ecology & heritage partners

Final Report

Offset Management Plan: 'Terrinallum South', Darlington-Carranballac Road, Darlington, Victoria 833

Prepared for

Essendon Airport Pty Ltd

February 2015

Ecology and Heritage Partners Pty Ltd

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ACKNOWLEDGEMENTS

We thank the following people for their contribution to the project:

- Rory Kennedy (Essendon Airport Pty Ltd) for project information;
- Kate Calvert for information on the offset site.

DOCUMENT CONTROL

Assessment	Offset Management Plan
Address	833 Darlington-Carranballac Road, Darlington, Victoria
Project number	6677
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Mapping	Robyn Giles, Monique Elsley
File name	6677_EHP_Ess Airport_Darlington_Draft_OMP_09022015
Client	Essendon Airport Pty Ltd

Report versions	Comments	Comments updated by	Date submitted
Draft 1	-	-	09/02/15
Final	DoE, Kate Calvert	Marc Freestone	16/02/15
Final v2	DoE, Kate Calvert	Marc Freestone	25/02/15
Final v3	DoE, Kate Calvert, Rory Kennedy	Tom Schmidt	02/03/2015

accepts no liability for any damages or loss incurred as a result of reliance placed upon the report and its contents.

CONTENTS

1 TITLE OFFSET PLAN

Title information for the offset site is documented in Table 1.

Table 1. Title information for the offset site

Title Offset Plan	
Planning Permit Number (ID) / Work Authority No:	TBC
Proponent:	Essendon Airport Pty Ltd
Address:	Level 2, 7 English Street, Essendon Fields VIC 3041
Landowner and Permit (Work Authority) Holder Statement	
Permit (Work Authority) Holder	
Name:	Essendon Airport Pty Ltd
Landowner of Offset Site	
Name:	Tom and Kate Calvert
Responsible Authority Statement	
The native vegetation credits described in this plan provide an offset for the removal of native vegetation specified in this plan to the satisfaction of the Department of the Environment (Commonwealth).	
Name:	Department of the Environment
Responsible Authority Approval	
This Offset Plan has been approved and is endorsed by the responsible authority.	
Responsible Authority:	Department of the Environment

2 INTRODUCTION

2.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Essendon Airport Pty Ltd to develop an Offset Management Plan (OMP) for the Wirraway North Precinct development, Victoria (Figure 1).

The Wirraway North Precinct at Essendon Airport is proposed for commercial development. A flora and fauna assessment as well as targeted fauna surveys were conducted by a number of consultancies including Ecology and Heritage Partners Pty Ltd, Biosis Research Pty Ltd and Sinclair Knight Mertz Pty Ltd between 2007 and 2014 in order to document flora and fauna values and legislative implications of the proposed development (Ecology and Heritage Partners Pty Ltd 2014a; SKM Pty Ltd 2014, Biosis Research Pty Ltd 2012, Meinhardt Infrastructure and Environment Pty Ltd 2008, Biosis Research Pty Ltd 2007).

2.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

One ecological community (Natural Temperate Grassland of the Victorian Volcanic Plain) listed under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was recorded within the proposed development area (Ecology and Heritage Partners Pty Ltd 2014; SKM 2012). Based on the EPBC Act Significant Impact Guidelines (DEWHA 1999; 2009), the Project will have a significant impact on this ecological community.

An EPBC Act referral has been submitted for the proposed construction works. Essendon Airport Pty Ltd was advised by the Department of the Environment on 18 June 2014 that the proposed project is a controlled action requiring assessment and approval in accordance with the EPBC Act.

2.2 Objectives

The objective of the OMP is to document the clearing site and offset site details to meet EPBC Act requirements by securing, maintaining and improving remnant vegetation within the designated offset site.

Specifically, the objectives of the OMP are to:

- Review offset requirements based on vegetation clearance and the outcomes of the Planning Permit conditions;
- Review the previous habitat hectare assessment of the proposed offset site; and,
- Develop an OMP to compensate for the permitted loss of vegetation as part of the proposed development. This will include but not be limited to the following:
    - Means of calculating the offsets;
    - Location of the offset sites;
    - Type of offsets to be provided;
    - Details of management actions for remnant vegetation;
    - Investigate an appropriate 'security' arrangement, if applicable;

- Based on available information from the client, prepare a map of the offset sites;
- Develop a timetable of management actions, outcomes and progress reviews; and,
- Suggest appropriate monitoring and evaluation of management actions.

2.3 Report Structure

The structure and content of the OMP is organised in several parts:

- *Introduction* - This section summarises the background information relevant to the Project, including the purpose and scope of the work and the assessment methodology.
- *Part A: Offset Suitability* - This section assesses the suitability of the proposed offset site, and includes details regarding the approved clearing, gain calculations and the offset site. Part A should be read in conjunction with Part B, but due to its technical nature, the information it contains is not intended to be placed on title (e.g. covenant or Section 173 Agreement pursuant to the *Planning and Environment Act 1987*).
- *Part B: Offset Implementation* - This section describes how the offset is to be implemented. Part B includes details regarding landowner commitments, management activities monitoring and reporting. This section is intended for those responsible for implementing the plan, including future landowners. Information in this section is intended to be placed on title.

3 METHODS

3.1 Database and Literature Review

The Victorian Biodiversity Atlas (DSE 2011a; 2011b), the Flora Information System (Viridans 2012a) and the Victorian Fauna Database (Viridans 2012b) were reviewed to identify threatened flora and fauna species that have the potential to occur within 10 kilometres of the proposed offset site.

Information pertaining to matters protected under the EPBC Act including listed taxa, ecological communities and Ramsar wetlands, was obtained from the Department of Environment (DoE) Protected Matters Search Tool (DoE 2014).

