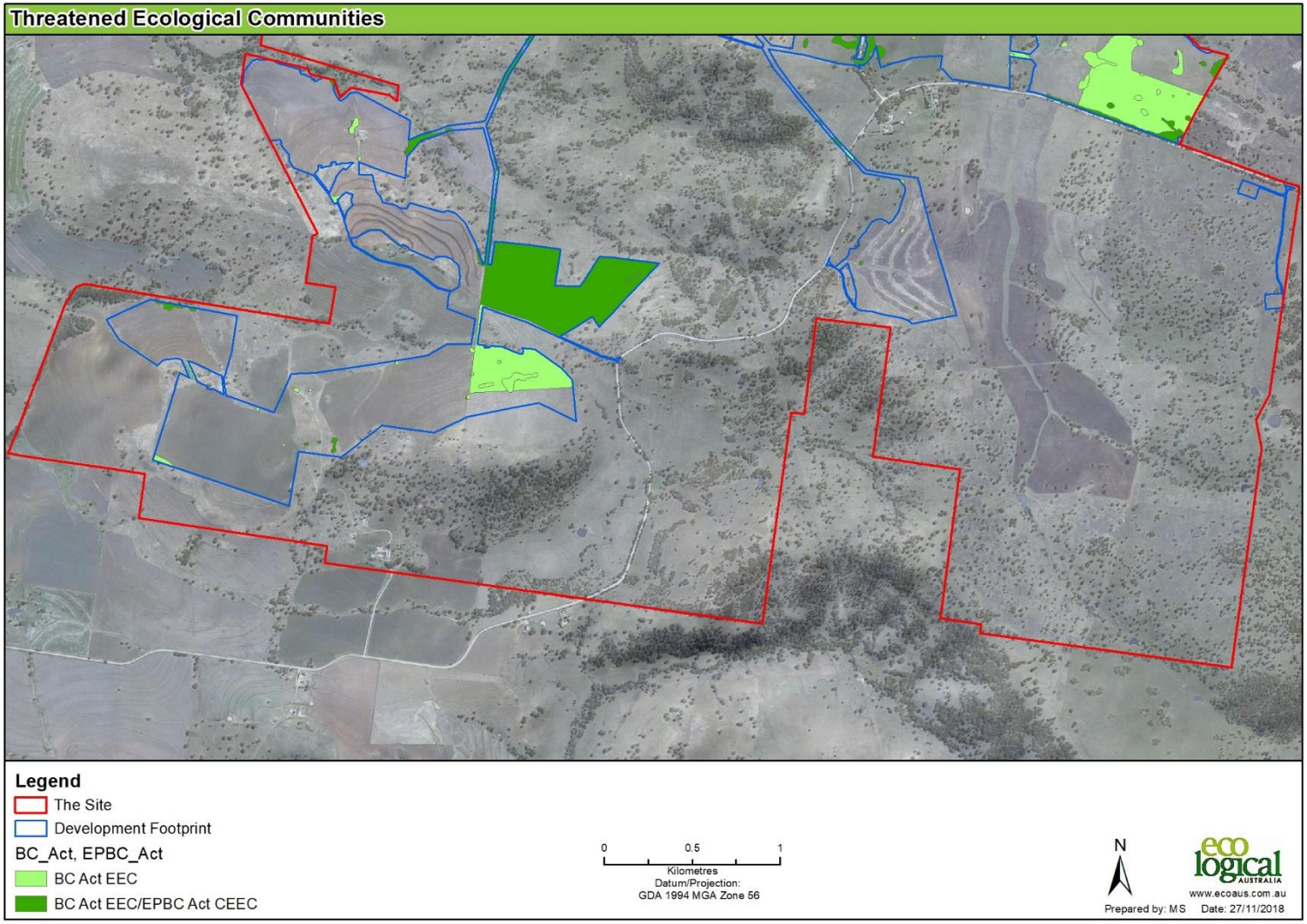
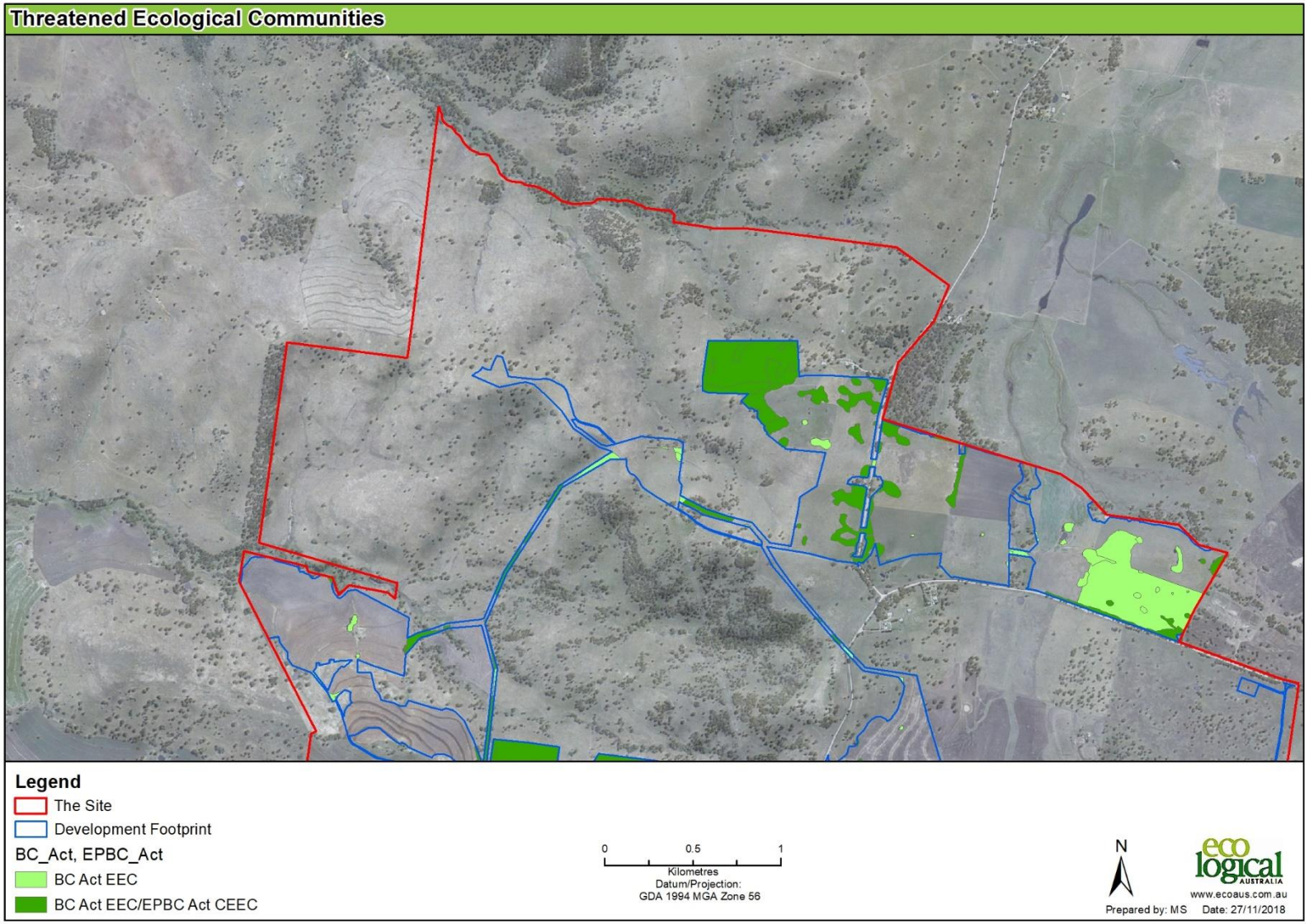


Figure 3-4: Threatened ecological communities in the development footprint (north)

