

Biodiversity Offset Management Plan

Donald Mineral Sands Project (EPBC 2005/2372)

03-Feb-2025

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Client: Donald Project Pty Ltd

Co No.: 674 664 629

03-Feb-2025

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Glossary

Term	Explanation
Biodiversity	The variety of all life-forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part.
Bioregional Conservation Status (BCS)	An assessment of the conservation status of the native vegetation type (EVC) in the context of a particular bioregion, taking account of how commonly it originally occurred, the current level of depletion and the level of degradation of condition typical of remaining stands.
Bioregion	A landscape based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.
Diameter at Breast Height (DBH)	Circumference of a tree in centimetres measured at 1.3 metres above ground level
Ecological Vegetation Class (EVC)	Native vegetation in Victoria is classified into EVCs based on floristic, structural, and ecological features. Each EVC has been assigned a 'benchmark' condition for each of Victoria's bioregions. The EVC benchmark is used for comparison when assessing vegetation quality through a Vegetation Quality Assessment (VQA). The benchmark is also used for determining the size category of scattered trees.
Ecology	Ecology is the study of the interrelationships between living organisms and their environments.
Exotic vegetation	Any vegetation that is not native to Australia or its States and Territories.
Habitat Hectare (HHa)	A site based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation type. For native vegetation: <i>Habitat hectares of patch = extent in hectares × condition multiplier</i> For scattered trees: <i>Habitat hectares of scattered trees = (number of trees × standard extent) × condition multiplier</i> Where: Standard extent is a circle with 15 metre radius
Habitat Zone (HZ)	A discrete area of native vegetation consisting of a single vegetation type (EVC) with an assumed similar averaged quality. This is the base spatial unit for conducting a habitat hectare assessment.
High threat weed	Introduced species, including native species occurring outside their natural range ('non-indigenous'), with the ability to out-compete and substantially reduce one or more native life forms in the longer term assuming on-going current site characteristics and disturbance regime.
Indigenous vegetation/species	Indigenous vegetation/species includes vegetation that is native to Australia as well as being native to a specific geographic region.
Limiting habitat	An area that supports key abiotic or biotic factors critical for a particular species to persist, that are not present elsewhere; the species is limited in its ability to persist in areas outside where these key factors are present (EHP pers. comm 2022).
Key Biodiversity Area	Key Biodiversity Areas (KBA) are specific geographical regions recognised for their critical significance in biodiversity conservation. These areas are identified using globally standardized criteria established by the International Union for Conservation of Nature (IUCN) through a collaborative effort involving scientists, conservation organizations, and government agencies worldwide.

Term	Explanation
Matter of National Environmental Significance (MNES)	The EPBC Act defines and protects nine MNES: World Heritage properties, National Heritage places, wetlands of international importance (Ramsar sites), listed threatened species and ecological communities, migratory species protected under international agreements (JAMBA, CAMBA, ROKAMBA), Commonwealth marine areas, Great Barrier Reef Marine Park, nuclear actions (including uranium mines), and a water resource, in relation to coal seam gas development and large coal mining development.
Native vegetation	Native vegetation (as defined in Victorian planning schemes) are plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses.
Native vegetation - patch	A patch of native vegetation is defined as: <i>an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or</i> <i>any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or</i> <i>any mapped wetland included in the Current wetlands map, available in DELWP systems and tools (DELWP 2017a).</i>
Native vegetation – scattered tree	A scattered tree is defined as: <i>a native canopy tree that does not form part of a patch (DELWP, 2017a).</i> Scattered trees were classified as large or small based on their Diameter at Breast Height (DBH). DBH is measured in centimetres at 1.3 m above ground level. Large scattered tree DBH is specified in the relevant EVC benchmark description. Small scattered trees are those less than the EVC benchmark for a large tree but greater than 3 m in height (DELWP 2018a).
Native vegetation offset	A native vegetation offset is any works of other actions to make reparation for the loss of native vegetation arising from the removal of native vegetation. This may include an area of existing remnant vegetation that is protected and managed, an area that is revegetated and protected, an area that is set aside for regeneration or restoration, or any combination of these. The relative size of an offset is graded according to its conservation significance.
Non-indigenous vegetation	Vegetation that is native to Australia, but not to the geographic region to which a site is located.
Study area	Geographic boundary of the assessment.
Vegetation Quality Assessment (VQA)	An assessment of vegetation condition undertaken using the Habitat Hectares method as described in the <i>Vegetation Quality Assessment Manual – guidelines for applying the habitat hectare scoring method</i> (DSE 2004a). Individual patches are termed Habitat Zones (HZ) in accordance with DEECA terminology.
Weeds of National Significance (WoNS)	The most problematic invasive plant species in Australia as determined by the federal government.
Work plan area	The area where the mineral sands will be mined and processed in the first stage of the project, represented in Attachment A by the zone enclosed by the dashed black line designated 'Work plan area'

Declaration of Accuracy

In making this declaration, I: [REDACTED]

am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (EPBC Regulations). The offence is punishable on conviction imprisonment or a fine, or both.

I am authorised to bind **Donald Project Pty Ltd** to this declaration and have no knowledge of that authorisation being revoked at the time of making this declaration.

Signature

[REDACTED]

Full name (please print)

[REDACTED]

Organisation (please print)

Donald Project Pty Ltd

Date: 05 / 02 / 2025

Conditions of approval reference table (EPBC 2005/2372)

The conditions of approval for EPBC 2005/2372, respective to the requirements for an Offset Management Plan, is presented in Table 1 below.

Table 1 Conditions of approval reference table (Condition 2 and 3 EPBC 2005/2372)

Condition of approval	Where addressed
2) The approval holder must submit a Biodiversity Offset Management Plan (BOMP) to the department for the Minister's approval to compensate for the residual significant impacts of the Action on the Buloke Woodlands . All commitments, including environmental outcomes, management measures, corrective measures, trigger values and performance indicators in the BOMP must be SMART . The BOMP must be consistent with the Environmental Management Plan Guidelines and Environmental Offsets Policy , and must include:	
a. description of the offset sites , including the baseline habitat quality condition prior to management,	Section 3.0 Section 4.0 Appendix A
b. management actions, including timing and frequency, to protect and enhance the habitat quality ,	Section 5.0 Section 6.0
c. a monitoring program, including timing and frequency of monitoring, to determine impacts and effectiveness of management actions,	Section 7.0 Section 8.0 Section 9.0
d. clear and concise performance indicators specifying outcomes to be achieved and corrective actions if performance indicators are not being achieved, and	Section 5.0 Section 6.0 Section 7.0 Section 9.0 Section 10.0
e. persons responsible for implementing and reviewing the plan.	Section 5.1
3) The approval holder must not undertake any clearing of Buloke Woodlands unless the Minister has approved the BOMP in writing. The approval holder must implement the BOMP approved by the Minister in writing until the expiry date of this approval.	

Principles of the EPBC Act Environmental Offset

The principles of the EPBC Act Environmental Offset Policy are listed in Table 2 with respect to where these have been addressed in the Offset Management Plan.

Table 2 Principles of the EPBC Act Environmental Offset Policy

Principles of the EPBC Act Environmental Offset Policy	Where addressed
Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.	Section 5.2 of this BOMP outlines the managed and monitoring commitments for the purposes of ecological improvement and conservation.
Be built around direct offsets but may include other compensatory measures.	The impact is fully accounted for by direct offsets, as outlined in this BOMP.
Be in proportion to the level of statutory protection that applies to the protected matter.	Offsets are to be secured in accordance with the Environmental Offset Policy and achieve over 100% of impact offset in the offset assessment guide.
Be of a size and scale proportionate to the residual impacts on the protected matter.	The vegetation to be removed is of lower quality and in small fragmented patches totalling 4.98 hectares. The offset lands are of higher quality in two patches totalling 28.5 hectares.
Effectively account for and manage the risks of the offset not succeeding.	Section 10.0 outlines the risk assessment process and corrective measures to be implemented to address risks.
Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs.	Both offset areas are situated in a Farming Zone under the relevant Planning Schemes. The purpose of the Farming Zone is to provide for the use of land for agriculture and encourage the retention of productive land. Many agricultural practices that do not require a permit under this zone would be contrary to the long-term protection of the biodiversity values on the site. No overlays under the relevant planning schemes affect these sites. No law or regulation requires active management to protect the biodiversity values that currently exist.

1.0 Introduction

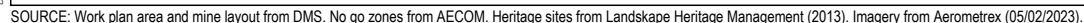
1.1 Project description

The Donald Mineral Sands Project (the Project) is a mining project located in western Victoria, Australia. It is being developed by Donald Project Pty Ltd (DMS), a wholly owned subsidiary of Astron Limited (Astron). The Project is located near Minyip in regional Victoria, 50 km from the regional centre of Horsham, approximately 300 km northwest of Melbourne. The Project will mine fine-grained sand sediments at depths of 10–24 metres below ground. These mineral sands contain titanium, zirconium and rare earth minerals (monazite and xenotime).

The work plan area (**Figure 1**) comprises the extraction area, processing facilities and required infrastructure in which the mine will be constructed and operated. The work plan area supports mining for over 19 years, at a mining rate of 7.5 million tonnes per annum (Mtpa). Mining will be followed by progressive rehabilitation. This BOMP relates to Buloke Woodlands clearing within the Work plan area where mineral sands are processed in the first stage of the project.

Operations will involve a truck and shovel open-pit mine, from which ore is sent to a mining unit plant (MUP), wet concentrator plant (WCP) and concentrate upgrade plant (CUP), which are designed to produce the products.

Product will be loaded into specialised (half-height) shipping containers, which are sealed and transported offsite to a port by road and rail.



1.1.1 Project approval conditions

The Project was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and approved in 2009 (EPBC Act Approval 2005/2372 (Approval)). The Approval acknowledges direct impacts to the Endangered Threatened Ecological Community (TEC): *Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions* (Buloke Woodlands).

As part of meeting its conditions in the Approval, DMS identified two suitable first party offset sites, identified as Habitat Zone 21 and Barry's Block (as shown in Attachment C, D and E of the Approval). The offset sites, combined with active management were deemed suitable to compensate for the Project impacts to Buloke Woodlands provided a *Biodiversity Offset Management Plan* (BOMP) is completed in accordance with the Department's Environmental Management Plan Guidelines and approved by the Minister (Approval Conditions 2 and 3). The Guidelines require that the BOMP include:

- A description of the offset lands (Habitat Zone 21 and Barry's Block), including baseline habitat quality prior to management;
- Management actions, including timing and frequency, to protect and enhance the habitat quality;
- A monitoring program, including timing and frequency of monitoring, to determine impacts and effectiveness of management actions;
- Clear and concise performance indicators specifying outcomes to be achieved and corrective actions if performance indicators are not being achieved; and,
- Persons responsible for implementing and reviewing the plan.

1.1.2 Objectives

The objective of this BOMP is to provide on-ground vegetation management actions to improve the ecological condition of two offset sites (Barry's Block and Habitat Zone 21) which have been classified as the *Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregion* Threatened Ecological Community (Endangered EPBC Act).

This plan details the management actions required to achieve a raw gain improvement of 1 point in accordance with the *EPBC Act Environmental Offset Policy* and utilises the Victorian state Habitat Hectare method to provide explicit comparisons between the existing vegetation features and those of the same community type in a natural or undisturbed condition (benchmark condition). Native vegetation management actions have been derived from such comparisons to effectively manage the site over ten years towards benchmark condition.

On ground outcomes to be achieved include control of noxious flora and fauna species, and the promotion and restoration of indigenous species in accordance with the relevant Ecological Vegetation Class benchmarks. Monitoring and reporting will be undertaken to measure the success of management actions and to provide a basis for adaptive management if required.

1.2 Assessment Qualifications and Limitations

The 'snap shot' nature of the assessments undertaken within the proposed offset sites reduces the likelihood of mobile, migratory, seasonal, cryptic, nocturnal or uncommon species being detected. As such, the complete diversity of species present within the respective sites is unknown where targeted or repeated surveys, at specific times of the year, are required to detect such species. Notwithstanding the above, terrestrial flora and fauna data collected during the assessment, and information obtained from relevant sources (e.g. biological databases and relevant literature) are considered adequate to provide an accurate assessment of the ecological values and the required management within the offset sites. As the site is managed over time there is potential for previously unrecorded species to recruit within the site and must be accounted for (as necessary) through adaptive management.

2.0 Project Environmental Context

This section provides a description of the extent and condition of native vegetation as recorded within the current work plan area. This section provides detail on the condition of Buloke Woodlands at the time of preparation of this BOMP and as recorded within the initial assessments for the Project's Environmental Effects Statement (EES) approved in 2008.

2.1 Extent and Quality of Buloke Woodlands

2.1.1 Buloke Woodland TEC extent within Work Plan Area AECOM 2023

The extent of Buloke Woodlands TEC within the work plan area was finalised following a review of the extent mapping undertaken in previous assessments and approvals for the Project (EHP 2006, EHP 2023). This was undertaken by AECOM in 2023 which reviewed the respective EVC for the area and identified the community to be present within the work plan area as follows:

- o Buloke *Allocasuarina luehmannii* over an exclusively exotic pasture understorey (Plate 1);
- o A derived grassland that supports 25% cover of native perennial grass, herbs and/or small shrubs where evidence of Buloke is present in proximity (Plate 2); and,
- o Areas of woodlands represented by a co-dominance of Buloke, Black Box and Grey Box *Eucalyptus largiflorens*, or, where Buloke is absent evidence of removal is present as logs or stumps.

Boundaries to the updated extent mapping of the community was defined by grouping distinct clusters of Bulokes and/or areas of derived grassland which were separated by:

- o open paddocks;
- o roads and access tracks where no native vegetation is present in the understorey, or connectivity of canopy; and,
- o Infrastructure such as buildings, sheds and storage.

Although highly degraded, the recorded community was clearly defined (using definitions by Sluiter *et al.* (1997)) as the listed Group 8 *Semi-arid Northwest Plains Buloke Grassy Woodland* which is described as an open woodland in which Buloke is the dominant tree, sometimes in association with Black Box. The community occurs on sites where soils are relatively fertile and subject to seasonal-waterlogging and little fire. Most sites on which it occurred were settled early and are now private land mainly cleared for farming. A total of **4.98 hectares** of the Ecological community is proposed to be impacted with the Work Plan Area.



Plate 1 Buloke Woodlands Community defined by a stand of Buloke over exotic pasture (AECOM 2024)



Plate 2 Buloke Woodlands Community derived grassland with Bulokes in background (AECOM 2024) .

2.1.2 Buloke Woodland TEC Quality within Work Plan Area

The presence of the Buloke Woodlands community was identified within the approved EES for the Project (EHP 2006), and subsequent assessments undertaken for the Project (EHP 2023). The assessment undertaken by Ecology and Heritage Partners (EHP 2023) provides the current condition of the Buloke Woodlands community within the work plan area. The initial community descriptions (EHP 2006) is provided below for comparison.

2.1.3 Detailed Flora and Fauna Survey (EHP 2006)

The extent of Buloke Woodlands was initially mapped by EHP in preparation of the Project's EES which was submitted in 2008. The Project was approved as a controlled action under the EPBC Act on 13 March 2009. The extent and definition of Buloke Woodlands as recorded in this assessment was superseded as per the detail in section 2.1.1.

Extent

The mapped extent of the Buloke Woodlands community (relative to the current work plan area) was defined by the presence of three EVCs; Plains Woodland (EVC 803), Plains Savannah (EVC 826), and Ridge Plains Mallee (EVC 96) which identify Buloke as a typical canopy species. The work plan area has since been reduced to the extent shown in Plate 3 below.

Plate 3 below shows superseded project area as indicated in Schedule 1 Figure 4 of the original 2009 Approval (red) relative to the current work plan area (yellow) that is a subset of the Approval project area, and the recorded habitat zones which represent the Buloke Woodlands community (21, 26, 28, 29, 30 and 33).

