60 HARVEST HOME ROAD, WOLLERT

OFFSET PLAN

Asset 1 (Wollert) Pty. Ltd.

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APPENDICES

1. INTRODUCTION

Asset 1 (Wollert) Pty. Ltd. engaged Brett Lane & Associates (BL&A) to produce an Offset Plan with vegetation gain calculations to account for the planned clearing of native vegetation at 60 Harvest Home Road, Wollert (Lot: 2 LP: 83366). The vegetation is to be cleared for residential development. The property currently supports one remnant patch (0.99 hectares in area) of degraded Plains Grassy Woodland and 17 scattered River Red-gums within the Victorian Volcanic Plain bioregion.

The property was previously assessed by BL&A, including the following investigations:

- Initial native vegetation and tree assessment - mid July 2009 (BL&A 2009).
- Updated flora and fauna assessment, including a targeted survey for Matted Flax-lily - 20th January 2010 (BL&A 2011).

Whittlesea Planning Permit Number 712628 was issued for the project based on the above assessments. Conditions 3, 12 and 14 of the permit require an Offset Management Plan (stating how offsets for vegetation removal will be achieved) to be prepared prior to vegetation removal. Condition 11 of the permit requires a Site Management Plan to be prepared for an area of native vegetation being retained for conservation purposes (being the same area to be set aside for on-site native vegetation offsets). Conditions 13 and 15 require the Conservation Significance of native vegetation to be elevated if Golden Sun Moth (GSM) is recorded at the removal site. Targeted surveys for GSM were undertaken and GSM was recorded. Conservation significance at the removal site has therefore been elevated accordingly, with onsite and offsite offsets meeting the required Net Gain targets. This Offset Plan addresses each of these conditions. Note that the permit was issued before the December 2013 changes to the state native vegetation permitted removal provisions in the State Planning Policy framework of all planning schemes. Therefore, the offset targets and the requirement have been met consistent with the controls operating at the time of the permit being issued, as agreed with the City of Whittlesea.

Parts of the property proposed for first-party offsets were revisited on 16th June 2014 to obtain current information on the significant threats to the areas covered by this Plan and to inform the choice of management strategy and actions.

A brief overview of the area proposed for clearing is provided in this report including quantified vegetation loss and legal obligations to offset that loss. This report also details the extent, condition and gain available within the proposed first-party offsets at the removal site. Third-party offsets to address the remaining offset deficit are dealt with in Appendix 7.

Among other content, this offset plan provides details of the following:

- Strategies and targets for weed control;
- Outline of management actions and targets;
- Methods of offset protection;
- Persons responsible for implementing and monitoring; and
- Timeframes for implementing the offset plan.

These directions are consistent with the requirements of the state Native Vegetation Management Framework, herein referred to as the 'Framework'; that is, the pre-

December 2013 native vegetation planning controls that applied at the time the permit was issued, as agreed with the City of Whittlesea

Section 2 is an assessment of the suitability of the proposed offset site. It includes details about the approved clearing, Like-for-Like criteria and gain calculations.

Section 3 describes how the offset is to be implemented. It includes details about landowner commitments, management activities, monitoring and reporting, and on-title security arrangements.

This offset plan was prepared by a team from Brett Lane & Associates Pty Ltd, comprising Davide Coppolino (Senior Botanist) and Brett Lane (Principal Consultant).

1.1. Compliance Summary

Condition number	Abbreviated condition details	Reference
3	*Prepare and implement a native vegetation offset management plan to achieve a net gain associated with the removal of native vegetation approved under this permit.*	This report (BL&A 2014)
12	*Prior to the commencement of vegetation removal, an Offset Plan for any onsite offsets must be prepared to the satisfaction of DEPI and approved by the Responsible Authority.*	This report (BL&A 2014)
13, 15	*In accordance with Condition 10, the offset targets (both onsite and offsite) may need to be amended if detection levels of Golden Sun Moth elevate the conservation significance of the native vegetation.*	Table 2 (BL&A 2014)
14	*Prior to the commencement of vegetation removal, an Offset Plan for any offsite offsets must be prepared to the satisfaction of DEPI and approved by the Responsible Authority.*	GSM Conservation Management Plan (Abzeco 2014)

2. OFFSET SUITABILITY (PART A)

Table 1: Clearing site details

Landowner of clearing site	Asset 1 (Wollert) Pty. Ltd.
Location and address of clearing site	60 Harvest Home Road, Wollert 3750 Lot: 2 LP: 83366
Local Government Area	City of Whittlesea
Catchment Management Authority	Port Phillip and Westernport
Responsible Authority	Whittlesea City Council
Permit applicant	Asset 1 (Wollert) Pty. Ltd.
Planning Permit Number (ID)/Work Authority Number	712628
Date approved	29th January 2013

2.1. Vegetation approved for removal

Details about the vegetation removal at the property and required offset targets are provided below in Table 2. Information regarding the additional removal of scattered trees is provided in Table 3.

The vegetation permitted to be removed comprises 0.686 hectares (0.13 habitat hectares) of Plains Grassy Woodland (EVC 55_61) of very high conservation significance as well as one very large scattered tree of high conservation significance.

Table 2: Summary of approved losses of patches of native vegetation

Habitat Zone		A
Bioregion		VVP
EVC No.		55_61
EVC Bioregional Conservation Status		Endangered
Habitat Score (out of 100)		**19**
Habitat points (out of 1)		0.19
Habitat Zone area to be cleared (ha)		0.686
Habitat Hectares of loss		**0.13**
Conservation Significance	Conservation status x Habitat Score	High
	Threatened Species	Very high*
	Other Site Attributes	Low
	Overall Conservation Significance	**Very high**
Net Gain Multiplier		X 2
Gain Target (Hha)		**0.26**
No. of Large Old Trees to be removed		0
Tree protection Multiplier		N/A
Large Old Trees to be protected		**0**

VVP = Victorian Volcanic Plain; ***** = rating is due to the habitat zone providing the best 50% of habitat for Golden Sun Moth (BL&A 2011)

Table 3: Summary of approved losses of scattered trees

Bioregion	EVC	Bioregional Conservation Status	Conservation Significance	Tree Size Class			
				Very Large	Large	Medium	Small
VVP	55_61	Endangered	High	1	-	-	-

2.2. Gain targets

The offset requirement, as specified in accordance with Appendix 4 of the Framework (see Appendix 4) and Appendix 3.4.3 of the Port Phillip and Westernport regional Native Vegetation Plan (see Appendix 5), comprises:

- 0.26 habitat hectares of Plains Grassy Woodland (EVC 55_61) of very high conservation significance, which provides the best 50% of habitat for Golden Sun Moth.
- The protection of 5 very large trees (high conservation significance) and recruitment of 30 new plants OR the recruitment of 180 new plants.

Part of the required gain target, presented in Table 4 and Table 5, will be met by the implementation of the onsite offsets covered in this plan. The remaining offset deficit of 0.22 habitat hectares will be achieved within the Golden Sun Moth (GSM) offsite offset presented in Appendix 7. Management of the GSM offset area is sufficient to meet Net Gain obligations in accordance with the Framework, and to the satisfaction of the Responsible Authority and DEPI.

Table 4: Gain targets for clearing remnant patches

Target No.	Habitat Zones	Bioregion	EVC No.	Conservation significance	Min. habitat score for target	Other Like-for-Like reqts	Habitat Hectares Target			Large Tree Protection Target*		
							Total Losses (Hha)	Net Outcome	Gain Target (Hha)	Total LOTs Lost	Protection Multiplier	LOTs to be protected
VH1	A	VVP	55_61	Very High	18	Best 50% of habitat for GSM	0.13	2	0.26	0	N/A	0

VVP = Victorian Volcanic Plan; **GSM** = Golden Sun Moth; ***** = The protection of a medium or large tree, either scattered or within a patch, is assumed to result in the generation of five recruits. To be considered protected, twice the canopy diameter of the tree must be fenced and protected from adverse impacts (DEPI 2007). It is therefore been assumed that protection of a tree will generate five recruits and no separate recruitment targets have been calculated.

Table 5: Gain targets for clearing scattered trees

Target No.	Bioregion	Pre-1750 EVC No.	Conservation Significance	Tree Size	No. Trees to be removed	Protect and recruit option				OR	Recruit Only Option	
						Tree protection*		Plant recruitment			Multiplier	Offset Total
						Multiplier	Offset Total	Multiplier	Offset Total			
H1	VVP	55_61	High	VLOT	1	5	5	30	30^		180	180^

***** = The protection of a very large tree, either scattered or within a patch, is assumed to result in the generation of five recruits. To be considered protected, twice the canopy diameter of the tree must be fenced and protected from adverse impacts (DSE 2007). It is therefore been assumed that protection of a tree will generate five recruits; ^ = 15% must comprise canopy tree species, according to the Port Phillip and Westernport Native Vegetation Plan (PPWCAM 2006); **VLOT** = very large old tree; **VVP** = Victorian Volcanic Plain).

2.3. Description of offset site

The offset site (Figure 1 to Figure 3) comprises private land located at Wollert, approximately 22 kilometres north of Melbourne. It occurs within the north-western part of the approved removal site at 60 Harvest Home Road, Wollert. Once the development is completed, these sites will pass to the ownership and management of the City of Whittlesea

The offset site has been historically used for grazing livestock, although stock have been removed from the property in recent years. It is now grazed less intensely, but possibly more selectively, by indigenous Eastern Grey Kangaroos as well as introduced European Hares and European Rabbits.

Residential development is encroaching on all sides of the offset site. Although the farming property immediately to the west—and adjoining the northern offset zone—is still being used for farming practices such as cropping and livestock grazing. Hard and general rubbish has blown into the offset site from adjacent residential development to the north and has also been dumped over back fences into the broader property.

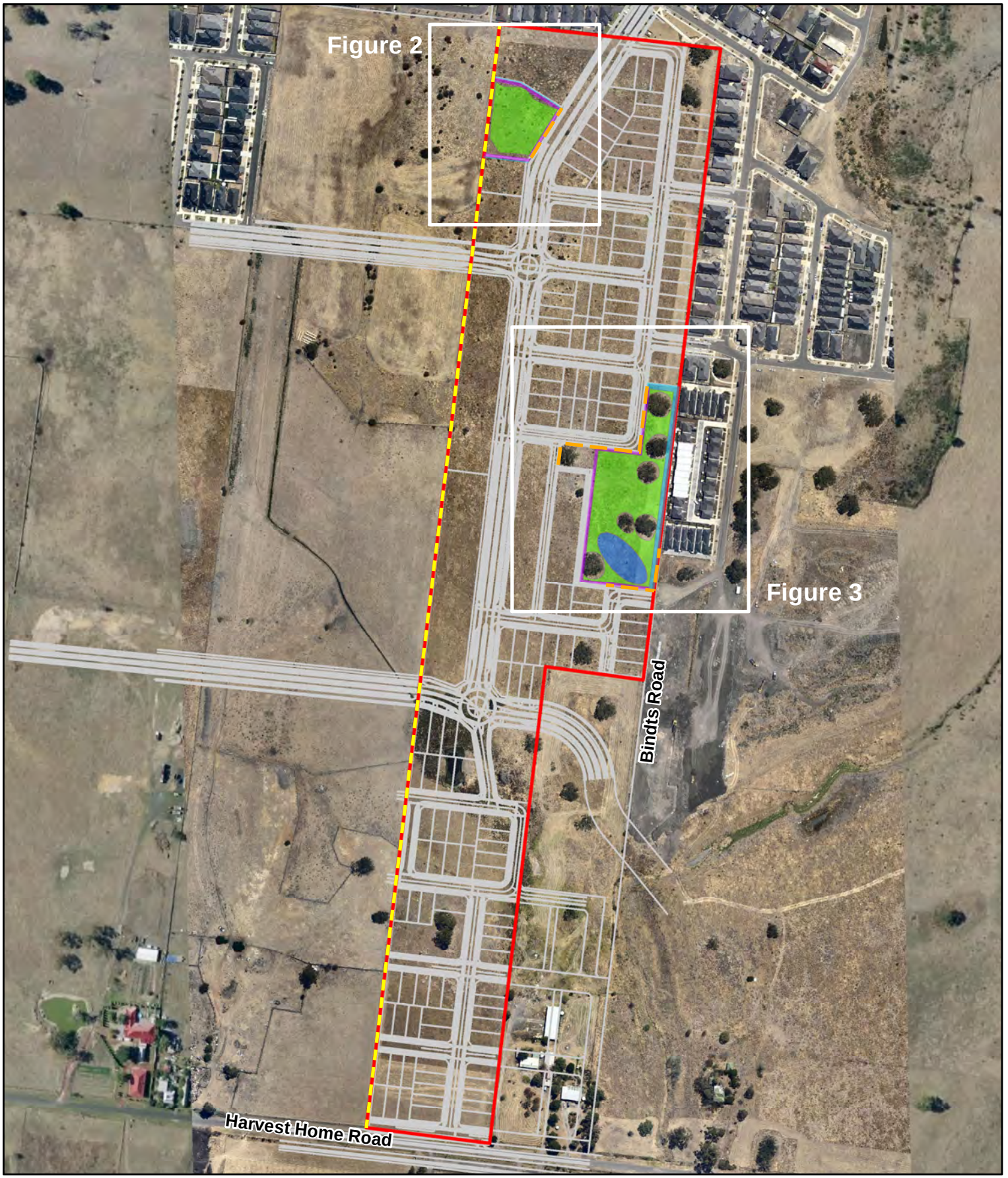
Onsite offsets pertaining to this Plan will be divided amongst the following offset zones:

- **Offset Zone A** (0.278 hectares) – an area of existing remnant patch native vegetation in the northern part of the offset site which supports indigenous ground layer vegetation.
- **Revegetation Zone** (0.540 hectares) – an area of mostly introduced grassy vegetation amongst scattered indigenous River Red-gum trees in the eastern part of the offset site.

The offset site supports quaternary basaltic soils on a gently undulating landscape. Offset Zone A occurs on a low stony knoll with an abundance of large outcropping basalt boulders. Some boulders have been removed in the past, leaving weedy holes. The Revegetation Zone occurs on deeper soils in a lower-lying part of the landscape.

Indigenous vegetation and the low stony knoll within Offset Zone A continues into the neighbouring property to the west. Similar patches of vegetation occur in the surrounding farmland, along with scattered River Red-gum trees.

The offset site lies within the Victorian Volcanic Plain bioregion and falls within the Port Phillip and Westernport catchment. It is currently zoned General Residential Zone and is subject to a Vegetation Protection Overlay - Schedule 2 in the Whittlesea planning scheme.



Legend

- Study area
- Existing fence
- Bollard & cable fencing
- Development layout
- Offset & Revegetation Zones
- Grassed firebreak
- Planting buffer (2.5m)
- Reconstructed dry stone walls

Metres
0 50 100 200

Figure 1: Offset sites - overview

Project: 60 Harvest Home Road, Wollert

Client: Asset1 Pty. Ltd.

Project No.: 9108	Date: 19/08/2014	Created By: M. Ghasemi / D. Coppolino

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Legend

- Study area
- Bollard & cable fencing
- Existing fence
- Development layout
- Vehiche access points
- Offset zone A
- Grassed firebreak (1m)
- Planting buffer (2.5m)
- Arching Flax-lily

Metres

0 5 10 20

Figure 2: Offset sites - detailed

Project: 60 Harvest Home Road, Wollert

Client: Asset1 Pty. Ltd.

Project No.: 9108	Date: 19/08/2014	Created By: M. Ghasemi / D. Coppolino

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Legend

- Study area
- Bollard & cable fencing
- Development layout
- Vehiche access points
- Scattered trees
- Revegetation Zone
- Grassed firebreak (5m)
- Planting buffer (2.5m)
- Reconstructed dry stone walls

Metres

0 10 20 40

Figure 3: Offset site - Detailed

Project: 60 Harvest Home Road, Wollert

Client: Asset1 Pty. Ltd.

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2.3.1. Flora

Ecological Vegetation Class

Pre–European EVC mapping (DEPI 2013) indicates that the offset site and surrounds would have supported Plains Grassy Woodland (EVC 55), Grey Clay Drainage-line Aggregate (EVC 124) and Creekline Grassy Woodland (EVC 68) prior to European settlement based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

Evidence on site, including floristic composition and soil characteristics, suggested that Offset Zone A comprised degraded Plains Grassy Woodland (EVC 55_61), lacking any tree cover and essentially resembling remnant native grassland. The Revegetation Zone would have also comprised this EVC in the past.

Plains Grassy Woodland (EVC 55_61) has an endangered conservation status in the Victorian Volcanic Plain bioregion. The benchmark for this EVC describes it as "an open, eucalypt woodland to 15 m tall. [It] occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer. This variant occupies areas receiving approximately 500 – 700 mm annual rainfall" (Appendix 6).