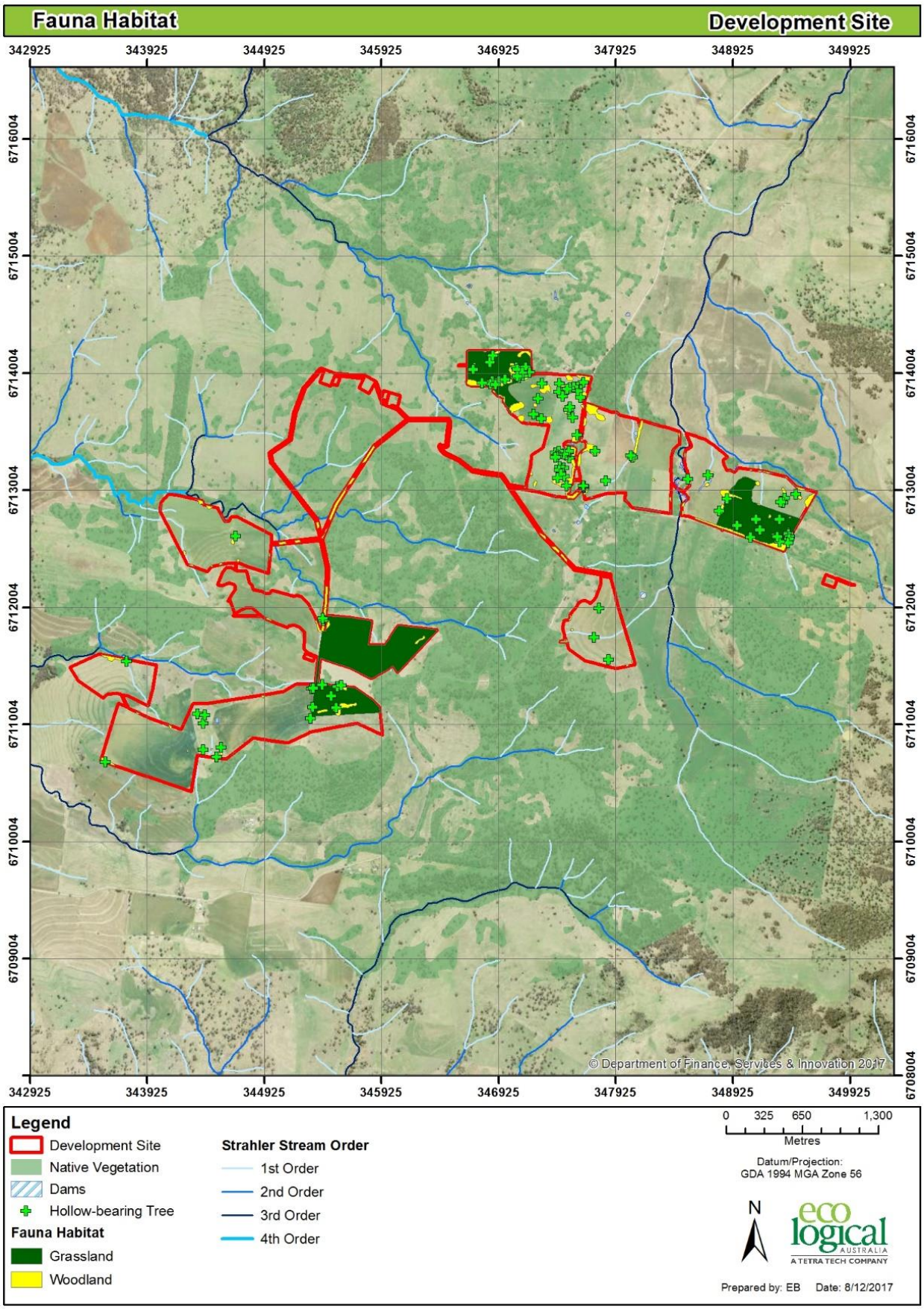


3.2 Fauna habitats

Habitat within the Stage 1 Development Footprint is highly modified due to persistent and extensive impacts of agriculture and the existing Sapphire Wind Farm. The mid-storey is absent and the groundcover is almost exclusively exotic pasture grasses. There is no accumulated leaf litter or rocky outcrops present. No known hollow bearing trees occur.

Within the Stage 2 Development Footprint, canopy species have been retained as scattered paddock trees with limited fauna habitat potential. There are hollow-bearing trees and some that may contain nests, referred to habitat trees (shown in Figure 3-5).

Figure 3-5 Fauna habitat identified in the EIS (note the former footprint shown as was changed during the application process)



3.3 Threatened Flora

The EIS identified two threatened flora species in the development footprint:

- Bluegrass (*Dichanthium setosum*) (EPBC Act: Vulnerable; BC Act: Vulnerable).
- Austral Toadflax (*Thesium australe*) (EPBC Act: Vulnerable; BC Act: Vulnerable).

The locations of their occurrence are detailed in Table 3-2 and shown in Figure 3-6 to Figure 3-9. Mitigation measures to avoid impact is described below.

Table 3-2 Native vegetation type and conservation status in the development footprint

Species Name	**Common Name**	**Occurrence Type**	**Identifier[1]**	**Size and Shape (approx)**	**Count of Individuals**	**Easting**	**Northing**	**Position Relative to Development Footprint**	**Approach to Avoidance[2]**
Dichanthium setosum	Bluegrass	Point	24	NA	3	349262	6712540	Inside PV area	Excluded from Stage 1 works. Demarcate shared edge of occurrence/ Development Footprint, educate staff
Dichanthium setosum	Bluegrass	Point	62	NA	10	345607	6712981	Inside overhead line area	Excluded from Stage 1 work.
Dichanthium setosum	Bluegrass	Polygon	151	5m diameter circle	9	348792	6712701	Inside PV area	Excluded from Stage 1 works. Demarcate shared edge of occurrence/ Development Footprint, educate staff
Dichanthium setosum	Bluegrass	Polygon	152	12m x 4m	2	348577	6712777	Inside PV area	Excluded from Stage 1 works. Demarcate shared edge of occurrence/

Species Name	**Common Name**	**Occurrence Type**	**Identifier[1]**	**Size and Shape (approx)**	**Count of Individuals**	**Easting**	**Northing**	**Position Relative to Development Footprint**	**Approach to Avoidance[2]**
									Development Footprint, educate staff
Dichanthium setosum	Bluegrass	Polygon	153	2.5m diameter circle	not taken	348857	6712696	Inside PV area	Excluded from Stage 1 works. Demarcate shared edge of occurrence/ Development Footprint, educate staff
Dichanthium setosum	Bluegrass	Polygon	154	35m x 50m	239	349372	6712512	Outside Development Footprint (DF redesigned to avoid polygon although a shared boundary exists)	Excluded from Stage 1 works. Demarcate shared edge of occurrence/ Development Footprint, educate staff
Dichanthium setosum	Bluegrass	Polygon	155	10m diameter circle	10	345462	6712692	Inside overhead line area	Excluded from Stage 1 work.
Dichanthium setosum	Bluegrass	Polygon	156	20m x 8m	23	345445	6712640	Half of polygon inside overhead line area	Excluded from Stage 1 work.
Dichanthium setosum	Bluegrass	Polygon	157	5m diameter circle	13	345383	6712675	Outside Development Footprint (DF	Excluded from Stage 1 work.

Species Name	Common Name	Occurrence Type	Identifier[1]	Size and Shape (approx)	Count of Individuals	Easting	Northing	Position Relative to Development Footprint	Approach to Avoidance[2]
								redesigned to avoid polygon)	
Dichanthium setosum	Bluegrass	Polygon	158	5m diameter circle	9	345373	6712670	Outside Development Footprint (DF redesigned to avoid polygon)	Excluded from Stage 1 work.
Dichanthium setosum	Bluegrass	Polygon	159	4m diameter circle	5	345461	6712718	Inside overhead line area	Excluded from Stage 1 work.
Dichanthium setosum	Bluegrass	Polygon	160	25m x 10m	48	345050	6712549	Very minor part of polygon inside overhead line area	Excluded from Stage 1 work.
Thesium australe	Austral Toadflax	Polygon	150		500+	346314	6713342	Outside Development Footprint	Excluded from Stage 1 work. Demarcate shared edge of occurrence/ Development Footprint, educate staff.

1. *Point/polygon identifier is unique and arbitrary*

Although not listed against each line the approach to avoidance for all occurrences include the dissemination of the threatened species avoidance requirements to site staff during site inductions