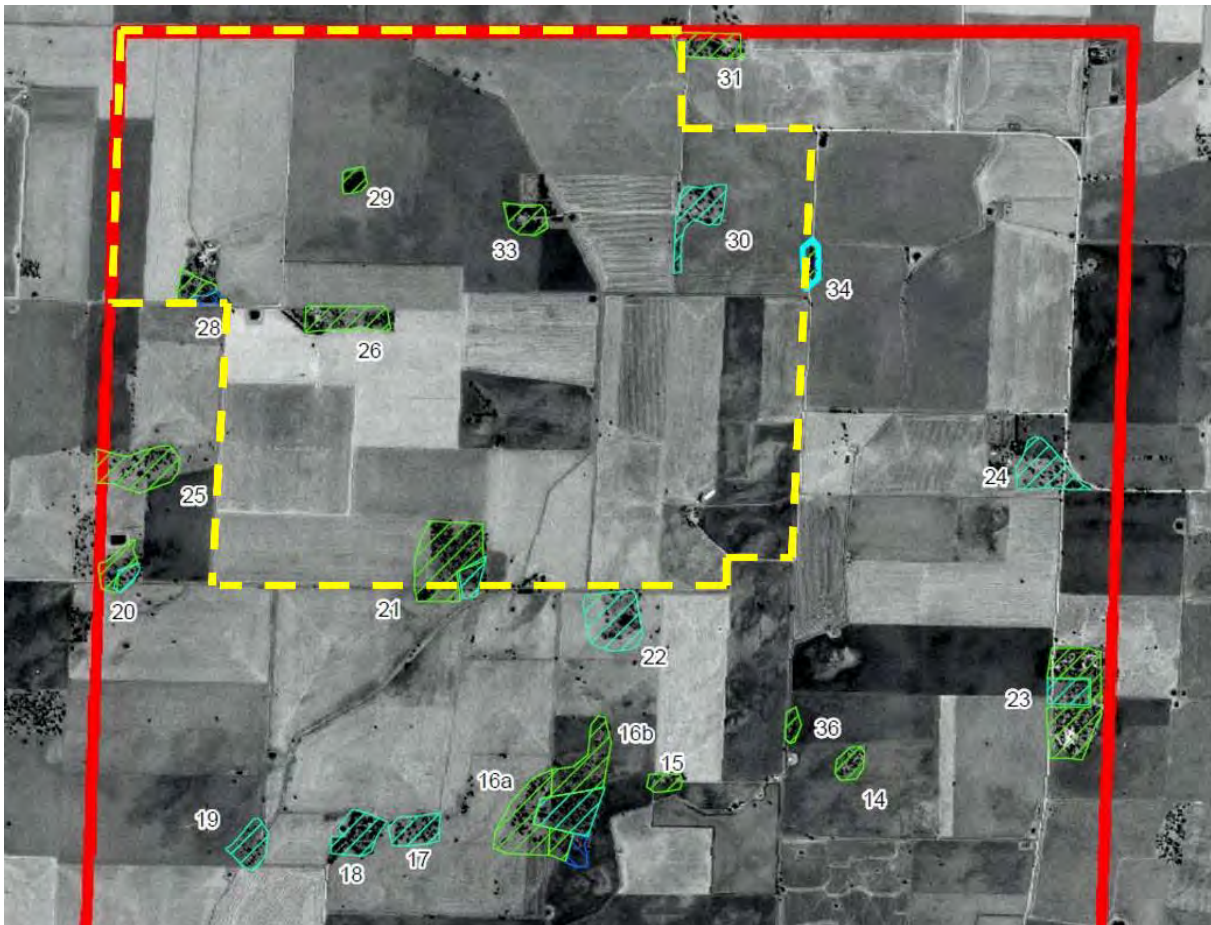


Plate 3 Mapped habitat zones EHP 2006 respective to current work plan area

Quality

The EHP 2006 assessment provides a brief description of the quality of Buloke Woodlands as presented in Table 3 below.

Table 3 EHP 2006 habitat zone descriptions representative of Buloke Woodlands in Work Plan Area

Habitat Zone	EVC	Description
21 (Offset Site)	Plains Woodland (803), Plains Savannah (826)	An area of mostly overgrazed Black Box and Buloke Woodland with a small ungrazed section on the south side of the road. Mostly Plains Savannah, with areas of Plains Woodland. Excellent overstorey but mostly overgrazed ground flora. Overall status Medium Condition. Listed species recorded: - Buloke Mistletoe <i>Amyema linophylla subsp. orientalis</i> (FFG Act Endangered) - Hooded Robin <i>Melanodryas cucullata</i> (EPBC Act Endangered) - Brown Tree Creeper <i>Climacteris picumnus victoriae</i> (EPBC Act Vulnerable)
26	Plains Savannah (826)	A narrow house paddock remnant mixed with numerous non indigenous trees and shrubs and a largely exotic ground flora. Poor condition. Listed species recorded: Nil.
28	Plains Savannah (826) Ridge Plains Mallee (96)	A small but quite rich house paddock remnant with a mixture of Buloke, Black Box and Bull Mallee vegetation. Overstorey is good, a limited midstorey and with a degraded ground flora. Overall status is Medium Condition. Listed species recorded: [REDACTED]
29	Not surveyed due to permission not being granted for access.	
30	Plains Woodland (803)	An overgrazed and formerly cropped small Black Box remnant. Poor condition. Listed species recorded: Nil.
33	Plains Savannah (826)	Dense Bulokes surrounded by crops. Poor condition. Listed species recorded: Nil.

2.1.4 Biodiversity Assessment (EHP 2023)

The Biodiversity Assessment undertaken by EHP in 2023 provides the current condition of the Buloke Woodlands community within the work plan area. The extent and definition of Buloke Woodlands as recorded in this assessment was superseded as per detail in Section 2.1.1.

Extent

The EHP 2023 assessment defined the presence of Buloke Woodland community to be represented by two EVCs: Plains Savannah (EVC 826) and Plains Woodland (EVC 803). A comparison table of the updated naming convention for habitat zones relative to the EHP 2006 assessment is provided in Table 4 below.

Table 4 Comparison of habitat zone name updates between EHP 2006 and EHP 2023

EHP 2006 Habitat Zone	EHP 2023 Habitat Zone
21 (Offset Site)	PS4, PW5
26	PS1, PS3
28	PS1, PS3, PS5
29	PS5
30	Removed from listing
33	PS1, PS3

Note: PS= Plains Savannah (826), PW=Plains Woodland (803).

The EHP 2006 habitat zone 30 was removed from listing as the Buloke Woodland TEC as it was represented predominantly by scattered Black Box and Grey Box over an exotic pasture dominated understorey. Given the notable absence of Buloke this area was omitted as representing the ecological community.

Quality

Plains Savannah (826)

Plains Savannah was present in two structural forms within the study area, either as a Buloke Woodland or open grassland (Plate 4, Plate 5). The woodland component was typically dominated by Buloke with scattered Black Box. The midstorey was generally absent, with native shrubs such as Golden Wattle *Acacia pycnantha* and Gold-dust Wattle *Acacia acinacea* observed sporadically. The ground layer was highly variable, ranging from exotic pasture grasses and environmental weeds, including Wild Oat, Barley-grass, Toowoomba Canary-grass, Horehound *Marrubium vulgare* and Bathurst Burr *Xanthium spinosus*, to higher quality remnants being dominated by native grasses and forbs including Wallaby-grass, Spear-grass, Tall Mulla Mulla and Ruby Saltbush (i.e Habitat Zone 21/PS4).



Plate 4 A patch of Buloke dominated Plains Savannah within the study area on the southern boundary (Ecology and Heritage Partners Pty Ltd 01/02/2023)



Plate 5 A patch of treeless Plains Savannah within the central portion of the study area (Ecology and Heritage Partners Pty Ltd 31/1/2023)

Plains Woodland (803)

Plains Woodland was dominated by Black Box, with occasional Buloke and Grey Box. The understorey present was in poor-moderate condition commonly containing Spear-grass, Wallaby-grass, Windmill Grass *Chloris truncata*, Grey Germander *Teucrium racemosum*, Prickly Starwort *Salsola tragus*, Wingless Bluebush *Maireana enchylaenoides*, and Berry Saltbush *Atriplex semibaccata*.



Plate 6 Plains Woodland within the study area (Ecology and Heritage Partners Pty Ltd 30/01/2023)



Plate 7 Plains Woodland within the study area (Ecology and Heritage Partners Pty Ltd 30/01/2023)

Respective to Table 4 above, the corresponding habitat hectare assessment for areas representing Buloke Woodlands impacted within the work plan area is provided in Table 5 below. Areas which are impacted by the Project works within the Work Plan Area include PS1, PS3, and PS5, which produced a habitat score of 13, 23 and 19 respectively. The score is out of a potential 100 indicating the recorded areas are missing key structural habitat components as well as poor diversity and high weed coverage.

Barry's Block

Table 5 Habitat Hectare results for areas of Buloke Woodlands within the Work Plan Area (EHP 2023)

Habitat Zone			PS1	PS3	PS5
EVC			EVC 826 – Plains Savannah		
Bioregion			Wimmera		
Bioregional Conservation Status (BCS)			Endangered		
Site Condition	Large Old Trees	10	0	10	6
	Tree Canopy Cover	5	5	5	5
	Lack of Weeds	15	0	0	0
	Understorey	25	5	5	5
	Recruitment	10	0	0	0
	Organic Litter	5	2	2	2
	Logs	5	0	0	0
	Total Site Score	75	12	22	18
	Total Landscape Score	25	1	1	1
Habitat Score		100	13	23	19
Habitat (Quality) Score = Score/10		10	1	2	2
Habitat Points = Score/100		1	0.13	0.23	0.19

3.0 Description of Offset Sites

3.1 Climate and environment

3.1.1 Climate

Habitat Zone 21 and Barry's Block (the offset sites) are positioned within the Wimmera bioregion of western Victoria. The climate is characterised by high summer temperatures mixed with short yet high intensity rainfall, and mild winters typically with low precipitation intensity predominantly occurring May to October. Annual rainfall is low between 400mm and 500mm. Winter months are prone to severe frost.

3.1.2 Environment

Nearly all of the Wimmera bioregion has been altered or cleared of native vegetation for agriculture, with minor occurrences found as scattered remnants on roadsides, farms and reserves. Prior to clearing, the region consisted mostly of savannah and woodland typically of Grey Box *Eucalyptus microcarpa*, Black Box *E. largiflorens*, Yellow gum *E. leucoxylon*, River Red Gum *E. camaldulensis*, and/or Buloke *Allocasuarina luehmannii*.

3.2 Ecological Vegetation Class and Buloke Woodlands

3.2.1 Ecological Vegetation Class (EVC)

The Victorian state classifies native vegetation into Ecological Vegetation Classes (EVC) which can be synonymous with TEC's provided they meet the prescriptive benchmarks as identified under the EPBC Act. Each EVC is allocated a Bioregional Conservation Status (BCS) which is a measure of the current extent and quality compared to its original pre-1750's extent. The EVC's allocated to the respective offset sites are provided in Table 6 below.

Table 6 Ecological Vegetation Classes represented at each offset site

Habitat Zone 21	
EVC	BCS
Plains Savannah (EVC 826)	Endangered (Wimmera)
Plains Woodland (EVC 803)	Endangered (Wimmera)
Barry's Block	
Plains Woodland (EVC 803)	Endangered (Wimmera)

The typical environmental condition of the EVC's representing the offset sites are discussed below, and the benchmarks for the respective EVC's are included as Appendix B.

3.2.1.1 Plains Woodland (EVC 803) – Wimmera (White et al. 2003)

Plains Woodland of the Wimmera is within a group of EVC's categorised as relict floodplains for the region typically dominated by Black Box *Eucalyptus largiflorens* among other eucalypts and Buloke *Allocasuarina luehmannii*. The defining characteristics of this EVC is a grassy woodland rich in small chenopods and annual or geophytic forbs occurring on non-riverine alluvial deposits, outside of seasonal wetlands or associated gilgai depressions lacking flood dependent species in the ground-layer.

Structurally the EVC is a woodland where in most occurrences shrubs are a minor component, but it is considered that the abundance and diversity of the shrub layer has generally been reduced in diversity by grazing.

The habitat for this EVC is within low-lying areas within former drainage systems on heavy soils plains. The habitat is not subject to flooding, though can include low-lying seasonally water-logged areas. This EVC is typically found on clay alluvial soils, sometimes with a shallow sandy overlay at elevations of 70-130m above sea level.

Very few relatively intact examples of Plains Woodland persist within this region due to large scale clearing for broadacre farming. It is also poorly represented in conservation reserves, and restricted public land examples are typically depauperate in indigenous species as a consequence of heavy grazing. Examples within lightly grazed private land are of major conservation value for the plant community as well as potential habitat for rare and/or threatened species.

A breakdown of the species typically associated with this EVC is provided in Table 7 below.

Table 7 Plains Woodland (EVC 803) Floristics

Floristics
Dominant overstory species
Black Box <i>Eucalyptus largiflorens</i> , Buloke <i>Allocasuarina luehmannii</i>
Other overstory species
Grey Box <i>Eucalyptus microcarpa</i> , Yellow Box <i>Eucalyptus melliodora</i> ,
Mid-storey
Gold-dust Wattle <i>Acacia acinacea</i> , Umbrella Wattle <i>Acacia oswaldii</i> , Golden Wattle <i>Acacia pycnantha</i> , Small Hop-bush <i>Dodonaea bursariifolia</i> , Hakea <i>Hakea leucoptera</i> , Pittosporum <i>Pittosporum angustifolium</i> , Pale-fruit Ballart <i>Exocarpos strictus</i> , Waterbush <i>Myoporum montanum</i> , Boobialla <i>Myoporum platycarpum</i> subsp. <i>platycarpum</i> , Common eutaxia <i>Eutaxia microphylla</i> , Cranberry Heath <i>Styphelia humifusa</i> , Peach Heath <i>Lissanthe strigosa</i> subsp. <i>subulata</i> .
Ground layer - Grasses
Common Wheat-grass, <i>Anthosachne scabra</i> , Spear-grass <i>Austrostipa scabra</i> subsp. <i>falcata</i> , Bristly Wallaby-grass <i>Rytidosperma setaceum</i> , Kneel Wallaby-grass <i>Rytidosperma geniculatum</i> , Bristly Wallaby-grass <i>Rytidosperma setaceum</i> , Tussock grass <i>Poa sieberiana</i> , Dark Nineawn-grass <i>Enneapogon nigricans</i> , Mallee Love-grass <i>Eragrostis dielsii</i> , Spider-grass <i>Enteropogon acicularis</i> .
Ground layer - Chenopods
Wingless bluebush <i>Maireana enchylaenoides</i> , Black cotton-bush <i>Maireana decalvans</i> , Australian saltbush <i>Atriplex semibaccata</i> , Small saltbush <i>Atriplex eardleyae</i> , Mealy saltbush <i>Atriplex pseudocampanulata</i> , Lindley's saltbush <i>Atriplex lindleyi</i> , Ruby saltbush <i>Enchylaena tomentosa</i> , Nodding saltbush <i>Chenopodium nutans</i> .
Ground layer - Herbs
Sheep's burr <i>Acaena echinata</i> , Bindweed <i>Convolvulus angustissimus</i> , Smooth Solenogyne <i>Solenogyne domini</i> , Early nancy <i>Wurmbea dioica</i> , Bog-rush <i>Schoenus apogon</i> , Twining fringe-lily <i>Thysanotus patersonii</i> , Lemon beauty-heads <i>Calocephalus citreus</i> .
Small ephemeral depressions (Gilgai terrain)
Common Swamp Wallaby-grass <i>Amphibromus nervosus</i> , Spike-Rush <i>Eleocharis</i> spp.

3.2.1.2 Plains Savannah (EVC 826) – Wimmera (White et al. 2003)

The defining characteristics of Plains Savannah of the Wimmera region is a structurally diverse vegetation unit which includes grassy openings of a few hundred to many hundreds of hectares, with a variable tree density ranging from a very sparse savannah to woodland. The relative absence of eucalypts is particularly characteristic, with Buloke *Allocasuarina luehmannii* being the dominant canopy species.

The habitat is typically flat to very slightly undulating paleo-lacustrine loamy-clay plains in areas receiving annual rainfall of less than 450mm annually. Relative drainage characteristics appear to be the main determinant of the presence of trees, with slight rises providing sufficient drainage to allow for tree establishment. Internal drainage to, and/or impeded vertical drainage in, lower areas excludes trees and allows for the development of grassy openings.

The canopy species in this community was popular as a timber resource amongst early settlers, with Slender Cypress-pine for its insect and rot resistance, workability and straightness; Buloke for its toughness and ability to be radially split into fence droppers.

A breakdown of the species typically associated with this EVC is provided in Table 8.

Table 8 Plains Savannah (EVC 826) Floristics

Floristics
Dominant overstory species
Buloke <i>Allocasuarina luehmannii</i>
Species at ecological margins
Black Box <i>Eucalyptus largiflorens</i> , Yellow Gum <i>Eucalyptus leucoxylon</i> , Grey Box <i>Eucalyptus microcarpa</i> , River Red Gum <i>Eucalyptus camaldulensis</i> , <i>Callitris gracilis</i> subsp. <i>murrayensis</i>
Mid-storey
Gold-dust Wattle <i>Acacia acinacea</i> , Silver cassia <i>Senna artemisioides</i> , Desert quandong <i>Santalum acuminatum</i> , Umbrella Wattle <i>Acacia oswaldii</i> , Spiny saltbush <i>Chenopodium spinescens</i> , Sweet bursaria <i>Bursaria spinosa</i>
Ground layer - Grasses
Common Wheat-grass, <i>Anthosachne scabra</i> , Spear-grass <i>Austrostipa scabra</i> subsp. <i>falcata</i> , Bristly Wallaby-grass <i>Rytidosperma setaceum</i> , Knead Wallaby-grass <i>Rytidosperma geniculatum</i> , Bristly Wallaby-grass <i>Rytidosperma setaceum</i> , Tussock grass <i>Poa sieberiana</i> , Dark Nineawn-grass <i>Enneapogon nigricans</i> , Mallee Love-grass <i>Eragrostis dielsii</i> , Spider-grass <i>Enteropogon acicularis</i> .
Ground layer - Forbs
Bindweed <i>Convolvulus angustissimus</i> , Grassland Wood-sorrel <i>Oxalis perennans</i> , Ruby salt-bush <i>Enchylaena tomentosa</i> , Wingless blue-bush <i>Maireana enchylaenoides</i> , Minnie Daisy <i>Minuria leptophylla</i> , Variable Sida <i>Sida corrugata</i> , New Holland Daisy <i>Vittadinia</i> spp., Cut-leaf Goodenia <i>Goodenia pinnatifida</i> , Nodding Saltbush <i>Einadia nutans</i> , Berry Saltbush <i>Atriplex semibaccata</i> , Pink Mulla-mulla <i>Ptilotus exaltatus</i> , Scented Mat-rush <i>Lomandra effusa</i> , Bulbine Lily <i>Bulbine bulbosa</i> , Yellow Rush Lily <i>Tricoryne elatior</i> , Small Vanilla-lily <i>Arthropodium minus</i> , Lemon beauty-heads <i>Calocephalus citreus</i> , Scaly buttons <i>Leptorhynchos squamatus</i> , Saltbush <i>Chenopodium desertorum</i> , Bottle Bluebush <i>Maireana excavata</i> , Black Cotton Bush <i>Maireana decalvans</i> , Blue bells <i>Wahlenbergia</i> spp.