Reports and documents detailing the ecological features of the study area as relevant to the OMP were reviewed, in particular:

- Ecology and Heritage Partners Pty Ltd 2014a. *Peer review of ecological advice for the Wirraway North Precinct and Hart Precinct, Essendon Airport, Essendon Fields, Victoria*. Report prepared for Essendon Fields Pty Ltd.
- Ecology and Heritage Partners Pty Ltd 2014b. *Offset Management Plan: 'Terrinallum South', 833 Darlington-Carranballac Road, Darlington, Victoria*. Report prepared for VicRoads (Western Highway Section).
- Sinclair Knight Mertz Pty Ltd 2014. *Essendon Fields Flora and Fauna Assessment – North East Section*. Report prepared for Essendon Fields Pty Ltd.
- Biosis Research Pty Ltd 2013. *Essendon Fields: Golden Sun Moth Survey*. Report prepared for Essendon Fields Pty Ltd.
- Brett Lane and Associates Pty Ltd 2013. *'Terrinallum South', 833 Pura Road, Darlington, Vic, 3271 Native Vegetation and Threatened Species Assessment.* Report prepared for Tom and Kate Calvert.
- Meinhardt Infrastructure and Environment Pty Ltd 2008. *Golden Sun Moth (Synemon plana) Survey Essendon Airport.* Report prepared for Essendon Airport Pty Ltd.
- Biosis Research Pty Ltd 2007. *Flora and Fauna Assessment of Essendon Airport, Victoria*. Report prepared for Essendon Airport Pty Ltd.

4 PART A - OFFSET SUITABILITY

4.1 Clearing Site Details

The clearing site details are provided in Table 2. A detailed description of ecological values within the study area is provided in the Impact Assessment Reports (SKM Pty Ltd 2014).

Table 2. Clearing Site Details

Clearing Site Details	
Landowner of clearing site	Essendon Airport Pty Ltd
Location and address of clearing site	Wirraway North Precinct, Essendon Airport
Local Government Area	Moonee Valley
Catchment Management Authority	Port Phillip and Westernport Catchment Management Authority
Responsible Authority	DoE
Applicant	Essendon Airport Pty Ltd
Referral no.	EPBC 2014/7213
Date approved	18 June 2014

4.1.1 Significant Species and Communities

A total of 50 plant taxa (16 indigenous, 34 exotic) were recorded within the study area (Ecology and Heritage Partners Pty Ltd 2014a; SKM Pty Ltd 2014). One nationally significant ecological community was identified, Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).

A total of eight fauna species (seven indigenous, one exotic) were recorded within the study area (Ecology and Heritage Partners Pty Ltd 2012). No nationally significant fauna species were recorded.

Based on the EPBC Act Significant Impact Guidelines (DEWHA 1999; 2009), the Project will have a significant impact on the NTGVVP ecological community.

4.2 Summary of Losses and offset targets

Losses associated with Matters of National Environmental Significance (NES) are summarised in Table 3. Offset targets were determined through discussions with the DoE and in accordance with the EPBC Act Offsets Policy (October 2012). All required offsets can be sourced within the proposed offset site.

Table 3. Losses associated with Matters of NES

Matter of NES	Losses	Offset Target
Natural Temperate Grassland of the Victorian Volcanic Plain	4.13 hectares	6.6 hectares

4.3 Environment Protection and Biodiversity Conservation Act 1999 Offsets Policy

Offset targets were determined through discussions with DoE and in accordance with the EPBC Act Offsets Policy (October 2012). The EPBC Act Offsets calculator (Excel spreadsheet) was used to determine appropriate offset targets to compensate for the loss of Matters of NES. The assumptions used to populate the calculator are presented below.

Natural Temperate Grassland of the Victorian Volcanic Plain

- *Clearing Location* = Wirraway North Precinct, Essendon Airport, Victoria
- *Offset Location* = 833 Darlington-Carranballac Road, Darlington, Victoria
- *Habitat to be removed* = 4.13 hectares.
- *Habitat quality* = 2/10 (Ecology and Heritage Partners site visit in 2014). The NTGVVP to be removed is a monoculture of Wallaby-grass, with high annual weed cover and very low indigenous flora diversity, and which has regrown following soil disturbance in the past.
- *Risk-related time horizon* = 20 years. The land will be managed in perpetuity for conservation purposes for NTGVVP.
- *Time until ecological benefit* = 10 years. Native vegetation is expected to improve in extent, species diversity and density within 2 years through applied weed and biomass control regimes.
- *Start area and quality* = 6.6 hectares and 5/10. The offset site supports native grassland habitat of moderate quality. Cover of indigenous grass and herb species is high, however, the diversity of species is low and the opportunity for further recruitment of indigenous species is also low.
- *Risk of loss without offset* = 20%. Without protection as an offset site there is uncertainty regarding the future use of the land. Most likely the property would continue to be managed under the current regime, however there remains potential that the property will be cropped or grazing intensity will be increased, as is the case with surrounding properties.
- *Future quality without offset* = 5/10. Assumes management proceeds in accordance with the current regime and quality remains at 5/10.
- *Risk of loss with offset* = 5%. The land will be managed in perpetuity for conservation purposes for NTGVVP.
- *Future quality with offset* = 8/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a vegetation management plan incorporating weed control and regular monitoring, aiming to maintain and enhance native biodiversity.
- *Confidence in result* = 80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing habitats and landscape context.

5 DESCRIPTION OF THE OFFSET SITE

The study area supports one broad vegetation and habitat type: native grassland. Vegetation condition and habitat quality are discussed in further detail below.

5.1 Vegetation Condition

Vegetation within the study area is dominated by grassland, located throughout the property along with several other vegetation types. Based on field assessments, grassland within the study area is consistent with the Plains Grassland EVC. This is broadly consistent with extant DELWP mapping which shows these areas are dominated by Plains Grassland (EVC 175) and Plains Grassy Wetland (EVC 125) (DEPI 2014b).

Plains Grassland is described as treeless vegetation mostly less than one metre tall dominated by largely graminoid and herb life forms (DEPI 2014a).

Remnant vegetation within the study area consisted of high quality grassland dominated by indigenous grass species including Kangaroo Grass *Themeda triandra*, Wallaby Grasses *Rytidosperma* spp. and Common Tussock-grass *Poa labillardierei*. Due to the sub-optimal timing of the survey, a low diversity of herb species was observed (Sheep's Burr *Acaena echinata*, Blue Devil *Eryngium ovinum*, Varied Raspwort *Haloragis heterophylla*, Lemon Beauty-heads *Calocephalus citreus*, and Pink Bindweed *Convolvulus angustissimus* subsp. *angustissimus)*. A higher diversity of herbs may be observed during spring as indicated by Brett Lane and Associates Pty Ltd (2013).