A description of Offset Zone A, being the only remnant patch native vegetation pertinent to this plan, is provided in Table 6 below.

Table 6: Description of remnant patches pertinent to this offset plan

Offset Zone	EVC	Bioregional conservation status	Description
A	Plains Grassy Woodland (EVC 55_61)	Endangered	Indigenous woody component absent; dominated by native tussock grass species including Kangaroo Grass, wallaby Grasses and spear grasses; fairly low indigenous flora diversity; high cover of introduced flora species including high-threat weeds such as Chilean Needle-grass, Texas Needle-grass, Cane Needle-grass, Sweet Briar, Brown-top Bent and Toowoomba Canary-grass.

Flora species

Flora species recorded

A combined total of 36 species of plants were recorded in the offset zones during the 2014 site visit. This number included 14 (39%) indigenous species and 22 (61%) introduced species. These are listed in Appendix 1.

Threatened flora species

One listed rare or threatened species—the Arching Flax-lily—has been recorded within Offset Zone A (Figure 2). No other listed flora species have been recorded or are considered likely to occur (BL&A 2009 & 2011).

2.3.2. Fauna

Fauna habitats

The offset site supports the following habitat types:

- Remnant grassland and rocky ground cover habitat along a stony rise in Offset Zone A; and
- Exotic pasture with exotic shrubs in the Revegetation Zone.

Remnant habitat along a stony rise

This habitat type extends into the heavily-grazed neighbouring property to the west. It is characterised by a prevalence of embedded and surface rocks. Kangaroo Grass, wallaby grasses and spear grasses dominate the area. Weeds such as Chilean Needle-grass, Texas Needle-grass, Brown-top Bent and Sweet Briar contribute a high percentage of the vegetation cover.

Stony rises offered shelter and basking habitat for reptiles. The introduced shrubs provided foraging and nesting opportunities for small birds such as Yellow-rumped Thornbills and Superb Fairy-wrens. This habitat was considered to be of moderate quality for fauna (BL&A 2011).

Exotic pasture with scattered remnant trees and exotic shrubs

This habitat type contains dense swards of Needle Grasses, Artichoke Thistle, Sweet Briar, Paterson's Curse and Ribwort as well as opportunistic native grasses. Large old remnant River Red-gums occur as scattered individuals or in small clusters of two trees immediately adjacent to this area. Cattle have previously grazed these areas. Some scattered embedded rock occurs and collected dry stonewalls form the eastern boundary, which possibly provides shelter for lizards and small ground-dwelling mammals. Some species listed as threatened at the state level may still occur, in particular, the Fat-tailed Dunnart might be expected to occur along the dry stonewalls. The use of surface rock in the dry stonewalls indicates significant past disturbance to the land surface, which likely reduced populations of native ground mammals and reptiles. No lizards or small ground-dwelling mammals were recorded during past assessments (BL&A 2011).

The adjacent River Red-gums provide valuable roosting and nesting sites for parrots, cockatoos, pardalotes, possums and bats; however connectivity with larger areas of such remnants is poor.

This habitat type generally lacks structural diversity and provides few opportunities for fauna other than common agricultural landscape species of birds (native and exotic), mammals and reptiles. The ground layer is highly modified from the original intact vegetation, so that overall, this habitat was considered to be of low quality for fauna (BL&A 2011).

Fauna species

Fauna species recorded

Past assessments indicated the presence or likely occurrence of 148 fauna species including 19 mammal (seven introduced), 109 bird (10 introduced), 15 reptile and five

frog species in the broader property (BL&A 2011). These are listed with their scientific names in Appendix 2.

Threatened fauna species

Past assessments indicated that the following listed rare and threatened fauna species could potentially make significant use of the offset zones (BL&A 2011):

- Golden Sun Moth (within Offset Zone A).

Table 7 identifies how offset zones were determined to be of 'Best/remaining 50% habitat" for the above threatened fauna species found likely to make significant use of the offset zones.

Table 7: Determination of best/remaining habitat for threatened fauna species

Species	Rare/ Threatened Species	EVC	Offset Zone	Assessment Process	Outcome	Conservation significance
Golden Sun Moth	Threatened	Plains Grassy Woodland (EVC 55_61)	A	A, D, F, Yes	Best 50% of habitat	Very high

Notes: For offset zones refer to Figure 1 to Figure 3; Assessment process refers to Table 2 in the Guide for Assessment of referred planning permit applications (DSE 2007)

2.3.3. Management issues (threats)

Current management issues within the offset zones are listed below. These threats must be controlled to maximise the short-term success and long-term viability of revegetation offsets set out under this offset plan.

Weeds

Introduced weeds that have invaded the offset zones pose a significant threat to existing indigenous vegetation and vegetation proposed to be established under this plan. Weeds compete against the indigenous flora for resources such as space, nutrients, light and moisture and will further displace the indigenous species if left unmanaged.

Inappropriate grazing regime

Livestock have been removed from the offset site. Livestock being allowed to re-enter the Offset Site (e.g. from the farming property abutting Offset Zone A) as well as grazing by hares and rabbits could pose a substantial risk to natural River Red-gum recruitment and revegetation works. It could also further reduce the diversity of indigenous ground-flora, particularly forbs.

Hard rubbish, shrubs and dense grasses in the offset site and adjacent farmland and landscaped garden beds provide harbour for rabbits. Further, the shrub plantings prescribed by this offset plan will provide additional harbour in the future for rabbits.

Other non-indigenous animals

Red Foxes pose a significant threat of predation to the indigenous fauna that utilise the offset site. In addition, the presence of domestic cats and dogs will increase with

development. Further predation of indigenous fauna is likely, if these domestic pets are not appropriately managed.

Rubbish

Construction and domestic waste is too often dumped in reserves (including offset sites) or is carried in by wind. Rubbish dumping can bury indigenous vegetation, fauna or fauna habitat. It can also pollute soils and be toxic or otherwise dangerous to indigenous fauna. It can also prevent indigenous vegetation establishment or encourage weed establishment as a result of associated soil disturbance.

Incompatible anthropogenic activities

The following human activities pose significant current and future threats to the conservation of environmental values within the offset zones:

- Pedestrian traffic;
- Vehicular access (including motorcycles);
- Gardening (i.e. mowing/slashing, use of fertiliser and planting of non-indigenous plants);
- Removal of organic litter and course organic debris;
- Conflicting maintenance and construction works (e.g. for infrastructure development, infrastructure maintenance, stormwater management, grounds keeping, etc.).

The above activities can suppress the establishment, survival and recruitment of indigenous vegetation. They can also reduce the habitat value of the offset zones (including their existing values and future revegetation works proposed by this plan) by altering their structure and composition.

Rock removal

Rock removal has occurred within the offset site in the past, and could potentially occur in future (e.g. by people seeking boulders for landscaping) if not addressed. The Arching Flax-lily depends on embedded rock, as it grows its roots between soils and rocks embedded in the soils, where moisture levels and potentially other factors are maintained at favourable levels. Further, removal of rock can damage of destroy indigenous flora, such as the Arching Flax-lily.

Altered hydrology

Altering natural surface and sub-surface moisture levels and fluctuations can kill indigenous canopy trees or understorey vegetation by exposing their roots and stems to undesirable levels of flooding or desiccation. This can result in a shift in vegetation structure and/or the loss of native vegetation and fauna habitat.

Hydrology can be altered through the redirection of surface- or sub-surface water movement resulting from altered site topography and inappropriate stormwater drainage.

2.4. Like-for-like criteria

Like-for-like criteria are addressed in Table 8 and Table 9.

The onsite and third-party (offsite) offsets are located in the Victorian Volcanic Plain Bioregion and are of the same Conservation Significance as the loss zones. Both the

Table 8: Meeting Like-for-Like criteria for clearing a remnant patch

Clearing site							Offset sites						
Target No.	Habitat Zones	Bioregion	EVC No.	Conservation significance	Min. habitat score for target	Other Like-for-Like reqts	Trading up	Offset Zones	Bioregion	EVC No.	Conservation significance	Habitat score	Other Like-for-Like attributes
VH1	A	VVP	55_61	Very High	18	B50%-GSM	No	A (onsite)	VVP	55_61	Very High	19	B50%-GSM
							No	Offsite (Appendix 7)	VVP	55_61	Very High	64	B50%-GSM

VVP = Victorian Volcanic Plain; **B50%-GSM** = Best 50% of habitat for the Golden Sum Moth

Table 9: Meeting Like-for-Like criteria for clearing scattered trees

Clearing site						Offset site				
Target No.	Trees numbers	Bioregion	Pre-1750 EVC NO.	Conservation significance	Other Like-for-Like reqts	Offset Zones	Bioregion	Pre-1750/current EVC No.	Conservation significance	Other Like-for-Like attributes
H1	12	VVP	55_61	High	None	Revegetation Zone	VVP	55_61	N/A	None

VVP = Victorian Volcanic Plain

onsite and third-party offset sites are considered to meet the Like-for-Like requirements for supporting the same Ecological Vegetation Class (EVC) (Plains Grassy Woodland (EVC 55_61)). However, it should be noted that Abzeco (2014) has mapped the vegetation within the third party offset site as Plains Grassland (EVC 132). As pre–European EVC mapping (DEPI 2014) indicates that the third party offset site and surrounds would have supported a mixture of Plains Grassland (EVC 132) and Plains Grassy Woodland (EVC 55) (see Appendix 8), it is considered to meet the Like-for-Like criteria as specified in Appendix 4 of the Framework (see Appendix 4). Quantification of gains available on offset site

The following table quantifies the remnant patch offset gains available within Offset Zone A. The specific landowner commitments by which those gains were generated are listed in Section 3 in accordance with the prescriptions in DEPI's vegetation gain approach manual (DSE 2006b).

Table 10: Quantification of offset gains available – protection and management of a remnant patch

Offset Zone			**A**		
EVC No.			**55_61**		
Area (ha)			**0.278**		
Current Score (out of 100)[1]			**19**		
Conservation Significance[2]			**Very High**		
Bioregion			**Victorian Volcanic Plain**		
Site Condition gain multiplier[3]			**None**		
		Score out of	***Current Score***	**Maintenance**	**Improvement**
Site Condition	Large Old Trees	15	*0*	N/A	*N/A*
	Canopy Cover	5	*0*	N/A	0.6
	Lack of Weeds	15	*4*	N/A	2
	Understorey	25	*10*	1	2.5
	Recruitment	10	*0*	0	2
	Organic Matter	5	*4*	0.4	1
	Logs	5	*0*	0	0
Subtotal of gains achievable in zone				*1.4*	*8.1*
Total gains achievable in zone[4]			**9.50**		
Recognition of prior management[5]			1.9		
Improved security gain[6]			3.8		
Total HHa gained per ha[7]			0.15		
Net Gain (habitat hectares)[8]			**0.04**		

Notes:

1. The habitat score of the offset zone as a whole number between 1 and 100.
2. The conservation significance of the offset zone, determined as per Appendix 3, Table 5 of the Framework (DNRE 2002).
3. Site Condition gains standardizing multiplier, as per Table 14 of DEPI's Vegetation Quality Assessment Manual (DSE, 2004).
4. Total gain points available from maintenance and improvement commitments, then multiplied by the Site Condition gains standardizing multiplier (out of 100).
5. Only available on freehold land - calculated as 10% of the current habitat score for the offset zone (out of 100).
6. Only available if the site is to be made legally more secure, such as by an on-title conservation agreement or reservation etc. Gain varies according to a number of improved security options, as per Table 1a of DEPI's vegetation gain approach manual (DSE 2006b). (Gain out of 100).
7. Total gain points available from the four possible sources (maintenance, improvement, prior management and security) as a rate of gain in Habitat Hectares per hectare (HHA/ha) to 3 decimal places.
8. The total gain available from each offset zone = the rate of gain per hectare (7) multiplied by the area of the offset zone in hectares rounded to two decimal places.

2.5. Allocation of native vegetation gains

The offset gains for remnant patch removal are allocated to Offset Zone A and the third-party (offsite) offset outlined in Appendix 7, as detailed in Table 11 and Table 12.

Table 11: Allocation of native vegetation gains for clearing a remnant patch

Gain Target			Trading up	Source of gains to meet the target				Outcome	
Target No.	Habitat Zones	Target (Hha)	Discount	Offset Zone	Gain (Hha)	Offset Zone	Gain (Hha)	Total gains (Hha)	Surplus/ Deficit (Hha)
VH1	A	0.26	N/A	A (onsite)	0.04	offsite (Appendix 7)	0.22*	0.26	0

* = Gain available within offset site was provided by Abzeco Pty. Ltd. (Richard Francis pers. comm. 28th July 2014).

The onsite and offsite offsets will together meet the total gain target of 0.26 habitat hectares for removal of remnant patches.

The recruitment (planting) of 180 plants (27 of which must be canopy tree species) is required to meet the Gain Target for the removal of one scattered tree (Table 12).

Table 12: Allocation of tree offsets for clearing scattered trees or trees in a remnant patch

Gain Target				Source of tree offsets to meet the target		Outcome	
Target No.	Scattered tree no.	Habitat zone (for LOT's)	Plants to be recruited (recruit only option)	Offset Zone	Plants recruited	Tree protection surplus/ deficit	Tree recruitment surplus/ deficit
H1	12	N/A	180	Revegetation Zone	180*	0	0

* = 15% must comprise canopy tree species, according to the Port Phillip and Westernport Native Vegetation Plan (PPWCAM 2006)

3. OFFSET IMPLEMENTATION (PART B)

Table 13: Offset site details

Landowner of offset site	Asset1 (Wollert) Pty. Ltd.	TBD*
Type of offset	First party (i.e. onsite)	3rd party
Location and address of offset site	60 Harvest Home Road, Wollert 3750	See Appendix 7
Area of offset site (ha)	0.818, including: ▪ 0.278 in OZA ▪ 0.540 in RZ	
Offset site number (if applicable)	N/A	
Volume	N/A	
Folio	N/A	
Parish	Wollert (3855)	
Allotment	2	
Local Government Area	Whittlesea	
Responsible Authority	Whittlesea City Council	
Bioregion	Victorian Volcanic Plain	

OZA = Offset Zone A; **RZ** = Revegetation Zone; *

3.1. Strategy for offset site

The offset site is to be secured and managed for the purposes of conservation in perpetuity.

Table 14: Offset security and management responsibility

Who is liable/responsible for meeting offset requirements?	Asset1 (Wollert) Pty. Ltd.
Type of security	Section 173 Agreement on title between proponent and Whittlesea City Council. The land will be transferred to council for protection as a secured Municipal Reserve for conservation purposes in perpetuity.
Agreement or Planning Permit Number (ID)	712628
Date 10-year offset management to commence	2015
Date 10-year offset management expires	2024
Registered on title? (Yes/No)	N/A
Offset site management responsibility	Whittlesea City Council
Offset Monitoring Responsibility	DEPI

3.2. Ongoing land-use commitments

In accordance with the prescriptions in DEPI's vegetation gain approach manual (DSE 2006b), the landowner must forego the following entitlements in perpetuity to achieve the maintenance and improvement gain components of the offsets:

- Animal keeping; and
- Destruction, removal or lopping of native vegetation for:
    - Fire protection measures

      Note: that a minimum firebreak of five-metre has been provided along the perimeter of the offset zones (including adjacent roads)
    - Road safety

      Note: roads should be designed and constructed in a way which eliminates the need for removal, destruction of lopping of native vegetation within the offset zones.
    - Removal of naturally established native vegetation regrowth
    - The establishment of sight-lines for the measurement of land by surveyors in the exercise of their profession, using hand-held tools.

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

3.3. Management actions

In accordance with the prescriptions in DEPI's vegetation gain approach manual (DSE 2006b), the landowner must commit to the management actions outlined in this section for the 10 year life of this plan to achieve the required offsets gains. Gains achieved at completion of the 10-year offset plan periods must be maintained in perpetuity by the landowner.

The offset zones below are contained within two separate areas (Figure 1 to Figure 3). A minimum five-metre wide firebreak (including any 'paper roads', footpaths, lawns and adjacent road reserves) will be established around each of these two areas, outside of retained native vegetation. Vegetation within these areas will be kept slashed to manage the risk of wildfire for adjacent properties. Slashing of firebreaks is not to be undertaken within areas of suitable habitat while Golden Sun Moth is active (usually between November and January). Slashing of firebreaks should also be excluded from areas supporting the following weed species, during their seed-set periods listed below:

- Chilean and Texas Needle-grass (usually between November and February);
- Cane Needle-grass (usually between January and February).