3.3 Buloke Woodlands of the Riverina and Murray-darling Depression Bioregions

In Victoria, Buloke Woodlands occur scattered throughout the Riverina and Murray Darling Depression Interim Biogeographic Regionalisation for Australia (IBRA) regions (of which the Wimmera bioregion falls within), except for immediately adjacent to major rivers, including the Murray River intrusion of Riverina into the adjoining Murray-Darling Depression bioregion.

Buloke is usually a dominant or co-dominant tree, but may also have prominent occurrences of *Callitris* and/or eucalypts. In some stands the Buloke Woodlands includes vegetation where Buloke is a minor component or may even be absent (Sluiter et al. 1997), often due to a lack of regeneration following the disturbances contingent on non-Indigenous settlement or due to local variability. Therefore, the lack of Buloke at any given site does not necessarily preclude that area from being within a patch of the Buloke Woodlands ecological community. Evidence for the occurrence of the ecological community may include the presence of dead *A. luehmannii* trees or stumps or previous records of *A. luehmannii* trees in the landscape (DCCEEW 2000).

The occurrence of mid and understorey species is synonymous with those listed in Table 7 and Table 8 above.

As a result of past and ongoing disturbance, introduced plant species are frequently abundant. Introduced grasses include Wimmera rye grass *Lolium rigidum* and several bromes *Bromus* spp. Introduced herbs include clovers *Trifolium* spp. and medics *Medicago* spp., sand catchfly *Silene apetala*, skeleton weed *Chondrilla juncea*, and common pepper-cress *Lepidium africanum*. Drought and/or other disturbances can also cause the ground stratum to be sparse and affect the detectability of some species.

In order to determine the presence of the Buloke Woodlands TEC a series of diagnostic characteristics must be met. A review of these characteristics respective of the offset sites is provided in Section 3.3.1 below.

3.3.1 Key diagnostic characteristics

3.3.1.1 Approved Conservation Advice for the Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions

The ecological structure and condition of native vegetation at Barry's Block and Habitat Zone 21 were reviewed against the key diagnostic characteristics of the *Approved Conservation Advice for the Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions* (DCCEEW 2023) which came in effect under the EPBC Act from 31 August 2023. The key diagnostic features were used in combination with section 1.2 Description of the ecological community and the area it inhabits of the Approved Conservation Advice (DCCEEW 2023) to determine the presence of the community which is detailed in Table 9 below.

Table 9 Key diagnostic features of Buloke Woodlands TEC (DCCEEW 2023).

Diagnostic characteristic	Barry's Block and Habitat Zone 21
Distribution limited to the Riverina and Murray Darling Depression IBRA bioregions	Yes , the offset sites occur within the Wimmera bioregion which falls within the Murray Darling Depression IBRA region
Structure is typically open woodland to woodland, but can be a forest (including high stem density), particularly temporarily following disturbance	Yes , the offset sites are classified as open woodlands with large canopy trees
Typically has a canopy of trees dominated by <i>Allocasuarina luehmannii</i> (buloke or bull oak), and sometimes other tree species are prominent such as <i>Callitris gracilis</i> (slender cypress pine), <i>Callitris glaucophylla</i> (white/Murray pine), <i>Eucalyptus largiflorens</i> (Black Box), <i>E. leucoxylon</i> subsp. <i>pruinosa</i> (yellow/blue gum) and <i>E. microcarpa</i> (Grey Box)	Yes , the offset sites are co-dominated by <i>Allocasuarina luehmannii</i> and <i>Eucalyptus largiflorens</i>
Native grasses often include <i>Rytidosperma</i> spp. (wallaby grasses) (such as <i>R. caespitosum</i> and <i>R. setaceum</i>), <i>Austrostipa</i> spp. (spear grasses) (such as <i>A. blackii</i> and <i>A. elegantissima</i>) and other grasses including <i>Anthosachne scabra</i> (syn. <i>Elymus scaber</i>) and <i>Chloris truncata</i>	Yes , the offset sites both have an understorey with occurrences of species from the genus' <i>Rytidosperma</i> , <i>Austrostipa</i> , <i>Anthosachne</i> , and <i>Chloris truncata</i>
Native subshrubs and herbs may include <i>Brachyscome lineariloba</i> (hard-headed daisy), <i>Calandrinia eremaea</i> (small purslane), <i>Calocephalus citreus</i> (lemon beauty-heads), <i>Calotis hispidula</i> (bogan flea, bindy eye), <i>Convolvulus remotus</i> (grassy bindweed), <i>Crassula colorata</i> (dense crassula), <i>Crassula sieberiana</i> (Australian stonecrop), <i>Daucus glochidiatus</i> (wild carrot), <i>Einadia nutans</i> (nodding saltbush), <i>Enchylaena tomentosa</i> (ruby saltbush), <i>Eutaxia microphylla</i> (common eutaxia), <i>Senecio pinnatifolius</i> (variable groundsel), <i>Sida corrugata</i> (variable sida), <i>Maireana enchylaenoides</i> (wingless bluebush), <i>Oxalis perennans</i> , <i>Ptilotus nobilis</i> subsp. <i>semilanatus</i> (syn. <i>Ptilotus exaltatus</i> var. <i>semilanatus</i>), <i>Sida corrugata</i> (corrugated sida), <i>Sclerolaena diacantha</i> (grey copperburr), <i>Swainsona procumbens</i> (Darling pea), <i>Vittadinia</i> spp. (New Holland daisies) and <i>Wahlenbergia luteola</i> :	Yes , the offset sites recorded understorey species of the genus's listed above. However, it is noted that these species were not persistent throughout both offset site areas.
Vegetation with abundant weeds, but with the characteristic trees also present, should be considered as part of the ecological community amenable to rehabilitation	Yes , offset sites have included areas which are abundant with weeds with characteristic trees present.

3.3.1.2 National Recovery Plan for Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions

In addition to the key diagnostic characteristics detailed in the Approved conservation advice (DCCEEW 2023), and applied in the section above, the *National Recovery Plan for Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions* (DSE 2011), which came into effect under the EPBC Act on 10 February 2012, provides further classification of the Buloke Woodland Community in Victoria into 10 groups.

The Buloke Woodlands encompasses a number of closely-related woodland communities in which Buloke is usually a dominant or co-dominant tree. Other trees that may be prominent in Buloke Woodlands include:

- Slender Pine *Callitris gracilis* - a common codominant;
- White/Murray Pine *Callitris glaucophylla* - a common associate;
- Black Box *Eucalyptus largiflorens* - a frequent dominant from adjoining communities;
- Yellow/Blue Gum *Eucalyptus leucoxylon* subsp. *pruinose* - a common codominant; and,
- Grey Box *Eucalyptus microcarpa* - a common codominant.

The delimitation of 'Buloke Woodlands' from the National Recovery Plan (DSE 2011) is based on the report by Sluiter et al. (1997) that classified Buloke and pine woodlands in Victoria and nearby regions into 10 groups. Groups 1, 2, 3, 8, 9 and 10 fit the definition for inclusion in Buloke Woodlands. Together, these groups make up the bulk of the listed Buloke Woodlands community as shown in Table 10.

Table 10 Buloke communities described by Sluiter et al 1997

Group	Name	Common species	Distribution
1	Semi-arid herbaceous Pine Buloke woodland	<i>Allocasuarina luehmannii</i> , <i>Callitris gracilis</i> , <i>Crassula sieberiana</i> , <i>Crassula colorata</i> , <i>Brachyscome lineariloba</i> , <i>Calandrinia eremaea</i> , <i>Daucus glochidiatus</i>	On dune systems. Mainly in the northwest Victorian Mallee in the Mallee Parks.
2	Semi-arid shrubby Pine Buloke woodland	<i>Allocasuarina luehmannii</i> , <i>Callitris gracilis</i> , <i>Enchylaena tomentosa</i> , <i>Sclerolaena diacantha</i> , <i>Calandrinia eremaea</i> , <i>Brachyscome lineariloba</i> , <i>Calotis hispidula</i>	On sandy loams. Mainly in the northwest Victorian Mallee in Parks and Reserves.
3	Semi-arid grassy Pine Buloke woodland	<i>Callitris gracilis</i> , <i>Allocasuarina luehmannii</i> , <i>Danthonia caespitosa</i> , <i>Einadia nutans</i> , <i>Austrostipa elegantissima</i> , <i>Wahlenbergia luteola</i> , <i>Pittosporum angustifolium</i> , <i>Austrostipa eremophila</i>	Widespread on loams. In reserves, roadsides and private land.
8	Semi-arid Northwest Plains Buloke grassy woodland	<i>Allocasuarina luehmannii</i> , <i>Eucalyptus largiflorens</i> , <i>Eucalyptus leucoxylon</i> , <i>Sida corrugata</i> , <i>Oxalis perennans</i> , <i>Einadia nutans</i> , <i>Rytidosperma setacea</i> .	Wimmera and Northern Plains. In reserves, roadsides and private land
9	Buloke grassy woodland	<i>Allocasuarina luehmannii</i> , <i>Callitris gracilis</i> , <i>Sida corrugata</i> , <i>Vittadinia gracilis</i> , <i>Convolvulus remotus</i> , <i>Austrostipa blackii</i>	Mainly on the northern plains of Victoria on roadsides
10	Grey Box – Buloke grassy woodland	<i>Allocasuarina luehmannii</i> , <i>Eucalyptus microcarpa</i> , <i>Austrodanthonia setacea</i> , <i>Maireana enchylaenoides</i> , <i>Chloris truncata</i> , <i>Elymus scabra</i> , <i>Rumex brownii</i> .	Mainly on the Northern and Wimmera Plains on reserves, roadsides and private land.

Both Habitat Zone 21 and Barry's Block offset sites have been categorised as **Group 8** Semi-arid Northwest Plains Buloke Grassy Woodlands based on the shared current and perceived historical co-dominance between Buloke *Allocasuarina luehmannii* and Black Box *Eucalyptus largiflorens*, as well as having distribution within the Wimmera bioregion.

4.0 Baseline Condition

4.1 Barry's Block

The offset site identified as Barry's Block (Figure 2 in Schedule 1 of the Approval) was assessed and confirmed to be the Buloke Woodland community by AECOM ecologists on 13 September 2023 and 12 March 2024. The purpose of the assessment was to determine the extent and condition of Buloke Woodlands and key management actions specific to the site that would inform the development of this plan.

A total of **16.2 hectares** of Buloke Woodlands was identified to be suitable for offset within the property address 472 Barru-Lawler Road, Rich Avon West 3480. Barry's Block is centrally positioned within the broader property where the surrounding land is cleared and actively used as broadacre cropping. The property and adjacent land does not form part of the planned mining area, and is expected to be used for agriculture in the foreseeable future.

Barry's Block is situated 135m above sea level within a landscape that is topographically flat with minor elevation changes predominantly at marked waterways such as the Richardson River (9km east) and Dunmunkle Creek (3.6km west).



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4.1.1 Baseline condition

The baseline condition of Barry's Block was initially undertaken on 13 September 2023 (early Spring), which identified the site to be dominated by annual understorey weed species typical of agricultural landscapes. A subsequent baseline condition survey was undertaken on 12 March 2024 (early autumn) to identify the extent of perennial native vegetation. At the time of the Autumn survey the region had received little rainfall and was evidently very dry with minimal annual weed cover. A comparative example representative of the broader site is provided in **Plate 8** and **Plate 9** below.



Plate 8 Early Spring annual weed cover example
(AECOM 13/09/2023)



Plate 9 Early autumn annual weed die back example
(AECOM 12/03/2024.)

4.1.1.1 Overstorey

Barry's Block is characterised by two overstorey species; Buloke and Black Box, with Black Box observed to be the dominant overstorey species. It is evident that Buloke was historically in higher density at the site by the presence of stumps scattered throughout the site (**Plate 10**), likely cut and used for farm fencing within the property (**Plate 8; Plate 9**).

Based on the Victorian EVC benchmark system the optimal number of Large trees is 15 per hectare with a projected foliage cover of 15%. Large Trees are defined by the Diameter at Breast Height (DBH) respective to the benchmark size of canopy trees listed in the respective EVC, in this case eucalypts are considered Large if >70cm DBH and Buloke Large if >40cm DBH.

The vast majority of trees on site were identified as 'large' with very few small and/or recruiting trees. Based on the size of the offset site (16.2), the benchmark number of Large trees required is 243. The site is considered to currently achieve at least 80% of this benchmark, with many of its large trees having formed small to medium sized hollows (**Plate 11**). The overstorey general health and condition was considered to be high with at least 70% healthy canopy cover.



Plate 10 Buloke stumps typical of Barry's Block (AECOM 12/03/2024)



Plate 11 Hollow bearing tree typical of the offset site (AECOM 12/03/2024)

4.1.1.2 Recruitment and shrub cover

Recruitment was considered inadequate at the time of assessment with very few canopy tree recruits observed, as well as a very low shrub cover. The lack of recruitment is likely due to grazing pressures at the site, both current and historical (**Plate 12, Plate 13**). This remains consistent with the description of the community (i.e., DCCEEW 2000) whereby shrub cover was potentially higher than observed prior to farming impacts through grazing.



Plate 12 Active grazing within Barry's Block (AECOM 12/03/2024).



Plate 13 Representative photo showing lack of recruitment amongst Large trees (AECOM 12/03/2024).

Shrub species observed throughout the site were typical of the region including Cattle Bush *Pittosporum angustifolium*, and small chenopod species including Black Roly-poly *Sclerolaena muricata*, Ruby Saltbush *Enchylaena tomentosa* var. *tomentosa*, Nodding Salt-bush *Einadia nutans* and Black Cotton Bush *Maireana decalvans*. Shrub cover was very low forming around 1% of the vegetative cover.

4.1.1.3 Native understorey

The native perennial understorey (grasses and herbs) ranged in cover and demographic within Barry's Block correlating with two distinctive substrate types of open plains (**Plate 14**) and gilgai formations (**Plate 15**).



Plate 14 Open plain dominated by native Spider grass and Windmill-grass (AECOM 12/03/2024).



Plate 15 Gilgai formations within Barry's Block (AECOM 12/03/2024).

Areas of open plains were typically higher in perennial native cover (up to 80%), with intact cryptogamic crust, and growth of bryophytes and lichen (**Plate 16**). The dominant species in such areas were Spider Grass *Enteropogon acicularis*, Windmill-grass *Chloris truncata*, Bristly Wallaby-grass *Rytidosperma setaceum* var. *setaceum*, and Knotty Spear-grass *Austrostipa nodosa* (**Plate 17**). This type of habitat was more prominent in the western half of Barry's Block.



Plate 16 Cryptogamic crust, bryophytes and lichen within open plains (AECOM 12/03/2024).



Plate 17 Perennial native grass cover and diversity of open plains (AECOM 12/03/2024).

Areas of gilgai formation (eastern half of Barry's Block) held an overall lower cover of native perennial vegetation at the ground layer (**Plate 18**). The typical species include those identified above, but at far lower densities ranging between 0-30% cover. Within gilgai depressions water logging species such as Common nardoo *Marsilea drummondii* was observed (**Plate 19**).



Plate 18 Low perennial native cover in gilgai areas of Barry's Block (AECOM 12/03/2024).



Plate 19 Waterlogging species observed (Nardoo) within Gilgais (AECOM 12/03/2024).

4.1.1.4 Weed cover

Weed cover at the site is high in both annual and perennial weeds particularly within distinctive areas as shown in **Figure 2**. The site is characterised by annual weed cover ranging from 5-100% cover of typical annual grasses including Squirrel-tail fescue *Vulpia bromoides* and Wild oat *Avena fatua* (**Plate 20**).

Perennial weed cover was found in distinct locations as mapped in **Figure 2**, and commonly observed beneath Large trees throughout the site. Perennial weeds were predominantly represented by a single noxious species White Horehound *Marrubium vulgare* (**Plate 21**).

Three listed noxious weed species were recorded within the offset site; African Boxthorn *Lycium ferocissimum*, Bathurst burr *Xanthium spinosum*, and Horehound.



Plate 20 Typical high annual weed cover in early Spring (AECOM 13/08/2023).



Plate 21 Horehound commonly observed beneath Large Trees (AECOM 12/03/2024).