The site is currently rotationally grazed by sheep at a low rate. Paddocks are secured through well maintained and planned internal fences to control stock access throughout the property. Weed infestations were scattered but often found in areas where sheep are likely to congregate e.g. tanks, troughs etc. These areas were typically dominated by the noxious weeds Horehound *Marrubium vulgare* and Spear Thistle *Cirsium vulgare* as well as other exotic grass and herb species. Grassy pasture species including Toowoomba Canary-grass *Phalaris aquatica*, Cocksfoot *Dactylis glomerata*, Perennial Rye-grass *Lolium perenne*, and Squirrel-tail Fescue *Vulpia bromoides* were found throughout the site in varying densities and distributions. Typically the areas of Plains Grassland included in this offset plan had a relatively low weed cover (<25%) (Figure 2).

5.1.1 Natural Temperate Grassland of the Victorian Volcanic Plain

One nationally listed vegetation community, NTGVVP listed as critically endangered under the EPBC Act, was recorded within the study area. The NTGVVP ecological community is also listed as Western (Basalt) Plains Grasslands Community under the *Flora and Fauna Guarantee Act 1988* (FFG Act), and has been mapped as Plains Grassland (Figure 2).

The key diagnostic criteria and condition thresholds present within the study area, as outlined in Policy Statement 3.8 (EPBC Act Policy Statement 3.8 2008) for NTGVVP include:

- At least one of the following grass genera is the dominant native species in the ground layer: Themeda (Kangaroo-grass), Austrodanthonia (Wallaby-grass), Austrostipa (Spear-grass) and/or Poa (Tussock-grass).

- For a native vegetation remnant >1 hectare in size, the minimum contiguous size of the grassland patch is 0.5 hectare.
- The total perennial tussock cover represented by the native grass genera Themeda, Austrodanthonia, Austrostipa or Poa is at least 50%.

Remnant Plains Grassland (Habitat Zones 1, 2, 3, 4, 5, 6, 7, 8 and 10) meets the condition thresholds outlined above and is considered to be representative of the NTGVVP vegetation community (Figure 2). Remnant vegetation within Habitat Zones 9 and 11 do not meet the condition thresholds and are not considered to correspond with this ecological community.

5.2 Fauna Habitat

Native grassland within the offset site provides moderate to high quality habitat for native fauna. These areas are likely to be utilised by birds adapted to open areas and large macropods including Australian Magpie *Gymnorhina tibicen*, Magpie-lark *Grallina cyanoleuca* and Eastern Grey Kangaroo *Macropus giganteus*. Nocturnal and diurnal raptors are likely to forage over these areas, with Black-shouldered Kites *Elanus axillaris* observed during the site assessment, hovering over grassland areas. Areas of native grassland, particularly those with a high cover of wallaby-grasses *Rytidosperma* spp. provide known and likely habitat for the nationally significant Golden Sun Moth. Areas identified as Stony Knoll Shrubland (Figure 2) support cracking soils as well as surface and embedded rock, which may provide sheltering habitat for reptiles and small mammals including the nationally significant Striped Legless Lizard *Delma impar* and the regionally significant Fat-tailed Dunnart *Sminthopsis crassicaudata*.

Previous surveys identified numerous significant fauna species across the entire property, listed in Table 4 (Damien Cook, Australian Ecosystems in Brett Lane and Associates Pty Ltd 2013; Enics Solutions 2012). Of these species, Brolga *Grus rubicunda* and Golden Sun Moth *Synemon plana* are likely to occur within the offset site.

Table 4. Significant fauna identified during previous surveys

Species	DEPI Advisory List	FFG Act	EPBC Act	Recorded by
Australian Shoveler *Anas rhynchotis*	Vu	-	-	1
Whiskered Tern *Chlidonias hybridus*	NT	-	-	1
Spotted Harrier *Circus assimilis*	NT	-	-	1
Brown Quail *Coturnix ypsilophora*	NT	-	-	1
Latham's Snipe *Gallinago hardwickii*	NT	-	-	1
*Brolga *Grus rubicunda*	Vu	L	-	1
Growling Grass Frog *Litoria raniformis*	En	L	Vu	1
Caspian Tern *Hydroprogne caspia*	NT	L	-	1
*Golden Sun Moth *Synemon plana*	Cr	L	Cr	2
Corangamite Water Skink *Eulamprus tympanum marnieae*	En	L	Cr	3

Notes: 1 = Damien Cook, Australian Ecosystems *in* Brett Lane and Associates Pty Ltd 2013; 2 = Enics Solutions 2012; 3 = identified by landowner *in* Brett Lane and Associates Pty Ltd 2013. Cr = Critically Endangered; En = Endangered; Vu = Vulnerable; NT = Near Threatened; L = Listed. * = Suitable habitat within the offset site.

An ecological assessment undertaken by Brett Lane and Associates Pty Ltd (2013) identified suitable habitat for numerous additional fauna species which have potential to occur across the entire property. These species include Black Falcon *Falco subniger*, Curlew Sandpiper *Calidris ferruginea*, Eastern Great Egret *Ardea modesta*, Emu *Dromaius novaehollandiae*, Fat-tailed Dunnart *Sminthopsis crass*icaudata, Fork-tailed Swift *Apus pacificus*, Gull-billed Tern *Gelochelidon nilotica*, Rainbow Bee-eater *Merops ornatus*, Red-necked Stint *Calidris ruficollis*, Royal Spoonbill *Platalea regia*, Striped Legless Lizard *Delma impar*, Tussock Skink *Pseudemoia pagenstecheri*, White-throated Needletail *Hirundapus caudacutus* and White-bellied Sea-Eagle *Haliaeetus leucogaster*. Of these species, there is suitable habitat within the offset site for Striped Legless Lizard, Fat-tailed Dunnart and Tussock Skink. Golden Sun Moth has been identified within the Darlington property during previous assessments (Enics Solutions 2012, Plume Ecology Pty Ltd - In Prep 2015). Based on habitat present within the study area, landscape context and the extent of a known population, Golden Sun Moth is considered highly likely to occur throughout the study area where suitable habitat is present. Suitable habitat includes all areas identified as Plains Grassland and Stony Knoll Shrubland, comprising 100 hectares within the offset site (Figure 2).

6 PART B – OFFSET IMPLEMENTATION

This section presents the actions required to implement the OMP. The plan details methods for the management and conservation of native vegetation at the offset site over the requisite ten year management period and in perpetuity.

It is anticipated that the offset management works will begin prior to the clearing of native vegetation associated with the proposed development. It is envisaged that the majority of the works would be conducted by the landholder or a suitably qualified and experienced contractor nominated by the landholder.