Slashing of firebreaks within the canopy drip-line of existing mature River Red-gums must be undertaken using brush-cutters, ensuring that existing and recruiting River Red-gums are not damaged and that cut plant material is removed and hygienically disposed of.

<u>Offset Zone A</u>

- Control *all* onsite grazing threats (incl. livestock, European Rabbit, European Hare and Eastern Grey Kangaroo).

- Supplementary planting, in accordance with this Plan.
- Exclude stock and ensure that weed cover (not limited to high threat weeds) does not increase beyond current levels.
- Eliminate high threat woody environmental weeds (to <1% cover) and ensure that the cover of other high threat weeds does not increase beyond current levels.
- Control *all* other high threats, including:
    - Inappropriate grazing regime from European Rabbit, European Hare and Eastern Grey Kangaroo (if required)
    - Inappropriate fire regime
    - Other non-indigenous animals, including Red Foxes as well as domestic cats and dogs
    - Rubbish dumping
    - Inappropriate anthropogenic activities outlined in Section 2.3.3 of this Plan
    - Rock removal
    - Altered site hydrology
    - Significant shading from construction of adjacent buildings/structures.
- Retain fallen branches and leaf litter.

Log maintenance gains are not considered to be achievable within this zone due to the difficulty in preventing local residents and other individuals from removing logs from site (e.g. for firewood collection). Introducing logs into the zone is unlikely to be achieved within Offset Zone A without adversely impacting upon the resident Arching Flax-lily population. Therefore, improvement gains are considered to be unachievable through log introduction.

Note that the landowner is also required to uphold their existing legal obligations, such as the control of regionally declared weeds, which may not be described in this Plan.

<u>Revegetation Zone</u>

- Control weeds
- Control grazing threats
- Implement revegetation, in accordance with this Plan.
- Control any other identified risks to the long-term survival of plantings or naturally regenerated indigenous vegetation, including:
    - Rubbish dumping
    - Inappropriate anthropogenic activities outlined in Section 2.3.3 of this Plan
    - Rock removal
    - Alteration of site hydrology
    - Significant shading from construction of adjacent buildings/structures.

3.3.1. Management actions to be undertaken

This section provides detailed methods for management actions which require further explanation.

It should be noted that the discussed actions include actions required for all offset zones. Refer to Section 3.2 above for offset zone specific commitments.

3.3.2. Weed control

Weed control is required in the Revegetation Zone prior to planting to avoid established native plants being outcompeted by weeds. Broad-scale weed control methods can be used in any parts of this area that do not support indigenous ground flora or naturally regenerating River Red-gums. Such methods must ensure that there are no adverse impacts upon any adjacent indigenous vegetation (including the root zones of existing River Red-gums) or waterways, and must not alter the site's micro-topography or soil characteristics. Examples of suitable broad-scale control methods include:

- Carefully designed, controlled and monitored boom-spraying.
- Covering areas with weed mat or a suitable alternative type of sheeting which will solarise weeds, then removing the sheeting once weeds have been eliminated.

Alternatively, precision control methods outlined below for each weed species may be implemented in these areas of non-indigenous vegetation. These precision weed control methods are also to be applied within Offset Zone A.

High threat weeds species which occur on site (or are likely to invade the site in future), and methods for controlling them within areas supporting existing indigenous vegetation, are shown in Table 15.

Mulch should not be used in Offset Zone A, is this is likely to adversely impact the existing indigenous ground flora in this areas. Mulching could also result in a significant adverse impact on the Arching Flax-lily, which has been recorded within Offset Zone A.

Any herbicide use is not to occur in the following situations:

- Wet areas;
- Within two days of rain (before or after); or
- During windy conditions.

All non-target kill (i.e. cover of indigenous flora killed as a direct result of weed control works) is to be documented and provided in the annual reports outlined in Appendix 3. Non-target kill is not to exceed 1% projective foliage cover in any given area.

Weed control efforts should be intensified in the lead up to, and immediately following, plantings (or assisted natural regeneration works) and should aim to control all weeds to less than 5% total cover across each offset zone.

Adaptive management is to be applied to all weed control measures provided in this Plan (see Section 3.3.11).

Where possible, weed control should be co-ordinated with adjacent landowners to minimise ongoing threats from weeds on adjacent land. Every weed control action must be undertaken by a bushland contractor with experience in weed management within the Whittlesea Council area.

Table 15: High threat weed species and control methods

Common Name	Scientific name	Weed Category	Control requirement		Control method	Optimal timing
			Control under CaLP Act	Control under offset plan		
			Eliminate (to <1% cover)			
African Box-thorn	*Lycium ferocissimum*	HT woody weed	X		Cut and swap mature plants using an appropriate herbicide. Spot-spray seedlings with appropriate herbicide.	Autumn and spring
Artichoke Thistle	*Cynara cardunculus*	HT non-woody weed	X		Remove flowers before seeds ripen. Spot spray with appropriate herbicide.	Mid-spring
Blackberry	*Rubus fruticosus* agg.	HT woody weed	X		Cut and swab mature plants using an appropriate herbicide. Spot-spray seedlings with appropriate herbicide.	Spring
Briar Rose	*Rosa rubiginosa*	HT woody weed	X		Cut and swap mature plants using an appropriate herbicide. Spot-spray seedlings with appropriate herbicide.	Autumn and spring
Broad-leaf Dock	*Rumex obtusifolius subsp. obtusifolius*	Other weed		X	Spot-spray using an appropriate herbicide mixed with a wetting agent.	Autumn (after autumn break)
Brown-top Bent	*Agrostis capillaris*	HT non-woody weed		X	Spot-spray using a non-selective or grass-selective herbicide.	Autumn and spring
Cane Needle-grass	*Nassella hyalina*	HT non-woody weed		X	Spot-spray using an appropriate herbicide. Quarantine infestations during seeding period. Not machinery, vehicles, personnel or livestock to enter quarantined sites during quarantine periods.	Autumn and spring (Herbicide application) Jan to Feb (Quarantine)
Chilean Needle-grass	*Nassella neesiana*	HT non-woody weed		X	Spot-spray using an appropriate herbicide. Quarantine infestations during seeding period.	Autumn and spring (Herbicide application) Nov to Feb (Quarantine)
Cocksfoot	*Dactylis glomerata*	HT non-woody weed		X	Spot-spray using an appropriate herbicide.	Autumn and spring
Couch	*Cynodon dactylon var. dactylon*	HT non-woody weed		X	Spot-spray using a non-selective or grass-selective herbicide. Repeat applications are always required. Fire before spraying large infestations can improve site access and minimise off target spray.	Spring
Hairy Hawkbit	*Leontodon taraxacoides subsp. taraxacoides*	Other weed		X	Spot-spray with a broad-leaf selective herbicide.	Autumn and spring
Hawthorn	*Crataegus monogyna*	HT woody weed	X		Cut and paint mature plants using an appropriate herbicide. Dig up or hand-pull seedlings from roots (up to 10 cm deep for larger plants).	Any time of year
Large Quaking-grass	*Briza maxima*	Other weed		X	Hand pull or spot spray with a grass-selective herbicide. Alternatively, burn (in Offset Zone A only) during flowering but prior to seeding, if this option is available within the offset zones. Burning only occur at a frequency that promotes the establishment of woodland vegetation.	Autumn (spot spraying) / late winter to early spring (burning)
Paspalum	*Paspalum dilatatum*	HT non-woody weed		X	Spot-spray using a non-selective or grass-selective herbicide.	Late-winter to Early-spring (burn /slash/heavily graze); Spring to Summer (herbicide treatment)
Paterson's Curse	*Echium plantagineum*	HT non-woody weed	X		Spot-spray with an appropriate herbicide.	Spring (before flowers mature)
Perennial Rye-grass	*Lolium perenne*	Other weed			Spot spray with a grass selective herbicide.	Winter to spring
Prairie Grass	*Bromus catharticus*	Other weed		X	Spot-spray using a non-selective or grass-selective herbicide.	Autumn and spring
Soursob	*Oxalis pes-caprae*	HT non-woody weed		X	Spot-spray repeatedly using an appropriate herbicide (e.g. glyphosate). Several years of control may be required. Avoid hand-pulling or other mechanical means of removal. Ensure that plant waste is properly removed as plants can reshoot from this material.	All-year-round, with maximum effort during bulb exhaustion stage (c. mid May - late July)
Spear Thistle	*Cirsium vulgare*	HT non-woody weed	X		Remove any flower heads before they go to seed. Spot-spray leaves using an appropriate herbicide.	Autumn and Spring
Sweet Vernal-grass	*Anthoxanthum odoratum*	Other weed		X	Spot-spray using a non-selective or grass-selective herbicide.	Winter to spring (before seeds ripen)
Texas Needle-grass	*Nassella leucotricha*	HT non-woody weed		X	Spot-spray using an appropriate herbicide. Quarantine infestations during seeding period. Not machinery, vehicles, personnel or livestock to enter quarantined sites during quarantine periods.	Autumn and spring (Herbicide application) Nov to Feb (Quarantine)
Toowoomba Canary-grass	*Phalaris aquatica*	HT non-woody weed		X	Spot-spray using an appropriate herbicide.	Autumn and spring
Variegated Thistle	*Silybum marianum*	HT non-woody weed	X		Remove any flower heads before they go to seed. Spot-spray leaves using an appropriate herbicide.	Autumn to early-winter

HT = High Threat

3.3.3. Pest Animal Control

Cats, European Hares, European Rabbits and Red Foxes are to be controlled under this Plan. Control methods are to comprise:

- Signage (see Section 3.3.8) to advise pet owners that pets are not permitted within the offset site;
- Harbour removal;
- Fumigating and hand collapsing warrens and dens; and
- Baiting.

All animal control measures (excluding signage) are to be undertaken by a suitably-qualified contractor. They are to be designed to compliment any control programs being implemented across the broader landscape for increased effect. As such the control program should be coordinated with adjoining private and public landholders.

Baiting is to be undertaken as follows:

- Baiting is to be carried out within the offset zones only (i.e. Offset Zone A and the Revegetation Area).
- Baiting is to utilise Pindone only with carrots as bait, due to the sites proximity to residential estates.
- Baiting is to be carried out at dusk. Any carcases and uneaten bait are to be collected at dawn the next morning. No dead animals or uneaten bait are to be left on site under any circumstances, is this can result in the poisoning of indigenous fauna (e.g. raptors) of dogs from neighbouring properties.
- Baiting is to be conducted in late summer or early autumn.

Temporary rabbit-proof fencing (e.g. star-picket and chicken wire-mesh) will need to be installed around revegetation areas and areas where assisted natural regeneration is underway to optimise plant survival. Temporary fencing can be removed once:

- Plantings have matured to a point where they are no longer susceptible to grazing threat from rabbits; or,
- Rabbits, hares and kangaroos no longer exert significant grazing pressure on the revegetation areas due to progress of surrounding residential development or pest animal control.

Tree-guards will also be used for any plantings. Tree guards are to be removed once the plants exceed the height of the tree-guards.

Current intense grazing by indigenous Eastern Grey Kangaroos is considered unlikely to be an issue within the offset site once residential development is complete due to the increased human activity and resulting fragmentation and isolation of the offset zones, which will likely lead to the demise of the kangaroo population in the area.

3.3.4. Restriction of site access

The following measures are to be implemented to discourage machinery, vehicle, pedestrian and cyclist movement throughout the Offset Site:

- Bollard fencing (see Section 3.3.7 for specifications).
- Planting buffers along perimeters, utilising prickly indigenous species (see Section 3.3.9 for specifications).
- Erection of signage (see Section 3.3.8 for specifications) along the fences to be erected around the offset zones. The signage is to state:
    - The purpose of the offset zones is as an area of revegetation and regenerating vegetation; and
    - That unauthorised vehicle, machinery and personnel access is prohibited.

Rock and/or trunk and log placement (from trees legally felled from the adjacent residential development) may be used outside the perimeters of offset zones and associate firebreaks to further discourage access into the offset zones from adjacent passive use area. Rocks, trunks and logs must not be placed within the offset zones, as this could result in the destruction of native vegetation.

All unauthorised access into the offset zones is prohibited under this Plan. All authorised access into the offset zones (e.g. for maintenance purposes) will need to be arranged through Whittlesea Council. No vehicle or machinery access is permitted when soils are wet and boggy or inundated.

3.3.5. Other incompatible anthropogenic activities

The following human activities will be prohibited within the offset zones:

- Conflicting maintenance and construction works (e.g. for infrastructure development, infrastructure maintenance, stormwater management, grounds keeping in a manner that is inconsistent with this Plan, etc.).
- Rock removal (including during implementation or maintenance of activities required under this Plan, such as fence construction).
- Altering natural surface and sub-surface moisture levels and fluctuations can kill indigenous canopy trees or understorey vegetation by exposing their roots and stems to undesirable levels of flooding or desiccation. This can result in a shift in vegetation structure and/or the loss of native vegetation and fauna habitat.

These threats will be managed through the erection of fencing and signage as per sections 3.3.7 and 3.3.8, respectively. The above threats will also be managed by incorporating clauses into works contracts (e.g. for fencing installation, signage installation, firebreak management and maintenance works), which stipulate that the above activities must not occur within the offset zones.

Developing super-lots which abut the offset zones in the ways listed below should be encouraged to deter activities within the offset zones and minimise impacts from shading:

- Orientating dwellings to face the offset zones, rather than back fences being set against them.

- Siting access driveways along the shared boundaries between the super-lots and offset zones. This would provide the following advantages:
    - A clear line of site between dwellings and the offset zones
    - Would effectively widen firebreaks; and
    - Would set the dwelling back from the offset zones, minimising shading.

3.3.6. Rubbish

All hard and general rubbish is to be removed from the fenced areas surrounding and including the offset zones on commencement of this plan. Rubbish removal must be undertaken in a manner that minimises impacts to indigenous flora and fauna. Regular rubbish removal will then be required over the ten-year period of this plan to removal any material that blows in from adjacent areas.

3.3.7. Bollard fencing

A bollard and cable fence is to be erected along the boundary shared between the parcel containing Offset Zone A and the Saltlake Boulevard road reserve to the east, as shown in Figure 2. A removable bollard will be provided at the southern end of this fence for vehicle access. The existing post and wire fencing along the western side of the zone will be maintained until such time as the abutting area of native vegetation in the property to the west is reserves for conservation. Once this has occurred, bollard and cable fencing will be extended to enclose both Offset Zone A and the adjacent retained native vegetation. Once the bollard and cable fencing has been completed, the existing fence line dividing the two areas is to be removed in a manner which minimises impacts upon the retained native vegetation.

The Revegetation Zone is to be fenced together with the immediately adjacent mature River Red-gums using bollard and cable fencing. This is only required where this area abuts adjacent roads, shown in Figure 3.

Fencing alignments and locations of vehicle access points—utilising removable bollards—are shown in Figure 1 to Figure 3.

3.3.8. Signage

All signage must be simple, clear and consistent in design with other interpretive signage shown in any Landscape Master Plan prepared for the area. Deterrent signage is to be clearly legible from any area surrounding the offset zones and is to clearly state the prohibited activities listed below, indicating maximum penalties where they apply:

- Dumping of rubbish;
- Unauthorised works and access (including machinery, vehicles and personnel);
- All vehicle and machinery access during wet periods (i.e. when soils are boggy);
- Allowing livestock or domestic pets to enter the Offset Site;
- Removal of organic litter; and
- Use of fertilisers and the planting of lawn or other non-indigenous plants.

All signage is to be updated where required (e.g. when information within the sign is outdated) and maintained in perpetuity.

3.3.9. Revegetation and supplementary planting

Table 16 (Revegetation Zone) and Table 17 (Offset Zone A) list the species recommended for use in revegetation works. These tables indicate the densities required of each species or life-form category per offset zone, based on the EVC Benchmark for Plains Grassy Woodland (EVC 55_61). Planting densities presented in these tables are consistent with DSE's Revegetation Planting Standards (DSE 2006a) and the Port Phillip and Westernport Native Vegetation Plan (PPWCMA 2006).

In total, at least 180 plants are to be established in the Revegetation Zone, including:

- 27 canopy trees (i.e. 15% of the plants to be established); and
- 153 understorey plants (i.e. 85% of the plants to be established).

Plantings prescribed for Offset Zone A are aimed at supplementing existing vegetation cover. Therefore, plantings in this zone will be limited to trees and shrubs, as indigenous woody vegetation is lacking but indigenous non-woody groundcover is already present.

Advice should be sought from local indigenous nurseries, bushland contractors and/or Parks Victoria on the availability of the plant species recommended for revegetation in this plan. Indigenous seed should be collected from the study area and other areas of native vegetation within a 10 kilometre radius of the study area.