4.1.1.5 Pest fauna

Evidence of a single pest fauna species was identified within Barry's Block, the European rabbit *Orytolagus cuniculus*. The species was considered to be present in relatively low numbers based on the extent of droppings and minor diggings observed (**Figure 2**). Other pest species which may occur commonly in the landscape, but were not observed, include Red Fox *Vulpes vulpes*, Wild cats *Felis* spp., and Common myna *Acridotheres tristis*.

4.2 Habitat Zone 21

The offset site identified as Habitat Zone 21 was assessed and confirmed to have **12.37 hectares** of the Buloke Woodland Community by AECOM ecologists on 13 September 2023 and 12 March 2024. The purpose of the assessment was to determine the extent and condition of Buloke Woodlands and key management actions specific to the site that would inform this plan.

Habitat Zone 21 is located at property address 163 R Funckes Road, Minyip, 3392 positioned within the southeastern boundary of parcel SPI: 20-A\PP3451. The surrounding parcels form the southern boundary of the mining licence area, where a 15-metre buffer will be implemented to protect Habitat Zone 21 from mining activities. The current land use surrounding Habitat Zone 21 is broadacre cropping with opportunistic sheep grazing between crops. Future land use includes mining works beyond a 15-metre protective buffer surrounding Habitat Zone 21.

Habitat Zone 21 is situated 2.2km north east of Barry's Block at the same elevation (135m) within a landscape that is topographically flat with minor elevation changes.

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Mine Licence Area MIN5532

Offset Boundary - Habitat Zone 21

No Go Zone

Buloke Woodlands of the Riverina and Murray-darling depression bioregions

Pest Fauna

European Rabbit (*Oryctolagus cuniculus*) diggings

Noxious Weeds

African Boxthorn (*Lycium ferocissimum*)

Bathurst burr (*Xanthium spinosum*)

Weed Infestation Areas

White horehound (*Marrubium vulgare*) and Hairy panic (*Panicum effusum*)

Barley grass (*Hordeum* sp.) and Hairy panic (*Panicum effusum*)

Donald

Bendigo

Ballarat

Melbourne

VICTORIA

Site

050100

Kilometers

Data sources:
Base Data: (c) 2012 StreetPro
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Study Area - Habitat Zone 21

EPBC 2005/2372 Donald Mineral Sands Project

Offset Management Plan

Donald Mineral Sands, Minyip, Victoria

Figure

F3

A3 size

Map Document: (\\lna.aecomnet.com\LFS\APAC\Melbourne-AUMEL\1\Legacy\Projects\60634428\900_CAD_GIS\02_GIS\02_maps\2024\60634428_Donald_MS_Ecol_2024 - AS.aprx)

4.2.1 Baseline condition

The baseline condition of Habitat Zone 21 was initially undertaken on 13 September 2023 (early Spring), which identified the site to be dominated by annual understorey weed species typical of agricultural landscapes. It was evident at the time of assessment in early Spring that Habitat Zone 21 was actively grazed. A subsequent baseline condition survey was undertaken on 12 March 2024 (early autumn) to identify the extent of perennial native vegetation. At the time of the Autumn survey the region had received little rainfall and was evidently very dry with minimal annual weed cover.

A comparative example representative of the broader site is provided in **Plate 22** and **Plate 23** below.



Plate 22 Early Spring annual weed cover example Habitat Zone 21 (AECOM 13/09/2023)



Plate 23 Early autumn annual weed die back example Habitat Zone 21 (AECOM 12/03/2024.)

4.2.1.1 Overstorey

Habitat Zone 21 is characterised by two overstorey species; Buloke and Black Box where the species held a reasonable co-dominance. It is evident that Buloke was historically in higher density at the site by the presence of large stockpiles of cut Buloke lengths found within the site (**Plate 24**).

The site is considered to currently achieve the benchmark number of Large trees split between Plains Woodland (See section 2.1.2) and Plains Savannah (5 trees per ha) with many of its Large trees having formed small to medium sized hollows. The overstorey general health and condition was considered to be high with at least 70% healthy canopy cover.



Plate 24 Buloke stockpile within Habitat Zone 21(AECOM 12/03/2024)

4.2.1.2 Recruitment and shrub cover

A lack of recruitment at the site is likely due to grazing pressures, both current and historical (**Plate 25**). Recruitment was considered inadequate at the time of assessment with very few canopy tree recruits observed, as well as a very low shrub cover. This remains consistent with the description of the community (i.e., DCCEEW 2000) whereby shrub cover was potentially higher than observed prior to farming impacts through grazing.

Shrub species observed throughout the site were the same as those identified within the Barry's Block offset site however, small shrub cover was consistently higher forming up to 45% in areas (**Plate 26**). Shrub cover was very low forming around 1% of the vegetative cover.



Plate 25 Evidence of grazing within Habitat Zone 21 (AECOM 13/09/2023).



Plate 26 Representative photo of high small shrub cover within Habitat Zone 21 (AECOM 12/03/2024).

4.2.1.3 Native understorey

The native perennial understorey (grasses and herbs) ranged in cover within Habitat Zone 21 across two distinctive areas; open plains (**Plate 27**) and open woodland areas (**Plate 28**). The species demographic was synonymous with what was observed at the Barry's Block site, however the overall cover of native species was considerably lower ranging between 0-50%.



Plate 27 Open plain dominated by mixed native grasses (AECOM 12/03/2024).



Plate 28 Gilgai formations within Barry's Block (AECOM 12/03/2024).

It is evident that Habitat Zone 21 has undergone a higher level of ground disturbance comparative to Barry's Block. The offset site has areas of worked ground in the form of artificial dams and general presence of silos and discarded farm equipment (**Plate 29; Plate 30**)



Plate 29 Artificial dam within Habitat Zone 21 (AECOM 12/03/2024).



Plate 30 Farm equipment within Habitat Zone 21 (AECOM 13/09/2023).

4.2.1.4 Weed cover

Weed cover at the site is high in both annual and perennial weeds particularly within distinctive areas as shown in **Figure 3**. The site is characterised by annual weed cover ranging from 40-100% cover of typical annual grasses as identified in Barry's Block, although more heavily grazed (**Plate 31**).

Perennial weed cover was found in distinct locations as mapped in **Figure 3**, and commonly observed beneath Large trees throughout the site, similar to that of Barry's Block. Perennial weeds were predominantly represented by the single noxious species White Horehound (**Plate 32**).

Three listed noxious weed species were recorded within the offset site; African Boxthorn, Bathurst burr, and Horehound.



Plate 31 Typical high annual weed cover in early Spring (AECOM 13/08/2023).



Plate 32 Horehound commonly observed throughout Habitat Zone 21 (AECOM 12/03/2024).

4.2.1.5 Pest fauna

Evidence of a single pest fauna species was identified within Habitat Zone 21, the European rabbit. The species was considered to be present in relatively low numbers based on the extent of droppings and minor diggings observed (**Figure 3**). Other pest species which are likely to occur commonly in the landscape, but were not observed, include Red Fox, Wild cats, and Common myna.

5.0 Offset Security and Management Responsibilities

The offset will be secured via a Section 69 agreement to protect and improve the extent and quality of native vegetation on the site. The agreement will be recorded on the title of the subject land.

Table 11 Offset property details

Offset Sites	Detail
Address	Barry's Block: 472 Barrum-Lawler Road, Rich Avon West 3480
Parish	Rich Avon West
Crown Description	Allot. 14 Sec. B Parish of Rich Avon west
Local Government Area	Northern Grampians Shire
Catchment Management Area	Wimmera CMA
SPI	14~B\PP3451
Council Property Number	1050593
Bioregion (Victoria)	Wimmera
IBRA Bioregion	Murray-Darling Depression

Offset Sites	Detail
Address	Habitat Zone 21: 163 R Funckes Road, Minyip 3392
Parish	Rich Avon West
Crown Description	Allot. 20 Sec. A parish of Rich Avon West
Local Government Area	Shire of Yarriambiack
Catchment Management Area	Wimmera CMA
SPI	20~A\PP3451
Council Property Number	7706
Bioregion (Victoria)	Wimmera
IBRA Bioregion	Murray-Darling Depression

5.1 Responsible persons

The land manager and the landowner is responsible for:

- management of the site for conservation;
- implementation of the management commitments and targets detailed in this Plan; and,
- engagement of suitably qualified contractors.

This applies for the life of the BOMP and the properties will be managed as an offset site in perpetuity in accordance with the on-title agreement.

5.2 Management and Monitoring Commitments

The two offset sites, Barry's Block and Habitat Zone 21, will be managed for the purposes of ecological improvement and conservation. All works will be conducted by a suitably qualified land manager and experienced native vegetation management contractor.

5.2.1 Duration of the BOMP

The **Initial Period** of the BOMP refers to the implementation of active management actions set within this BOMP and spans 10 years. The **Initial Period** will begin when the Section 69 agreement is registered on title. Beyond the **Initial Period**, the offset sites require ongoing management and monitoring **in perpetuity** to verify that the offset sites remain ecologically functional and sustain the intended benefits achieved by active management.

5.2.2 Initial Period Commitments

During the **Initial Period** the current and future landowners will undertake the following active management at the offset sites:

- Prevent uncontrolled stock access.
- Control woody weeds to <1% cover in year 1 and beyond with no mature plants present.
- Stabilise grassy and herbaceous weed cover, with an aim to reduce weed cover to <25%.
- Monitor for and eliminate new and emerging high threat weeds.
- Monitor and control pest animals (including but not limited to European Rabbits, Foxes, wild Cats).
- Retain all standing indigenous trees (dead or alive).
- Retain all logs, fallen timber and leaf litter. Retain Buloke in log piles (Habitat Zone 21) at the site.
- Improve the condition of native vegetation relative to the baseline quality (see section 5.2.5), which is to be monitored and reported annually via:
 - o Photo point monitoring that shows no degradation* in condition or new emerging threats; and,
 - o Habitat Hectare Assessment comparative to baseline condition.
- Monitor fencing and maintain to an acceptable standard (see Section 6.1.3).

* "no visual degradation in condition" is a measure of ecosystem health where the observed ecosystem remains visually unchanged condition or has improved in condition.

5.2.3 Perpetuity Commitments

The following ongoing management and monitoring controls will be undertaken in perpetuity to verify the sustained benefits of the efforts made during the **Initial Period**:

- Prevent uncontrolled stock access.
- Monitor for and reduce any new and emerging high threat weeds.
- Monitor and control pest animals (including but not limited to European Rabbits, Foxes, wild Cats).
- Monitor fencing and maintain to an acceptable standard (see Section 6.1.3).
- Retain all standing indigenous trees (dead or alive).
- Retain all logs, fallen timber and leaf litter. Retain Buloke in log piles (Habitat Zone 21) at the site.

5.2.4 Adaptive management

Adjustments to the method and timing of the nominated management and monitoring controls may be required in response to unforeseen challenges and developments to maintain ecological integrity of the sites. Factors that may trigger adaptive management include the emergence of new information on; the ecology of the vegetation community or the management techniques, or varied seasonal conditions (e.g., climate change impacts). In recognition of the need for flexibility to adapt to these factors, timing of the actions will be at the discretion of the land manager, except where specific timing commitments have been specified in this BOMP.

If changes to the BOMP are required that are beyond the scope of the current plan, this must be done in consultation with, and approval of DCCEE before changes can be implemented.

Management actions are described in **Section 6.0** and summarised in **Table 28**. An assessment of risks to the successful implementation of those management commitments/actions is provided in **Table 30**.

Some actions that will be required for the ongoing management and improvement of the offset sites will be decided after the examination of monitoring data. This is particularly important for the re-establishment of native understorey vegetation species and cover and regeneration of canopy species (**Section 6.4**). Adaptive management is outlined in this section where relevant.

5.2.5 Ecological Improvement

This BOMP commits the ecological enhancement of Barry's Block and Habitat Zone 21 to be demonstrated by a measurable improvement through the Habitat Hectare method (DSE 2004). This improvement is measurable through the Site Condition component of the assessment and is relative to the baseline site condition of Barry's Block and Habitat Zone 21 provided below in Table 12 (Full assessment provided in Appendix A). It is noted that the Landscape Context component of the Habitat Hectare assessment applies to factors outside of the Barry's Block and Habitat Zone 21 offset areas, and as such is to remain unchanged for future assessment and monitoring commitments of this BOMP.

Table 12 Baseline Site Condition for the Barry's Block and Habitat Zone 21 offset sites

Habitat Zone			Barry's Block	Habitat Zone 21	
EVC			EVC 803 – Plains Woodland		EVC 806 – Plains Savannah
Bioregion			Wimmera		
Site Condition	Large Trees	10	10	6	10
	Tree Canopy Cover	5	3	5	5
	Lack of Weeds	15	6	6	4
	Understorey	25	15	10	10
	Recruitment	10	3	5	5
	Organic Litter	5	2	5	5
	Logs	5	3	2	2
	Total Site Score	75	42	39	41
Landscape Context	Total Landscape Score	25	11	11	11
Habitat Score = Score/100		100	53	50	52
Habitat (Quality) = Score/10		10	5	5	5

Habitat Zone		Barry's Block	Habitat Zone 21	
Habitat Points = Score/1	1	0.53	0.50	0.52

Each Site Condition component is discussed in the subsections below, and how the improvement will be measurable against the Habitat Hectare method.

5.2.5.1 Large Trees

Large Trees are defined by the Diameter at Breast Height (DBH) respective to the benchmark size of Canopy Trees listed in the respective EVC. The scoring system is relative to the number of such trees present within the subject area compared with the EVC benchmark. This component can achieve a maximum score of **10** ($\geq$ the benchmark number of large trees /ha). The baseline score of the offset sites meet the benchmark score of 10, with the exception of areas of Plains Woodland within Habitat Zone 21 which achieved a baseline score of 6.

To qualify as a Large tree within Plains Woodland/Plains Savannah eucalypts need to be a minimum size of 70cm DBH and Buloke to be 40cm DBH.

As Large Trees are achieved by prolonged growth this component cannot be improved within the **Initial Period** however, through protection of the offset, trees which are currently below the benchmark Large tree size (i.e Eucalypts <70cm DBH and Buloke <40) are expected to meet or exceed the benchmark beyond the initial period due to protection of the areas as an offset site.

Table 13 Large Tree improvement comparative to baseline condition

Habitat Zone		Barry's Block	Habitat Zone 21	
EVC		Plains Woodland		Plains Savannah
Large Trees Baseline	10	10	6	10
Large Trees Improvement (Perpetuity)		10	10	10

5.2.5.2 Tree Canopy Cover

Tree Canopy Cover is defined by the percentage projected foliage cover respective to the benchmark listed in the respective EVC. The scoring system is relative to the canopy tree foliage cover within the subject area compared to the EVC benchmark. This component can achieve a maximum score of **5** ($\geq 50\%$ or $\leq 150\%$ of benchmark cover, with $>70\%$ canopy health).

Canopy Trees are defined as those reaching $\geq 80\%$ of the benchmark height for the respective EVC which equates to 8 metres in areas of Plains Savannah and 12 metres in areas of Plains Woodland. It is unlikely that planted trees can reach such heights within the **Initial Period** due to the slow growing conditions of the site.

Tree Canopy Cover is however expected to reach the maximum score of 5 after the **Initial Period**, between the 10 and 20 year mark, within the area of Plains Woodland of Barry's Block. All other areas have achieved a maximum score of 5 at baseline condition.

Table 14 Tree Canopy Cover improvement comparative to baseline condition

Habitat Zone		Barry's Block	Habitat Zone 21	
EVC		Plains Woodland		Plains Savannah
Tree Canopy Cover Baseline	5	3	5	5
Tree Canopy Cover Improvement (Perpetuity)		5	5	5

5.2.5.3 Lack of Weeds

Lack of Weeds is defined by the percentage cover of weed species and the percentage of such species being classified as 'high threat weeds' at any given site. This component can achieve a maximum score of **15** (<5% cover of weeds with no 'high threat' weeds).

Both offset sites will undergo active weed management as identified in Section 6.2, where a reduction of grassy and herbaceous weeds is committed to be reduced to <25% cover, and woody weeds to be reduced to <1% cover. As such, the Lack of Weeds is expected to improve to a score of **9** (5-25% cover of weeds where ≤ 50% are high threat) at both sites.

High threat weeds are considered unlikely to be fully eradicated due to the EVC benchmarks classifying commonly occurring species such as Rye grass into such categories.

Table 15 Lack of Weeds improvement comparative to baseline condition

Habitat Zone		Barry's Block	Habitat Zone 21	
EVC		Plains Woodland		Plains Savannah
Lack of Weeds Baseline	15	6	6	4
Lack of Weeds Improvement (Initial Period)		9	9	9

Weed control methods and commitments are further detailed in Section 6.2.

5.2.5.4 Understorey

The Understorey component is assessed by identifying the presence of understorey life forms (Understorey Tree, prostrate-large shrubs, tiny-tall tufted graminoids etc) comparative to the EVC benchmark and then assessing their modification for either diversity or cover.