The plan aims to achieve vegetation gains through on-ground actions and therefore is required to be simple and practical. However, the management actions must be measurable against the commitments made to the Department of Environment.

6.1 Details of Offset Site

Table 5 provides details of the offset site.

Table 5. Offset Site Details

Offset Site Details	
Landowner of offset site	Tom and Kate Calvert
Type of offset (onsite, 3rd party)	3rd Party
Location and address of offset site	833 Carranballac–Darlington Road, Darlington 3271
Area of offset site (ha)	6.6 hectares in total
Offset site number (if applicable)	N/A
Volume	8434
Folio	127
Parish	Jellalabad
Allotment	17a and 17b
Local Government Area	Moyne Shire Council
Responsible Authority	DoE
Bioregion	Victorian Volcanic Plain

6.2 Strategy for Offset Site

The offset site is to be secured and managed for conservation purposes in perpetuity. The management strategy for the proposed offset site consists of implementing a vegetation management plan incorporating weed control and regular monitoring. Details of security and management responsibility are shown in Table 6.

Table 6. Security and Management Responsibility

Offset Security and Management Responsibility	
Who is liable/responsible for meeting offset requirements?	Essendon Airport Pty Ltd
Type of security i.e. Planning Permit Condition, Section 69 of the *Conservation, Forest and Lands Act 1987 (Vic),* Section 173 of the *Planning and Environment Act 1987 (Vic)* Covenant under the *Victorian Conservation Trust Act 1972 (Vic)*	Section 173 of the *Planning and Environment Act 1987 (Vic)*
Agreement or Planning Permit Number (ID)	TBC
Date 10-year offset management to commence	TBC
Date 10-year offset management expires	TBC
Registered on title? (Yes/No)	Yes
Offset site management responsibility (i.e. Landowner, Authority Name)	Landowner
Offset Monitoring Responsibility (i.e. Responsible Authority, DELWP)	DoE

6.3 Adaptive Management

This Plan provides actions for a period of 10 years. The timing of actions and whether they occur is based on adaptive management. By monitoring the outcomes of actions, management may be adapted to ensure the stated commitments in the Plan are upheld. For example, new techniques for controlling high threat weeds may become available, or further information on the ecology and status of the vegetation communities may necessitate adjustment to management actions. The western districts of Victoria are known to be highly seasonal and conditions can vary greatly from year to year. This seasonality is acknowledged in this offset plan by allowing for flexibility around timing of actions at the discretion of the land manager.

6.4 Corrective Actions

As part of the adaptive management approach in the Plan, corrective actions may need to be undertaken in response to risks that emerge during the implementation of the Plan. The following details examples of scenarios and possible corrective actions:

6.4.1 Access control

Scenario:

During installation of perimeter fencing around the offset site, a population of a threatened plant species is discovered growing in the planned fence alignment.

Corrective action:

Modify the alignment of the fence to avoid impacts to the threatened plant by offsetting the fence line to keep the area of the offset the same. For example, if the fence line runs east-west, extend the fence north of

the plant population for 10 metres, then south for 20 metres then north for 10 metres back to the original alignment of the fence (Plate 1).

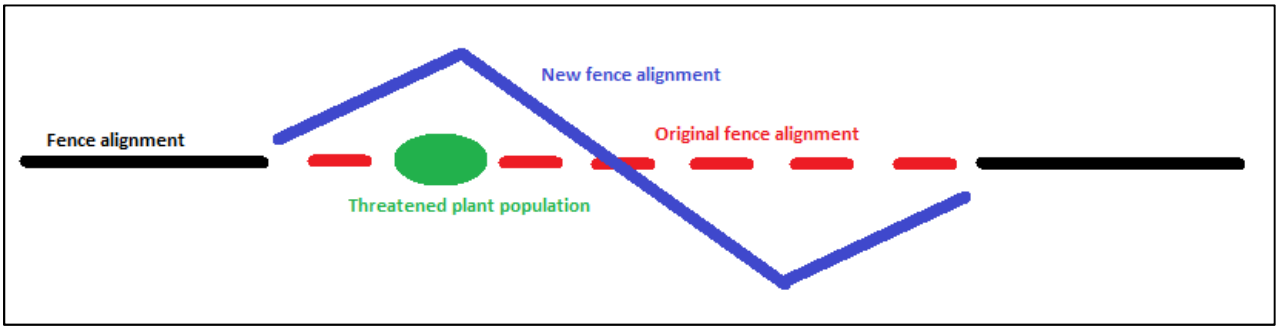

Plate 1. Example of fence realignment to avoid impacts to a threatened plant population.

6.4.2 Grazing and fire management

Scenario:

An infestation of annual weeds breaks out and threatens to spread.

Corrective action:

A small controlled burn or pulse grazing (restricted to the area of the annual weed infestation) in early spring before the weed sets seed will destroy the population of the annual weed. Burning or pulse-grazing in early spring should be undertaken over the minimum extent necessary for weed control and should not impact a threatened species population.

Scenario:

Unseasonably dry or wet conditions cause lower or higher than average growth of dominant native grasses.

Corrective action:

Stocking rates used in rotational grazing for biomass control will be adjusted in accordance with rainfall conditions to maintain a minimum of 70% native vegetation cover across the offset site and to avoid rank biomass developing, which out-competes herbaceous species.

6.4.3 Weed and pest control

Scenario:

Weed spraying impacted detrimentally on the NTGVVP present at the offset site.

Corrective action:

Modify weed control techniques to avoid any further impacts. Collect seed of colonising native grass species (e.g. Wallaby Grasses or Windmill Grass *Chloris truncata*) from the remainder of the property to direct sow into areas affected by weed control to prevent colonisation of bare ground patches by weeds. Continue

control of emerging weeds in affected areas with modified techniques that avoid further detrimental impacts.

6.4.4 Threatened species management

Scenario:

A new population of a threatened flora species is found within the offset area and appears to be suffering from grazing.

Corrective action:

The management actions would be modified around the location of the threatened flora species, which could include fencing the population off a small paddock to enable greater control of stock access to the population.

6.5 On-going Land Use Commitments

This section presents the actions required to implement the management strategy for remnant grassland within the offset site. The site is to be secured and managed for conservation purposes in perpetuity. Management actions described below are to be implemented for a period of 10 years. The landowners will continue to manage the offset site after the completion of year 10 as specified in this plan, such that:

- weed cover is managed in perpetuity to ensure it does not increase beyond the level attained at year 10 of management; and,
- pest animals are controlled in perpetuity to the level attained at year 10 of the management.