Where feasible, direct seeding into the natural substrate or encouraged natural recruitment should be used as the primary means for revegetation. Where these methods are impractical or unsuccessful, other methods should be adopted (e.g. use of tubestock or cells). Mulch is not to be used in Offset Zone A.

Direct-seeding/planting should occur when there is adequate soil moisture. Depending on seasonal conditions, this is most likely to be between May and September each year. Direct-seeding/planting may be required over several years. Plantings should be well-watered immediately after planting and during periods when plants are likely to dry out before their roots are well established.

The placement of plants should incorporate a balanced design that takes account of the following considerations:

- Moisture, exposure, soil drainage and other habitat requirements of the species (information for each species should be available from the plant supplier);
- Scatter and intermingle species and life-forms as much as possible to form a mosaic effect. The design should aim to replicate the existing natural vegetation as much as possible; and
- Larger, competitive species should be positioned to out-compete introduced species where invasion by such species is presumed likely (e.g. areas previously supporting denser weed cover or disturbed ground).

Planting should be staggered and timed with weed management so that weedy shrubs are progressively replaced with indigenous shrubs.

Table 16: Species to be planted and survival numbers – Revegetation Zone

Area (ha):	**0.540**			
Bioregion:	**Victorian Volcanic Plain**			
EVC No.	**Plains Grassy Woodland (EVC 55_61)**			
Lifeform Category	**Lifeform density per hectare***	**Common Name**	**Scientific Name**	**No. plants required**
Canopy trees	50	River Red-gum	*Eucalyptus camaldulensis*	27
Understorey trees	50	Blackwood	*Acacia melanoxylon*	27
		Black Wattle	*Acacia mearnsii*	
		Sweet Bursaria	*Bursaria spinosa subsp. spinosa*	
Medium Shrubs	234	Golden Wattle	*Acacia pycnantha*	126
		Hedge Wattle	*Acacia paradoxa*	
		Tree Violet	*Melicytus dentatus*	
			Total	**180**

* = densities based upon DEPI standard planting densities (DSE 2006a) and benchmark lifeform covers for EVC 55_61 (Appendix 6), then corrected to achieve the minimum 15% canopy tree requirement set by the Port Phillip and Westernport regional Native Vegetation Plan (PPWCMA 2006).

Table 17: Species to be planted and survival numbers – Offset Zone A

Area (ha)	0.278			
Bioregion:	Victorian Volcanic Plain			
EVC No.	Plains Grassy Woodland (EVC 55_61)			
Lifeform Category	**Lifeform density per hectare***	**Common Name**	**Scientific Name**	**No. plants required**
Canopy trees	50	River Red-gum	*Eucalyptus camaldulensis*	14
Understorey trees	50	Black Wattle	*Acacia mearnsii*	4^
		Sweet Bursaria	*Bursaria spinosa subsp. spinosa*	6
		Silver Banksia	*Banksia marginata*	4
Medium Shrubs	400	Hedge Wattle	*Acacia paradoxa*	56^
		Tree Violet	*Melicytus dentatus*	55^
			Total	139

* = densities based upon DEPI standard planting densities (DSE 2006a) and benchmark lifeform covers for EVC 55_61 (Appendix 6), then adjusted based on existing vegetation condition; ^ = concentrate plantings in weedier areas.

The 2.5 meter wide planting buffers shown in Figure 2 and Figure 3 will utilize the species listed in the project's landscape plan. The landscape plan provides species lists and planting designs which meet the following criteria:

- Selected species are fairly prickly to deter pedestrian access into the offset sites;
- Selected species are indigenous or non-invasive introduce species;
- Selected species comprise species which typically grow to no more than two meters in height; and
- Up to 30% of buffer planning cover may comprise medium shrubs while the remaining buffer planting cover comprises ground layer species (e.g. small shrubs, grasses, sedges, rushes, forbs, etc.)—this criterion ensures that buffer plantings will not shade out or outcompete revegetation plantings.

3.3.10. Monitoring

Monitoring of recruited and remnant native vegetation, pest plants and animals and any other management objectives will be undertaken on a regular basis to ensure the successful implementation of this Plan and to inform adaptive management processes.

3.3.11. 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 met. 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.

3.3.12. Management action tables

The following tables identify specific management actions and targets pertaining to the management of the proposed offset.

Table 18: Year 1-2 actions

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Commencement of plan	A	Estimate the following conditions: ▪ Overall weed cover; ▪ *Overall high threat* weed cover; Refer to Table 15 for *high threat* species	▪ Overall weed cover benchmark* documented; ▪ Overall cover of *high threat* weed species listed in Table 15 documented;	Ecologist		
Commencement of plan	Both	Order plants for revegetation	Plants ordered	Bushland contractor		
Commencement of plan	Both	Erect bollard and temporary rabbit-proof fencing, and place rocks, trunks and logs to prevent unauthorised access (if relevant)	▪ Bollard fencing must prevent entry of threatening herbivores (temporary fencing) as well as unauthorised, vehicles and machines.	Fencing contractor		
Commencement of plan	Both	Hard and general rubbish to be removed	▪ Offset zones free of any rubbish	Bushland contractor		
Commencement of plan	Both	Erect signage	▪ Required signage made and erected to specifications set out in Section 3.3.8.	Contracted sign-maker		
Early summer	Both	No slashing of firebreaks	▪ No slashing within firebreaks during this period.	Whittlesea Council		
Early summer	Both	Quarantine Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Mid summer	Both	Quarantine Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Mid summer	Both	Quarantine Cane Needle-grasses infestations	▪ No machinery, vehicle or personnel access into areas supporting Cane Needle-grasses.	Whittlesea Council		
Mid summer	Both	Repair/maintain fencing, signage and other offset site infrastructure.	Integrity and function of all fencing, signage and other offset site infrastructure maintained.	Bushland contractor / Ecologist		
Mid summer	Both	Hard and general rubbish to be removed	▪ Offset zones free of any rubbish	Bushland contractor		
Late summer	Both	Quarantine Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Late summer	Both	Quarantine Cane Needle-grasses infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Late summer	Both	Pest animal control to be carried out: ▪ Fumigate and collapse burrows where present; ▪ Bate.	▪ <5% survival of target; ▪ <2% death of non target species.	Bushland contractor/Vermin control specialist		
Early autumn	Both	Pest animal control to be carried out: ▪ Fumigate and collapse burrows where present; ▪ Bate.	▪ <5% survival of target; ▪ <2% death of non target species.	Bushland contractor/Vermin control specialist		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Mid autumn	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late autumn	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Early winter	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late winter	Both	Repair/maintain fencing, signage and other offset site infrastructure.	Integrity and function of all fencing, signage and other offset site infrastructure maintained.	Bushland contractor / Ecologist		
Late winter	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Early spring	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Mid spring	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Mid spring	Both	Monitoring: ▪ Estimate overall weed cover and cover of each *high threat* weed species (refer to Table 15 for *high threat* species); ▪ Assess integrity of offset zone fencing, bollards and signage; ▪ Assess level of grazing pressure; ▪ Monitor compliance with land-use commitments and other management commitments.	Monitoring results to be documented and retained for reporting purposes. Results should also inform management approaches and techniques.	Ecologist		
Late spring	Both	No slashing of firebreaks	▪ No slashing within firebreaks during this period	Whittlesea Council		
Late spring	Both	Quarantine Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Report due 31st December	Both	Report to be prepared documenting management actions undertaken and monitoring results. Report structure and content to be prescribed by DEPI.	Report delivered to DEPI no later than three months after the due date.	Whittlesea Council /Ecologist		

***** = The overall weed cover benchmark is an estimate of the overall weed cover at the commencement of the offset plan. This informs both contractors and auditors of the plan in ensuring that overall weed cover does not increase beyond that benchmark.

Table 19: Years 3-5 actions

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Early summer	Both	No slashing of firebreaks	▪ No slashing within firebreaks during this period	Whittlesea Council		
Early summer	Both	Quarantine Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Mid summer	Both	Quarantine Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Mid summer	Both	Quarantine Cane Needle-grasses infestations	▪ No machinery, vehicle or personnel access into areas supporting Cane Needle-grasses.	Whittlesea Council		
Mid summer	Both	Repair/maintain fencing, signage and other offset site infrastructure.	Integrity and function of all fencing, signage and other offset site infrastructure maintained.	Bushland contractor / Ecologist		
Mid summer	Both	Hard and general rubbish to be removed	▪ Offset zones free of any rubbish	Bushland contractor		
Mid summer	Both	Supplementary irrigation of revegetation and supplementary planting areas.	▪ Plantings irrigated.	Bushland contractor		
Late summer	Both	Quarantine Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Late summer	Both	Quarantine Cane Needle-grasses infestations	▪ No machinery, vehicle or personnel access into areas supporting Cane Needle-grasses.	Whittlesea Council		
Late summer	Both	Pest animal control to be carried out if required: ▪ Fumigate and collapse burrows where present; ▪ Bate.	▪ <5% survival of target; ▪ <2% death of non target species.	Bushland contractor/Vermin control specialist		
Late summer	Both	Supplementary irrigation of revegetation and supplementary planting areas.	▪ Plantings irrigated.	Bushland contractor		
Early autumn	Both	Pest animal control to be carried out if required: ▪ Fumigate and collapse burrows where present; ▪ Bate.	▪ <5% survival of target; ▪ <2% death of non target species.	Bushland contractor/Vermin control specialist		
Mid autumn	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late autumn	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late autumn	Both	Plant out revegetation and supplementary planting areas, as per Section 3.3.9.	▪ Plant survival targets in Table 16 and Table 17 achieved.	Bushland contractor		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Early winter	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late winter	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late winter	Both	Repair/maintain fencing, signage and other offset site infrastructure.	Integrity and function of all fencing, signage and other offset site infrastructure maintained.	Bushland contractor / Ecologist		
Early spring	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Early spring	Both	Replace dead plants in revegetation and supplementary planting areas, as per Section 3.3.9.	▪ Plant survival targets in Table 16 and Table 17 achieved.	Bushland contractor		
Mid spring	Both	Control weeds, as per Section 3.3.2.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Mid spring	Both	Monitoring: ▪ Estimate overall weed cover and cover of each *high threat* weed species (refer to Table 15 for *high threat* species); ▪ Assess integrity of offset zone fencing, bollards and signage; ▪ Assess level of grazing pressure; ▪ Monitor compliance with land-use commitments and other management commitments.	Monitoring results to be documented and retained for reporting purposes. Results should also inform management approaches and techniques.	Ecologist		
Following monitoring	Both	Order any plants required to replace failed plantings	▪ Plants ordered	Whittlesea Council/Bushland contractor		
Late spring	Both	No slashing of firebreaks	▪ No slashing within firebreaks during this period	Whittlesea Council		
Late spring	Both	Quarantine Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Late spring	Both	Supplementary irrigation of revegetation and supplementary planting areas.	▪ Plantings irrigated.	Bushland contractor		
Report due 31st December	Both	Report to be prepared documenting management actions undertaken and monitoring results. Report structure and content to be prescribed by the Responsible Authority.	Report delivered to the Responsible Authority no later than three months after the due date.	Land owner/Ecologist		

***** = The overall weed cover benchmark is an estimate of the overall weed cover at the commencement of the offset plan. This informs both contractors and auditors of the plan in ensuring that overall weed cover does not increase beyond that benchmark.

Table 20: Years 6-10 actions

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Early summer	Both	No slashing of firebreaks	▪ No slashing within firebreaks during this period	Whittlesea Council		
Early summer	Both	Quarantine any remaining Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Mid summer	Both	Quarantine any remaining Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Mid summer	Both	Quarantine any remaining Cane Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Mid summer	Both	Repair/maintain fencing, signage and other offset site infrastructure.	Integrity and function of all fencing, signage and other offset site infrastructure maintained.	Bushland contractor / Ecologist		
Mid summer	Both	Any hard and general rubbish to be removed	▪ Offset zones free of any rubbish	Bushland contractor		
Mid summer	Both	Supplementary irrigation of revegetation and supplementary planting areas, if required.	▪ Plantings irrigated if a significant threat of desiccation has occurred.	Bushland contractor		
Late summer	Both	Quarantine any remaining Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Late summer	Both	Quarantine any remaining Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Late summer	Both	Pest animal control to be carried out if required: ▪ Fumigate and collapse burrows where present; ▪ Bate.	▪ <5% survival of target; ▪ <2% death of non target species.	Bushland contractor/Vermin control specialist		
Late summer	Both	Replace dead plants in revegetation and supplementary planting areas, as per Section 3.3.9.	▪ Plantings irrigated if a significant threat of desiccation has occurred.	Bushland contractor		
Early autumn	Both	Pest animal control to be carried out if required: ▪ Fumigate and collapse burrows where present; ▪ Bate.	▪ <5% survival of target; ▪ <2% death of non target species.	Bushland contractor/Vermin control specialist		
Mid autumn	Both	Control weeds, as per Section 3.3.2 if required.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late autumn	Both	Control weeds, as per Section 3.3.2 if required.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late autumn	Both	Plant out revegetation and supplementary planting areas, as per Section 3.3.9.	▪ Plant survival targets in Table 16 and Table 17 achieved.	Bushland contractor		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Early winter	Both	Control weeds, as per Section 3.3.2 if required.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late winter	Both	Control weeds, as per Section 3.3.2 if required.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Late winter	Both	Repair/maintain fencing, signage and other offset site infrastructure.	Integrity and function of all fencing, signage and other offset site infrastructure maintained.	Bushland contractor / Ecologist		
Early spring	Both	Control weeds, as per Section 3.3.2 if required.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		
Early spring	Both	Replace dead plants in revegetation and supplementary planting areas, as per Section 3.3.9.	▪ Plant survival targets in Table 16 and Table 17 achieved.	Bushland contractor		
Mid spring	Both	Control weeds, as per Section 3.3.2 if required.	▪ Cover of each *high threat* weed species reduced to <1%; ▪ Overall weed cover benchmark* not exceeded.	Bushland contractor		

Timing	Offset Zone/s	Management Action	Target to be achieved	Responsible person	Completed (Yes/No)	Month and Year Completed
Mid spring	Both	Monitoring: ▪ Estimate overall weed cover and cover of each *high threat* weed species (refer to Table 15 for *high threat* species); ▪ Assess integrity of offset zone fencing, bollards and signage; ▪ Assess level of grazing pressure; ▪ Monitor compliance with land-use commitments and other management commitments.	Monitoring results to be documented and retained for reporting purposes. Results should also inform management approaches and techniques.	Ecologist		
Following monitoring	Both	Order any plants required to replace failed plantings	▪ Plants ordered	Whittlesea Council/Bushland contractor		
Late spring	Both	No slashing of firebreaks	▪ No slashing within firebreaks during this period	Whittlesea Council		
Late spring	Both	Quarantine any remaining Chilean and Texas Needle-grass infestations	▪ No machinery, vehicle or personnel access into areas supporting Chilean or Texas Needle-grasses.	Whittlesea Council		
Late spring	Both	Supplementary irrigation of revegetation and supplementary planting areas, if required.	▪ Plantings irrigated if a significant threat of desiccation has occurred.	Bushland contractor		
Report due 31st December	Both	Report to be prepared documenting management actions undertaken and monitoring results. Report structure and content to be prescribed by the Responsible Authority.	Report delivered to the Responsible Authority no later than three months after the due date.	Land owner/Ecologist		

***** = The overall weed cover benchmark is an estimate of the overall weed cover at the commencement of the offset plan. This informs both contractors and auditors of the plan in ensuring that overall weed cover does not increase beyond that benchmark.

3.4. Monitoring and reporting

The Landowner agrees to submit the Landowner Monitoring and Report Form to the DEPI as specified in Table 21.

Table 21: Landowner Monitoring and Reporting Schedule

Year	Year from commencement	Time of year	Monitoring Method	Person Responsible	Report due to DEPI by:
2015	1	Spring	Landowner Monitoring Form	Whittlesea Council	By 31 December 2015
2016	2				By 31 December 2016
2019	5	Any			By 31 December 2019
2024	10				By 31 December 2024
Post 2024	As requested in writing by DEPI and within a maximum 3 months of the date of issue				

4. REFERENCES

Brett Lane & Associates (BL&A) 2009, *Native Vegetation and Trees Assessment - Report No. 9108 (1.4)*, Brett Lane & Associates Pty Ltd, North Carlton, consultant report prepared for Asset1 Pty. Ltd.

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Department of Natural Resources and Environment 2002, *Victoria's Native Vegetation Management - a Framework For Action*. State of Victoria, Department of Natural Resources and Environment, Victoria.

Department of Sustainability and Environment 2006a, *Native Vegetation: Revegetation Planting Standards – Guidelines for establishing native vegetation for net gain accounting*. Department of Sustainability and Environment, East Melbourne, Victoria.