The baseline condition was recorded as shown in Table 16 below, alongside the projected improvements within the initial period:

Table 16 Understorey baseline condition for Barry's Block and Habitat Zone 21

Offset Site	Baseline Score	VQA Category & description	Understorey Improvement (Initial Period)	VQA Category & description
Barry's Block	15	≥50% to 90% of Life Forms Present, of those present <50% substantially modified	20	≥90% of Life Forms Present, of those present <50% substantially modified
Habitat Zone 21	10 (Plains Woodland)	≥50% to 90% of Life Forms Present, of those present		
	10 (Plains Savannah)	≥50% substantially modified		

Management at the completion of the **Initial Period** is committed to achieve a minimum understorey score of 20 (≥90% of Life Forms Present, of those present <50% substantially modified). This is to be achieved through restoration plantings of indigenous species in accordance with the respective EVC/ Buloke Woodlands, and natural recruitment (if any) following weed works and control of sheep grazing.

Further detail on plantings, species diversity and cover at each site is provided in Section 6.4.

5.2.5.5 Recruitment

Recruitment is defined as evidence of immature woody plants that have survived for at least 12 months since germination or first establishment. This component is scored based on the proportion of woody species showing adequate recruitment compared to the benchmark species diversity.

The baseline observations show poor recruitment of woody species at low diversity, where management within the **Initial Period** is expected to achieve a maximum score of 10 ($\geq 70\%$ woody species having adequate recruitment, high diversity) as shown in Table 17 below.

Table 17 Recruitment improvement from baseline condition for Barry's Block and Habitat Zone 21

Habitat Zone		Barry's Block	Habitat Zone 21	
EVC		Plains Woodland		Plains Savannah
Recruitment Baseline	10	3	5	5
Recruitment Improvement (Initial Period)		10	10	10

A score of **10** can be achieved after 12 months of successful planting/establishment of woody species respective to the EVC benchmark cover and diversity (**Appendix B**). The rapid improvement is achievable as recruitment is measured for woody species only (i.e small shrubs up to Immature Canopy Trees) which have a relatively low benchmark diversity and cover within the respective EVC benchmarks. The success of recruitment is dependent on successful understorey plantings which is addressed further in Section 6.4.2.

5.2.5.6 Organic Litter

The organic litter assessment involves estimating the percentage cover of the organic litter in the habitat zone in comparison to the EVC benchmark percentage cover and then qualifying this score depending on the proportion of this litter due to native species.

Organic litter can fluctuate on a seasonal basis, grazing pressure or natural events such as fire. While Habitat Zone 21 meets the maximum score of 5 in both EVC's ($\geq 50\%$ or $\leq 150\%$ of benchmark cover and dominated by native organic litter), Barry's Block was identified to be $>150\%$ of benchmark cover and dominated by non-native litter scoring a 2 (Table 18).

Table 18 Organic Litter improvement from baseline condition for Barry's Block and Habitat Zone 21

Habitat Zone		Barry's Block	Habitat Zone 21	
EVC		Plains Woodland		Plains Savannah
Organic Litter Baseline	5	2	5	5
Organic Litter Improvement (Initial Period)		5	5	5

It is noted that exotic annual species significantly add to the cover of organic litter in dry seasons (e.g Annual Rye-grass) which has contributed to the baseline condition score at the Barry's Block offset site. Improvement works following how this will be achieved is detailed further within section 6.4.2.2.

5.2.5.7 Logs

The logs assessment involves estimating the length of logs present in the habitat zone and comparing this to the EVC benchmark log length. The logs score is further qualified depending on whether the length of large logs present in the habitat zone is greater than 25% of the EVC benchmark log length. Logs are defined as dead timber fallen to the ground (substantially detached from the parent tree) with a diameter ≥ 10 cm. Large logs are defined as logs that have a diameter of at least half the large tree DBH, as defined in the EVC benchmark.

Logs were observed to be $<50\%$ of the benchmark length where Habitat Zone 21 lacked large logs (score of 2), and Barry's Block had large logs present (score of 3) (Table 19) (Plains Woodland: 100m/ha at 35cm DBH for Eucalypts/20cm DBH for Buloke, Plains Savannah 50m/ha at 20cm DBH). Table 19 Logs improvement from baseline condition for Barry's Block and Habitat Zone 21

Habitat Zone		Barry's Block	Habitat Zone 21	
EVC		Plains Woodland		Plains Savannah
Logs Baseline	5	3	2	2
Logs Improvement (Initial Period)		5	5	5

It is expected that the Logs component can reach a maximum score of 5 within each offset site where >50% of benchmark log length is achieved with large logs present by the end of the **initial period**. This is achieved through preventing removal of dead trees and logs within the offset sites in accordance with this BOMP.

5.2.6 Habitat Hectare Improvements

The final improvement of Barry's Block and Habitat Zone 21 by the end of the **Initial Period** is provided in Table 20 below. The **Total Site Score** in this instance is relative to a total Site Condition Score of 75.

Table 20 Improvement within the Initial Period for Barry's Block and Habitat Zone 21 offset sites

Habitat Zone			Barry's Block	Habitat Zone 21	
EVC			EVC 803 – Plains Woodland		EVC 806 – Plains Savannah
Bioregion			Wimmera		
Site Condition	Large Trees	10	10	6	10
	Tree Canopy Cover	5	3	5	5
	Lack of Weeds	15	9	9	9
	Understorey	25	20	20	20
	Recruitment	10	10	10	10
	Organic Litter	5	5	5	5
	Logs	5	5	5	5
	Total Site Score	75	62	60	64

Beyond the **Initial Period** with protection and management of the sites in perpetuity, the Large Tree and Tree Canopy Cover score component are expected to meet the benchmark cover and densities for areas of Plains Woodland in Habitat Zone 21 and Barry's Block, improving the Site Condition from 62 and 60 to a total of 64.

6.0 Methods for Implementation of Management and Monitoring Actions

This section presents the land management activities for the offset sites to achieve vegetation improvement through on-ground actions. Commitments in this plan need to be achievable and practical. They also need to be measurable against the commitments made in the EPBC Act Offset Strategy (AECOM, 2023) in the calculation of improvement over time to achieve conservation gains.

Vegetation improvements will be achieved by:

- Fencing to control stock access;
- Weed control and monitoring;
- Restoration plantings;
- Retention of logs and native organic litter;
- Management of tree regeneration;
- Pest animal control and monitoring
- Monitoring condition of the native vegetation to continually assess the efficacy of the management actions in achieving the stated performance targets and to identify the need for adaptive management.

Management actions have been developed with reference to the following documents:

- *Management standards for native vegetation offset sites* (DEECA, 2023) which replace the BushBroker management standards for fencing, weeds, rabbits, scattered trees, supplementary planting and revegetation.
- *DELWP Output delivery standards – for the delivery of environmental activities* (DELWP, 2015)

6.1 Fencing

Livestock grazing and trampling are a threat to native vegetation through processes such as soil compaction, over-grazing, exposure of bare ground and increased nutrient levels promoting weed growth.

Controlled sheep grazing is recommended to continue as necessary to control for annual weed cover at the start of the **Initial Period**. The sites will be managed to avoid being overgrazed, as observed in baseline conditions (Habitat Zone 21). All restoration efforts such as plantings will be protected with tree guards when grazing occurs, and any direct seeding efforts will be protected during establishment.

Uncontrolled stock access must be prevented from both offset sites.

6.1.1 Timing of installation

Fencing must be installed (or repaired in the case of existing fences) within 3 months of commencement of the on-title agreement.

Fencing to exclude stock will be completed before any other vegetation management works are undertaken.

6.1.2 Location

Fencing will be installed on the perimeter of the offset sites as indicated by the 'Offset Boundary' shown in **Figure 2 and Figure 3**.

6.1.3 Design

Stock-proof fencing will be installed as per standards approved by the Victorian Government Department of Energy, Environment and Climate Action (DEECA²) in the *Management standards for native vegetation offset sites* (DEECA, 2024). An extract of the fencing advice from the management standards is provided as **Attachment 1**.

To prevent adverse impacts on wildlife, plain strand wire will be used, and the top wire will be white to increase visibility. A gap will be retained at the bottom to allow native animals to pass underneath.

The fence will not include barbed wire or be electrified on the bottom strand (DEECA, 2024).

6.1.4 Gates

Gates will be installed for each fenced area to:

- Allow efficient removal of stock that could stray into the area.
- Access for spot spraying weeds or firefighting.

6.1.5 Maintenance

Fencing will be maintained to the required standard in perpetuity.

Fencing will be monitored quarterly (each season) to ensure the integrity is maintained.

6.1.6 Signage

Signs indicating the site is being managed for conservation purposes will be installed at access gates and strategic points along the boundary fencing.

6.1.7 Large Herbivore Monitoring and Management (Exclusion Plot)

An overabundance of large herbivores can hamper conservation efforts due to excessive levels of herbivory (Mills et al., 2020). An exclusion plot at each offset site may be established as necessary to determine if excess herbivory from large herbivores such as macropods are having a detrimental impact to native vegetation values. Exclusion plot specification is detailed in DEECA (2023) (Attachment 1).

If plots are determined to be required, the cover and abundance within and external to the exclusion plot (across the remaining offset site) will be measured once per season for two years from the start of the **Initial Period**. If the results from two years of monitoring the exclusion plots indicate that excessive

² Formerly the Department of Environment, Land, Water and Planning (DELWP) until 1 January 2023

herbivory is likely causing detrimental impacts on native vegetation (such as low cover, decreased complexity and fewer native understorey species and/or canopy species recruitment) the use of exclusion plots will continue.

The exclusion plot will be moved to another part of the offset site once the native vegetation has reached a height and maturity that can withstand herbivory in accordance with the DEECA management standards (DEECA, 2023). The movement of the exclusion plot will be repeated until the understorey vegetation within the offset site has had a chance to regenerate in cover and species richness or until the end of the **Initial Period** of the BOMP.

6.1.8 Responsibilities and Qualifications

Ultimately the Land Holder and Land Manager are responsible for establishing fencing installation timing, design, signage and maintenance within the **Initial Period** and **Perpetuity** as detailed within this Plan. It is the responsibility of the Land Holder and Land Manager to engage (as necessary) a suitably qualified person that holds all current permits and certificates for fence construction and/or repairs.

6.2 Weed monitoring and control

Noxious weeds are listed under the *Catchment and Land Protection Act 1994* (CaLP Act). Under the CaLP Act, landowners are legally required to manage declared noxious weeds and pest animals on their land. Landowners are required to take reasonable steps to:

- Eradicate regionally prohibited weeds.
- Prevent the growth and spread of regionally controlled weeds.
- Prevent the spread of, and eradicate, established pest animals.

Control of high threat weeds is a key management action for the offset sites. DEECA management standards require weed cover to not exceed current levels and for monitoring to be undertaken to identify new and emerging weed threats.

Table 21 Weed management terminology (from DEECA, 2023)

Term	Description
Eliminate	To reduce weed cover to <1% with no mature individuals present.
New and emerging weeds	Any weed not detailed in the management plan tables.
High threat weeds	Any introduced species (including non-indigenous natives) which can outcompete and substantially reduce one or more indigenous life forms in the longer term. High threat weeds include all perennial weeds (including woody weeds), weeds listed as high impact on EVC benchmarks and weeds listed under the CaLP Act.

6.2.1 Methods

The baseline condition of the offset sites do not demonstrate evidence of appropriate management and weed control. As such this plan identifies, but is not limited to, the following suitable methods:

Chemical and Mechanical

Weed control will primarily be undertaken through spot or boom spraying with an appropriate herbicide, hand weeding, cut and paint method and chipping. Non-chemical methods of weed control will be undertaken where populations of weeds are small or in areas where herbicide use is inappropriate. Soil disturbance will be minimised to discourage growth of new seedlings of weed species. Off-target damage to areas of native vegetation must be avoided.

In areas where there is a dense weed infestation, brush-cutting or mowing is permitted to be used to stop seed set and allow for easier herbicide application (DEECA, 2023).

Scraping

Areas of weed infestation at the time of the baseline condition assessment is provided in **Figure 2** and **Figure 3**. In such areas weed cover at the ground layer forms at least 80% cover between annual and perennial weeds. Such areas may be suitable for stripping and direct seeding if advised by and undertaken by a suitably experienced restoration ecologist, or ecological restoration company.

Burning

Ecological burning is permitted if fallen timber precludes access for mowing and if the land manager deems brush-cutting unlikely to be effective at stopping seed set.

Plantings

Buffers of indigenous species associated with the offset site and the Buloke Woodlands TEC is permitted to be planted around the outside of each offset site to reduce the incursion of weeds from surrounding areas (DCCEEW, 2023).

Specific weeds and further management is discussed below in **Sections 6.2.2** and **Section 6.2.3**.

6.2.2 Woody weeds

Existing woody weed cover across both sites is low and was observed to be $\leq 5\%$ of overall vegetation cover at the time of assessments. On this basis, a performance target of reducing the cover of woody weeds to $<1\%$ has been set for the patches overall by the end of the 10-year management period.

- $<5\%$ within 1 year;
- $<4\%$ within 2 years;
- $<3\%$ within 5 years;
- $<2\%$ within 8 years and
- $<1\%$ maintained in subsequent years.

Woody weeds present must be eliminated in a manner that avoids impacts to indigenous plants. New outbreaks of woody weed species must be eliminated when detected.

Timing and methods for control of specific woody weeds within the offset site are outlined in **Table 22**.

Table 22 Woody weeds to be control including method and timing for control.

Scientific name	Common name	Control Method	Timing
Lycium ferocissimum	African Boxthorn*	Large plants - cut and paint stump with high strength herbicide. Small plants – hand pull	Year round

*Victorian noxious weed listed under the CaLP Act

6.2.3 Herbaceous and grassy weeds

The cover of herbaceous and grassy weeds both annual and perennial at the time of assessment ranged from 15% to 90% across both offset sites. The majority of which are annual grassy weeds and Hordeum in marked areas (**Figure 2**; **Figure 3**) and beneath large trees.

On this basis, a performance target of maintaining the cover of annual and perennial weeds to $<25\%$ has been set for the patches overall by the end of the 10-year management period. As the cover of such weeds is high across both sites a viable method of control will be to incorporate weed control into restoration via direct seeding, which requires suitable surface preparation (i.e., weed control) in order to achieve viable restoration results. Direct seeding must be advised and undertaken by a suitably qualified restoration ecologist.

It should be noted that the complete suite of weeds present within the offset site may not have been observed at the time of field assessment given the seasonality and 'snapshot in time' nature of the survey. If new outbreaks of woody, herbaceous or grassy weeds are identified, they must be treated as soon as they are detected, with suitably adapted management actions for that species.

Timing and methods for control of specific herbaceous weeds within the offset sites are outlined in **Table 23**. Appropriate herbicides for each species can be found by accessing the Australian Pesticides and Veterinary Medicines Authority website <https://portal.apvma.gov.au/pubcris>. Chemicals used for the control of weeds must be used in accordance with the *Agricultural Chemical (Control of Use) Regulations 2017*. Persons applying agricultural chemicals must have an agricultural Chemical user permit (ACUP).

Table 23 Herbaceous and grassy weeds to be control including method and timing for control.

Scientific name	Common name	Control Method	Timing
<i>Avena sp.</i>	Wild Oat	- Spot spray with an appropriate herbicide. - Brush cut or mow before seed set. - Pulse graze in Winter, burn in early Spring.	Winter to Spring

Scientific name	Common name	Control Method	Timing
<i>Marrubium vulgare</i>	Horehound*	- Hand pulling of scattered individuals. - Spot spray with an appropriate herbicide for smaller infestations. - Autumn low-intensity burns for larger infestations (CRC, 2000).	Winter to Spring (hand pulling and spot spraying) Autumn (burns)
<i>Vulpia sp.</i>	Vulpia	- Spot spray with an appropriate herbicide.	Winter (spraying)
<i>Helminthotheca echinoides</i>	Bristly Oxtongue	- Hand pulling of scattered individuals. - Spot spray with an appropriate herbicide for smaller infestations.	All year (hand pulling) Winter (spot spraying)
<i>Xanthium spinosum</i>	Bathurst Burr	- Hand pulling of scattered seedlings and saplings. - Spot spray with an appropriate herbicide for smaller infestations.	All year (hand pulling) Summer (spot spraying)
<i>Panicum effusum</i>	Hairy Panic	- Spot spray with an appropriate herbicide.	Autumn and Spring (spot spraying)
<i>Cirsium vulgare</i>	Spear Thistle	- Hand pulling of scattered individuals. - Spot spray with an appropriate herbicide for smaller infestations.	All year (hand pulling) Spring (spot spraying)
<i>Cucumis myriocarpus</i>	Paddy Melon	- Hand pulling of scattered individuals. - Spot spray with an appropriate herbicide. - Brush cut or mow before seed.	Summer

*Victorian noxious weeds listed under the CaLP Act

6.2.4 Responsibilities and Qualifications

Ultimately the Land Holder and Land Manager are responsible for meeting the targets of weed cover reduction within the **Initial Period** as detailed within this Plan. It is the responsibility of the Land Holder and Land Manager to engage (as necessary) a suitably qualified person that holds all current permits and certificates to undertake the respective weed management actions.

6.3 Pest animal monitoring and control

Landowners are required under the *Catchment and Land Protection Act 1994* (CaLP Act) to take reasonable steps to prevent the spread of established pest animals on their land.

Evidence of European Rabbits were directly observed during the site assessment, and it is assumed that species such as Red Fox and Wild cats are present within the wider landscape which are likely to utilise habitat features within the offset sites.

Chemicals used for the control of pest animals must be used in accordance with the *Agricultural Chemical (Control of Use) Regulations 2017* by pest animal management contractor with am ACUP.