Any proposed uses or development of the site which conflict with the landowners commitments are not permitted under this plan.

6.6 Management Objectives

The offset site will be managed for the purposes of conservation. Management of these sites will involve physical protection of the proposed offset site, management of woody and noxious weeds, the control of pest animals, biomass reduction and general maintenance of the character and quality of the native vegetation, consistent with its occurrence in an area of remnant grassland. Where appropriate, the offset management plan and specified management actions should form part of a broader strategy for long-term management of ecological values within contiguous land.

6.6.1 Security Arrangements

The offset site will have on-title legal agreements put in place (conservation covenant [*Victorian Conservation Trust Act 1972*], Section 173 [*Planning and Environment Act 1987*] or a Section 69 [*Conservation, Forests and Lands Act 1987*] in accordance with the relevant Responsible Authority) to ensure it is secured and managed appropriately in perpetuity. The boundary of the offset site will be surveyed and included in the on-title agreement.

6.6.2 Access Control

Without active management and appropriate fencing, unrestricted access into the offset site may result in loss of native vegetation cover, soil disturbance and compaction, and weed facilitation. The perimeter of the property is currently enclosed by permanent post-and-wire fencing, with well-maintained and planned internal fences to control stock access throughout the property. The site is currently rotationally grazed by sheep at a low rate.

Access control will proceed in accordance with the following:

- Maintain permanent fences surrounding the offset site. Any new perimeter fencing should be vermin proof and constructed with minimal impact to the offset site (i.e. no stock piling of fencing materials or soil during construction);
- Time controlled grazing can continue within the offset site using appropriate fencing for stock control constructed with minimal impact to the offset site; and,
- Fence condition will be monitored on an annual basis with any gaps or holes repaired in a timely manner.

Key Performance Targets

The following key performance target has been provided to measure the success of the access control:

- Permanent stock-proof fence prevents all unauthorised access to the offset site.

6.6.3 Pest Control

6.6.3.1 Weed Control

The control of weed species is a key management action within the offset area and is critical to achieving a gain in native vegetation condition. Effective weed control should promote the regeneration of existing populations of indigenous species and encourage recruitment from soil stored seed. Care should therefore be taken to ensure this ultimate objective is not compromised by excessive treatment. Weed control work may be carried out by the landholder or a suitably qualified contractor.

Whilst all weeds should be treated, emphasis is placed on priority weeds within the offset site. Priority weeds include woody weeds and all noxious weeds listed under the *Catchment and Land Protection Act 1994* (CaLP). High priority weeds that require immediate attention within the offset site and surrounds are also listed in Table 7. The control of priority weeds is a key management action within the offset site and must be adequately addressed if Net Gain is to be achieved.

The following key management actions will be undertaken to ensure success of the weed management program:

- Eliminate woody weeds (cover reduced to <1%) within all habitat zones (Table 8);
- Identify new infestations of weed species and implement control as appropriate;
- Control all other weeds within all habitat zones (cover maintained at current level) (Table 8).

The following guidelines should be taken as general management principles in regards to weed control:

- Weed control methodology for managing graminoid and herbaceous weeds will consist of manual removal and/or spot spraying weeds with an appropriate herbicide. Care should be taken when spraying herbicide to ensure that the poison does not affect native vegetation in the local application area. Weed species should be treated before seed is set, which may involve localised slashing if spot-spraying proves ineffective. A dye should be used in the spray to mark where the spraying has occurred;
- Selective herbicide application is preferable to broad area application but clearly the loss of non-target species needs to be balanced with the threat of incomplete control of the existing weed population;
- Any weed control should be done in a manner that minimises soil disturbance;
- Where herbicide application is employed, waterway sensitive products and non-residual herbicides are to be employed;
- Pest plants that reproduce sexually (by seed) are best controlled before seed set. If herbicide application is proposed after seed set, slashing should be undertaken to ensure seed does not reach maturity;
- To reduce the amounts of herbicide used, the target biomass should be reduced (e.g. slashed or recently grazed) before application so the herbicide can also be absorbed by the actively regrowing plants. Herbicides are only effective when plants are actively growing; and,
- Weed control works should be monitored regularly to assess their effectiveness, perform follow up works and evaluate the feasibility of management objectives.

Table 7. High priority weeds to be controlled

Common Name		Scientific Name	Control Method	Timing	Current Cover	Threat Level	Goal
Herbaceous Weeds							
Thistles*		*Cirsium spp.*	SS, CH	SS – Winter-Spring, CH - All Year	1%	High	Maintain (current level)
Horehound*		*Marrubium vulgare*	SS, CH	SS – Winter-Spring, CH - All Year	1%	High	Maintain (current level)
Ox-tongue		*Helminthotheca echioides*	SS, CH	Winter-Spring	1%	Medium	Maintain (current level)
Grassy Weeds							
Annual Grasses	Fescue	*Vulpia spp.*	F, SS	Mid-winter to late spring	10%	Medium	Maintain
	Wild Oats	*Avena spp*	F, SS	Mid-winter to late spring	10%	Medium	Maintain
Perennial Grasses	Ryegrass	*Lolium* spp.	MR, SS, F	SS – Winter-Spring, M, MR - All year	10%	Medium	Maintain
	Cocksfoot	*Dactylis glomerata*	MR, SS, F	SS – Winter-Spring, M, MR - All year	10%	Medium	Maintain
	Phalaris	*Phalaris aquatica*	MR, SS, F	SS – Winter-Spring, M, MR - All year	10%	Medium	Maintain

Notes: SS = Spot-spray; F = Frequent Grazing/Mowing; MR = Manual removal; CH = Chip Out or Hand Pull. Weed Status: * = Declared Noxious Weed (DPI 2008)

Key Performance Targets

The following key performance targets have been provided to measure the success of the weed management program:

- Reduce woody weed cover to <1%; and,
- Maintain all other weed cover at current levels.

6.6.3.2 Pest Animal Control

The Catchment and Land Protection Act 1994 lists rabbits and foxes as established pest animals and requires that all landowners take reasonable steps to prevent the spread of, and as far as possible eradicate, established pest animals on their land.