Figure 3-6 Threatened flora and the development footprint: overview

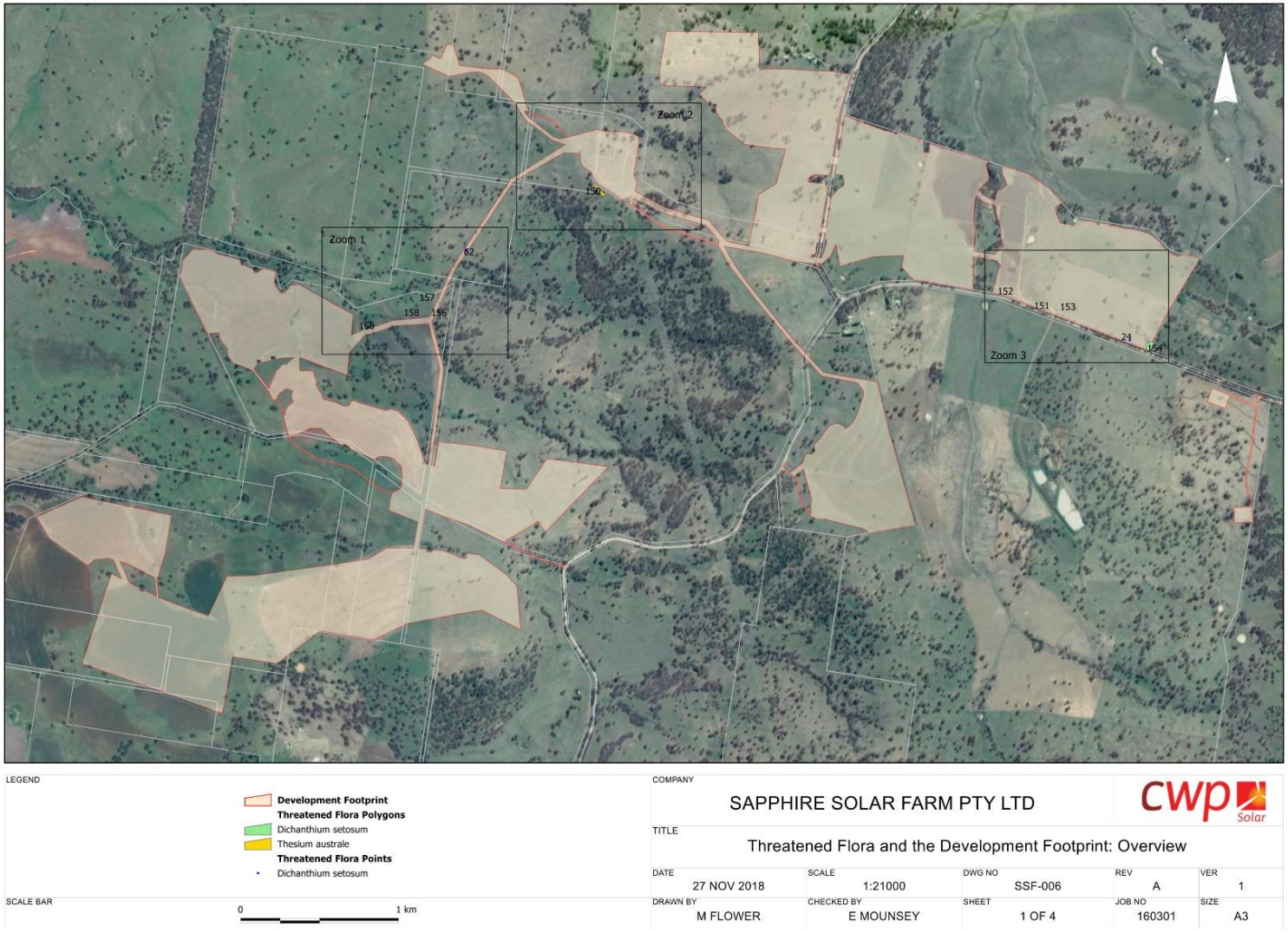


Figure 3-7 Threatened flora and the development footprint: Zoom 1

Figure 3-8 Threatened Flora and the Development Footprint: Zoom 2

Figure 3-9 Threatened flora and the development footprint: Zoom 3

3.4 Threatened Fauna

Although no threatened fauna were identified in the surveys undertaken for the EIS, the NSW and Commonwealth consent conditions have assessed the Swift Parrot (*Lathamus discolor*) as having potential habitat present within the development footprint, that being all of the woodland present (i.e. vegetation zones 1, 3, 5; refer to Table 3-1 and Figure 3-1). Other threatened fauna species may use the habitats of the development footprint, however their presence and potential impacts are accounted for in the Framework for Biodiversity Assessment and subsequent offset credits conditioned upon the Project.

3.5 Weeds

A number of introduced species were identified in the EIS. The weed survey contained in the EIS, as well as the pre-construction weed survey, will both be used to identify the 'baseline' case of weed occurrence in the Development Footprint. These data will be used to finalise the target species and spatial locations from which the performance against the objectives of the Weed Management Plan (outlined in Section 4.5.1) will be measured. Further to those identified, landholders have identified weed species of concern to their agricultural activities as: African Love Grass, Coolatai Grass and Chilean Needle Grass (all of which pose risks to native grass species and grassland communities).

3.6 Pest Fauna

A number of introduced species (brown hare, red fox, feral pig and rabbit) were identified in the EIS in the development footprint. All of these introduced species present risks to agriculture, native biodiversity, and landscape integrity.

4 Biodiversity Management Measures

This section outlines the measures that will be implemented for biodiversity management outlined in the consent conditions and approvals documentation. The management measures outlined are aimed at generally minimising the impacts of the Project to the biodiversity values for the Stage 1 Development Footprint. These management measures will be reviewed and updated for subsequent stages of the Project.

4.1 Avoidance of Threatened Flora

The EIS identified the presence of two threatened flora species in or near the development footprint: Bluegrass and Austral Toadflax (refer to Section 3.3 and Figure 3-6). Avoidance of these locations is committed to in the EIS, RtS, and Additional Information Memo (document references provided in Table 2-3) and form a requirement of the NSW and Commonwealth consent conditions. The two flora species are only detectable for a brief period of the year each summer. Comprehensive surveys were undertaken during the previous seasonal window (summer 2017-2018) during the EIS process.

Actions to avoid impacts to these identified locations for Stage 1 works are:

- Detailed design: digital GIS of the locations currently known from those EIS surveys are incorporated into the Project design process.
- Pre-construction: known locations have been visited by a suitably qualified and skilled ecologist to verify and demarcate those known areas of occurrence during this seasonally-identifiable window (summer 2018-2019). The locations have been physically marked in the field to allow demarcation during construction.
- Construction:
    - The map of the species locations, including exclusion zones and the style of demarcation will be incorporated into the Indicative Worker Induction (refer to Appendix B).
    - Areas will be demarcated in accordance with the approach to avoidance outlined in Table 3-2.
    - Demarcated areas will be regularly inspected by the EPC Environment Officer during weekly monitoring of construction activities for Stage 1.
- Operations: locations will remain demarcated and exclusion structures will be inspected for condition as part of site maintenance monitoring (at a frequency related to the seasonal-detectability of the species such as yearly during December or January). Where additional plants are identified outside of the demarcated areas through visual inspection of the immediate area, suitable responses to their presence will be considered. Such suitable measures can't be determined at this stage because the operational solar farm will have specific functional and operational requirements to ensure its ongoing function. As such, suitable measures will need to be determined at the time by the operational staff.

Installation of the avoidance measures and their integrity will be reported through regular monitoring reports including photographic evidence of avoidance structures.

Accidental damage would represent a failure of the above mitigation measures and would be outside of the allowed impacts of the Project. Amelioration measures in the circumstance of accidental damage would be that seeds could be collected from an adjacent population (pending appropriate permitting) or that biodiversity credits could be sought from the market.

4.2 Minimisation of Native Vegetation Clearance, Habitat Clearance, and Fauna Impacts

This section contains details of clearance and impact minimisation.

4.2.1 Minimising Onsite Native Vegetation Clearance

The approach in the Project approval documentation (EIS, RtS, and Additional Information Memo) to vegetation clearance has been based around the development footprint. Approval was granted to clear all vegetation inside the development footprint (excluding threatened species discussed in Section 4.1), with biodiversity offsets proposed to account for those losses. The native vegetation of the site covers 107.3 ha and is described in Section 3.1 and shown in Figure 3-1 and Figure 3-5.

It is a combination of 29.5 ha of woodland and 77.8 ha of derived native grasslands.

Stage 1 of the projects clearing will be a small proportion of the Project's total vegetation clearing impacts and will not involve any woodland or derived native grassland clearing. .

Areas of grassland outside the Stage 1 Development Footprint that will not be impacted for the Project infrastructure will remain in situ, such as those around the edges of the Development Footprint. The demarcation of these areas is not feasible due to the flexibility required for construction within the Development Footprint. The requirement to minimise vegetation impacts will be identified in the Project site inductions and reiterated at toolbox meetings.

Impacts to vegetation outside the Development Footprint are not permitted by the State and Commonwealth approvals. To reduce the chance of felled vegetation impacting beyond the Development Footprint clearing near the edges of the Development Footprint will not be undertaken by heavy machinery, but rather using chainsaws. Directional felling will be undertaken to direct felled trees inwards into the Development Footprint.

4.2.2 Minimising Loss of Key Fauna Habitat

Key fauna habitat in the development footprint is highly modified due to the persistent and extensive agricultural activities and is generally limited to the woodland areas and hollow-bearing trees. Discussion in Section 4.2.1 outlines the limitations to minimising clearance within the development footprint. Habitat reuse may occur where practical and feasible and this is described further in Section 4.4.

Habitat for the Swift Parrot (*Lathamus discolor*) is identified in the Commonwealth consent conditions as the woodland PCTs (i.e. the non-DNG PCTs). The main minimisation technique is to avoid removing those woodland PCTs. Methods to minimise the impacts to woodlands both within and outside the Development Footprint are described in Section 4.2.1 and 4.2.4. It is noted that Stage 1 of the project will not remove any woodland PCTs. Consistent with the NSW Framework for Biodiversity Assessment, the Swift Parrot is an ecosystem credit species, which means its habitat can be reliably predicted by the presence of certain vegetation types. Stage 1 of the project will not retire offsets as there will be no clearing of this habitat, however subsequent stages that do clear this habitat, will offset the project's impact to the species through the credit transaction.