Pest animals to be controlled and the method and timing of control is outlined in **Table 24**.

Table 24 Pest animals to be controlled including method and timing for control

Common name	Method	Timing
European Rabbit	Site walkover to identify location of any warrens or other harbour. Baiting in areas where rabbits are present. Warrens will be targeted for fumigation while non-destructive control works will be used for other harbour to avoid impacts to habitat for native fauna. Spotlight shooting over a minimum period of 3 hours, only if a significant population is present.	Annually Baiting can be undertaken year-round but preferably in late summer/early autumn
Red Fox	Canid Pest Ejector (CPE) used with either 1080 or PAPP toxic capsules where foxes are present. Spotlight shooting over a minimum period of 3 hours, if a significant population is present.	Annually Baiting can be undertaken year-round but preferably in late Winter and Spring.

6.3.1 Responsibilities and Qualifications

Ultimately the Land Holder and Land Manager are responsible for meeting the targets of pest animal monitoring and control within the **Initial Period** as detailed within this Plan. It is the responsibility of the Land Holder and Land Manager to engage (as necessary) a suitably qualified person that holds all current permits and certificates to undertake the respective pest animal control actions.

6.4 Native vegetation management

6.4.1 Canopy Species Plantings

The tree canopy cover within the offset sites is generally at or above EVC benchmark for canopy cover. Natural ecological succession is encouraged to maintain canopy cover at or slightly over benchmark EVC values for EVC 803 Plains Woodland and EVC 826 Plains Savannah (Table 25).

It is evident that Buloke was historically removed from both offset sites and did not show adequate recruitment at baseline condition. Restoration plantings of Buloke is required throughout each site to re-establish dominance and/or codominance with Black Box. As such, Buloke plantings is to be relative to the current density of Black Box with allowances made for planting mortality.

Restoration of Buloke within the offset sites is to achieve both re-establishment of Buloke within the **Initial Period**, and as a future canopy species achieving the benchmark cover within the respective EVC as shown in Table 25 below. The benchmark canopy cover is expected to be achieved beyond the **Initial Period** due to the slow growth rates of Buloke and the minimum height required to be classified as a Canopy Tree in accordance with the Habitat Hectare methodology.

Table 25 Benchmark Canopy Cover to be achieved beyond the Initial Period

Offset Site	EVC	Benchmark Cover
Barry's Block	Plains Woodland	15% projected foliage cover of canopy trees >12m
Habitat Zone 21		
	Plains Savannah	10% projected foliage cover of canopy trees >8m

6.4.2 Understorey Plantings

Understorey species include grasses, herbs, shrubs and immature canopy trees which collectively form habitat structure that is relative to the EVC benchmark diversity and percentage cover. Both Habitat Zone 21 and Barry's Block lack components of the understorey life form, and as such require restoration plantings in accordance with the EVC benchmarks as shown in Table 26 below and Appendix A.

In order to achieve an understorey score of **20** by the end of the **Initial Period** ≥90% of Understorey Life Forms need to be present, of those present <50% substantially modified respective to the EVC benchmark. Understorey plantings should follow the diversity and cover of lifeforms as shown in Table 25 below and Appendix A.

Table 26 Benchmark cover for understorey life forms

EVC	Understorey Life Form	Benchmark Species Diversity	Benchmark Cover (%)
Plains Savannah (Wimmera)	Immature Canopy Tree	2	5
	Small Shrub (20cm – 1m)	2	5
	Large Herb (>50cm)	3	5
	Medium Herb (5cm - 50cm)	6	20
	Small or Prostrate Herb (<5cm)	3	10
	Large Tufted Graminoid (>1m)	1	5
	Large Non-tufted Graminoid (>1m)	1	5
	Medium to Small Tufted Graminoid (10cm-1m)	5	35
	Medium to Tiny Non-tufted Graminoid (<1m)	2	5
	Bryophytes/Lichens	Na	10
	Soil Crust	Na	25
Plains Woodland (Wimmera)	Immature Canopy Tree	2	5
	Medium Shrub (1m – 5m)	2	5
	Small Shrub (20cm – 1m)	2	5
	Prostrate Shrub (<20cm)	1	1
	Large Herb (>50cm)	1	1
	Medium Herb (5cm - 50cm)	20	25
	Small or Prostrate Herb (<5cm)	4	10
	Large Tufted Graminoid (>1m)	1	5
	Large Non-tufted Graminoid (>1m)	1	1
	Medium to Small Tufted Graminoid (10cm-1m)	16	30
	Medium to Tiny Non-tufted Graminoid (<1m)	3	5
	Bryophytes/Lichens	Na	10
	Soil Crust	Na	10

Note that in order to achieve a score of **20** the species diversity and percentage cover does not need to be exact to the benchmark as the following rules apply:

Understorey Classification	Definition
Present	For life forms with benchmark cover of < 10%, considered 'present' if any specimens are observed.
	For life forms with benchmark cover of ≥ 10%, considered 'present' if the life form occupies at least 10% of benchmark cover
Modified	For life forms with benchmark cover of < 10%, then considered substantially 'modified' if the life form has either: - <50% of the benchmark species diversity, or - No reproductively-mature specimens are observed
	For life forms with benchmark cover of ≥ 10%, then considered substantially 'modified' if the life form has either: - <50% of benchmark cover; or - <50% of benchmark species diversity; or - ≥50% of benchmark cover due largely to immature canopy specimens but the cover of reproductively-mature specimens is <10% of the benchmark cover.

6.4.2.1 Understorey Species for restoration

The species required for understorey plantings must be indigenous to the respective EVC. A copy of the EVC benchmarks is provided in **Appendix B**, which provides a basic list of species which are typical of the respective EVC, or at least part of, within the Wimmera bioregion. This list can be used as a guide for species to plant within the respective offset sites however, it is recommended that additional species local to the Minyip area, and those with a conservation status are also planted. An example of listed species which are suitable for planting is provided in Table 27 below.

Table 27 Indigenous Listed species suitable for planting

Species	FFG Act	EPBC Act	Structural lifeform
Wimmera Rice-flower <i>Pimelea spinescens subsp. pubiflora</i>	Critically Endangered	Critically Endangered	Small Shrub
Turnip Copperburr <i>Sclerolaena napiformis</i>	Critically Endangered	Endangered	Small Shrub
Pin Sida <i>Sida fibulifera</i>	Endangered	N/A	Small Shrub
Downy Swainson-pea <i>Swainsona swainsonioides</i>	Endangered	N/A	Large Herb
Spiny Lignum <i>Duma horrida subsp. horrida</i>	Critically Endangered	N/A	Prostrate Shrub
Fine-hairy Spear-grass <i>Austrostipa puberula</i>	Endangered	N/A	Tufted Graminoid

Sourcing species for restoration

Sourcing species is limited to the availability of seed collection and/or propagation within specialist nurseries. As such, the species identified in Table 27 and Appendix B act as a recommendation for restoration plantings that are subject to availability.

In order to obtain plants suitable for planting, the Land Holder and Land Manager is required to work with local indigenous nurseries, Landcare groups and/or seed banks to responsibly source the species required to meet the commitments set within this BOMP. It is the responsibility of the Land Holder and Land Manager to ensure suitable timeframes are allocated to engage such groups to undertake seed collection and propagation for restoration plantings in accordance with this BOMP.

Restoration planting regime and mortality rate

Restoration plantings

The success of restoration plantings is dependent on weed control actions, notably in relation to targets for grassy and herbaceous weed control. As grassy and herbaceous weed cover is high across both offset sites it is recommended that restoration plantings are undertaken following successful weed control measures to reduce/prevent re-establishment of noxious species. Further, the success of restoration plantings often relies on on-going weed works to allow planted species to establish, as such the two components (being understorey plantings and weed control) should be managed together in terms of timing and frequency.

A Restoration Planting and Weed Control Plan has been provided in **Appendix C** which acts as a guide to progressively meet the restoration plantings and weed control commitments. This guide was developed using the benchmark covers and diversity of Life Forms of the respective EVC's to achieve an established cover and diversity in accordance with the expected outcomes of the **Initial Period**.

Planting Mortality

Mortality of restoration plantings is expected due to herbivory, planting shock and climatic factors.

The key threatening process for understorey species is likely due to excessive herbivory from macropods or other large herbivores. Sheep must be excluded to prevent mortality of restoration plantings, and in instances where herbivory from macropods is identified as a contributing factor exclusion plots will be established, maintained and progressively moved throughout the offset sites to restore understorey vegetation values (See section 6.4.2.3).

Where restoration mortality has occurred in any instance the Land Holder and Land Manager is responsible for replacing planted species to meet the requirements of this BOMP.

6.4.2.2 Biomass / organic litter control

Biomass is a term used to describe accumulated live and dead plant material in the ground layer. High biomass can reduce floristic diversity and increase fuel loads and therefore fire risk. Biomass is generally measured as g/m² or tonnes/ha but this volume-based measurement can be a poor indicator of structure, particularly for grassland management. The ground stratum of Buloke Woodlands is usually grassy, with some areas also containing shrubby or herbaceous species. The associated EVC benchmarks contain low organic litter at a cover of 5-10%. As such, management of biomass will help to manage understorey species diversity and cover.

Biomass within the offset sites will be monitored as part of vegetation condition monitoring. If biomass of the ground layer becomes too dense such that some native species struggle to flourish and/or are prevented from naturally recruiting, then biomass levels will need to be managed.

Generally, efforts will be made to exclude fire from the Buloke Woodlands (DCCEE, 2023). However, low-intensity ecological burning or mosaic burning can be used to control biomass and contribute to an increase in understorey species growth by creating recruitment space.

Ecological burning must use the following documentation for reference to fire interval, monitoring and guidelines for burning:

- Cheal, D. (2010) Growth stages and tolerable fire intervals for Victoria's native vegetation data sets. Fire and Adaptive Management Report No. 84. Department of Sustainability and Environment, East Melbourne, Victoria, Australia.
- Cawson, J. and Muir, A. (2008) Flora monitoring protocols for planned burning: a user's guide. Fire and Adaptive Management Report No. 74. Department of Sustainability and Environment, East Melbourne, Victoria, Australia.
- Fire Ecology Working Group, (2004). Guidelines and Procedures for Ecological Burning on Public Land in Victoria 2004. Department of Sustainability and Environment, Melbourne

6.4.2.3 Large Herbivore Monitoring and Management (Exclusion Plot)

An overabundance of large herbivores can hamper conservation efforts due to excessive levels of herbivory (Mills et al., 2020). An exclusion plot at each offset site will be established to determine if excess herbivory from large herbivores such as macropods are having a detrimental impact to native vegetation values. Exclusion plot specification is detailed in DEECA (2023) (Attachment 1).

After each plot is established, the cover and abundance within and external to the exclusion plot (across the remaining offset site) will be measured once per season for two years from the start of the **Initial Period**. If the results from two years of monitoring the exclusion plots indicate that excessive herbivory is likely causing detrimental impacts on native vegetation (such as low cover, decreased complexity and fewer native understorey species and/or canopy species recruitment) the use of exclusion plots will continue.

The exclusion plot will be moved to another part of the offset site once the native vegetation has reached a height and maturity that can withstand herbivory in accordance with the DEECA management standards (DEECA, 2023). The movement of the exclusion plot will be repeated until the understorey vegetation within the offset site has had a chance to regenerate in cover and species richness or until the end of the **Initial Period** of the BOMP.

6.4.3 Responsibilities and Qualifications

Ultimately the Land Holder and Land Manager are responsible for meeting the targets of native vegetation management within the **Initial Period** as detailed within this Plan. It is the responsibility of the Land Holder and Land Manager to engage (as necessary) a suitably qualified person, or local indigenous nurseries, landcare groups and/or seed banks, that hold all current permits and certificates to undertake the respective native vegetation management actions.

7.0 Monitoring

Monitoring plays a crucial role in implementing this BOMP. It enables the effectiveness of management measures to be assessed and new or emerging management issues to be identified.

It is the responsibility of the Land Holder and Land Manager to undertake on-going and quarterly monitoring of the offset sites as per the monitoring actions set in Section 9.0, Table 28.

It is the responsibility of the Land Holder and Land Manager to engage a VQA certified ecologist/botanist to undertake the requirements for annual Habitat Hectare assessments and Photo Point Monitoring. The person(s) engaged to undertake such monitoring must also produce an annual monitoring report for the offset sites which identifies the performance of management actions against the requirements of this BOMP. If adaptive management actions are required approval must be sought from DCCEE.

7.1 On-going Monitoring

7.1.1 Fences and livestock

Fences will be inspected quarterly or after severe storm events. Damage or faults in the fencing will be promptly repaired if the damage or fault would allow uncontrolled stock access.

Fencing integrity is maintained to an acceptable standard (see Section 6.1.3) to ensure no uncontrolled livestock are able to access the sites.

7.1.2 Restoration plantings

It is the responsibility of the Land Manager to undertake weekly monitoring of restoration plantings for mortality until the plantings have established. Where mortality has occurred, the Land Holder and Land Manager must replace dead individuals to ensure the offset sites are in accordance with the enhancement commitments of this BOMP (Section 5.2.5 and Section 6.4).

7.1.3 Weed control

It is the responsibility of the Land Manager to monitor the offset sites following weed management actions to ensure the sites are managed for weeds to achieve the commitments set in this BOMP which requires:

Reduction in woody weed cover for both offset sites to the following levels:

- <5% within 1 year;
- <4% within 2 years;
- <3% within 5 years;
- <2% within 8 years; and,
- <1% maintained in subsequent years.

Reduction in herbaceous and grassy weed cover for both offset sites to the following levels:

- <70% within 1 year;
- <50% within 2 years;
- <40% within 5 years;
- <30% within 8 years; and,
- <25% maintained in subsequent years.

7.1.4 Pest animals

Monitoring provides data for pest animal population size and presents a trigger to management actions. Additionally monitoring data assesses whether a management strategy is meeting its objectives or requires adjustments, thereby facilitating performance monitoring (Mitchell, B. and Balogh, S. 2007).

Monitoring may be undertaken using trail cameras. The site will be walked during the day to identify location of any warrens or other harbour. Camera traps will be set up around observed warrens, trails or droppings. Camera trap monitoring will occur for minimum one week before results are analysed.

Other methods of monitoring may be used including methods described in Mitchell, B. and Balogh, S. (2007) where a walked spotlight count and a sight count is used to identify and count populations of European Rabbits and European Hares. The site may also be walked to identify the location of warrens or other harbour. Other pest animals may be monitored in conjunction with the walked spotlight count sight count.

During other works or monitoring, incidental observations of pest animals either direct or indirect will be recorded (dens, latrine sites, scats).

7.1.5 New and emerging threats

It is the responsibility of the Land Holder and Land Manager to undertake on-going visual inspections of the offset sites to identify the potential for establishment of new pest flora and fauna species, and to act immediately to control and eradicate.

7.2 Annual Vegetation Monitoring

The condition of vegetation will be monitored to detect new and emerging threats. Monitoring of vegetation condition is to be undertaken annually (mid-Spring) via two methods; Habitat Hectare Assessment and Photo Point Monitoring. Vegetation condition monitoring must be undertaken by a VQA certified botanist/ecologist. Findings of the Habitat Hectare Assessment and Photo Point Monitoring will form part of the Annual compliance report.

7.2.1 Habitat Hectare Assessment

The Habitat Hectare Assessment must be conducted at the same of year (mid-Spring) and is relative to the baseline condition (Appendix A), the ecological improvement commitments (Section 5.2.5) and timing of actions within the **Initial Period** (Table 28).

The assessment applies to the entirety of the offset sites and is to report on the Site Condition component of the Habitat Hectare method which generates a total score out of a potential 75. The Landscape Context Score is to remain unchanged (i.e 11/25) for future assessments as factors contributing to this component occur outside of the management area of the offset sites. As such, the habitat hectare assessment will be scored out of a potential 100.

7.2.2 Photo Point Monitoring

Permanent photo monitoring points will be established, with a minimum of eight photo monitoring points at each offset site. Each photo point will comprise two images:

- Ground view of a square 5 m x 5 m plot which will be clearly marked and accurately located by GPS or similar.
 - o Each plot will be assessed for percentage total vegetation cover, percentage cover of native and exotic life-forms, inter-tussock space and average height of the vegetation.
 - o Using the north-east corner of the plot as the top right corner of the photo frame, a photo will be taken from above keeping the frame of the photo as square as possible to the boundary of the plot.
- Overview (wide-angle landscape view) of photo monitoring point from the north-east corner of the plot facing south-west.

Photo points will be monitored annually in Spring for the **Initial Period**. Baseline photo point monitoring will be conducted at the beginning of the **Initial Period**, before the first weed control action.

Photos will be taken using a reasonable quality phone camera or similar, horizontal orientation and using 1X zoom. The photographic field of view will be matched year to year, using landmarks present in the original baseline photo.

8.0 Reporting

The Land Holder and Land Manager will submit a report annually to DCCEEW each year of the **Initial Period**. The purpose of the annual report is to assess progress of management against the current and future commitments set out in this BOMP as detailed in Section 5.0, Section 6.0, Section 7.0 and Table 27. Reports are to be submitted at least 2 months prior to the anniversary date of the execution of the BOMP to allow time for compliance to be assessed before the anniversary date.