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Department of Sustainability and Environment 2007, *Native Vegetation: Guide for assessment of Referred Planning Permit Applications*. Department of Sustainability and Environment, East Melbourne, Victoria.

Department of Environment and Primary Industries (DEPI) 2013, *Biodiversity Interactive Map 2.0*. Department of Environment and Primary Industries (then DSE), East Melbourne, Victoria, viewed 8th July 2014, <http://www.depi.vic.gov.au>.

Port Phillip and Westernport Catchment Management Authority (PPWCAM) 2006, *Port Phillip and Westernport Native Vegetation Plan*, Port Phillip and Westernport CMA, Frankston, Victoria.

Appendix 1: Flora species recorded in the offset zones during 2014 site visit

Origin	Common Name	Scientific name	Conservation status		
			EPBC	FFG	DEPI
	Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*			VU
*	Artichoke Thistle	*Cynara cardunculus subsp. flavescens*			
*	Broad-leaf Dock	*Rumex obtusifolius subsp. obtusifolius*			
*	Brown-top Bent	*Agrostis capillaris var. capillaris*			
*	Cane Needle-grass	*Nassella hyalina*			
*	Chilean Needle-grass	*Nassella neesiana*			
	Chocolate Lily	*Arthropodium strictum s.s.*			
*	Cocksfoot	*Dactylis glomerata*			
	Common Tussock-grass	*Poa labillardierei var. labillardierei*			
	Common Woodruff	*Asperula conferta*			
*	Couch	*Cynodon dactylon var. dactylon*			
*	Curled Dock	*Rumex crispus*			
*	Fiddle Dock	*Rumex pulcher subsp. pulcher*			
	Grassland Wood-sorrel	*Oxalis perennans*			
*	Hairy Hawkbit	*Leontodon taraxacoides subsp. taraxacoides*			
	Hairy Sheep's Burr	*Acaena agnipila*			
	Hairy Willow-herb	*Epilobium hirtigerum*			
*	Hawthorn	*Crataegus monogyna*			
	Kangaroo Grass	*Themeda triandra*			
	Knob Sedge	*Carex inversa*			
*	Large Quaking-grass	*Briza maxima*			
*	Medic	*Medicago spp.*			
*	Onion Grass	*Romulea rosea*			
*	Paterson's Curse	*Echium plantagineum*			

Origin	Common Name	Scientific name	Conservation status		
			EPBC	FFG	DEPI
*	Perennial Rye-grass	*Lolium perenne var. perenne*			
	Plains Sedge	*Carex bichenoviana*			
*	Ribwort	*Plantago lanceolata*			
	River Red-gum	*Eucalyptus camaldulensis*			
	Rush	*Juncus spp.*			
	Soft Tussock-grass	*Poa morrisii*			
*	Spear Thistle	*Cirsium vulgare*			
*	Sweet Briar	*Rosa rubiginosa*			
*	Sweet Vernal-grass	*Anthoxanthum odoratum*			
*	Texas Needle-grass	*Nassella leucotricha*			
*	Toowoomba Canary-grass	*Phalaris aquatica*			
	Variable Crane's-bill	*Geranium sp. 2*			

***** = introduced species; **FFG (L)** = Listed as threatened under FFG Act; **DEPI** = Status in DEPI Advisory List; **EPBC** = Status under EPBC Act; **C** = critically endangered; **EN** = endangered

Appendix 2: Terrestrial fauna species that occur or are likely to occur in the broader offset site

Origin	Common Name	Scientific Name	Conservation status		
			EPBC	FFG	DSE
Birds					
	Australasian Pipit	*Anthus novaeseelandiae*			
	Australian Hobby	*Falco longipennis*			
	Australian Magpie	*Gymnorhina tibicen*			
	Australian Owlet-nightjar	*Aegotheles cristatus*			
	Australian Raven	*Corvus coronoides*			
	Australian White Ibis	*Threskiornis molucca*			
	Banded Lapwing	*Vanellus tricolor*			
	Black Falcon	*Falco subniger*			VU
	Black Kite	*Milvus migrans*			
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*			
	Black-fronted Dotterel	*Elseyornis melanops*			
	Black-shouldered Kite	*Elanus axillaris*			
	Blue-winged Parrot	*Neophema chrysostoma*			
	Brown Falcon	*Falco berigora*			
	Brown Goshawk	*Accipiter fasciatus*			
	Brown Songlark	*Cincloramphus cruralis*			
	Cattle Egret	*Ardea ibis*			
	Collared Sparrowhawk	*Accipiter cirrhocephalus*			
*	Common Blackbird	*Turdus merula*			
	Common Bronzewing	*Phaps chalcoptera*			
*	Common Myna	*Acridotheres tristis*			
*	Common Starling	*Sturnus vulgaris*			
	Crested Pigeon	*Ocyphaps lophotes*			
	Crimson Rosella	*Platycercus elegans elegans*			
	Dusky Woodswallow	*Artamus cyanopterus*			
	Eastern Rosella	*Platycercus eximius*			
*	European Goldfinch	*Carduelis carduelis*			
*	European Greenfinch	*Carduelis chloris*			
*	European Skylark	*Alauda arvensis*			
	Fairy Martin	*Hirundo ariel*			
	Fan-tailed Cuckoo	*Cacomantis flabelliformis*			
	Flame Robin	*Petroica phoenicea*			
	Fork-tailed Swift	*Apus pacificus*			
	Galah	*Eolophus roseicapilla*			
	Golden Whistler	*Pachycephala pectoralis*			
	Grey Butcherbird	*Cracticus torquatus*			
	Grey Currawong	*Strepera versicolor*			
	Grey Fantail	*Rhipidura albiscarpa*			
	Grey Shrike-thrush	*Colluricincla harmonica*			
	Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*			
	Horsfield's Bushlark	*Mirafra javanica*			
*	House Sparrow	*Passer domesticus*			
	Laughing Kookaburra	*Dacelo novaeguineae*			
	Little Button-quail	*Turnix velox*			NT
	Little Corella	*Cacatua sanguinea*			
	Little Eagle	*Hieraaetus morphnoides*			
	Little Lorikeet	*Glossopsitta pusilla*			

Origin	Common Name	Scientific Name	Conservation status		
			EPBC	FFG	DSE
	Little Raven	*Corvus mellori*			
	Long-billed Corella	*Cacatua tenuirostris*			
	Magpie-lark	*Grallina cyanoleuca*			
	Masked Lapwing	*Vanellus miles*			
	Masked Woodswallow	*Artamus personatus*			
	Mistletoebird	*Dicaeum hirundinaceum*			
	Musk Lorikeet	*Glossopsitta concinna*			
	Nankeen Kestrel	*Falco cenchroides*			
	New Holland Honeyeater	*Phylidonyris novaehollandiae*			
	Noisy Miner	*Manorina melanocephala*			
	Pacific Barn Owl	*Tyto javanica*			
	Pacific Black Duck	*Anas superciliosa*			
	Pallid Cuckoo	*Cuculus pallidus*			
	Peregrine Falcon	*Falco peregrinus*			
	Pied Currawong	*Strepera graculina*			
	Purple-crowned Lorikeet	*Glossopsitta porphyrocephala*			
	Rainbow Lorikeet	*Trichoglossus haematodus*			
	Red Wattlebird	*Anthochaera carunculata*			
	Red-rumped Parrot	*Psephotus haematonotus*			
*	Rock Dove	*Columba livia*			
	Rose Robin	*Petroica rosea*			
	Rufous Whistler	*Pachycephala rufiventris*			
	Sacred Kingfisher	*Todiramphus sanctus*			
	Silvereye	*Zosterops lateralis*			
	Southern Boobook	*Ninox novaeseelandiae*			
	Spotted Harrier	*Circus assimilis*			NT
	Spotted Pardalote	*Pardalotus punctatus*			
*	Spotted Turtle-Dove	*Streptopelia chinensis*			
	Straw-necked Ibis	*Threskiornis spinicollis*			
	Striated Pardalote	*Pardalotus striatus*			
	Stubble Quail	*Coturnix pectoralis*			
	Sulphur-crested Cockatoo	*Cacatua galerita*			
	Superb Fairy-wren	*Malurus cyaneus*			
	Swift Parrot	*Lathamus discolor*	EN	L	EN
	Tawny Frogmouth	*Podargus strigoides*			
	Tree Martin	*Hirundo nigricans*			
	Varied Sittella	*Daphoenositta chrysoptera*			
	Wedge-tailed Eagle	*Aquila audax*			
	Welcome Swallow	*Hirundo neoxena*			
	Whistling Kite	*Haliastur sphenurus*			
	White-browed Woodswallow	*Artamus superciliosus*			
	White-faced Heron	*Egretta novaehollandiae*			
	White-fronted Chat	*Epthianura albifrons*			
	White-necked Heron	*Ardea pacifica*			
	White-plumed Honeyeater	*Lichenostomus penicillatus*			
	White-throated Needletail	*Hirundapus caudacutus*			
	White-winged Chough	*Corcorax melanorhamphos*			
	White-winged Triller	*Lalage sueurii*			
	Willie Wagtail	*Rhipidura leucophrys*			
	Yellow-billed Spoonbill	*Platalea flavipes*			

Origin	Common Name	Scientific Name	Conservation status		
			EPBC	FFG	DSE
	Yellow-faced Honeyeater	*Lichenostomus chrysops*			
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*			
	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*			
Mammals					
*	Black Rat	*Rattus rattus*			*
*	Cat	*Felis catus*			*
	Chocolate Wattled Bat	*Chalinolobus morio*			
	Common Brushtail Possum	*Trichosurus vulpecula*			
	Eastern Grey Kangaroo	*Macropus giganteus*			
*	European Hare	*Lepus europeaus*			*
*	European Rabbit	*Oryctolagus cuniculus*			*
	Fat-tailed Dunnart	*Sminthopsis crassicaudata*			NT
	Gould's Wattled Bat	*Chalinolobus gouldii*			
	Grey-headed Flying-fox	*Pteropus poliocephalus*	VU	L	VU
*	House Mouse	*Mus musculus*			*
	Large Forest Bat	*Vespadelus darlingtoni*			
	Lesser Long-eared Bat	*Nyctophilus geoffroyi*			
	Little Forest Bat	*Vespadelus vulturnus*			
*	Red Fox	*Vulpes vulpes*			*
	Southern Forest Bat	*Vespadelus regulus*			
	Southern Freetail Bat (long penis)	*Mormopterus sp. 1*			
	White-striped Freetail Bat	*Tadarida australis*			
Reptiles					
	Bougainville's Skink	*Lerista bougainvillii*			
	Common Blue-tongued Lizard	*Tiliqua scincoides*			
	Eastern Brown Snake	*Pseudonaja textilis*			
	Garden Skink	*Lampropholis guichenoti*			
	Large Striped Skink	*Ctenotus robustus*			
	Lowland Copperhead	*Austrelaps superbus*			
	Tiger Snake	*Notechis scutatus*			
	Tussock Skink	*Pseudemoia pagenstecheri*			
Frogs					
	Common Froglet	*Crinia signifera*			
	Common Spadefoot Toad	*Neobatrachus sudelli*			
	Plains Froglet	*Crinia parinsignifera*			
	Southern Brown Tree Frog	*Litoria ewingii*			
	Southern Bullfrog	*Limnodynastes dumerilii*			
	Spotted Marsh Frog	*Limnodynastes tasmaniensis*			
	Striped Marsh Frog	*Limnodynastes peronii*			
Invertebrates					
	Golden Sun Moth	*Synemon plana*	CE	L	EN

Appendix 3: 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 No.	
Signature	
Date	

Please attach a copy of Management Action Table from the Offset Plan with information on which actions have been completed for year/s of this reporting period.

Describe specific monitoring results from surveys undertaken, survival rates of revegetation works, fencing work, success of weed and pest animal control work, successful management tools (i.e. techniques used to control weed species, protection of new plants, monitoring techniques…) and any problems or issues experienced (i.e. new infestation of weed species, storm damage to fencing…).

Provide photographs showing evidence of works.

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

Appendix 4: Summary of responses and offset criteria for approved native vegetation removal DNRE (2002)

APPENDIX 4 RESPONSES AND OFFSET CRITERIA - SUMMARY

TABLE 6. SUMMARY OF RESPONSES AND OFFSET CRITERIA GRADED ACCORDING TO CONSERVATION SIGNIFICANCE

CONSERVATION SIGNIFICANCE	VERY HIGH	HIGH	MEDIUM	LOW
Response to proposal to clear & offset	In keeping with the principles in Section 4 and in the context of the Net Gain approach which has, as a priority, the avoidance of further permanent losses of native vegetation through clearing (page 19):			
	Clearing not permitted unless exceptional circumstances apply (i.e. impacts are an unavoidable part of a development project, with approval of the Minister for Environment and Conservation (or delegate) based on considerations of environmental, social and economic values from a statewide perspective)	clearing generally not permitted	clearing generally not permitted	clearing may be permitted but only as part of an appropriate sustainable use response as determined by the responsible planning authority
	If some clearing is to be permitted, the following offset requirements must be met			
Net outcome	substantial net gain i.e. at least 2 X the calculated loss in habitat hectares[1]	net gain i.e. at least 1.5 X the calculated loss in habitat hectares[1]	equivalent gain i.e. at least 1 X the calculated loss in habitat hectares[1, 2]	equivalent gain i.e. at least 1 X the calculated loss in habitat hectares[1, 2]
Formal agreement to achieve and secure offset	Requirements to achieve offsets must be identified in the associated management agreements &/or the permit conditions. Gains must be of an on-going and secure nature. Once achieved the offset must be maintained and the relevant planning authorities must maintain adequate and readily accessible records of agreed offset arrangements (ultimately on the Native Vegetation Permit Tracking system)			
Like-for-Like				
vegetation or habitat type of offset	the same vegetation/ habitat type	the same vegetation/ habitat type OR a Very High significance vegetation/ habitat in the same Bioregion	Any EVC in the Bioregion OR a Very High or High significance vegetation/ habitat in an adjacent Bioregion	
landscape role	Similar or more effective ecological function AND land protection function as impacted by the loss	Similar or more effective ecological function OR land protection function as impacted by the loss	Similar or more effective land protection function as impacted by the loss	
quality objectives for offset	The existing vegetation proposed as the basis of an offset must be at least 90% of the quality in the area being lost.	75% of the quality in the area being lost	50% of the quality in the area being lost	
	The proportion of revegetation included in the offset (in habitat hectares) is limited to 10%	25%	50%	100%

1 Gains can include active improvements of quality and/or avoiding potential losses of quality by agreement to forego permitted uses. Note that applying all of the following offset criteria (where relevant) may require more than the minimum habitat hectares specified by these multipliers

2 Where gains are achieved in vegetation/habitat of a higher significance than the vegetation lost, then the amount of the offset will be proportionally reduced (eg. offsetting losses in medium conservation significance with very high conservation significance gains will reduce the amount of the offsets required by half, i.e. the medium multiplier divided by the very high multiplier)

CONSERVATION SIGNIFICANCE	VERY HIGH	HIGH	MEDIUM	LOW
large old tree[4] objectives for offset	For remnant patches of native vegetation that contain large old trees[4] for each large old tree removed as part of permitted clearing[3]:			
	8 other large old trees to be protected AND 40 new trees to be recruited[5]	4 other large old trees to be protected AND 20 new trees to be recruited[5]	2 other large old trees to be protected AND 10 new trees to be recruited[5]	no specific 'other large old tree protection' offset required
	For parcels of land greater than 4 ha and with 8 or more scattered old trees[4] /ha for each large old tree removed as part of permitted clearing[3]:			
	8 other large old trees to be protected 40 new trees to be recruited[5]	4 other large old trees to be protected 20 new trees to be recruited[5]	2 other large old trees to be protected 10 new trees to be recruited[5]	10 new trees to be recruited[5]
	for each medium old tree removed as part of permitted clearing[3]:			
	4 other medium old trees to be protected 20 new trees to be recruited[5]	2 other medium old trees to be protected 10 new trees to be recruited[5]	1 other medium old tree to be protected 5 new trees to be recruited[5]	5 new trees to be recruited[5]
	For parcels of land greater than 4 ha with less than 8 scattered old trees[4]/ha, or For parcels of land less than 4 ha with any number of scattered old trees[4]/ha for each medium or large old tree removed as part of permitted clearing[3] an appropriate number of new trees must be recruited. The number of new trees that must be recruited will be specified in regional Native Vegetation Plans and may be graded according to conservation significance. These numbers will be clearly greater than those specified above for recruitment that is supplementary to protection of other trees. However, where it better suits their circumstances, landholders may use the "protect other trees and ensure supplementary recruitment" approach to meet this criteria.			
Vicinity	Gains must be within the same bioregion, and within the same priority landscape zone[6] as the loss where considered appropriate by the planning authority	Gains must be within the same bioregion as the loss	Gains must be within the same bioregion as the loss OR an adjacent bioregion if offsets are in Very High or High significance vegetation	
Timing	Offsets to be initiated prior to the loss	Offsets to be initiated as soon as possible after loss occurs but no more than 1 year (seasonal requirements to be considered)		

3 these offsets are only required as a consequence of native vegetation clearing which requires and receives a planning permit, and not where tree removal is exempt from the requirement to have such a permit

4 old trees, large or medium, are defined as individuals of key long-lived dominant tree species (as specified in the relevant EVC benchmark) that are greater than certain diameters (for large or medium) at 1.3 m above ground level

5 on a case-by-case basis at the discretion of the planning authority, this requirement to recruit new trees may be either through plantings to a prescribed standard (e.g. species composition, density, survivorship) and/or through regeneration associated with protection of other old trees. Recruitment should meet the timing criterion below. Any plantings that have been undertaken by the landholder since 1989 and that meet all the relevant offset criteria, can be used to meet this requirement.