Whilst rabbit activity is currently low within the offset site, they should be monitored and controlled throughout the year. Foxes are a threat to native fauna and should be controlled if found on your property. Fox dens where present are required to be destroyed through fumigation and hand collapse. Continue to monitor and control rabbits and foxes all year round as well as any new and emerging pest animals.

All vermin harbour (i.e. burrows) should be removed, without disturbance to native vegetation or significant soil disturbance. The landowner/contractor is to monitor pest animal use of the offset site whilst undertaking vegetation management works. Any changes in the influences of pest animals may require a change in the management actions.

The following key management actions should be undertaken to ensure success of the pest animal program:

- Monitor the population of pest animals (namely rabbits and foxes) during targeted night transect surveys and weed control works;
- Identify potential harbour and burrows, and destroy if soil disturbance can be minimised and all native vegetation retained; and,
- Adapt management as considered appropriate (i.e. if an increase in pest animal activity is observed then a targeted pest animal control program should be implemented). If necessary, undertake a pest animal control program, which may include shooting, baiting, fumigation and warren destruction.

Key Performance Targets

The following key performance targets have been provided to measure the success of the pest animal management:

- No increase in pest animal activity from approval of this plan; and,
- Minimal soil disturbance and no native vegetation loss from pest animal management activities.

6.6.4 Biomass Control

The current biomass reduction method applied throughout the site consists of low-intensity rotational grazing by sheep. This grazing regime is considered appropriate as a method for managing biomass within the offset site on the provision that total vegetation cover remains to be at least 70%. It is also important to minimise stock 'camping' during grazing periods and allow adequate 'rest' between grazing periods.

Alternatively, low intensity mosaic burns can be used to maintain biomass levels as well as aid in the recruitment of indigenous species. Given the presence of suitable habitat for Golden Sun Moth, these activities should be conducted outside of the normal activity period (from November to January) for the species (e.g. employing cool autumn burns). Biomass reduction via ecological burning will be implemented on an as-needed basis, with consideration of the success of stock grazing and based on recommendations presented in vegetation monitoring reports (see Section 6.7).

Key Performance Targets

The following key performance target has been provided to measure the success of the biomass control:

- Biomass is managed and maintained at current levels.

6.6.5 Supplementary Planting

It is anticipated that natural regeneration of remnant native vegetation and implementation of weed control measures are likely to improve the overall cover and diversity of indigenous flora within the offset site. As such, direct seeding and supplementary planting is not essential at this stage of proceeding and has not been included as a required management action as part of this plan.

6.6.6 Threatened Species

There is suitable habitat throughout the property, including within the proposed offset site, for several significant flora and fauna species (Section 5.2). Management actions should be undertaken to ensure that; firstly these species are protected, and; secondly recruitment or expansion of the species is encouraged. Ongoing management activities need to be aware of any significant species that may persist on the site. All workers involved in the control of pest plants and animals must be able to identify the significant plant and animal species present within the study area.

Key Performance Targets

- All populations of threatened flora and fauna species are maintained or improved within the offset site through the habitat management actions detailed in this plan.

6.7 Monitoring and Reporting

Monitoring of native vegetation must be undertaken by a suitably qualified ecologist to ensure key performance targets are met and the responsible authorities notified of the successes and failures of works through regular progress reports. Progress reports will be provided to the responsible authority at the end of year 2, 5 and 10 of the program as this is considered to provide adequate time for management actions to have a noticeable effect on improving the quality of the grassland vegetation (Table 8). More frequent progress reports are not considered necessary as the landowner has considerable experience in managing NTGVVP under DoE-approved Offset Management Plans in the remainder of the property. In addition to these progress reports, the landowner will complete annual landowner monitoring and reporting detailing compliance with the OMP (i.e. what management actions have been undertaken) (Section 6.7.2.1).

6.7.1 Monitoring

6.7.1.1 Native vegetation

Monitoring is required to assess the positive and negative impacts of management actions on the integrity of the offset site, and to implement change if required. Vegetation monitoring will be conducted in years 2, 5 and 10, with progress reports provided to the responsible authority at the end of these years.

This monitoring will be undertaken by a suitably qualified ecologist, with some input from the landowners. However, the frequency of monitoring may need to vary to allow for seasonal variations and to target periods of active weed growth. Similarly, pest animal monitoring should be undertaken at a time of year when these animals are most active so that an accurate assessment of population sizes can be made.

It is recommended that monitoring be undertaken by a qualified ecological consultant familiar with the methodology for assessing the quality of vegetation as well as any offset and EPBC Act referral requirements. This plan provides the baseline data to be used as a reference point to assess the impacts of the management actions.

Monitoring and progress reports should include the following:

- Overall condition and composition of vegetation as well as consideration of measurable vegetation quality outcomes i.e. habitat hectare assessment;

- Biomass levels;
- The extent, severity, trend and presence of current weed species and any new and emerging weed species; and,
- Implementation of permanent photo points. Photographs must be taken at the same location and during the same time of each year. Photo points will allow monitoring of weed populations and maintenance of the current condition of native vegetation within the offset site. Details of photo points and photographs will be provided to DoE where required as evidence of progress.

6.7.1.2 Other Monitoring

Information relating to fencing, weed control and pest animal control will be provided by landowners and the relevant contractors, with a landowner monitoring form completed on an annual basis (see below). This information will be included in the progress report, discussed below.

6.7.2 Reporting

Progress reports will be provided to the responsible authority at the end of year 2, 5 and 10 of the program. Information to be provided in the progress report includes:

- A copy of the Management Actions Table (Table 8) detailing actions completed during the reporting period;
- Landowner monitoring and reporting forms;
- A description of the specific monitoring results from ecological surveys undertaken;
- Results of weed and pest animal control work;
- Successful management tools (i.e. techniques used to control weed species, monitoring technique, etc.);
- Any problems or issues experienced (i.e. new infestation of weed species, etc.);
- Any corrective actions and contingency measures where monitoring indicates that there has been a deterioration in the native vegetation; and,
- Photographs showing evidence of works.

In order to meet EPBC Act referral conditions, all records/evidence of management actions must be maintained, and be submitted to DoE upon request, and any proposed management changes must be submitted to DoE prior to the changes being undertaken.

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the landowner is to document the justification and the actions that will be undertaken to implement the requirement.