A review of the BOMP will be conducted after 5 years and a report provided to DCCEEW.

The annual report must include:

- Details of management actions undertaken within the reporting period.
- Results of on-going and annual monitoring activities relative to the commitments of this BOMP.
- Site photographs.
- Assessment of compliance or non-compliance with the schedule of management actions and performance targets.
- Assessment of restoration plantings and weed works against the Restoration Planting and Weed Control Plan (Appendix C)
- Details of any new and emerging management issues, with recommendations for corrective action and plan review.

9.0 Management, Monitoring and Reporting Objectives and Performance Targets

Table 27 presents a summary of the objectives and performance targets for each of the management, monitoring and reporting controls required during the **Initial Period** and those required to be undertaken in perpetuity to ensure that the ecological improvements and raw gain of 1 point are maintained to comply with the on-title agreement.

Table 28 Offset management, monitoring and reporting actions

Action	Objective	Frequency and timing	Performance Target	Approach
Management actions				
MA-01	Control stock	Within 3 months of commencement of the Initial Period . To be maintained in perpetuity	Offset site is appropriately fenced from neighbouring land.	Install stock exclusion fencing in accordance with DEECA standards. Undertaken by Land Manager
MA-02	Control woody weeds	Ongoing from the commencement of the Initial Period . To be undertaken in perpetuity .	Reduction in woody weed overall patch cover for both offset sites to the following levels: <5% within 1 year; <4% within 2 years; <3% within 5 years; <2% within 8 years and <1% maintained in subsequent years.	Eliminate woody weeds in a manner that avoids impacts to indigenous plants. Timing and method for control of woody weeds are outlined in Table 22 . Undertaken by the Land Holder/Land Manager or suitably qualified contractor.
MA-03	Control herbaceous and grassy weeds	Ongoing from the commencement of the Initial Period . To be undertaken in perpetuity .	Cover of herbaceous weeds during the Initial Period : <70% within 1 year; <50% within 2 years; <40% within 5 years; <30% within 8 years; and, <25% maintained in subsequent years	Timing and method for control of herbaceous and grassy weeds are outlined in Table 23 . Undertaken by the Land Holder/Land Manager or suitably qualified contractor.

Action	Objective	Frequency and timing	Performance Target	Approach
MA-04	Control new and emerging weeds	Ongoing from the commencement of the Initial Period . To be undertaken in perpetuity .	Outbreaks of new and emerging high threat weeds are eliminated as soon as they are detected	As per Action MA-02 and MA-03. Undertaken by the Land Holder/Land Manager or suitably qualified contractor.
MA-05	Control rabbits and foxes	Ongoing from the commencement of the Initial Period . To be undertaken in perpetuity .	Rabbits, hares and fox populations are not present	Pest animals to be controlled and the method and timing of control is outlined in Table 24 . Undertaken by the Land Holder/Land Manager or suitably qualified contractor.
MA-06	Control new and emerging pest animals	Ongoing from the commencement of the Initial Period . To be undertaken in perpetuity .	Pest animal populations are not present.	As per Section 6.3, Table 23, Section 7.14 and Section 7.1.5 Undertaken by the Land Holder/Land Manager or suitably qualified contractor.
MA-07	Control understorey regeneration	Annual – Autumn (if required), from the commencement of the Initial Period	≥90% of Life Forms Present, of those present <50% substantially modified in accordance with the respective EVC benchmark.	Achieved through a dynamic approach of weed works (MA-02,MA-03) and restoration plantings (MA-12)
MA-08	Control biomass	Ongoing from the commencement of the Initial Period (if required)	Cover of grasses and herbs maintained at >30% and <80%	Slashing or brush cutting. Burning can be used to control biomass as outlined in Section 6.4.2.2.
MA-09	Establish photo monitoring points	Within 3 months of commencement of the Initial Period	Photo monitoring points established.	Establish photo monitoring points as per the approach outlined in Section 7.2.2.
MA-10	Retain all standing indigenous	Ongoing from the commencement of the Initial Period .	All mature standing indigenous trees (dead or alive) retained.	Retain all mature standing indigenous trees.

Action	Objective	Frequency and timing	Performance Target	Approach
	trees (dead or alive)	To be retained in perpetuity .		
MA-11	Retain all logs, fallen timber and leaf litter	Ongoing from the commencement of the Initial Period . To be retained in perpetuity .	All logs, fallen timber and leaf litter retained unless retention of those features prevents other performance targets from being achieved.	Retain all logs. If fallen timber impedes effective management, redistribute to more appropriate location.
MA-12	Restoration plantings and natural recruitment	Ongoing from commencement of Initial Period. See Appendix C	≥90% of Life Forms Present, of those present <50% substantially modified in accordance with the respective EVC benchmark.	Planting of Buloke to re-establish canopy co-dominance at both sites. Supplemental plantings or direct seeding of indigenous understorey species to increase the lifeforms present within offset site. Exclusion of stock and weed control may allow for natural recruitment of indigenous species.
Monitoring				
M-01	Monitor fence condition	On-going/Quarterly (per season) or following severe storm events from the commencement of the Initial Period .	Fences in good working order.	Survey perimeter of the offset site to ensure fences are intact. Check for evidence of domestic stock access.
M-02	Monitor native vegetation condition	Annual (in Spring) from the commencement of the Initial Period	Patches of Buloke Woodland continue to meet the definition of the threatened ecological community. Biomass cover of grasses and herbs remain <80% and >30% in the ground layer. Habitat Hectare <i>Site Condition Score</i> is in accordance with the improvement commitments of this BOMP.	Monitor canopy and understorey regeneration. Monitor understorey condition through photo points established under MA-09. Annual Habitat Hectare monitoring undertaken by a VQA certified botanist/ecologist.

Action	Objective	Frequency and timing	Performance Target	Approach
M-03	Monitor weeds	On-going/Biannual (in Autumn and Spring) from the commencement of the Initial Period	Cover of woody and herbaceous weeds does not exceed thresholds assigned in Action MA-02 and Action MA-03.	Monitor cover of woody and herbaceous weeds. Spring - at time of vegetation condition survey
M-04	Monitor pest animals	On-going/Annual (in Spring) from the commencement of the Initial Period	Pest animal (particularly rabbit) populations are not observed.	Monitor for the presence of pest animals or signs (scat, diggings, burrows, grazing pressure). Spring - at time of vegetation condition survey
Reporting				
R-01	Annual reporting	Annual from the commencement of the Initial Period	Documented evidence of progress against commitments in the BOMP as detailed in Section 5.0, Section 6.0, Section 7.0 and Section 8.0	Submit to DCCEEW by at least 2 months prior to the anniversary date of the execution of the BOMP.
R-02	Review BOMP for effectiveness of management actions	Five years from the commencement of the Initial Period	Increase in Habitat Hectare <i>Site Condition Score</i> and increase against individual criteria of habitat hectare method.	Analyse annual BOMP reports to identify any management actions that are not effective. Make recommendations to update BOMP for consideration by DCCEEW

10.0 Risk assessment and corrective measures

Events which occur over time which have the potential to compromise the success of management of the offset site are measured through a risk assessment matrix as detailed in Table 29 below.

Table 29 Risk Assessment Matrix

		Consequence				
		Minor	Moderate	High	Major	Critical
Likelihood	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Qualitative measure of consequences	Consequence
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Sever widespread loss of environmental amenity and irrevocable damage

The potential events and risk rating based on the likelihood of the event occurring and the consequence if it does occur is provided in Table 30 below. Contingency measures to address the identified risks to management success are also provided.

Table 30 Risks to offset management success and corrective measures

Event	Objective compromised	Likelihood	Consequence	Mitigation	Risk rating	Trigger	Corrective measures	Timing
Uncontrolled entry of domestic stock	MA-01	Unlikely	Minor	Regular fence inspections and management activities will identify stock access early	Low	Uncontrolled domestic stock sighted in offset sites. Signs of recent stock access. Grazing and trampling damage to vegetation and/or loss of juvenile trees or shrubs observed.	Remove stock. Repair fencing.	Immediately
Woody weeds present in offset site (% cover greater than levels stated in Section 6.2)	MA-02	Unlikely	Minor	Biannual weed monitoring and active control reduces risk of weed invasion	Low	Woody weed cover exceeds % cover greater than levels stated in Section 6.2	Increase weed control works.	Prior to seed set
Herbaceous weed cover exceeds and / or annual grassy weed cover exceeds levels stated in Section 6.2	MA-03	Possible	Minor	Biannual weed monitoring and active control reduces risk of weed invasion	Low	Herbaceous weed and / or annual grassy weed cover exceeds % cover greater than levels stated in Section 6.2	Increase weed control works.	During plant's active growth period and prior to seed set

Event	Objective compromised	Likelihood	Consequence	Mitigation	Risk rating	Trigger	Corrective measures	Timing
Pest animals within offset site	MA-05	Possible	Moderate	Regular monitoring will identify pest animal invasion early	Medium	Fresh ground disturbance or scats. Active rabbit warrens observed. Any fox observations including indirect evidence such as scats. New and emerging pest observed in offset site. Damage to understorey vegetation or limited recruitment of trees and shrubs observed.	Increase pest animal control works. Develop a fox control plan and incorporate into the management plan.	Immediately
Tree and shrub recruitment substantially above EVC benchmark	MA-07	Possible	Minor	Monitored annually. Corrective measures undertaken early	Low	Exclusion of understorey vegetation due to shading.	Increase regeneration control works.	Within 3 months
Understorey recruitment substantially below EVC benchmark		Possible	Minor	Monitored annually. Corrective measures undertaken early	Low	Inadequate recruitment or restoration planting failure outside of the requirements of this BOMP	Replace failed restoration plantings. Should larger herbivore grazing become a problem	After next Autumn break to early Spring

Event	Objective compromised	Likelihood	Consequence	Mitigation	Risk rating	Trigger	Corrective measures	Timing
							install large herbivore exclusion plots with the suitability of exclusion plots to be checked after 2 years.	
Biomass exceeds 80%	MA-08	Possible	Moderate	Annual photo monitoring and habitat hectare assessments identify biomass targets against benchmark	Medium	Cover of grasses and herbs >80%	Increase biomass control.	Within 2 months
Biomass succeeds 30%		Possible	Moderate	Monitored annually. Corrective measures undertaken early	Medium	Cover of grasses and herbs <30%	Decrease biomass control. Monitor native vegetation condition and weeds. Consider alternative understorey re-establishment or large herbivore exclusion plots	Immediately
Understorey cover of native species below 50%.	MA-09	Possible	Moderate	Annual photo monitoring	Medium	Understorey <50% native species.	Decrease biomass control.	Within 3 months

Event	Objective compromised	Likelihood	Consequence	Mitigation	Risk rating	Trigger	Corrective measures	Timing
				and habitat hectare assessments compare understorey score against EVC benchmark			Monitor native vegetation condition and weeds. Install large herbivore exclusion plots and check after 2 years.	
Wildfire or intentional controlled/ecological burn	n/a	Possible	Moderate	Active management and monitoring of biomass levels	Medium	Permanent or temporary impact on overstorey condition.	Monitor vegetation condition and recruitment. Implement understorey re-establishment measures.	Immediately and continue to monitor vegetation condition quarterly following fire event
	n/a	Possible	Moderate	Active management and monitoring of biomass levels	Medium	Permanent or temporary impact on understorey condition.	Monitor vegetation condition and recruitment. Implement understorey re-establishment measures.	Immediately and continue to monitor vegetation condition quarterly following fire event
	MA-01	Possible	Moderate	Inspect fences following wildfire event	Medium	Damage or loss of fencing.	Reinstatement of fencing	Immediately

Event	Objective compromised	Likelihood	Consequence	Mitigation	Risk rating	Trigger	Corrective measures	Timing
Severe storm	MA-01	Possible	Minor	Fences to be inspected after storm events	Low	Damage or loss of fencing.	Reinstatement of fencing	Immediately

11.0 References

DCCEEW (2023). Approved Conservation Advice for the Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions. Victorian Government Department of Climate Change, Energy, the Environment and Water, Melbourne.

DEECA (2024). Management standards for native vegetation offset sites. Victorian Government Department of Environment, Land, Water and Planning, Melbourne.

DEECA (2024). NatureKit. Victorian Government Department of Energy, Environment and Climate Action, Melbourne.

DELWP (2015). DELWP Output Delivery Standards – for the delivery of environment activities. Victorian Government Department of Environment, Land, Water and Planning Melbourne.

DELWP (2022). Native Vegetation Newsletter 6 - Update on the implementation of the Native Vegetation Regulations – June 2022. Victorian Government Department of Environment, Land, Water and Planning Melbourne.

DSE (2004). Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual - Version 1.3. Department of Sustainability and Environment, Melbourne.

DSE (2007). EVC/Bioregion Benchmark for Vegetation Quality Assessment Wimmera Bioregion – November 2007. Published by the Victorian Government Department of Sustainability and Environment, Victoria.

DSE (2011). National Recovery Plan for Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions. Department of Sustainability and Environment, Melbourne.

Mills, C. H., Waudby, H., Finlayson, G., Parker, D., Cameron, M., & Letnic, M. (2020). Grazing by over-abundant native herbivores jeopardizes conservation goals in semi-arid reserves. *Global Ecology and Conservation*, Volume 24.

Mitchell, B. and Balogh, S. (2007) Monitoring techniques for vertebrate pests rabbits. NSW Department of Primary Industries, orange and Bureau of rural Sciences, Canberra.

White, M., Oates, A., Cheal, D., Sinclair, S., Sutter, G. (2003) The vegetation of north-west Victoria: a report to the Mallee, Wimmera and North Central Catchment Management Authorities. Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment.

Appendix A

VQA Scoring of Offset Sites

Appendix A VQA Scoring of Offset Sites

Barry's Block Offset Site

An assessment of the quality of the vegetation within Barry's Block was undertaken during the offset site assessment in March 2024. While it is recognised that the application of the Victoria's Vegetation Quality Assessment data is not immediately applicable to communities listed as MNES, it is considered to provide a quantitative analysis of the baseline quality of the vegetation at a site. The assessment was undertaken by an assessor accredited by DEECA, and the results of the VQA are provided in **Table 31**, below:

Table 31 AECOM VQA assessment of Barry's Block.

Habitat Zone			Barry's Block
EVC			EVC 803 – Plains Woodland
Bioregion			Wimmera
Bioregional Conservation Status (BCS)			Endangered
EPBC Community			Y – Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions
Site Condition	Large Old Trees	10	10
	Tree Canopy Cover	5	3
	Lack of Weeds	15	6
	Understorey	25	15
	Recruitment	10	3
	Organic Litter	5	2
	Logs	5	3
	Total Site Score	75	42
Landscape Context	Patch Size	10	6
	Distance to Core Area	5	1
	Neighbourhood	10	4
	Total Landscape Score	25	11
Habitat Score = Score/100		100	53
Habitat (Quality) = Score/10		10	5
Habitat Points = Score/100		1	0.53

Habitat Zone 21

An assessment of the quality of the vegetation within the Habitat Zone 21 Offset site was undertaken by Ecology and Heritage Partners (EHP). EHP Identified two EVCs within this offset site. The total Habitat Hectare scores are provided below in **Table 32**.

Table 32 Habitat Hectares Scores from EHP

Habitat Zone			Habitat Zone 21	
EVC			EVC 826 – Plains Savannah	EVC 803 – Plains Woodland
Bioregion			Wimmera	Wimmera
Bioregional Conservation Status (BCS)			Endangered	Endangered
Site Condition	Large Old Trees	10	10	6
	Tree Canopy Cover	5	5	5
	Lack of Weeds	15	4	6
	Understorey	25	10	10
	Recruitment	10	5	5
	Organic Litter	5	5	5
	Logs	5	2	2
	Total Site Score	75	41	39
Landscape Context	Patch Size	10	6	6
	Distance to Core Area	5	1	1
	Neighbourhood	10	4	4
	Total Landscape Score	25	11	11
Habitat Score		100	52	50
Habitat (Quality) = Score/10		10	5	5
Habitat Points = Score/100		1	0.52	0.50

Appendix B

Ecological Vegetation Class Benchmarks

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Wimmera bioregion

EVC 803: Plains Woodland

Description:

Grassy or sedgy woodland to 15 m tall with large inter-tussock spaces potentially supporting a range of annual or geophytic herbs adapted to low summer rainfall, with low overall biomass. Mostly occurs on terrain of low relief in areas receiving <600 mm rainfall per annum. Fertile, sometimes seasonally waterlogged, mostly silty, loamy or clay topsoils, with heavy subsoils, derived largely from former Quaternary swamp deposits.

Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	70 cm	15 / ha
<i>Allocasuarina luehmannii</i>	40 cm	

Tree Canopy Cover:

%cover	Character Species	Common Name
15%	<i>Eucalyptus leucoxylon</i>	Yellow Gum
	<i>Allocasuarina luehmannii</i>	Buloke
	<i>Eucalyptus microcarpa</i>	Grey Box
	<i>Eucalyptus melliodora</i>	Yellow Box

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Medium Shrub	2	5%	MS
Small Shrub	2	5%	SS
Prostrate Shrub	1	1%	PS
Large Herb	1	1%	LH
Medium Herb	20	25%	MH
Small or Prostrate Herb	4	10%	SH
Large Tufted Graminoid	1	5%	LTG
Large Non-tufted Graminoid	1	1%	LNG
Medium to Small Tufted Graminoid	16	30%	MTG
Medium to Tiny Non-tufted Graminoid	3	5%	MNG
Bryophytes/Lichens	na	10%	BL
Soil Crust	na	10%	S/C

Recruitment:

Continuous

Organic Litter:

10 % cover

Logs:

10 m/0.1 ha.