Prior to construction of Stage 1, the EPC Environmental Officer will locate and mark hollow bearing trees within the impacted sections of the Development footprint identified in the EIS (refer to Section 3.2) related to Stage 1. Also prior to clearing the tree will be inspected by an appropriately qualified ecologist to identify nests and roosts. Those trees containing nests or roosts will be marked and treated uniquely in the clearance protocol (refer to Section 4.2.3.1).

4.2.3 Minimisation of Impacts to Fauna

To minimise direct and indirect impacts to fauna during all phases of the project, this section outlines how construction activity and vehicle interactions with the environment. The two main elements of minimising direct and indirect impacts to fauna are via clearance protocols and on site staff behaviour.

4.2.3.1 Pre-clearance measures

Prior to construction in each area the EPC Environment Officer will identify and mark the habitat trees within the Stage 1 Development Footprint. Those trees will be marked in a manner that is disseminated to all staff involved in vegetation clearance.

4.2.3.2 Clearance Protocol

In any area to be cleared, non-habitat trees (those without hollows or nests) will be cleared first with identified habitat trees (i.e. those with hollows or nests) left standing overnight to encourage the self-relocation of fauna that may be using the available habitat feature.

Where fauna are observed using a habitat tree during clearance, the tree will not be cleared until the fauna have vacated the tree.

A qualified ecologist or wildlife handler with appropriate licences will be present where active management of fauna is needed. Active management protocols to be undertaken by the qualified ecologist or wildlife handler for each species group are described below:

- Arboreal mammals

Where habitat trees are present, and the presence of arboreal mammals is suspected or known, they will be managed by:

  - soft pushing the tree to the ground in order to reduce the likelihood of disturbance to the habitat feature/animal present;
  - inspection of the felled tree to confirm that the mammal has relocated from the habitat feature;
  - where the mammal is still present, block the hollow entrance with porous cloth material (such as some rags). Return prior to (but near) dusk to remove the cloth material and unblock the hollow, leaving the felled tree overnight to encourage the animal to relocate. Return to check the hollow has been vacated the next morning or prior to removal or disposal.

- Nesting birds
  - Where a nest is active, the birds present (generally fledglings) will be collected where safe, and taken to a wildlife carer to be cared for, prior to later release (transport considerations will include measures to minimise further stress to the animals making them feel safe and secure such as in a darkened, closed box with material and cushioning);
  - where the nest is not active (ie. no fledglings present), the nest will be removed from the tree (where safe to do so) to ensure that the nest does not become active prior to disturbance. The tree should be inspected immediately prior to clearing to ensure that it remains inactive.

- Hibernating, roosting and/or breeding microbats

Habitat trees with suspected or confirmed bat roosts will be managed by:

  - soft pushing the tree to the ground in order to reduce the likelihood of disturbance to the habitat feature/roost/microbat present;

- preferentially positioning the tree on the ground so the entrance to the hollow faces upwards (i.e. so bats are able to exit);
- inspect the felled tree to confirm whether bats have exited the tree. If they have not, block the hollow entrance with porous cloth material (such as some rags). Return prior to (but near) dusk to remove the cloth material and unblock the hollow; and
- leave the felled tree overnight to allow any remaining bats time to exit.

4.2.3.3 Fauna Capture and Release

Individual fauna identified during clearance may require relocation. A person suitably qualified (such as an ecologist, wildlife carer or veterinarian) and/or person experienced in fauna handling, with appropriate licenses will be used to capture and relocate any fauna. Fauna that is harmed during site activities will be taken to a vet or wildlife carer. Suitable release areas will be determined at the start of construction in each part of the Development Footprint by the EPC Environment Officer and subsequently verified by the qualified ecologist based on site conditions during the vegetation clearance in that location. Release areas will prioritise adjacent areas of similar suitable habitat, or where adjacent similar habitat is not available, suitable habitat otherwise identified by the qualified ecologist.

4.2.3.4 Onsite Staff Behaviour

Important controls to minimise direct impacts to fauna are:

- Vehicle speed limits within construction areas will be reduced to minimise fauna strike risk (speeds in the Project Traffic Management Plan as 40 kph on formed roads, 20 kph during foggy/dusty conditions with headlights on, and 10 kph when passing work parties).
- Vehicle use should be restricted to the development footprint and wherever possible to those areas which are to be used for access tracks or infrastructure.
- Temporary construction features such as trenches and pits will be fenced overnight by the EPC Environment Officer (or as delegated to the construction team at that location) and when not in use for construction.
- Open trenches will checked the following morning by the EPC Contractor Environment Officer or delegate.

These will be carried through into the Indicative Worker Induction – Biodiversity Content (refer to Appendix B).

4.2.4 Avoidance of Over-clearance

The following processes will be undertaken to ensure that clearing only occurs within the Stage 1 development footprint.

4.2.4.1 Identifying Clearance Boundaries

The EPC Contractor's detailed design will define the disturbance boundaries for Stage 1 of the development footprint. The boundaries will be digitally captured and displayed within site survey and GIS databases. These data will be made available both digitally and in map format to inform and guide vegetation clearing, and post-construction for land preparation and rehabilitation requirements. The EPC Environment Officer will be responsible for demarcating clearing boundaries based on the detailed design and will provide the proponent with mapping of the boundaries.

4.2.4.2 Demarcation of Development Footprint

Prior to clearing being undertaken, the EPC Environment Officer will clearly demarcate the boundaries of the development footprint using flagging tape or other visible markers to prevent construction

works breaching the boundaries. Demarcation and clearance will be checked by the EPC Environment Officer during vegetation clearing and construction to identify adherence to limits, or to identify if demarcation requires rectification. This approach will ensure that only approved vegetation is impacted and reduce the impact to vegetation outside of these zones.

4.2.4.3 Clearing Procedures

Tree felling near the edges of the Stage 1 Development Footprint will be undertaken in a manner to avoid the impacts outside of the Development Footprint. The methods to achieve this will include avoiding using heavy machinery, instead using chainsaws, and to undertake directional felling towards the interior of the Development Footprint.

4.3 Rehabilitating and Revegetating Temporary Disturbance Areas

This section outlines the Project's approach to rehabilitation of temporary disturbance areas. The Project overall Environmental Management Strategy (EMS) contains details on the Project's final rehabilitation upon decommissioning.

Consistent with the themes of Schedule 3, Condition 35 regarding rehabilitation objectives, rehabilitation and revegetation of temporary impact areas will aim to return disturbed areas to ensure that they are safe, stable and non-polluting. The main aim will be to maximise grass cover over the areas of exposed soil to reduce the risk of erosion around the Project infrastructure. The Project also has land agreements in place which will potentially result in the landowners continuing to graze their livestock under the solar array. Therefore, the grass species selection and management will consider those two main objectives: maximising ground cover, and grazing suitability. If considered acceptable by the landowner, native species may be used in areas where native vegetation adjoins the Development Footprint.

Rehabilitation will be undertaken progressively in all temporary impact areas, that is, those areas that are not required to be maintained for the operational phase of the Project. Temporary impact areas may include:

- construction laydown areas;
- temporary construction compounds;
- drainage areas;
- underground infrastructure trenches;
- access road verges; and
- batters, cuts and fills.

Prior to the commencement of rehabilitation activities, the EPC Environment Officer will establish the pre-existing conditions and identify the proposed methods for rehabilitation of each site in a Rehabilitation Management Program. The program will include as a minimum:

- identify the pre-existing land use prior to construction, including mapping or relevant drawings;
- a program for the proposed rehabilitation activities (commencement and any follow up);
- proposed rehabilitation methods (i.e. cover crop, seeding, topsoil, mulching, watering regime etc.);
- plant species mix to be established at each site, based on the dual goals of developing ground cover and grazing suitability (considering with the landowner's input and their grazing objectives);
- proposed physical works for rehabilitated areas including items such as:
    - ensuring stability of slopes;

- ensuring that drainage is appropriate and does not result in ponding or scouring;
- early rectification of any erosion occurrences; and
- details of proposed monitoring and weed control (hand removal, spot spraying, broad application of herbicide).

The EPC Environment Officer will be responsible for implementing the Rehabilitation Management Program under the supervision of the Project Environmental Officer. Rehabilitation will be monitored by the EPC Contractor in accordance with the schedule in Section 5. The Project Environmental Officer will monitor the effectiveness of the plan and report to the Principal Project Officer and Independent Environmental Auditor on its performance.

4.4 Vegetation and Soil Salvage and Beneficial Reuse

Topsoil salvage and reuse will be undertaken by the EPC Contractor with the goals of reinstating topsoil removed in locations where topsoil is required. Topsoil will be managed in accordance with the Project Environmental Management Strategy, but notably stockpiled for only as long as practical, with a goal to minimise time spent in stockpile. Stockpile management will be developed and detailed in the EPC Contractor's environmental management documentation.