6 Identified in local landscape-scale biodiversity action plans

Appendix 5: Appendix 3.4.3 of the Port Phillip and Westernport Catchment Management Authority Native Vegetation Plan (PPWCMA 2006)

Table 3.4C: Offset Requirements for the loss of scattered trees of various ages and sizes

		BIOREGIONAL CONSERVATION SIGNIFICANCE			
		Very High	High	Medium	Low
'Protect and recruit' offset requirements[17] for scattered old trees	**Very large old trees**[18] *(At least 1.5 times trunk diameter of a large old tree as defined by the relevant EVC benchmark)*	Protect **10** very large old trees and recruit **50** new plants	Protect **5** very large old trees and recruit **30** new plants.	Protect **4** very large old trees and recruit **20** new plants.	Protect **2** very large old trees and recruit **10** new plants.
	Large old trees (> 1.0 to <1.5 times *trunk diameter of a large old tree as defined by the relevant EVC benchmark*)	Protect **8** large old trees and recruit **40** new plants	Protect **4** large old trees and recruit **20** new plants.	Protect **2** large old trees and recruit **15** new plants.	Protect **1** large old tree and recruit **10** new plants.
	Medium old trees (> 0.75 to <1.0 x *trunk diameter of a large old tree as defined by the relevant EVC benchmark*)	Protect **4** medium[3] old trees and recruit **20** new plants.	Protect **2** medium[3] old trees and recruit **20** new plants.	Protect **1** medium[3] old tree and recruit **15** new plants.	Protect **1** medium[3] old tree and recruit **10** new plants.
'Recruitment-only' offset requirements for scattered old trees	**Very large old trees**[1] *(At least 1.5 times trunk diameter of a large old tree as defined by the relevant EVC benchmark)*	Recruit **350** new plants.	Recruit **180** new plants.	Recruit **140** new plants.	Recruit **70** new plants.
	Large old trees (> 1.0 to <1.5 times *trunk diameter of a large old tree as defined by relevant EVC benchmark)*	Recruit **240** new plants.	Recruit **120** new plants.	Recruit **65** new plants.	Recruit **35** new plants.
	Medium old trees[3] (> 0.75 to <1.0 x *trunk diameter of a large old tree as defined by relevant EVC benchmark)*	Recruit **100** new plants.	Recruit **60** new plants.	Recruit **35** new plants.	Recruit **30** new plants.
	Smaller trees (<0.75 x *trunk diameter of a large old tree as defined by relevant EVC benchmark)*	See Figure 7 and Table 3.4D below	See Figure 7 and Table 3.4D below	See Figure 7and Table 3.4D below	See Figure 7 and Table 3.4D below
Type of vegetation or habitat to be created by the offset		Trees must belong to the same vegetation/ habitat type (EVC) as those being cleared	Trees must belong to the same vegetation/ habitat type (EVC) as those cleared OR to a very high significance vegetation/ habitat in the same bioregion	Trees can belong to any EVC in the bioregion OR to a very high or high significance vegetation/ habitat in an adjacent bioregion[2]	Trees can belong to any EVC in the bioregion OR to a Very High or High significance vegetation/ habitat in an adjacent bioregion[2]

[17]Where gains are achieved in vegetation/habitat of a higher significance than the vegetation lost, then the amount of the offset will be proportionally reduced (eg. offsetting losses in medium conservation significance with very high conservation significance gains will reduce the amount of the offsets required by half, i.e. the medium multiplier divided by the very high multiplier)

[18]Old trees, very large, large or medium, are defined as individuals of key long-lived canopy tree species (as specified in the relevant EVC benchmark) that are greater than certain trunk diameters at 1.3 m above ground level

Table 3.4C: Offset Requirements for the loss of scattered trees of various ages and sizes continued

	BIOREGIONAL CONSERVATION SIGNIFICANCE			
	Very High	**High**	**Medium**	**Low**
Ecological and landscape and function of the vegetation to be created by the offset.	Similar or more effective ecological function and land protection function as impacted by the loss	Similar or more effective ecological function and land protection function as impacted by the loss	Similar or more effective land protection function as impacted by the loss	Similar or more effective land protection function as impacted by the loss
Location of the offset vegetation.	Gains must be within the same bioregion, and within the same priority landscape zone[19] as the loss where considered appropriate by the responsible authority.	Gains must be within the same bioregion as the loss.	Gains must be within the same bioregion as the loss OR an adjacent bioregion if offsets are in Very High or High significance vegetation.	Gains must be within the same bioregion as the loss OR an adjacent bioregion if offsets are in Very High or High significance vegetation.
Timing of the offset	Offsets to be initiated prior to the loss.	Offsets to be initiated as soon as possible after loss occurs but no more than 1-year (seasonal requirements to be considered).	Offsets to be initiated as soon as possible after loss occurs but no more than 1-year (seasonal requirements to be considered).	Offsets to be initiated as soon as possible after loss occurs but not more than 1-year (seasonal requirements to be considered).

Appendix 6: EVC Benchmarks

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 55_61: Plains Grassy Woodland

Description:
An open, eucalypt woodland to 15 m tall. Occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer. This variant occupies areas receiving approximately 500 – 700 mm annual rainfall.

Large trees:

Species	DBH(cm)	#/ha
Eucalyptus spp.	80 cm	8 / ha

Tree Canopy Cover:

%cover	Character Species	Common Name
10%	*Eucalyptus camaldulensis*	River Red Gum

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	1	5%	T
Medium Shrub	3	10%	MS
Small Shrub	2	1%	SS
Prostrate Shrub	1	1%	PS
Large Herb	3	5%	LH
Medium Herb	8	15%	MH
Small or Prostrate Herb	3	5%	SH
Large Tufted Graminoid	2	5%	LTG
Medium to Small Tufted Graminoid	12	45%	MTG
Medium to Tiny Non-tufted Graminoid	2	5%	MNG
Bryophytes/Lichens	na	10%	BL
Soil Crust	na	10%	S/C

LF Code	Species typical of at least part of EVC range	Common Name
MS	*Acacia pycnantha*	Golden Wattle
MS	*Acacia paradoxa*	Hedge Wattle
SS	*Pimelea humilis*	Common Rice-flower
PS	*Astroloma humifusum*	Cranberry Heath
PS	*Bossiaea prostrata*	Creeping Bossiaea
MH	*Oxalis perennans*	Grassland Wood-sorrel
MH	*Gonocarpus tetragynus*	Common Raspwort
MH	*Acaena echinata*	Sheep's Burr
SH	*Dichondra repens*	Kidney-weed
SH	*Hydrocotyle laxiflora*	Stinking Pennywort
LTG	*Austrostipa mollis*	Supple Spear-grass
LTG	*Austrostipa bigeniculata*	Kneed Spear-grass
MTG	*Themeda triandra*	Kangaroo Grass
MTG	*Elymus scaber* var. *scaber*	Common Wheat-grass
MTG	*Austrodanthonia setacea*	Bristly Wallaby-grass
MTG	*Austrodanthonia racemosa* var. *racemosa*	Stiped Wallaby-grass
MNG	*Microlaena stipoides* var. *stipoides*	Weeping Grass

Recruitment:
Continuous

Organic Litter:
10 % cover

Logs:
10 m/0.1 ha.

Victoria The Place To Be

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MS	*Lycium ferocissimum*	African Box-thorn	high	high
LH	*Cirsium vulgare*	Spear Thistle	high	high
LH	*Sonchus oleraceus*	Common Sow-thistle	high	low
LH	*Plantago lanceolata*	Ribwort	high	low
MH	*Hypochoeris radicata*	Cat's Ear	high	low
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
MTG	*Vulpia bromoides*	Squirrel-tail Fescue	high	low
MTG	*Romulea rosea*	Onion Grass	high	low
MTG	*Briza minor*	Lesser Quaking-grass	high	low
MTG	*Briza maxima*	Large Quaking-grass	high	low

Published by the Victorian Government Department of Sustainability and Environment May 2004

Appendix 7: Offsite offsets which relate to this Plan

ABZECO
Applied Botany, Zoology & Ecological Consulting

Golden Sun Moth Conservation Management Plan
346 Streatham-Carngham Road, Chepstowe

Prepared for Asset 1 Pty Ltd

Report 13002, Version 1.0

November 2013

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Table of Contents

1 Introduction

Aspect 1 Pty Ltd commissioned Abzeco Pty Ltd to produce a Conservation Management Plan (CMP) for 40 ha of Golden Sun Moth habitat (the Offset Site) at 346 Streatham-Carngham Road, Chepstowe. The CMP is required to inform the EPBC referral process for land at 60 Harvest Home Road, Victoria (the development site).

This plan defines clear objectives for habitat protection, maintenance and enhancement for the Golden Sun Moth, a species of National Environmental Significance (NES) known to occur within the proposed offset site. Major objectives outlined in this plan will inform detailed design, implementation, protection and monitoring programs to be undertaken over the 10-year conservation management period.

2 Background

2.1 Offset Site

The Offset site is 40 ha of privately owned land at 346 Streatham-Carngham Road, Chepstowe, approximately 150km west of Melbourne, Victoria. A targeted Golden Sun Moth survey of the site (Abzeco 2013) outlines the extent of Golden Sun Moth habitat and existing records for the site and surrounding areas.

2.2 Golden Sun Moth

Description

The Golden Sun Moth is a medium-sized, day-flying moth exhibiting a high degree of sexual dimorphism. Females have bright, orange hind wings and males have dull brown hindwings. Males are also slightly larger than females (see also Images 1a and 1b below), having a wingspan of 3.5 cm as opposed to the females 3cm wingspan (DSE 2004).

Images 1a and 1b. Golden Sun Moth *Synemon plana* from Craigieburn Grasslands. Females have dark, near black forewings and brighter hind wings (K. Whittaker 2008, Abzeco Pty Ltd)

Images 2a and 2b. Golden Sun Moths from the offset area (D. Nugent 2012, Abzeco Pty Ltd)

Conservation Status

The Golden Sun Moth is currently listed as 'critically endangered' under the Victorian *Flora and Fauna Guarantee Act* 1988 (FFG Act) and is also considered 'critically endangered' under the Commonwealth *Environment and Biodiversity Protection Act* 1999 (EPBC Act).

Distribution

At the time of European settlement, the Golden Sun Moth had a wide distribution within temperate grasslands and open grassy woodlands of the south east of Australia. In Victoria, their recorded distribution extended across vast areas of the north, central and west. With the direct loss and fragmentation of the majority of grassy ecosystems within Victoria since European settlement, Golden Sun Moth distribution has simultaneously been greatly reduced and fragmented.

In recent years, the recorded distribution of Golden Sun Moth populations in Victoria has greatly increased, both in extent and number of records. This is largely due to a significant increase in sampling effort related to expansion of the Urban Growth Boundary of Greater Melbourne. This has also skewed the number of records, with the greatest concentration of records being around the north and west of Melbourne where Growth Area Authority surveys took place. Never the less, historical distribution of this species has been significantly reduced and is now mostly limited to remnant, grassy vegetation communities to the north and west of Melbourne (DSE 2013).

Distribution within the offset site

The Golden Sun Moth has been recorded across the extent of the study site, in both higher quality grassland vegetation areas and Wallaby Grass dominated open pasture (Abzeco 2013). While Moths have been incidentally recorded in low numbers over a number of years, a recent targeted survey recorded over 155 individuals within the offset site and adjacent vegetation (Abzeco 2013).

Habitat

This species is typically known to inhabit grassy-woodland and grassland vegetation dominated by a range of native grasses including Wallaby Grass *Rytidosperma* spp., Spear Grass *Austrostipa* spp., Red-leg Grass *Bothriochloa macra* and Kangaroo Grass *Themeda triandra*. Surveys in recent years have shown that this species is not wholly dependent upon native grasses and have been observed in degraded grassland areas dominated by Chilean Needle-grass *Nassella neesiana*.

Life History

Golden Sun Moth larvae spend two to three years underground feeding on the roots of perennial grasses (both native and exotic). Adult moths emerge continuously during the breeding season, normally between mid-October and early January, depending on climate and location. While females are poor fliers and walk between grass tussocks, males are active fliers at about 1m off the ground, with both sexes being active during the warmest part of the day (approximately 1000-1400 h).

2.3 Legislation, Regulations and the Cardinia Planning Scheme

The key biodiversity protection legislation and policy directing preparation and implementation of this management plan are the Commonwealth *Environment Protection and Biodiversity*

Conservation Act 1999 (EPBC Act) and associated EPBC Act Policy Statement (DEWHA 2009a), the *Catchment and Land Protection* Act *1994 (*CaLP Act*)* and the Pyrenees Shire planning scheme.

2.3.1 *Environment Protection and Biodiversity Conservation Act* (1999)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary Commonwealth legislation for environment protection. Under the EPBC Act, an action will require approval from the Commonwealth Environment Minister if it has, will have, or is likely to have a significant impact on a matter of 'National environmental significance' and it is not subject to certain specified exceptions.

Matters of National Environmental Significance (NES) trigger the Commonwealth's environmental assessment and approval responsibilities. These matters are: World Heritage properties, Ramsar wetlands of international importance, nationally listed threatened species and ecological communities, migratory species protected under international agreements, the Commonwealth marine environment and nuclear actions.

If a project might impact on a matter of National environmental significance, a 'Referral' to the Commonwealth Minister for the Environment (may include a delegate of the minister) is required. If the Minister considers it is likely that a proposed action will impact upon a matter of National environmental significance, the action is considered 'controlled' and requires a detailed assessment and the grant of a permit to proceed.

2.3.2 Catchment and Land Protection Act (1994)

The *Catchment and Land Protection Act 1994* (the CaLP Act) seeks to protect Victorian land and water resources from degrading processes.

Under the Act, Landowners are required to conserve soil, protect water resources, eradicate 'Controlled' and 'Prohibited' weeds, eradicate pest animals and avoid causing land degradation on neighboring properties. Landowners may be served with a Land Management Notice that may prohibit or regulate land use, or specify management actions required to be undertaken on degraded land.