EVC 803: Plains Woodland - Wimmera bioregion

LF Code	Species typical of at least part of EVC range	Common Name
MS	<i>Acacia pycnantha</i>	Golden Wattle
MS	<i>Acacia acinacea</i> s.l.	Gold-dust Wattle
SS	<i>Eutaxia microphylla</i> var. <i>microphylla</i>	Common Eutaxia
PS	<i>Astroloma humifusum</i>	Cranberry Heath
LH	<i>Senecio quadridentatus</i>	Cotton Fireweed
MH	<i>Acaena echinata</i>	Sheep's Burr
MH	<i>Plantago gaudichaudii</i>	Narrow Plantain
MH	<i>Maireana enchylaenoides</i>	Wingless Bluebush
MH	<i>Calocephalus citreus</i>	Lemon Beauty-heads
SH	<i>Solenogyne dominii</i>	Smooth Solenogyne
SH	<i>Oxalis perennans</i>	Grassland Wood-sorrel
SH	<i>Daucus glochidiatus</i>	Austral Carrot
SH	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia
LTG	<i>Austrostipa mollis</i>	Supple Spear-grass
MTG	<i>Austrostipa scabra</i>	Rough Spear-grass
MTG	<i>Austroanthonia setacea</i>	Bristly Wallaby-grass
MTG	<i>Dianella revoluta</i> s.s.	Black-anther Flax-lily
MTG	<i>Austroanthonia caespitosa</i>	Common Wallaby-grass
MNG	<i>Wurmbea dioica</i>	Common Early Nancy
TTG	<i>Centrolepis strigosa</i> ssp. <i>strigosa</i>	Hairy Centrolepis
TTG	<i>Centrolepis aristata</i>	Pointed Centrolepis
EP	<i>Amyema miquelii</i>	Box Mistletoe
SC	<i>Thysanotus patersonii</i>	Twining Fringe-lily
SC	<i>Convolvulus erubescens</i> spp. agg.	Pink Bindweed

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	<i>Sonchus oleraceus</i>	Common Sow-thistle	high	low
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MH	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover	high	low
MH	<i>Hypochoeris glabra</i>	Smooth Cat's-ear	high	low
MH	<i>Arctotheca calendula</i>	Cape Weed	high	low
MH	<i>Petrorhagia velutina</i>	Velvety Pink	high	low
MH	<i>Trifolium dubium</i>	Suckling Clover	high	low
MH	<i>Anagallis arvensis</i>	Pimpernel	high	low
SH	<i>Trifolium glomeratum</i>	Cluster Clover	high	low
LNG	<i>Avena fatua</i>	Wild Oat	high	low
MTG	<i>Romulea rosea</i>	Onion Grass	high	low
MTG	<i>Briza minor</i>	Lesser Quaking-grass	high	low
MTG	<i>Briza maxima</i>	Large Quaking-grass	high	low
MTG	<i>Lolium rigidum</i>	Wimmera Rye-grass	high	low
MTG	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	high	low
MNG	<i>Vulpia myuros</i>	Rat's-tail Fescue	high	low
MNG	<i>Juncus capitatus</i>	Capitate Rush	high	low
MNG	<i>Bromus rubens</i>	Red Brome	high	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Wimmera bioregion

EVC 826: Plains Savannah

Description:

A structurally diverse vegetation unit which includes 'grassy openings' of a few to many hundreds of hectares, with a variable tree density ranging from a very sparse savanna to woodland. The relative absence of eucalypts is particularly characteristic, with *Allocasuarina luehmannii* and perhaps *Callitris gracilis* subsp. *murrayensis* to 10 m tall being the dominant trees.

+ woodland only components (ignore when assessing grassland areas and standardise final score as appropriate)

Large trees⁺:

Species	DBH(cm)	#/ha
<i>Allocasuarina luehmannii</i>	40 cm	5/ha
<i>Callitris gracilis</i> subsp. <i>murrayensis</i>		

Tree Canopy Cover⁺:

% cover	Character Species	Common Name
10%	<i>Allocasuarina luehmannii</i>	Buloke
	<i>Callitris gracilis</i> ssp. <i>murrayensis</i>	Slender Cypress-pine

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree ⁺		5%	IT
Small Shrub	2	5%	SS
Large Herb	3	5%	LH
Medium Herb*	6	20%	MH
Small or Prostrate Herb*	3	10%	SH
Large Tufted Graminoid	1	5%	LTG
Large Non-tufted Graminoid	1	5%	LNG
Medium to Small Tufted Graminoid	5	35%	MTG
Medium to Tiny Non-tufted Graminoid*	2	5%	MNG
Bryophytes/Lichens	na	10%	BL
Soil Crust	na	25%	S/C

* Largely seasonal life form

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Acacia pendula</i>	Boree
MS	<i>Acacia oswaldii</i>	Umbrella Wattle
SS	<i>Sclerolaena napiformis</i>	Turnip Copperburr
SS	<i>Sclerolaena diacantha</i>	Grey Copperburr
SS	<i>Maireana decalvans</i>	Black Cotton-bush
SS	<i>Pimelea curviflora</i> s.s.	Curled Rice-flower
LH	<i>Ptilotus exaltatus</i>	Mulla Mulla
LH	<i>Eryngium ovinum</i>	Blue Devil
LH	<i>Calocephalus citreus</i>	Lemon Beauty-heads
LH	<i>Arthropodium fimbriatum</i>	Nodding Chocolate-lily
MH	<i>Calotis scabiosifolia</i>	Rough Burr-daisy
MH	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia
MH	<i>Sida corrugata</i>	Variable Sida
MH	<i>Ptilotus macrocephalus</i>	Feather Heads
SH	<i>Maireana pentagona</i>	Hairy Bluebush
SH	<i>Chamaesyce drummondii</i>	Flat Spurge
SH	<i>Pogonolepis muelleriana</i>	Stiff Cup-flower
SH	<i>Convolvulus erubescens</i> spp. agg.	Pink Bindweed
LTG	<i>Austrostipa blackii</i>	Crested Spear-grass
LTG	<i>Austrostipa gibbosa</i>	Spurred Spear-grass
LTG	<i>Austrostipa aristiglumis</i>	Plump Spear-grass
MTG	<i>Austrostipa scabra</i>	Rough Spear-grass
MTG	<i>Austrostipa nodosa</i>	Knotty Spear-grass
MTG	<i>Whalleya proluta</i>	Rigid Panic
MTG	<i>Austrodanthonia duttoniana</i>	Brown-back Wallaby-grass

EVC 826: Plains Savannah - Wimmera bioregion

Recruitment:

Continuous

Organic Litter:

5% cover

Logs⁺:

5 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MS	<i>Lycium ferocissimum</i>	Boxthorn	high	high
LH	<i>Helminthotheca echinoides</i>	Ox-tongue	high	low
LH	<i>Lepidium africanum</i>	Common Peppergrass	high	low
LH	<i>Salvia verbenaca</i>	Wild Sage	high	high
LH	<i>Echium plantagineum</i>	Patterson's curse	high	high
LH	<i>Sisymbrium irio</i>	London Rocket	high	high
LH	<i>Marrubium vulgare</i>	Horehound	high	high
LNG	<i>Avena fatua</i>	Wild Oat	high	high
MH	<i>Limonium sinuatum</i>	Notch-leaf Sea-lavender	high	high
MH	<i>Arctotheca calendula</i>	Cape Weed	high	high
MH	<i>Hypochoeris glabra</i>	Smooth Cat's-ear	high	low
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MH	<i>Oxalis pes-caprae</i>	Sour sob	high	high
MH	<i>Plantago coronopus</i>	Buck's-horn Plantain	high	high
MH	<i>Spergularia rubra</i> s.l.	Red Sand-spurrey	high	low
MH	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover	high	high
MH	<i>Trifolium arvense</i> var. <i>arvense</i>	Hare's-foot Clover	high	high
MH	<i>Trifolium campestre</i> var. <i>campestre</i>	Hop Clover	high	high
MH	<i>Trifolium striatum</i>	Knotted Clover	high	low
MH	<i>Trifolium subterraneum</i>	Subterranean Clover	high	low
MH	<i>Hedynois cretica</i>	Cretan Hedynois	high	high
MNG	<i>Aira cupaniana</i>	Quicksilver Grass	high	low
MNG	<i>Avena barbata</i>	Bearded Oat	high	high
MNG	<i>Brachypodium distachyon</i>	False Brome	high	high
MNG	<i>Juncus capitatus</i>	Capitate Rush	high	high
MNG	<i>Vulpia muralis</i>	Wall Fescue	high	high
MNG	<i>Vulpia myuros</i>	Rat's-tail Fescue	high	high
MTG	<i>Bromus diandrus</i>	Great Brome	high	high
MTG	<i>Critetion hystrix</i>	Mediterranean Barley-grass	high	high
MTG	<i>Critetion murinum</i>	Barley-grass	high	high
MTG	<i>Lolium rigidum</i>	Wimmera Rye-grass	high	high
MTG	<i>Pentastichis airoides</i> ssp. <i>airoides</i>	False Hair-grass	high	low
MTG	<i>Poa bulbosa</i>	Bulbous Meadow-grass	high	high
MTG	<i>Romulea minutiflora</i>	Small-flower Onion-grass	high	high
MTG	<i>Romulea rosea</i>	Onion Grass	high	high
MTG	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	high	high
SH	<i>Medicago minima</i>	Little Medic	high	high
SH	<i>Medicago polymorpha</i>	Burr Medic	high	high
SH	<i>Trifolium glomeratum</i>	Cluster Clover	high	low

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Appendix C

10-Year Restoration Planting and Weed Control Plan

Year	Native Cover Goal (%)	Weed Cover Goal (%)	Action Category	Details	Target Outcome
1 & 2	20-30	Woody: <5 Annual: <60	Site Preparation	- Control woody and annual weeds using mechanical removal and/or spraying. - Initial focus within high weed areas as mapped in Figure 2 and Figure 3 - Amend soil (if necessary) to support native species germination and growth.	Prepare site for planting and reduce weed competition.
			Initial Plantings (Following Site Preparation works)	Immature Canopy Trees: Plant Buloke seedlings at low density to achieve an additional 10% cover overall. Tufted Graminoids (Small to Large): Direct seed or plant plugs of tufted graminoids to stabilize soil and suppress weeds. Target 10-15% additional overall cover Medium Herbs (5cm-50cm): Sow or plant 2-3 species to establish a 5% cover baseline. Small Shrubs (20cm-1m): Introduce 1-2 shrub species to begin building structural diversity.	Establish structural layers and initial vegetation coverage.
			Monitoring	- Establish photo monitoring plots to track weed cover and native plant establishment and is representative of each offset site - Conduct site check-ups on restoration plantings and implement controls such as watering or additional weed works to maximise survival as necessary	Monitor weed reduction and planting success.
			Adaptive Management	- Conduct site check-ups on restoration plantings and weed works; - Implement controls such as watering, additional weed works, and herbivory controls to maximise survival;	
3 & 4	30-40	Woody:<4 Annual: <50	Weed Works and Site Preparation	- Control woody and annual weeds using mechanical removal and/or spraying. - Amend soil (if necessary) to support native species germination and growth.	Prepare site for area selected for planting and reduce weed competition.

Year	Native Cover Goal (%)	Weed Cover Goal (%)	Action Category	Details	Target Outcome
			Expansion of Plantings	Plant additional species to increase diversity: 0 Medium Herbs: Expand to 3-4 additional species, aiming for 10% cover; 0 Large Herbs (>50cm): Introduce 1-2 species for initial establishment at 1-2% cover; 0 Medium to Small Tufted Graminoids: Increase planting density to expand cover to 20%; 0 Small Shrubs: Introduce an additional 1-2 species for a combined cover of 2-3%.	Increase species diversity and native vegetation cover.
			Strategic Shrub and Tree Plantings	0 Immature Canopy Trees: Supplement Buloke plantings to increase cover by 5% cover. 0 Medium Shrubs (Plains Woodland): Begin planting to achieve 1% cover.	Increase future canopy and shrub layers.
			Weed Suppression with restoration plantings:	- o Increase indigenous groundcover to suppress annual weeds in gaps; - o Mulch around newly planted shrubs and trees to suppress weeds.	Further suppress weed growth and support native vegetation establishment.
			Monitoring	0 Monitor success of restoration plantings and weed works against cover goals for management year - o Conduct site check-ups on restoration plantings and implement controls such as watering or additional weed works to maximise survival as necessary	Monitor and act on weed reduction and planting success.
			Adaptive Management	o Implement additional controls as necessary to ensure restoration plantings and weed works are on-track to meet targets	

Year	Native Cover Goal (%)	Weed Cover Goal (%)	Action Category	Details	Target Outcome
5 & 6	40-60	Woody:<3 Annual: <40	Increase Diversity & Density	Add native plant species to fill Life Form gaps: - o Medium Herbs: Reach 15% cover with a minimum of 10 species. - o Small Herbs (<5cm): Introduce 3-4 species, aiming for 5% cover. - o Large Herbs: Expand to 3 species and aim for a combined cover of 4-5%. - o Prostrate Shrubs (Plains Woodland Only): Begin establishing at 1% cover	Fill structural gaps and ensure coverage goals for herbs and shrubs.
			Graminoid Establishment	- o Increase density of Medium to Small Tufted Graminoids to reach 25-30% cover with a minimum of 8 species in areas of Plains Woodland. - o Establish Large Tufted Graminoids (>1m) and Non-Tufted Graminoids in clusters, targeting 4-5% cover.	Achieve stronger grass layer dominance.
			Tree & Shrub Plantings	- o Immature Canopy Trees: Achieve 5% cover of Buloke through additional planting and growth. - o Small and Medium Shrubs: Ensure these layers reach 4-5% cover respective to EVC.	Strengthen canopy and mid-storey layers.
			Monitoring	- o Monitor success of restoration plantings and weed works against cover goals for management year - o Conduct site check-ups on restoration plantings and implement controls such as watering or additional weed works to maximise survival as necessary	Monitor and act on weed reduction and planting success.
			Adaptive Management	o Implement additional controls as necessary to ensure restoration plantings and weed works are on-track to meet targets	

Year	Native Cover Goal (%)	Weed Cover Goal (%)	Action Category	Details	Target Outcome
7 & 8	60-80	Woody:<2 Annual: <30	Enhance Plant Cover & Diversity	Focus on understorey layers: 0 Small Herbs and Prostrate Shrubs: Expand to reach EVC benchmark covers (3 species at 10% cover, 1 species at 1% cover, respectively). 0 Medium Herbs: Attain 20% cover with a minimum of 10 species in Plains Woodland, and 3 species in Plains Savannah. 0 Large Herbs: Aim for 5% cover with 3 species.	Aim for respective benchmark understorey diversity and cover.
			Grass Layer Strengthening	0 Medium to Small Tufted Graminoids: Achieve 30-35% cover with a minimum diversity of 8 species 0 Non-Tufted Graminoids (<1m): Establish 2-3% cover.	Solidify grass layer dominance across the site.
			Tree & Shrub Dominance	0 Immature Canopy Trees: Reach 4-5% cover of immature Bulokes 0 Maintain and support growth of shrubs to meet benchmark diversity and cover.	Establish sub-canopy and mid-storey structure
			Weed Control	0 Conduct spot treatments for any weed re-establishment in planting zones. 0 Focus on filling bare areas with native species to close gaps.	Minimize weed resurgence and stabilize native cover.
			Monitoring	0 Monitor success of restoration plantings and weed works against cover goals for management year 0 Conduct site check-ups on restoration plantings and implement controls such as watering or additional weed works to maximise survival as necessary	Monitor and act on weed reduction and planting success.
			Adaptive Management	0 Implement additional controls as necessary to ensure restoration plantings and weed works are on-track to meet targets	
9 & 10	80-100	Woody:<1 Annual: <25	Final Adjustments	Add indigenous species to fill any gaps to satisfy benchmark cover diversity.	Complete restoration planting to meet benchmark targets.

Year	Native Cover Goal (%)	Weed Cover Goal (%)	Action Category	Details	Target Outcome
			Mature Vegetation Monitoring:	0 Conduct detailed surveys to confirm site condition against benchmark diversity and cover targets for all life forms. 0 Address any shortfalls through targeted replanting.	Ensure sustainable ecosystem function with low weed presence.
			Ongoing Weed Suppression	0 Focus on maintaining weed cover at or below 25%. 0 Prevent re-invasion through consistent monitoring and prompt response to emerging weeds.	

The above restoration planting and weed control plan has been developed using the benchmark species diversity and percentage cover as listed under the EVC's Plains Woodland and Plains Savannah of the Wimmera Bioregion. The plan has been developed as a guide to maximise the successful establishment of understorey life forms combined with weed works using a progressive approach. It is recommended that this guide is followed and incorporated into the annual reporting of the offset sites to track management actions and performance over time to ensure outcomes are achieved.