The Project will consider the beneficial reuse of vegetation and habitat features (such as hollow logs and branches) within and around the development although the opportunities will be significantly limited by two main management aspects: felled timber placed in and around solar arrays will increase the risk and consequences of fire (consistent with fire management requirements to manage certain parts of the development footprint as Asset Protection Zones), and functionality for site access, traverse and management. Furthermore, mounting hollows on trees within the Development Footprint will not be feasible because as discussed in Section 4.4, the Development Footprint will contain few if any trees following construction.

Felled vegetation will be managed as discussed with the host landowner and reuse may include it being broken up mechanically (or mulched) and spread across the ground within the solar array. The landowner liaison is required because it is anticipated that there will be a surplus of vegetation to that which could be reused among the solar array. Local or regional (offsite) reuse of habitat features, the larger logs and tree trunks will be explored dependent on: agreement for site removal by the landowner, and local interest in habitat enhancement or restoration activities (such as Biodiversity Stewardship Sites, Local Land Services, or OEH programs).

4.5 Weed and Feral Pest Management

The Project's Weed Management Plan is detailed here and will require updating and revision based on pre-construction surveys. The feral pest management plan will be managed via the EPC Contractor's environmental management documentation which will be informed by pre-construction site surveys.

4.5.1 Weed Management Plan

Weed species identified in the EIS are described in Section 3.5. The Proponent will arrange for a suitably trained contractor to undertake a weed survey of the Stage 1 development footprint prior to construction. The results of which (in combination with the EIS flora survey data) will form the 'baseline' weed species presence. The key objective of weed management for the Project is to not increase the number of species or spatial distribution of any weed species, with a focus on those listed as Priority Weeds in DPI (2018) and by the *Northern Tablelands Regional Strategic Weed Management Plan 2017-2022* (LLS, 2017) as well as any identified in Threat Abatement Plans, Local Land Services guides, or Key Threatening Processes as being of key risks to the threatened ecological communities and species of concern (Box Gum Woodland, Bluegrass, Austral Toadflax, and Swift Parrot).

Weed management activities will be undertaken in the Stage 1 development footprint in a manner that will be consistent with the agricultural setting in which the Project is located, i.e. the Project will monitor and manage weeds to reduce the risk of those spreading to the surrounding land and agricultural areas to ensure adjacent agricultural land and native vegetation is not significantly impacted. Weeds will be proactively managed in the Development Footprint to avoid the spread of existing weeds and to manage any incursions which arise throughout construction and operation of the Project.

A Weed Management Plan is presented in this BMP (refer to Table 4-1) which is written with the key objective:

> *to not increase the number of species or spatial distribution of any weed species in the Development Footprint*.

And is focussed on the key potential risks of weed species from the Project:

- Weed invasion potential: site activities importing or spreading weeds around the Development Footprint.
- Edge effects: site activities causing spread of weeds into surrounding land (including cropping, native and non-native vegetation, and woodland).

It is also important that the Project does not become a source for weed species to move into the surrounding agricultural lands and areas of native vegetation. The Weed Management Plan details the mitigation measures and monitoring requirements to ensure the spread of weeds is prevented and that incursions are adequately managed by the EPC Contractor. When available, the pre-construction weed survey results will be used to revise the Weed Management Plan and will be used as the 'baseline' weed occurrence situation is set, from which the objectives will be measured. Once that 'baseline' situation is compiled, specific weed control measures and activities will be determined consistent with relevant, locally-specific weed control measures and added to the Weed Management Plan.

The EPC Environment Officer will ground-truth the pre-construction weed survey via a pre-construction assessment of weeds in each work area, prior to ground disturbance. The assessments will consider the weed species present, their concentrations and likelihood of spread to adjacent areas.

Table 4-1 Weed Mitigation Measures

Key Potential Risk	Mitigation Measure	Timing and Frequency	Responsibility	Target	Corrective Actions Where Target Not Met
Pre-construction – Site / Work Preparation					
Weed invasion potential	Undertake pre-construction weed survey and compile with EIS results to create the 'baseline' weed occurrence dataset. Create series of maps focussed on portions of the Stage 1 Development Footprint. Update Weed Management Plan with specific control measures, activities and timing dependent on the weed species identified and their spatial occurrence.	Once – Prior to construction	Principal Project Manager	Known weed species and spatial distribution. Updated Weed Management Plan.	Resurvey to recreate baseline weed situation.
Weed invasion potential	Ground-truth the pre-construction weed survey via a pre-construction assessment of weeds in each work area, prior to ground disturbance. Undertake and document recommended weed control methods in the revised Weed Management Plan prior to ground disturbance. The assessments will consider the weed species present, their concentrations and likelihood of spread to adjacent areas and will inform topsoil management decisions.	Once in each construction area – Prior to construction	EPC Environment Officer	Construction area weed presence ground-truthed and confirmed correct.	If any new weeds above the baseline situation are identified, communicate to the Project Environmental Officer and in collaboration update the site-specific weed plan.
Weed invasion potential	Identify the location designated for stockpiles on a plan for each construction area. Stockpiling sites will be categorised for clean or weed contaminated soils.	Once in each construction area – Prior to construction	Site Environmental Officer	Topsoil stockpiles marked on plans specific to each construction area.	Mark topsoil locations on plans specific to each construction area.
Weed invasion potential	Prior to commencing work on site all relevant site personnel to undertake appropriate training for awareness of the key BMP requirements and flora and fauna values to be managed and protected, including Weed Management Plan requirements.	Once - During site inductions	EPC Environment Officer All Employees and Contractors	100% site staff inducted to the relevant BMP and Weed Management Plan requirements.	Regular induction sessions to obtain 100% attendance.

Key Potential Risk	Mitigation Measure	Timing and Frequency	Responsibility	Target	Corrective Actions Where Target Not Met
Weed invasion potential	Plant and vehicles accessing the site will certified weed-free by a suitable third party process or upon arrival be inspected for weeds and seeds for issue of a compliance document or instruction for cleaning.	Frequently – Upon vehicle arrival	EPC Environment Officer	100% vehicle inspections.	Multiple site staff trained and able to undertake inspections.
Weed invasion potential	Topsoil recovery will be undertaken in areas that have a high proportion of native vegetation and few weeds in the ground layer of vegetation. Topsoil is harvested to salvage the native soil seed bank and reintroduce seed bank back during rehabilitation. The relocated topsoil is spread evenly and mulched lightly using the vegetation and leaf litter removed from the source site where practicable. Topsoils marked as priority weed contaminated to be disposed of at suitable disposal locations.	Once in each construction area – Prior to construction	EPC Project Manager	Re-spread topsoil not spreading weed species.	Weeds treated in re-spread topsoil, and subjected to remedial follow up weed treatment including higher inspection frequency (every three months).
Construction – General Construction Activities					
Edge effects and weed invasion potential	Vehicles are to remain within the Stage 1 Development Footprint and where possible the extent of the earth works designed specifically for the Project, to minimise spread of weeds.	During construction – Permanent and constant	All Employees and Contractors	No vehicles depart from the Development Footprint into adjacent areas.	Site staff education and dissemination via regular toolbox meetings.
Edge effects	Minimise extent of work areas and soil disturbances within the Stage 1 Development Footprint.	During construction – Permanent and constant	EPC Project Manager	Soil disturbance minimised to minimum required.	Site staff education and dissemination via regular toolbox meetings.
Weed invasion potential	Imported fill is to be certified weed free prior to transport to the site.	Once – upon engaging each importation event	EPC Project Manager	No soil is imported without weed free certification.	Soil imported without weed-free certification is removed.

Key Potential Risk	Mitigation Measure	Timing and Frequency	Responsibility	Target	Corrective Actions Where Target Not Met
Edge effects and weed invasion potential	All stockpiles to be managed to prevent the loss/spread of material during high wind and rain events. Measures will be recorded on each construction area plan and may include: • Regular review of weather conditions to identify periods of greater risk to spread of stockpiles. • Where practicable stockpiles to be placed in areas sheltered from the wind. • Implement stockpile covers, use water trucks to dampen stockpiles or employ other measures to limit spread of material during high winds. • Incorporate appropriate erosion and runoff controls to capture any material spread during rain events.	Once – Upon stockpiling, then inspected weekly while stockpiled	EPC Project Manager	All topsoil stockpiles retaining integrity and not eroding or spreading down-gradient.	Move stockpile to area of lower risk.
Edge effects and weed invasion potential	Stockpiling of soil that may contain seeds of non-native species at least 50 m away from creeks, drainage lines, and Development Footprint boundaries, where possible, to prevent spread into adjacent areas of ecological significance during rainfall or wind events.	Once – Upon stockpiling	EPC Project Manager	All topsoil stockpiles containing non-native species not located within 50 m of identified environmental features.	Move stockpile to area of lower risk.
Edge effects and weed invasion potential	Dispose of priority weed contaminated soils to appropriate locations using appropriate techniques to avoid spread of weed seed and weed material.	Once – Upon soil removal	EPC Project Manager	No soils containing priority weed species are reused onsite.	Priority weeds treated in re-spread topsoil and subjected to remedial follow up weed treatment including higher inspection frequency (every three months).