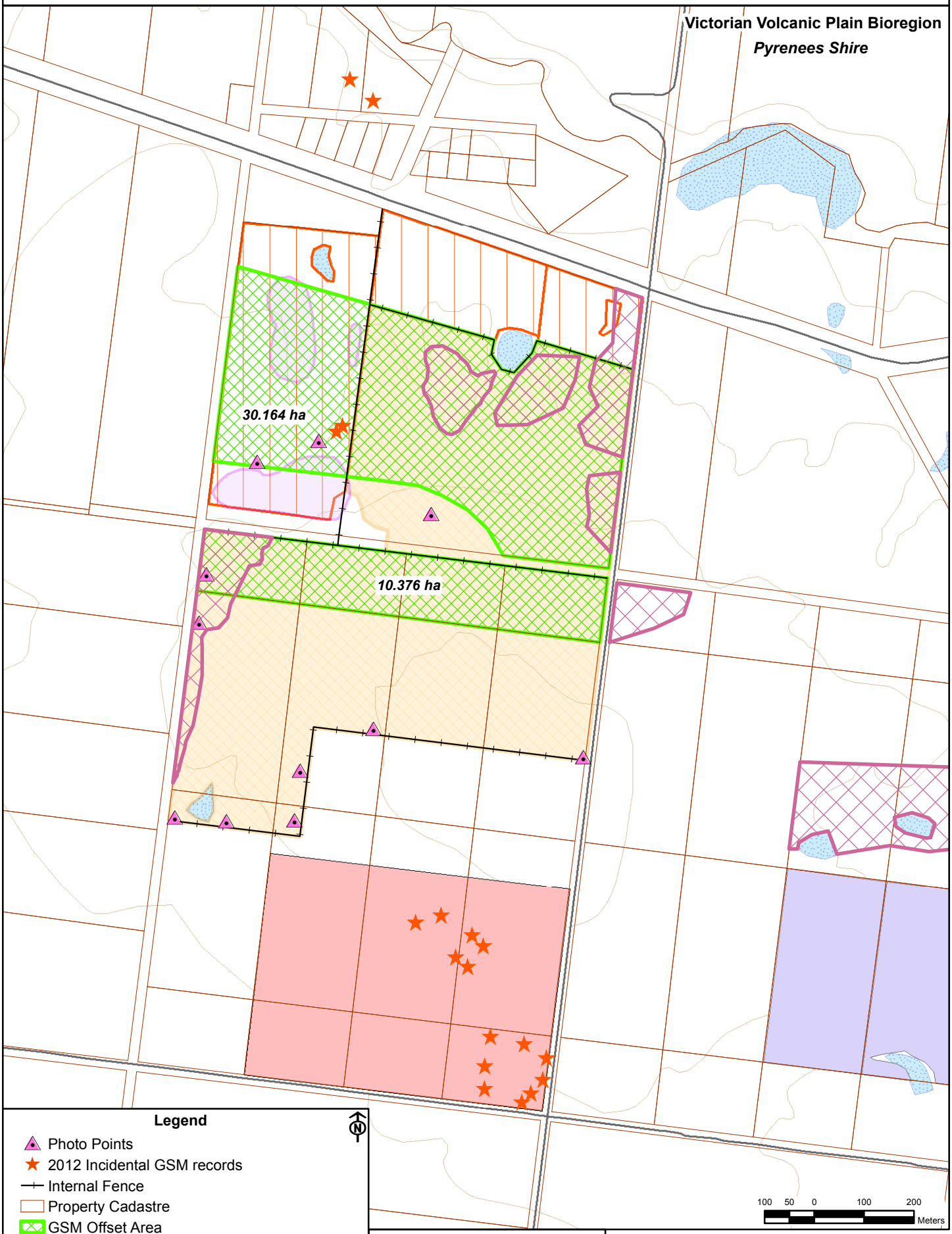
2.3.3 Pyrenees Shire Planning Scheme

According to online mapping[1] the offset site is currently zoned Farming Zone (FZ). Under provisions of the Planning Scheme, a permit is not required for a number of land use practices, including agriculture.

The offset site is also subject to a Restructure Overlay (RO), a key objective of which is to identify old and inappropriate subdivisions which are to be restructured.

[1] http://www.dse.vic.gov.au/planningschemes/cardinia/map.html

Figure 1. GSM Records & Proposed Offset Area, 346 Streatham-Carngham Road, Chepstowe



Legend

- Photo Points
- 2012 Incidental GSM records
- Internal Fence
- Property Cadastre
- GSM Offset Area
- 2012 Australian Ecosystems GSM Records
- 2012 Survey (155+ males)
- 2010-2011 Incidental Abzeco GSM Records
- High Quality Plains Grassland
- Westlink Offset
- Caroline Springs Offset

Scale 1:10,000

Survey Date: Various 2010 - 2013

Created by: Richard Francis

File: J:\Jobs\2013_Jobs\13002-GSM Offset\Abzeco13002-Figure02

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ABZECO
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3 Conservation Management Plan

3.1 Introduction

This Conservation Management Plan (CMP) provides objectives and guidelines for detailed habitat protection and maintenance measures, with a view to maintaining the existing Golden Sun Moth population size and distribution within the offset site. Management actions outlined in the plan will be directed towards habitat protection, biomass management and establishing and implementing a Golden Sun Moth population monitoring program.

3.2 Offset Site (Management Area)

The offset site is 40 ha of privately owned land at 346 Streatham-Carngham Rd, Chepstowe (see Figure 1). The site forms part of a larger property that has a long history of agricultural land use, namely grazing and cultivation. While the offset site has been subject to a grazing regime for over 100 years, grazing intensity has been gradually reduced over the last 30 years as the landowner made a strategic decision to move from exotic pasture to native grass. As a result, the number of sheep has been gradually reduced across the broader property from approximately 5,000 to approximately 2,600 over that time.

Topography within the offset site varies, from Brown-top Bent **Agrostis capillaris* dominated depressions to elevated, higher quality and well-draining areas dominated by native grasses and herbs. At present the pasture areas are dominated by Sweet Vernal Grass **Anthoxanthum odoratum*, Brown top Bent **Agrostis capillaris* and Wallaby Grass *Austrodanthonia* spp.

Higher quality vegetation within the survey area is dominated by indigenous grasses including Wallaby Grass *Austrodanthonia* spp. (~75% cover) and Spear Grass *Austrostipa* spp. (~10% cover) with negligible exotic grass cover (< 2%), represented by the species Brown-top Bent **Agrostis capillaris*, Brome **Vulpia* spp., and Hair-grass **Aira* spp. Native herbs include Bluebell *Wahlenbergia* spp., Scaly Buttons *Leptorhynchos squamatus* and Blue Devil *Eryngium ovinum*. Exotic herbs are limited to a very low cover of Smooth Cat's-ear **Hypochaeris glabra* and Flatweed **Hypochaeris radicata*.

The offset site has no fire history and during the recent prolonged drought, exotic grass species all but disappeared. There has been a dramatic increase in the cover of Sweet Vernal Grass and Brown-top Bent in the open pasture areas over the past two years, with this season's Sweet Vernal Grass growth being the largest the landowner has seen in his time on the property.

During the present site survey, soil moisture was high and there was negligible bare ground as a result of the dense, rank Sweet Vernal Grass. Sward height across the site ranged from 150mm to 300mm as it had been selectively grazed by sheep.

The offset site is not specifically fenced, however the broader property is divided into paddocks. There are sheep camps within fenced areas that have been excluded from the offset management areas. Given trees in these areas provide shade and shelter required seasonally for stock access to these areas will be maintained to contain impacts to already impacted areas. Although GSM were recorded within the stock camp areas their frequent use by stock limits potential for habitat improvement.

A baseline vegetation assessment was undertaken to inform preparation of the present management schedule and actions. A targeted Golden Sun Moth survey will be undertaken across the study site in the flying season for each year of the 10-year management period.

Objectives

The following key protection and conservation management objectives apply to the offset site:

- protection of existing Golden Sun Moth habitat in perpetuity,
- vegetation management to maintain and enhance existing habitat values,
- monitoring and review of management works to ensure successful habitat protection and maintenance
- monitoring to ensure Golden Sun Moth population size and distribution is maintained

3.3 Timing and Review

This CMP will be implemented from the date of approval by regulatory authorities and will be adhered to for a 10-year conservation management period. Where considered necessary, management actions may be amended to reflect changes in environmental conditions within the site, or in the instance that new information is obtained as a result of monitoring and review activities.

3.4 Offset Site Security

As stipulated in the Offset Supply Agreement, the landowner will be entering into a section 173 agreement with Pyrenees Shire Council for the offset site. The section 173 agreement will secure the area as an offset site in perpetuity.

3.5 Monitoring and Responsibilities

The Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) will approve this plan and oversee implementation of management actions for the duration of the 10-year management period in conjunction with the landowner and Council. Management actions will be undertaken by the landowner and where, required, a team of suitably qualified and experienced contractors. The landowner will liaise and work in conjunction with at least one representative from Pyrenees Shire Council.

Project Supervision & Monitoring Program

A monitoring program suitable for the duration of the project has been devised. This includes the determination of key performance criteria, monitoring parameters, assessment protocols and baseline data collection at the study site.

Monitoring parameters are set out in section 2.4.1 and each monitoring action will include:

- data collection on environmental attributes
- inspection of habitat protection measures
- implementation of appropriate responses to site assessments
- reporting on project outcomes

Any deviations or failures to meet Conservation Management Plan objectives will be reviewed and addressed via adaptive management measures to ensure objectives are satisfactorily met within the 10 year management period.

Project monitoring results will be made available to relevant stakeholders upon request.

Funding

All works undertaken during the 10-year conservation management period will be funded by Asset1 Pty Ltd.

3.6 Management Actions

1. **Baseline Ecological Assessment and Ongoing Monitoring Program**

   A benchmark assessment of vegetation condition and the status of the Golden Sun Moth population has been undertaken to inform the present CMP and is to be documented as part of the annual works record for the first year of management. Ongoing assessments will be undertaken at regular frequencies and following key events that pose a risk to the species and/or habitat. They will be conducted by appointed ecological experts or the landowner, adhering to established survey guidelines and protocol (DEWHA 2009, 2009a).

   Results will be assessed by appointed ecologists and in the event that results are deemed to have a negative effect on the Golden Sun Moth, appropriate mitigation measures will be recommended and implemented to the satisfaction of the ecologists.

   Baseline and on-going monitoring will involve a vegetation and habitat quadrat survey at each photo monitoring point, as well as a targeted Golden Sun Moth survey as outlined below:

   Vegetation and Habitat Assessment parameters:

   - Surveys are to be conducted in spring and will include a general description of the condition of the site and flora species list (any threatened species or notable weed infestations are to be mapped for follow-up monitoring or control, respectively).
   - Vegetation and habitat assessments are to be conducted using a 1m x 1m quadrat at each of the established monitoring points
   - A photo of the vegetation condition and structure is to be taken at each monitoring point.
   - The following information is to be collected within each quadrat:
     - Current vegetation condition
     - Weed species (and % cover)
     - Host plant species (and % cover)
     - Bare ground
     - Sward height
   - Vegetation and habitat assessments are to be documented and provided to the regulatory authority as part of the annual management report.

Targeted Golden Sun Moth Survey

A Targeted Golden Sun Moth survey is to be undertaken during each annual flying period (late October – January) and will adhere to DSEWPaC (2009) survey guidelines. The following summarises survey guidelines for the site;

- Surveys to be conducted by suitably qualified and experienced ecologists or landowner.
- Surveys conducted across the entire offset site, irrespective of whether the vegetation is native or exotic and irrespective of past or current land management practices.
- Surveys commence when the flight season around the Melbourne region begins (contact DEPI for more information).
- Surveys to be conducted over four non-consecutive suitable days (or until moths are detected)
- Moths are most likely to be active under the following conditions:
    - Warm to hot day (generally above 20°C by 10am),
    - Clear or mostly cloudless sky,
    - Still or relatively still wind conditions,
    - At least two days since rain,
- Once moths are detected, survey effort should be concentrated around determining the size and distribution of the population.
- Given the size of the survey area, a transect approach (50m between each transect) with two or more observers will be most practical and efficient.
- Temperature, wind speed and humidity data for the offset site is to be recorded either on-site using a hand-held weather meter (e.g. Kestrel® model k3500) measured at ~50 cm off the ground, or using observations from the Ballarat Aerodrome weather station from the Bureau of Meteorology website (Bureau of Meteorology, www.bom.gov.au).
- Targeted survey results are to be documented and provided to the regulatory authority as part of the annual management report.

2. <u>Fencing</u>

Existing fencing of the broader property and current land management regimes are sufficient for ensuring livestock have restricted access to the offset site. It is considered impractical to fence the offset site entirely as this may result in excluding stock from existing camp areas which provide shade, shelter and water. As these areas are already impacted by stock activity, they should remain accessible to stock, alleviating the need to create new camps and degrade other areas.

Fencing of the 40 ha offset site specifically may be a consideration further into the management period when grazing may no longer be taking place. In this instance, fencing should be standard farm-style post and wire, with no barbed to be used. As part of pest animal management of the offset site, it may be a consideration to incorporate rabbit proofing into the fence design. This could prove more economical in the long-term with regard to rabbit management.

3. Pest Animal Management

Rabbits and Foxes are known to be prevalent throughout the local area, however rabbit numbers at the site are not significant. Rabbit activity across the broader property is localised and is negligible within the offset site. Although warrens continually arise across the property due to a lack of readily available harbour, they are quickly destroyed by gas-blasting and this is the primary method for keeping numbers at a sustainable level across the land.

Foxes are a threat to a range of native fauna and rabbits create high levels of soil disturbance associated with burrows and grazing, which impacts on natural regeneration of native understorey.

Monitoring of pest animal activity and control, where practical, will continue within the offset area as part of the regime occurring across the broader property. Given the size of the property and similar land use on neighbouring properties, feral animal control requires a collaborative, integrated effort and should be approached from a regional perspective.

Rabbit Control

Rabbit activity will be continually monitored and appropriate action taken, where practical, to prevent any escalation in populations. Rabbits will generally reside among piles of timber, rock and other debris but also build and maintain large warrens. Rabbit activity impacts negatively upon native vegetation and contributes to erosion by creating areas of bare ground.

Monitoring and control, where practical, of rabbits will be required on an on-going basis. The use of poisoned carrots for rabbit baiting is not recommended as they may be consumed by kangaroos and other native macropods that are susceptible to the baits. However, bait stations that specifically target rabbits can be easily constructed and more information is available from local Council.

At present, a warren destruction and shooting program is undertaken to keep rabbit numbers down across the entire property and this is considered the most practical, economical and effective method of control for the property.

Rabbit inspections and any necessary control should be undertaken twice yearly. Rabbit control typically occurs in mid to late winter and late summer/early autumn, though may be required at any time when rabbit numbers increase to the point that patches of bare ground are visible as a result of grazing pressure.

Any rabbit control actions should be followed up with monitoring to determine if a suitable level of control was achieved. Monitoring of rabbit activity at the site should include site inspection to locate active burrows/warrens, with sufficient effort taken to observe any likely harbour areas such logs or dense understorey.

Warrens should always be left untreated until after a scheduled baiting program has been completed to ensure effective control.

Fox Control

The property should be monitored for fox activity, which is likely to increase with rabbit activity. Should foxes become a management issue, control should be a combination of trapping, shooting, baiting and harbour destruction.

4. Weed Control

The results of targeted Golden Sun Moth survey within the offset site and surrounds suggest that vegetation, at present, is providing preferential Golden Sun Moth habitat. As such, current land management activities are considered appropriate for encouraging and maintaining the required habitat values. However, there has been a significant increase in cover of exotic grasses in the two years since the drought broke. Therefore a reduction in exotic grass biomass in order to promote inter-tussock bare ground will be the focus of weed control and biomass management (see section 5 below) efforts.

Herbicide control of winter active exotic grasses, primarily Sweet Vernal Grass (following removal of grazing) should be undertaken around September, for the first three years of the management period to reduce seed set. Control of Sweet Vernal Grass will only be most effective in the two week period following the first signs of flowering (anther development).

As winter active exotics are annual or biannual, control can be achieved by spray-topping with a 'contact' herbicide such as Basta® or Gromoxone®. This will defoliate target plants, but will not kill native annuals (although some yellowing of foliage may occur) in the event that unpreventable off-target contact occurs.

It is recommended that a number of methods of weed control be trialled in small areas of the site in the first year of the management period, with all successful/unsuccessful trials to be documented and recorded as part of the annual works record for submission. This will assist in developing a site-specific, adaptive weed control regime that allows for flexibility with regard to timing of treatments and methodology.

Monitoring of weeds species and cover, particularly new and emerging threats will be imperative as part of targeted weed control throughout the management period.

5. Biomass Management

Biomass management for Golden Sun Moth habitat can be achieved by grazing with domestic stock, slashing/mowing and/or controlled burns. Management of the offset site in recent years has resulted in optimal habitat for the species, as evidenced by the population numbers and spread recorded in recent targeted surveys. However, annual and seasonal fluctuations in rainfall have resulted in a significant cover of exotic grasses which will be the focus of biomass management efforts in the conservation management period. In addition, as the landowner continues to reduce management input from a grazing perspective, the management period will see a movement from grazing for biomass management to infrequent controlled ecological burning. This will manage biomass levels but also encourage the return of a suite of indigenous herbs and grasses.

Where a weed control program is proposed and undertaken as part of the management regime, ecological burning can serve to assist with control of exotic flora. Burning stimulates germination from seeds of both indigenous and exotic flora, and as such will assist in exhausting the stored seed bank of exotics. However, as germination is promoted, any ecological burning will need to be diligently followed-up with a targeted weed control program.

Grazing

The current grazing regime is proposed to be gradually reduced over the initial years of the management period, and removed entirely prior to the introduction of controlled burning as an alternative and preferred biomass management tool.

The grazing regime will be dependent on annual conditions, for example, in colder years, vegetation growth and flowering can be delayed by up to two months. As a guide, grazing should occur over winter/spring at a rate of approximately 6 sheep per hectare with heavy grazing introduced just prior to removal.

Each year, grazing to be removed when the Sweet Vernal Grass begins to flower (i.e. anther development is visible).