6.7.2.1 Landowner Monitoring and Reporting Form

Information relating to fencing, weed control and pest animal control will be provided by landowners and the relevant contractors, with a landowner monitoring form completed on an annual basis (see below) and

also submitted with the progress reports at the end of year 2, 5 and 10 of the program. The template for a landowner monitoring and reporting form is shown in Table 9.

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the responsible party must explain the reasons why and what program of action/s will be undertaken to implement the action. If no action has been undertaken please explain the reason(s) and how the targets specified will be met.

6.8 Management Actions Table

Management actions are summarised in Table 8. The actions constitute the minimum management requirements for the offset site over the mandatory 10 year management period.

Table 8. Management Actions Table

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
0	0.1	Implement on-title legal agreements for offset site	Liaise between the landowner, DELWP and DoE.	Within three months of this plan being approved by DoE	Section 6.6	
1	1.1	Check and maintain permanent fences surrounding the offset site, as required	Landowner	Within three months of this plan being approved by DoE	Section 6.6.2	
1	1.2	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
1	1.3	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
1	1.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan. if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
1	1.6	Complete landowner monitoring form and submit to Essendon Airport Pty Ltd	Landowner	During Autumn each year	Section 7.6.2.1	
2	2.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
2	2.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
2	2.3	Conduct monitoring of vegetation	Suitably qualified ecological specialist/ landowner	Two years after commencement of OMP	Section 6.7.1	
2	2.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
2	2.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
2	2.6	Complete landowner monitoring form and submit progress report to Essendon Airport Pty Ltd	Landowner	Two years after commencement of OMP	Section 6.7	
3	3.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
3	3.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
3	3.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
3	3.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
3	3.6	Complete landowner monitoring form and submit to Essendon Airport Pty Ltd	Landowner	During Autumn each year	Section 7.6.2.1	
4	4.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
4	4.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
4	4.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
4	4.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
4	4.6	Complete landowner monitoring form and submit to Essendon Airport Pty Ltd	Landowner	During Autumn each year	Section 7.6.2.1	
5	5.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
5	5.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
5	5.3	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
5	5.4	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
5	5.5	Monitor and assess works	Suitably qualified ecological specialist/landowner	Five years after commencement of OMP	Section 6.7	
5	5.6	Complete landowner monitoring form and	Landowner	Five years after commencement of	Section 6.7	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
		submit progress report to Essendon Airport Pty Ltd		OMP		
6	6.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
6	6.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
6	6.3	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
6	6.4	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
6	6.5	Complete landowner monitoring form and submit to Essendon Airport Pty Ltd	Landowner	During Autumn each year	Section 7.6.2.1	
7	7.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
7	7.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
7	7.3	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
7	7.4	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
7	7.5	Complete landowner monitoring form and submit to Essendon Airport Pty Ltd	Landowner	During Autumn each year	Section 7.6.2.1	
8	8.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
8	8.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
8	8.3	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
8	8.4	Monitor biomass density and implement stock grazing regime or develop ecological	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
		burn/ fuel reduction plan if appropriate				
8	8.5	Complete landowner monitoring form and submit to Essendon Airport Pty Ltd	Landowner	During Autumn each year	Section 7.6.2.1	
9	9.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
9	9.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
9	9.3	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
9	9.4	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
9	9.5	Complete landowner monitoring form and submit to Essendon Airport Pty Ltd	Landowner	During Autumn each year	Section 7.6.2.1	
10	10.1	Conduct weed control	Landowner and/or competent Contractor	Refer to Table 7	Section 6.6.3 .1	
10	10.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 6.6.3 .2	
10	10.3	Maintain fences	Landowner/Fencing Contractor	As required	Section 6.6.2	
10	10.4	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/ competent Contractor/CFA	Summer/Autumn	Section 7.4.3	
10	10.5	Complete landowner monitoring form and submit progress report to Essendon Airport Pty Ltd	Landowner	Ten years after commencement of OMP	Section 6.7	
10	10.6	Monitor and assess works, and prepare final report	Suitably qualified ecological specialist/landowner	Ten years after commencement of OMP	Section 6.7	

Table 9. Landowner Monitoring and Reporting Form

Landowner of offset site		
Location and address of offset site		
Offset site number (if applicable)		
Offset plan reference number (if applicable)		
Responsible Authority		
Report # (Year since commencement)		
Actions completed within the offset site during the management year	**Date and details of action**	**Key performance target met (Y/N)**
Signature		
Date		

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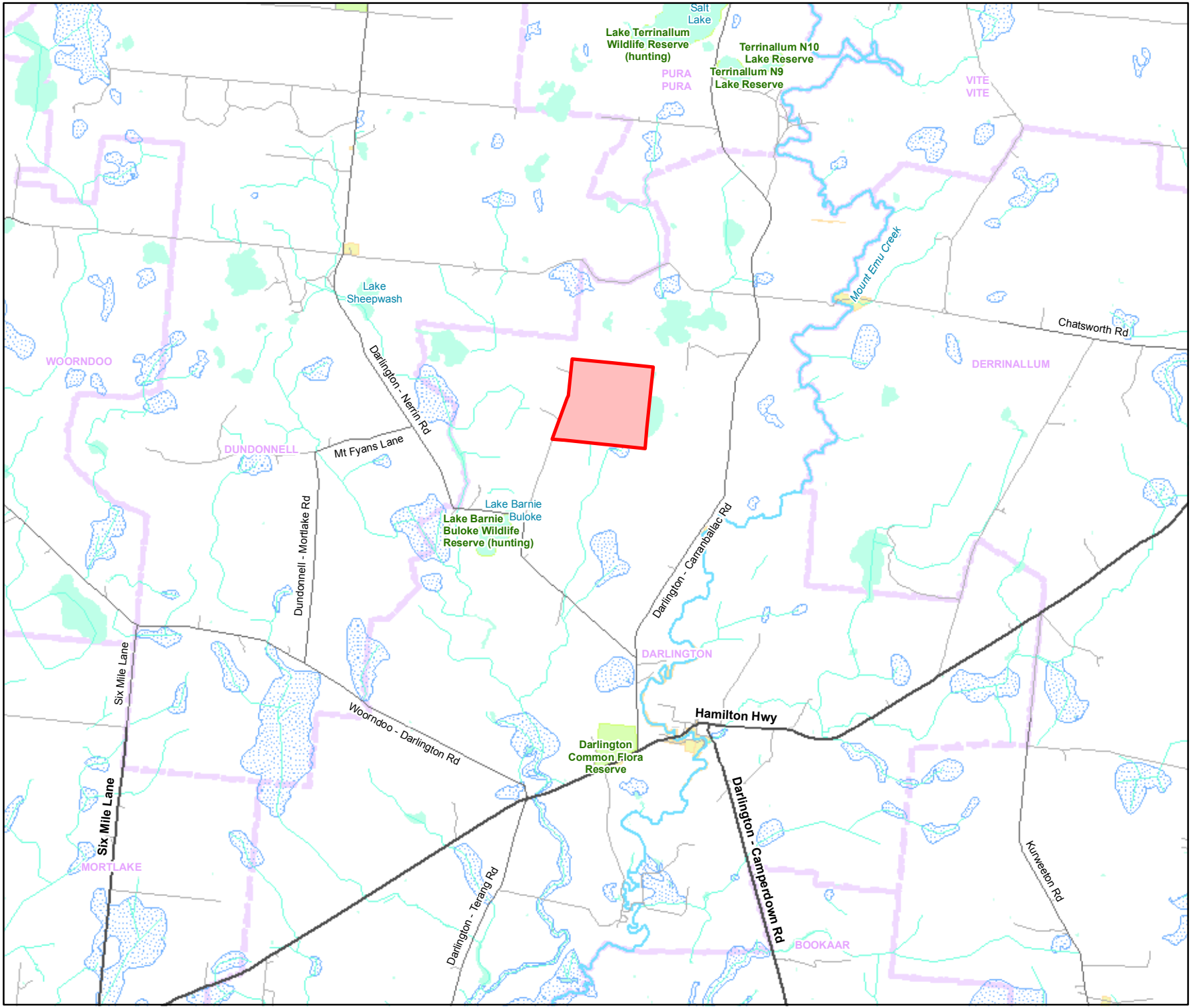
FIGURES