Key Potential Risk	Mitigation Measure	Timing and Frequency	Responsibility	Target	Corrective Actions Where Target Not Met
Weed invasion potential	Regular inspections for weed species occurrences in construction areas. Identified priority weeds will be actively removed from construction areas upon detection.	At regular seasonally suitable times for the majority of the weeds identified in the baseline situation (to be determined in the revised Weed Management Plan (estimated to be twice a year)	EPC Environment Officer	Weeds identified are removed from construction areas.	More frequent inspections.
Weed invasion potential	Re-establish vegetation as soon as practical following disturbance in accordance with appropriate rehabilitation requirements. This is with the main aim of preventing soil erosion and will consider the future landuse required by the landowner (such as selecting species for grazing) and any opportunities to use native species (if agreement with the landowner is made).	Once – upon construction completion in an area	EPC Project Manager	Ground cover of 70% relative spatial cover as measured in the middle of the next spring growing season after soil revegetation and rehabilitation (that is allowing for the dormant growth periods of winter and any drought conditions will be considered in measurement against this target).	New and seasonally suitable seed mix is spread.

4.5.2 Vertebrate Pest Management

Vertebrate pest species identified in the EIS are described in Section 3.6. Prior to the commencement of construction, the Proponent will undertake a qualitative Development Footprint assessment of pest species presence and activity levels. This information will be used to inform the EPC Contractor's detailed feral pest management plan. That plan will consider any relevant State or Commonwealth plans for feral pest management, including Threat Abatement Plans, Local Land Services guides and Key Threatening Processes.

A Pest Animal Management Program will be prepared in the EPC Contractor's environmental management Plans to identify the monitoring requirements to identify when pest animals are in occurrence where they pose a risk to surrounding agricultural land, as well as management measures to employ. These principles regarding monitoring and management will flow through to Project operations for the operational life of the Project. Any vertebrate pest control activities undertaken in the Development Footprint will be done in accordance with the requirements of the Local Land Services.

4.6 Threatened Species Chance Finds Procedure

All staff onsite are encouraged to report flora and fauna interactions to the EPC Environment Officer. The EPC Environment Officer will report to the Project Environment Officer to determine (with specialist ecological advice if required) if any threatened species or impacts not previously considered in the environmental impact assessment process are present. In the case that they are, activity in that area will be reconsidered by the Principal Project Manager (with specialist advice if required) considering the type of threatened species, their presence (in situ such as a flora species, or itinerant such as a bird) and ceased if the risk to the species is uncertain. Advice will be sought of BSC and the DAWE of the course of action to proceed considering the consistency of the presence with the environmental impact assessment process.

5 Monitoring, Reporting, Review and Improvement

5.1 Construction Environmental Monitoring

Ongoing monitoring of environmental control measures will be undertaken to record the effectiveness of control measures and inform adaptive management of the environmental management plans and programs.

Monitoring requirements for the BMP required under this plan to be undertaken by the EPC Environment Officer during the construction phase will include:

- Prior to vegetation clearing:
    - Ensure that threatened flora species and clearing limits have been clearly demarcated in accordance with Table 3-2.
    - Ensure that habitat trees (or resources for salvage) have been located and marked and those details are communicated to the clearing contractor.
    - Ensure that pre-construction weed surveys have been ground truthed and any management requirements in the Weed Management Plan have been undertaken.
- Post vegetation clearing:
    - Ensure that demarcated areas for exclusion of clearing have not been disturbed.
    - Ensure that threatened species present within the demarcated areas remain intact.
    - Ensure that areas clearing limits have not been exceeded.
    - Check that areas that have been cleared are consistent with those included within the Project's final layout.
- Daily inspection of any open trenches for trapped fauna.
- Weekly inspection of sediment and erosion control structures used during construction activities, and immediately after heavy rainfall (as defined in the Project Traffic Management Plan).
- Weed spread prevention measures being implemented and monitoring is undertaken as defined in the Weed Management Plan.
- Inspection of hazardous material storage controls as defined in the EPC Contractors Contamination and Waste Management Plan.

5.2 Rehabilitation and Revegetation Monitoring

All rehabilitated areas will be monitored on a monthly basis by the EPC Environment Officer during the construction phase, and every sixth months by the Project Environmental Officer during operations, until a review of this plan determines otherwise.

The monitoring will include an assessment of:

- drainage conditions (i.e. no ponding or scouring);
- weed infestations and required remedial actions;
- areas of instability that require stabilisation or remediation;
- whether rehabilitated areas are adequately stabilised and whether erosion is occurring;
- whether grass in revegetated areas are growing as expected; and
- requirements for follow up rehabilitation activities including any weed control, reseeding, vertebrate pest control and watering as required.

Thresholds have been identified for each monitoring aspect which will trigger implementation of remedial or management actions within Table 5-1.

A photographic images register will be created and maintained by the EPC Environmental Officer, and then the Principal Project Manager following construction that will be utilised to record groundcover conditions at the commencement of rehabilitation to monitor progress over time. Reports will be prepared annually to report on the success and learnings for the rehabilitation areas.

5.3 Monitoring Program

Table 5-1 Monitoring Program

Item	Requirement	Frequency	Trigger for corrective action	Corrective action
1	Inspection of any open trenches for trapped fauna.	Daily	Fauna are present within open trenches and cannot self-evacuate.	Capture trapped fauna and release at locations identified by the qualified ecologist.
2	Inspection of sediment and erosion control structures.	Weekly Immediately following heavy rainfall	Sediment and erosion structures are failing to capture sediment or are damaged.	Undertake maintenance and repair.
3	Ensure that threatened flora species and clearing limits have been clearly demarcated.	Prior to vegetation clearing	Areas where known records of threatened species and areas of EEC have not been demarcated as identified by inspection prior to commencement of vegetation clearing works.	Demarcate areas that are not defined clearly in the field.
4	Ensure that habitat trees (or resources for salvage) have been located and marked and those details are communicated to the clearing contractor.		Habitat resources to be salvaged have not been salvaged prior to commencement of vegetation clearing works or are not present within adjacent remnant vegetation post clearing. Salvage requirements have not been communicated to the clearing contractor.	Demarcate the habitat resources to be salvaged. Salvage resources. Communicate the requirement for salvage to the clearing contractor.
5	Ensure that demarcated areas for exclusion of clearing have not been disturbed.	Post vegetation clearing	Demarcated areas have been disturbed.	Determine the extent of the impact. Report any non-conformances using the procedures outlined in Section 5.7 of this document. Develop a plan for remediation/rehabilitation where necessary.
6	Ensure that threatened species present within the demarcated areas remain intact.		Threatened species marked prior to clearing have been disturbed.	

7	Ensure that areas clearing limits have not been exceeded.		Clearing limits have been exceeded and vegetation outside the development footprint is no longer intact.	
8	Check that areas that have been cleared are consistent with those included within the Project's final layout.		Areas that have been cleared are not consistent with the final Project layout.	
9	Soil stockpile monitoring: stockpiles not spreading, being eroded, becoming a source of weeds.	Monthly	Stockpiles being source of soil and or weed spread into adjoining lands.	Move stockpiles to areas of lower environmental risk, treat weed occurrences on the stockpiles.
10	Weed monitoring: Weed spread prevention measures being implemented and monitoring is undertaken as defined in the Weed Management Plan	Monthly Six monthly (spring and autumn)	Weeds have spread beyond the area of infestation identified during the pre-construction assessment.	Review and strengthen weed spread prevention measures. Develop a plan for ongoing weed management in areas where weeds are identified, and implement where necessary.
11	Rehabilitation and revegetation monitoring	Monthly Six Monthly (spring and autumn)	Weeds are present within rehabilitated and revegetated areas.	Implementation of follow up management activities including any weed control, reseeding, vertebrate pest control and watering as identified through monitoring.
			Areas of rehabilitation or revegetation are found to not be successfully establishing and increasing ground cover % (considering seasonal conditions in evaluating success).	
			Evidence and/or presence of vertebrate pests are present within rehabilitated and revegetated areas.	
12	Photographic monitoring	At completion of rehabilitation Bi-annually	Issues are identified during review of photographs post monitoring such as erosion, non-establishment of vegetation, weed and vertebrate presence, ponding and/or rubbish presence.	Where issues are identified through the monitoring, develop a plan to address these, and implement where necessary.

13	Inspect threatened flora demarcation areas, checking immediately surrounding area for threatened species occurrence	Annually (during detectable season e.g. December-January)	Presence of threatened flora species outside of the demarcated areas	Identify practical responses to the threatened flora presence that are compatible with the functional requirements of the operating infrastructure.

5.4 Monitoring Records

Results of monitoring will be recorded by the EPC Environment Officer and provided to the Project Environmental Officer as part of inspection checklists that will include as a minimum:

- date of inspection;
- personnel undertaking the inspection;
- features to be inspected/monitored;
- outcomes of the inspection and details of compliance with objectives;
- requirement for any corrective actions; and
- details of any photographic records (file name and saved location) detailing evidence of monitoring.

Results of all monitoring will be maintained at the Project office for supply to relevant agencies upon request.

5.5 Auditing

The construction work will be subject to regular internal audits (in accordance with the Project Environmental Management Strategy) by the Project Environmental Officer to evaluate the EPC Contractors performance. A scheduled audit will also be undertaken by an Independent Environmental Auditor within six months of the commencement of construction, in accordance with Schedule 4, Condition 6 of the Development Consent. The requirements for audits are identified in the Project consent conditions and none are specific or unique to biodiversity management, that is, the Project is subject to an auditing program as a whole. Unscheduled auditing may also be undertaken by DPIE and DAWE at any stage to evaluate the Project's compliance.

The EPC Contractor will support the Project Environmental Officer in providing all records and documentation required to demonstrate compliance with this BMP, the Development Consent and the Commonwealth approval.

5.6 Internal Reporting

Reporting requirements for the vegetation clearance protocol and threatened species management have been addressed in the Biodiversity Management Strategies section of this Plan (Section 4).

The EPC Environment Officer will provide weekly and / or monthly reporting to the Project Environmental Officer during the construction phase. Weekly reporting will:

- detail the newly established and monitored status of demarcation of threatened flora and clearing limits in areas where construction is occurring;
- detail any areas identified requiring ecologist assessment and areas where habitat features could be salvaged from;
- identify the status of any habitat tree location and marking undertaken that week;
- detail areas cleared during the week;
- results of trench inspections;
- detail of any fauna relocated/rescued; and
- newly established stockpiles and any management undertaken.

All site inspection and monitoring records are to be retained onsite for the duration of construction works and will be produced as required for auditing purposes. The above details will be compiled monthly into a cumulative dataset of biodiversity matters that would be accessible at any time, that is, the vegetation areas and habitat trees cleared, location, age of soil stockpiles, and fauna interactions.

5.7 Reporting Environmental Incidents and Non-conformances

All environmental incidents and non-conformances will be recorded and reported internally to aid in the prevention of further occurrences. Environmental Incidents will also trigger regulatory reporting in accordance with the Development Consent Schedule 4 Condition 5, 5a and 5b and Commonwealth approval Condition 8.

Incident reporting will be undertaken using the incident management procedures developed for the Project in the EMS.

5.8 Annual Reporting

The Project Environmental Officer will prepare an annual report as outlined in the EMS.

The EPC Contractor must provide the Project Environmental Officer with all records and documentation to support preparation of the annual report.

5.9 Record Keeping

Records of all environmental activities will be maintained by the EPC Environment Officer and the Project Environmental Officer to demonstrate compliance with this plan, the Development Consent and the Commonwealth approval. These records will be made available to the Independent Environmental Auditor, DPIE and DAWE upon request.

Condition 7 of EPBC Approval 2017/8121 requires that the person taking the action maintains accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans, reports, strategies, agreements required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.

5.10 Review

This BMP will be reviewed in accordance with Schedule 4, Conditions 2 and 3 of the Development Consent.

6 Roles and Responsibilities

Table 6-1 Roles and responsibilities for the project

Role	Responsibility
Principal Project Manager / Asset Manager	• *Responsible for delivery of the Project in accordance with this BMP;* • *Issue non-conformance notices to State and Commonwealth regulatory authorities and to issue actions to avoid or minimise potential environmental impacts, and failing the effectiveness of such steps, order cessation of a specific activity;* • *Engage suitably qualified contractor to undertake threatened flora demarcation prior to construction (described in Section 4.1), manage communication of those locations to the design team, verify the design avoids those locations prior to construction, and respond to unexpected occurrences;* • *Engage suitably qualified contractor to undertake a weed survey of the Development Footprint prior to construction (described in Sections 3.5 and 4.5.1);* • *Respond to threatened species chance finds (Section 4.6) and where relevant, feed those back into the design layout process;* • *Ensure all Project personnel attend a site induction prior to commencing work; and* • *Hold regular Project team meetings (monthly with the EPC Project Manager and weekly with the EPC Project Manager).*
Project Environmental Officer	• *Supervise and review the development and implementation of any required plans under this BMP;* • *Compile the results of the pre-construction weed survey creating the 'baseline' weed situation dataset and maps, and identify the appropriate specific control methods and approaches in an revised Weed Management Plan;* • *Monitor / inspect rehabilitation areas, directing the remedial actions;* • *Undertake regular internal audits;* • *Manage record keeping and evidence of compliance;* • *Engage a suitably qualified auditor for third party audits;* • *Respond to environmental incidents;* • *Prepare reports on compliance;* • *Prepare environmental induction training materials in conjunction with EPC Contractors;* • *Be the primary point of contact for regulatory authority liaison;* • *Update website with relevant documents;* • *Oversee environmental monitoring; and* • *Report to the Principal Project Manager on environmental performance of the EPC and sub-contractors.*
EPC Project Manager	• *Overall responsibility for the performance of the EPC Contractor and its sub-contractors against the requirements of this plan and the conditions of the Development Consent and Commonwealth approval as they relate to biodiversity;*

Role	Responsibility
	• *Ensure adequate resources are available for all contractors and subcontractors to deliver the Project in compliance with the EMS and other relevant documents;* • *Hold regular Project team meetings and toolbox talks, ensuring information is shared between all site personnel; and* • *Ensure all staff and sub-contractors complete a site environmental induction (which includes outputs of this BMP) prior to commencing work on site.*

EPC Environment Officer	• *Specific responsibilities in relation to this plan:*
	  ○ *Demarcation of the development footprint and vegetation clearing limits and monitoring of efficacy and adherence (Section4.2);*
	  ○ *Demarcation of threatened flora species locations;*
	  ○ *Locate and mark habitat trees (Section 4.2) prior to works in a given construction area, including engaging a qualified ecologist or wildlife handler, if active management measures are required*
	  ○ *Install (or delegate installation of) temporary fencing where trenches and pits will be left open overnight and then check them the following morning (Section 4.2)*
	  ○ *Manage the vegetation clearance procedures in Section 4.2*
	  ○ *Implementing the rehabilitation and revegetation measures identified in Section 4.3;*
	  ○ *Implement the weed control measures identified in Section 4.5, including the monitoring requirements and corrective actions described;*
	  ○ *Manage and record flora and fauna interactions with site activities;*
	  ○ *Monitoring of management activities as defined in Section 5, including maintenance of monitoring records and support of auditing;*
	  ○ *Weekly reporting identified in Section 5.6 and providing documentation required to comply with the reporting requirements in Section 5.6; and*
	• *Undertake site inductions including all key BMP and weed management measures (Appendix B);*
	• *Notify the Project Environmental Officer of any environmental incident or non-conformance immediately upon identifying the issue.*

Operational Environment Manager	• *Develop and implement management plans for rehabilitation, weeds and vertebrate pests.* • *Maintain threatened species demarcation.* • *Annually report on management plans, success of remedial actions and need for alternative remedial actions or controls.*
All Employees and Contractors	• *Complete a site induction prior to commencing works on site* • *Attend all environmental training as required* • *Comply with the specific controls in this BMP and associated plans* • *Undertake all activities in accordance with agreed procedures and work methods*

Role	Responsibility
	• *Implement the actions identified in their management plans and programs in order to comply with the Development Consent conditions; and* • *Follow instructions of the Project Environmental Officer.*

7 References

CWP Solar Pty Ltd (2018a). *Sapphire Solar Farm Response to Submissions Report (RtS)*. Prepared by CWP Solar Pty Ltd for DPE (March 2018).

CWP Solar Pty Ltd (2018b). *Sapphire Solar Farm: Additional Information Memo*. Prepared by CWP Solar Pty Ltd for DPE (July 2018).

Eco Logical Australia (ELA). (2018). *Sapphire Solar Farm Environmental Impact Statement (EIS)*. Report prepared for DPE for development consent (January 2018).

LLS (2017). *Northern Tablelands Regional Strategic Weed Management Plan 2017-2022*. Local Land Services: Northern Tablelands. NSW Government. Accessed from: https://inverell.nsw.gov.au/wp-content/uploads/2018/02/NT-RegionalWeedMgmtPlan-WEB-June17.pdf

NSW Department of Primary Industries (DPI). *NSW WeedWise: Priority weeds for the Northern Tablelands*. Accessed on 28 November 2018 from: https://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=73

8 Appendices

Appendix A: Satisfaction of the Secretary

Appendix B: Indicative Worker Induction – Biodiversity Content

Appendix A

Satisfaction of the Secretary

Appendix B

Indicative Worker Induction – Biodiversity Content

Onsite Staff Behaviours Relating to Fauna Impacts

Important controls to minimise direct impacts to fauna are:

- Vehicle speed limits within construction areas should be reduced to minimise fauna strike risk.
- Vehicle use should be restricted to the development footprint and wherever possible to those areas which are to be used for access tracks or infrastructure.
- Plant interactions (impacts or near misses) should be reported immediately.
- Temporary construction features such as trenches and pits should be fenced overnight and when not in use for construction.
- Open trenches will checked daily by the EPC Contractor Environment Officer or delegate.