Legend

- Study Area
- Major Road
- Collector Road
- Minor Road
- Minor Watercourse
- Major Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Parks and Reserves
- Crown Land
- Localities

Figure 1

Location of the study area

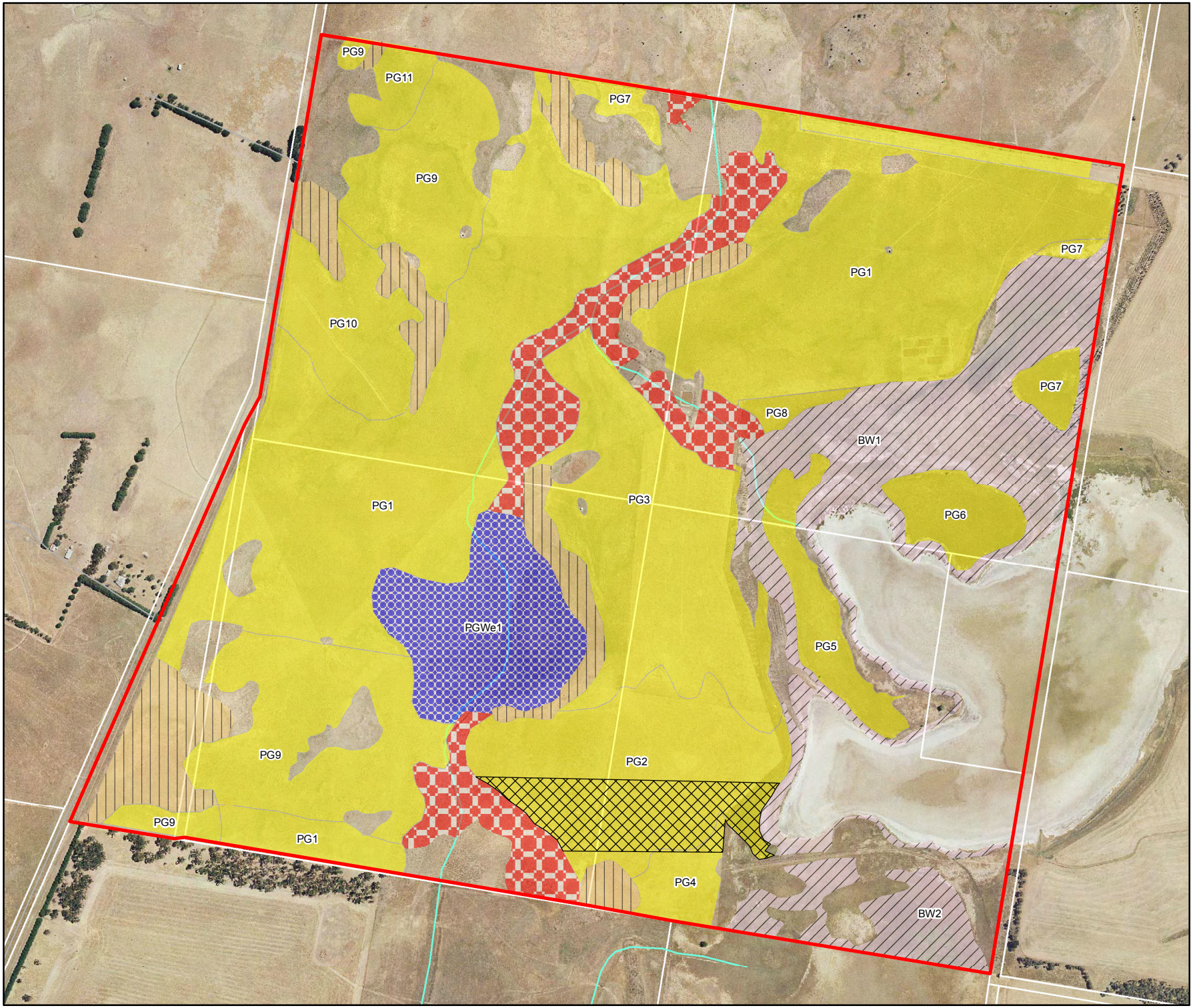
Terrinallum South, Darlington

N

0 1 2

Kilometres

ecology & heritage partners



Legend

Study Area

Proposed Offset

NTGVVP (6.6 Ha)

Vegetation

- Creekline Tussock Grassland
- Plains Grassland
- Plains Grassy Wetland
- Stony Knoll Shrubland
- Brackish Wetland

Figure 2

Ecological features in the study area and proposed offset site

Terrinallum South, Darlington

N

0 125 250

Metres

ecology & heritage partners

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