Threatened Flora Avoidance

Locations of threatened flora are shown on the attached plan. These will be demarcated onsite and must be avoided.

Minimisation of Vegetation Clearance

Disturb only the areas of the Development Footprint that are necessary for constructing and operating the Project.

No clearing of vegetation that had been fenced off for environmental protection.

Tree felling near the edges of the Development Footprint will be undertaken in a manner to avoid the impacts outside of the Development Footprint. The methods to achieve this will include avoiding using heavy machinery, instead using chainsaws, and to undertake directional felling towards the interior of the Development Footprint.

Habitat Tree Identification, Demarcation, and Clearance Protocols

Clearance limits will be clearly demarcated and access outside of those areas is not permitted.

In any area to be cleared, non-habitat trees (those without hollows or nests) will be cleared first with identified habitat trees (i.e. those with hollows or nests) left standing overnight to encourage the self-relocation of fauna that may be using the available habitat feature.

Where fauna are observed using a habitat tree during clearance, the tree will not be cleared until the fauna have vacated the tree.

A qualified ecologist or wildlife handler with appropriate licences will be present where active management of fauna is needed. Active management protocols to be undertaken by the qualified ecologist or wildlife handler for each species group are described below:

- Arboreal mammals

  Where habitat trees are present, and the presence of arboreal mammals is suspected or known, they will be managed by:

  - soft pushing the tree to the ground in order to reduce the likelihood of disturbance to the habitat feature/animal present;
  - inspection of the felled tree to confirm that the mammal has relocated from the habitat feature;
  - where the mammal is still present, block the hollow entrance with porous cloth material (such as some rags). Return prior to (but near) dusk to remove the cloth material and unblock the hollow, leaving the felled tree overnight to encourage the

animal to relocate. Return to check the hollow has been vacated the next morning or prior to removal or disposal.

- Nesting birds
    - Where a nest is active, the birds present (generally fledglings) will be collected where safe, and taken to a wildlife carer to be cared for, prior to later release (transport considerations will include measures to minimise further stress to the animals making them feel safe and secure such as in a darkened, closed box with material and cushioning);
    - where the nest is not active (ie. no fledglings present), the nest will be removed from the tree (where safe to do so) to ensure that the nest does not become active prior to disturbance. The tree should be inspected immediately prior to clearing to ensure that it remains inactive.
- Hibernating, roosting and/or breeding microbats

Habitat trees with suspected or confirmed bat roosts will be managed by:

- soft pushing the tree to the ground in order to reduce the likelihood of disturbance to the habitat feature/roost/microbat present;
- preferentially positioning the tree on the ground so the entrance to the hollow faces upwards (i.e. so bats are able to exit);
- inspect the felled tree to confirm whether bats have exited the tree. If they have not, block the hollow entrance with porous cloth material (such as some rags). Return prior to (but near) dusk to remove the cloth material and unblock the hollow; and
- leave the felled tree overnight to allow any remaining bats time to exit.
-

Weed Management Protocols

Among the other relevant management plan requirements, worker weed management actions include:

- understanding soil stockpiling procedures;
- regular inspections of work areas identifying weeds present and implementing required management actions;
- minimising the potential for establishment of new weeds by minimising the transport of weed species to and from the development footprint (mitigations will include restrictions on vehicle access, and requirements to wash-down of vehicles (arrive or upon arrival be certified weed-free), machinery and boots); and
- routine inspection of vehicles, machinery and plant for weed and weed seed;

Soil Management

Topsoil stockpiling will occur across the site. Topsoils will be managed by the EPC Project Manager and their disturbance and reuse should be consistent with agreed Project protocols.

Reporting

All workers are encouraged to report flora and fauna interactions to the EPC Project Manager.

All workers have a responsibility to adhere to this plan, participate in continuous improvement and notify the EPC Project Manager where situations inconsistent with this plan are encountered.

LEGEND

Development Footprint
Threatened Flora Polygons
Dichanthium setosum
Thesium australe
Threatened Flora Points
Dichanthium setosum

SCALE BAR

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COMPANY

SAPPHIRE SOLAR FARM PTY LTD

TITLE

Threatened Flora and the Development Footprint

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LEGEND

Development Footprint

Threatened Flora Polygons

Dichanthium setosum

Thesium australe

Threatened Flora Points

Dichanthium setosum

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COMPANY: SAPPHIRE SOLAR FARM PTY LTD

TITLE: Threatened Flora and the Development Footprint

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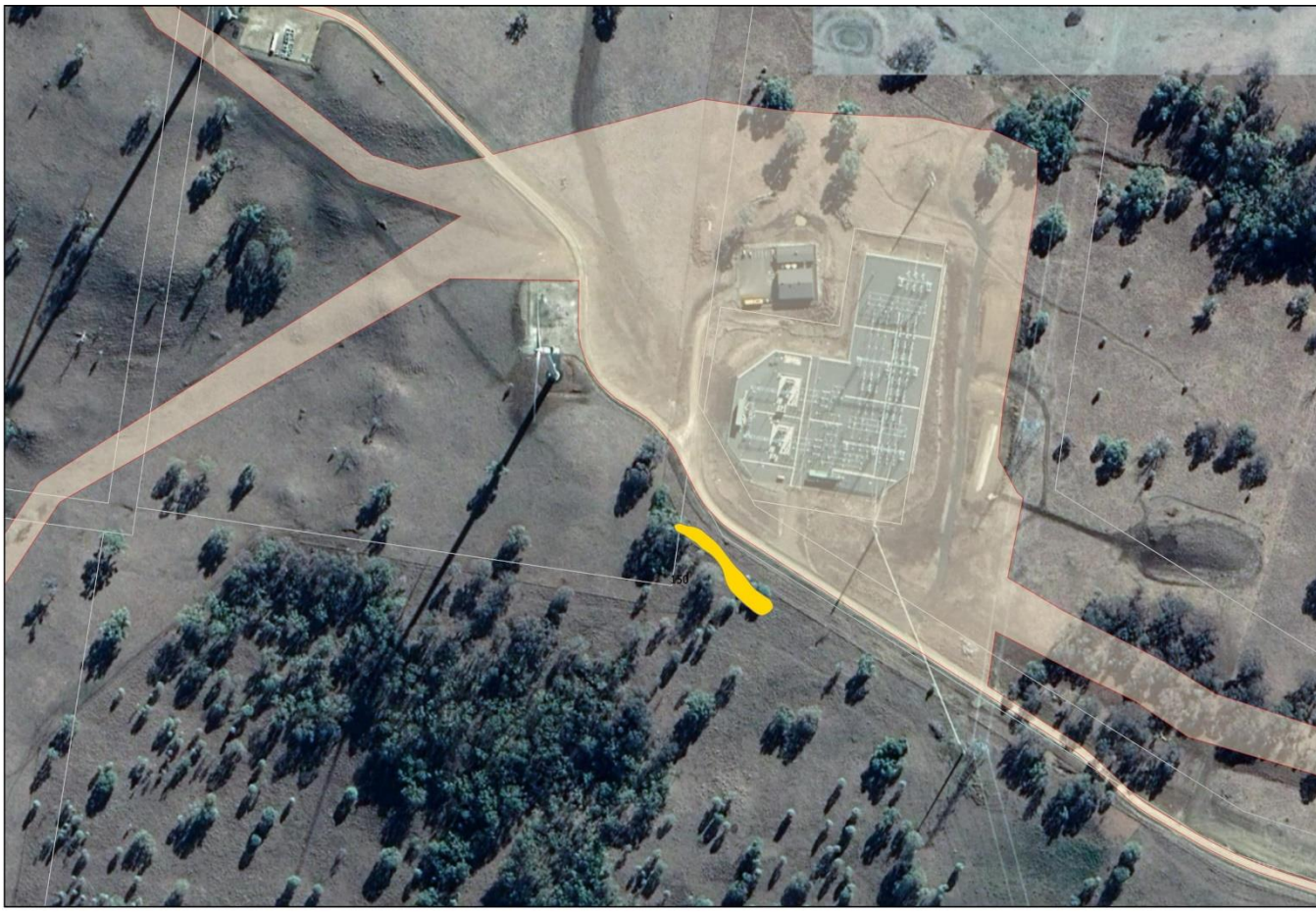

LEGEND

Development Footprint
Threatened Flora Polygons
Dichanthium setosum
Thesium australe
Threatened Flora Points
Dichanthium setosum

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Development Footprint

Threatened Flora Polygons

Dichanthium setosum

Thesium australe

Threatened Flora Points

Dichanthium setosum

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