Controlled burning

Controlled burning will benefit both broad vegetation types within the site, that is the higher quality indigenous grass dominated areas and also the predominantly exotic grass pasture. As with all management prescriptions for the site, controlled burning will be site-responsive and dependant on annual and seasonal environmental condition. As a guide, initial burning will be undertaken in the cooler months, specifically to manage biomass levels but also to stimulate a germination event that will promote indigenous flora but also serve to exhaust the exotic grass seed bank. Subsequent burns should then be undertaken in spring, allowing for easier herbicide control of exotic grass regrowth.

The requirements of controlled burning for biomass management are dependent on productivity of the area, but should be undertaken on a regular basis. As a guideline, ecological burning should be undertaken every two to three years to maintain the open grass structure preferred by Golden Sun Moth (Biosis Research 2010). However, as grazing will play a role in biomass management in the first few years of the management period, the first burn will unlikely take place before year 5.

Burning should occur in an approximate 3-5 year cycle at the offset site, with the first burn taking place in year 5 and subsequent burn in year 8 of the 10 year management period.

Direct Seeding/Planting

Following each burn, the site may require direct 'niche' seeding and/or planting to rapidly establish indigenous flora to compete with exotic regrowth in newly created spaces. Planting will also provide indigenous flora propagules for future germination. This process may require some light harrowing with a rake and as such works should be carefully targeted and only occur after an assessment of post fire germination has been performed. Seed, particularly from herbaceous species, is very valuable and should be used sparingly and niche sown by hand. Sowing should be undertaken just prior to a predicted cool wet period.

Direct seeding and planting will include colonising species known to have previously occurred within the site based on high quality grassland vegetation elsewhere on the property, such as Daisy, Wallaby Grasses, Spear Grasses and Geraniums. Seeds will be collected from within the property as part of the present and ongoing annual seed collection program

6. Monitoring and Review

Appointed ecologists and/or the landowner will undertake monitoring at least annually, providing a detailed report to the regulatory authorities. Reporting should clearly outline each activity undertaken, a description of the works and date completed. A brief report will be prepared and submitted, outlining progress with regard to habitat management and Golden Sun Moth population maintenance.

4 Works Schedule

The following works schedule is intended to guide management of the site over the next ten years to ensure the current Golden Sun Moth habitat values are maintained and/or enhanced. Management of the property until the present time has resulted in vegetation that provides preferential habitat for the Golden Sun Moth, evidenced by the size and distribution of the population. However, recent climatic conditions have resulted in a significant cover of exotic grasses, limiting the amount of bare ground and actions over the management period will need to focus on biomass reduction. In addition, weed control works, direct seeding and a gradual shift from grazing to controlled burning will seek to increase the cover of indigenous flora and deplete the exotic seed bank.

Given the long timeframe of the offset works, and given that ecological conditions can change in ways that cannot be anticipated, the following works schedule should be considered a guide only, particularly for the later years of the schedule. Site management should be adaptive and respond appropriately to changes in conditions, particularly any new weed invasions that may occur.

It should be noted that this offset management plan is to reflect beyond the 10 year period outlined. Offsets are in perpetuity and are to be managed in such a way as to maintain the gains achieved over the preceding 10 year period.

4.1 Conservation Management Plan 10-year Implementation Schedule

Table 1. Detailed schedule of Golden Sun Moth habitat conservation management works for the offset site, 346 Streatham-Carngham Road, Chepstowe.

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
1-4	Site inspection	Inspect site to inform ongoing weed control and biomass management works.	December	1	day	Landowner/ Consultant				
1-4	Grazing	Start time and length of grazing required for biomass management to be determined by landowner following previous site assessment and dependant on seasonal conditions. Grazing pressure to increase prior to removal in spring	June-September	Approx. 6/ ha	sheep	Landowner	Reduction in biomass, increase space between grass tussocks			
1-4	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Patch test a range of treatments in areas across the site to determine the most effective given local conditions. Record any successes and failures as part of annual report to DSEWPaC Target control of Sweet Vernal Grass once sheep are removed in spring. Concentrated effort in first two weeks after flowering commences. Monitor the site for any new high threat grassy, herbaceous or woody	September-December	30	days	Landowner/ consultant	<5% Weed Cover	Record treatments and any new weed issues as part of annual monitoring and reporting for submission to DSEWPaC		

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
		weeds and treatment accordingly								
1-4	Seed Collection	Seed collection	September-December	4	days	Landowner/ Contractor				
1-4	Habitat Assessment	Undertake vegetation and habitat quadrat survey as outlined in CMP	September-October	1	day	Landowner/ consultant		Document assessment results as part of annual report submission to DSEWPaC		
1-4	Site inspection	Inspect site to inform ongoing works program.	March	1	days	Landowner/ Consultant				
1-4	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Patch test a range of treatments in areas across the site to determine the most effective given local conditions. Record any successes and failures as part of annual report to DEWHA Target control of Sweet Vernal Grass once sheep are removed in spring. Concentrated effort in first two weeks after flowering commences. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	March	30	days	Landowner/ experienced contractor	<5% Weed Cover			
1-4	Rabbit Control	Monitoring and control where required (shooting, bait stations, warren destruction). May be	February/ March	3	days	Landowner/ experienced contractor				

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
		implemented as part of annual regime for the broader property.								
1-4	Targeted Golden Sun Moth Survey	Undertake targeted survey of Golden Sun Moth, adhering to published survey guidelines (DEWHA 2009). Once moths are detected as active at the site, survey efforts are to concentrate on determining the size and distribution of the population	November-January	4	days	Landowner/ Ecological consultant	No decrease in size or distribution of species population	Document survey results as part of annual report submission to DEWHA		
1-4	Annual Reporting	Compile data and works record sheets for the management year and submit as brief report to relevant regulatory authority and DSEWPaC	December – January	2	days	Landowner/ Consultant		Record works undertaken by task each with hours into the Annual Works Record Sheet. Submit a report to the responsible authority and DSEWPaC outlining achievements and habitat assessment results		
5	Site inspection	Inspect site to inform ongoing weed control and biomass management works.	December	1	day	Landowner/ Consultant				
5	Controlled Burn	Timing of burn for biomass management to be determined by landowner following previous site assessment and dependent on seasonal conditions. In general, an autumn burn will assist in exhausting seed bank of	March-May	1	day	Landowner/ experienced contractor/ CFA	Reduction in biomass, increase space between grass tussocks, increase native			

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
		winter active grasses.					vegetation cover			
5	Weed Control	Follow-up weed control post-fire, targeting exotic grass and flatweed seedlings Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	Post-burn	4	days	Landowner/ experienced contractor				
5	Direct Seeding	Direct seed with native grass as outlined in the CMP and only following controlled burn and post-burn weed control	Post-burn	2	days	Landowner/ experienced contractor	Rapid establishment of native grasses in cleared areas			
5	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass*, Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	September-December	30	days	Landowner/ experienced contractor	<5% Weed Cover			
5	Seed Collection	Seed collection	September-December	4	days	Landowner/ Contractor				
5	Habitat Assessment	Undertake vegetation and habitat quadrat survey as outlined in CMP	September-October	1	Day	Landowner/ consultant		Document assessment results as part of annual report submission to DSEWPaC		
5	Site inspection	Inspect site to inform ongoing works program.	March	1	days	Landowner/ Consultant				
5	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants.	March	30	days	Landowner/ experienced	<5% Weed Cover			

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
		Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly				contractor				
5	Rabbit Control	Monitoring and control where required (shooting, bait stations, warren destruction). May be implemented as part of annual regime for the broader property.	February/ March	3	Days	Landowner/ experienced contractor				
5	Targeted Golden Sun Moth Survey	Undertake targeted survey of Golden Sun Moth, adhering to published survey guidelines (DEWHA 2009). Once moths are detected as active at the site, survey efforts are to concentrate on determining the size and distribution of the population	November-January	4	Days	Landowner/ Ecological consultant	No decrease in size or distribution of species population	Document survey results as part of annual report submission to DEWHA		
5	Annual Reporting	Compile data and works record sheets for the management year and submit as brief report to relevant regulatory authority and DSEWPaC	December – January	2	Days	Landowner/ Consultant		Record works undertaken by task each with hours into the Annual Works Record Sheet. Submit a report to the responsible authority and DSEWPaC outlining achievements and habitat assessment results		
6-7	Site inspection	Inspect site to inform ongoing weed	December	1	day	Landowner/				

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
		control and biomass management works.				Consultant				
6-7	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	September-December	30	days	Landowner/ experienced contractor	<5% Weed Cover			
6-7	Seed Collection	Seed collection	September-December	4	days	Landowner/ experienced contractor				
6-7	Habitat Assessment	Undertake vegetation and habitat quadrat survey as outlined in CMP	September-October	1	Day	Landowner/ consultant		Document assessment results as part of annual report submission to DSEWPaC		
6-7	Site inspection	Inspect site to inform ongoing works program.	March	1	days	Landowner/ Consultant				
6-7	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	March	30	days	Landowner/ experienced contractor	<5% Weed Cover			
6-7	Rabbit Control	Monitoring and control where required (shooting, bait stations, warren destruction). May be implemented as part of annual regime for the broader property.	February/ March	3	Days	Landowner				

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
6-7	Targeted Golden Sun Moth Survey	Undertake targeted survey of Golden Sun Moth, adhering to published survey guidelines (DEWHA 2009). Once moths are detected as active at the site, survey efforts are to concentrate on determining the size and distribution of the population	November-January	4	Days	Landowner/ Ecological consultant	No decrease in size or distribution of species population	Document survey results as part of annual report submission to DEWHA		
6-7	Annual Reporting	Compile data and works record sheets for the management year and submit as brief report to relevant regulatory authority and DSEWPaC	December – January	2	Days	Landowner/ Consultant		Record works undertaken by task each with hours into the Annual Works Record Sheet. Submit a report to the responsible authority and DSEWPaC outlining achievements and habitat assessment results		
8	Site inspection	Inspect site to inform ongoing weed control and biomass management works.	December	1	day	Landowner/ Consultant				
8	Site inspection	Inspect site to inform ongoing works program.	March	1	days	Landowner/ Consultant				
8	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high	March	30	days	Landowner/ experienced contractor	<5% Weed Cover			

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
		threat grassy, herbaceous or woody weeds and treatment accordingly								
8	Rabbit Control	Monitoring and control where required (shooting, bait stations, warren destruction). May be implemented as part of annual regime for the broader property.	February/ March	3	Days	Landowner/ experienced contractor				
8	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	September-December	30	days	Landowner/ experienced contractor	<5% Weed Cover			
8	Seed Collection	Seed collection	September-December	4	days	Landowner/ Contractor				
8	Habitat Assessment	Undertake vegetation and habitat quadrat survey as outlined in CMP	September-October	1	Day	Landowner/ consultant		Document assessment results as part of annual report submission to DSEWPaC		
8	Targeted Golden Sun Moth Survey	Undertake targeted survey of Golden Sun Moth, adhering to published survey guidelines (DEWHA 2009). Once moths are detected as active at the site, survey efforts are to concentrate on determining the size and distribution of the population	November-January	4	Days	Landowner/ Ecological consultant	No decrease in size or distribution of species population	Document survey results as part of annual report submission to DEWHA		
8	Annual Reporting	Compile data and works record sheets for the management year and submit as brief report to relevant	December – January	2	Days	Landowner/ Consultant		Record works undertaken by task each with		

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
		regulatory authority and DSEWPaC						hours into the Annual Works Record Sheet. Submit a report to the responsible authority and DSEWPaC outlining achievements and habitat assessment results		
9	Site inspection	Inspect site to inform ongoing weed control and biomass management works.	December	1	day	Landowner/ Consultant				
9	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	September-December	30	days	Landowner/ experienced contractor	<5% Weed Cover			
9	Seed Collection	Seed collection	September-December	4	days	Landowner/ Contractor				
9	Habitat Assessment	Undertake vegetation and habitat quadrat survey as outlined in CMP	September-October	1	Day	Landowner/ Consultant		Document assessment results as part of annual report submission to DSEWPaC		
9	Site inspection	Inspect site to inform ongoing works program.	March	1	days	Landowner/ Consultant				

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
9	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass, *Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	March	30	days	Landowner/ experienced contractor	<5% Weed Cover			
9	Rabbit Control	Monitoring and control where required (shooting, bait stations, warren destruction). May be implemented as part of annual regime for the broader property.	February/ March	3	Days	Landowner				
9	Targeted Golden Sun Moth Survey	Undertake targeted survey of Golden Sun Moth, adhering to published survey guidelines (DEWHA 2009). Once moths are detected as active at the site, survey efforts are to concentrate on determining the size and distribution of the population	November-January	4	Days	Landowner/ Ecological consultant	No decrease in size or distribution of species population	Document survey results as part of annual report submission to DEWHA		
9	Annual Reporting	Compile data and works record sheets for the management year and submit as brief report to relevant regulatory authority and DSEWPaC	December – January	2	Days	Landowner/ Consultant		Record works undertaken by task each with hours into the Annual Works Record Sheet. Submit a report to the responsible authority and DSEWPaC outlining achievements and habitat assessment		

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
								results		
10	Site inspection	Inspect site to inform ongoing weed control and biomass management works.	December	1	day	Landowner/ Consultant				
10	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass*, Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	September-December	30	days	Landowner/ experienced contractor	<5% Weed Cover			
10	Seed Collection	Seed collection	September-December	4	days	Landowner/ Contractor				
10	Habitat Assessment	Undertake vegetation and habitat quadrat survey as outlined in CMP	September-October	1	Day	Landowner/ Consultant		Document assessment results as part of annual report submission to DSEWPaC		
10	Site inspection	Inspect site to inform ongoing works program.	March	1	days	Landowner/ Consultant				
10	Weed Control	Spot Spray across entire site, taking care to avoid existing native plants. Key Target Weeds; Sweet Vernal Grass*, Brown-top Bent* Flatweed *Hypochaeris* spp. Monitor the site for any new high threat grassy, herbaceous or woody weeds and treatment accordingly	March	30	days	Landowner/ experienced contractor	<5% Weed Cover			
10	Rabbit Control	Monitoring and control where required (shooting, bait stations,	February/ March	3	Days	Landowner				

Year(s)	Management action	Description of action	Timing	Quantity	Units	Who will undertake this action?	Standard to be achieved	Monitoring and Reporting	Completed (Yes/No)	Month/Year Completed
		warren destruction). May be implemented as part of annual regime for the broader property.								
10	Targeted Golden Sun Moth Survey	Undertake targeted survey of Golden Sun Moth, adhering to published survey guidelines (DEWHA 2009). Once moths are detected as active at the site, survey efforts are to concentrate on determining the size and distribution of the population	November-January	4	Days	Landowner/ Ecological consultant	No decrease in size or distribution of species population	Document survey results as part of annual report submission to DSEWPaC		
10	Final Reporting	Compile data and works record sheets for the management year and submit as brief report to relevant regulatory authority and DSEWPaC	December – January	2	Days	Landowner/ Consultant		Record works undertaken by task each with hours into the Annual Works Record Sheet. Submit a report to the responsible authority and DSEWPaC outlining achievements and habitat assessment results		

5 Conclusion

The present Conservation Management Plan provides a broad framework and management guidelines for achieving habitat protection, maintenance and enhancement for Golden Sun Moth within the offset site at 346 Streatham-Carngham Road, Chepstowe. While the offset site has a long history of land management for agricultural purposes, targeted surveys have shown that a large Golden Sun Moth population persists within the site and as such, existing habitat values are to be maintained. In particular habitat management works will focus on biomass management through grazing initially and then alternatively and preferentially introducing a controlled burn regime. This will ensure suitable inter-tussock spacing is provided and will favour the return of indigenous grass dominated vegetation over exotic.

While the landowner has made a conscious decision to shift from exotic grass-dominated pasture to a high quality native grass area, a more strategic, site-responsive and adaptive effort will be required to encourage the regeneration of indigenous grassland species that have otherwise struggled to return under the current management regime.

Management of the site for Golden Sun Moth habitat will focus on biomass management, weed control and will encourage a shift from exotic to indigenous flora dominated vegetation. In addition, a number of other actions may be undertaken as part of current and ongoing native vegetation and habitat enhancement works across the broader property. These works include seed collection, direct seeding and/or planting, pest animal management and fencing.

Regular monitoring of the site, including vegetation assessment and targeted Golden Sun Moth survey, will inform ongoing works and ensure that the Golden Sun Moth population remains or improves upon the current size and distribution. Monitoring of works and a record of successes and failures in the initial years will encourage an adaptive and site-responsive management regime which will maintain or enhance habitat values that secure the Golden Sun Moth population within the site in perpetuity.

6 References

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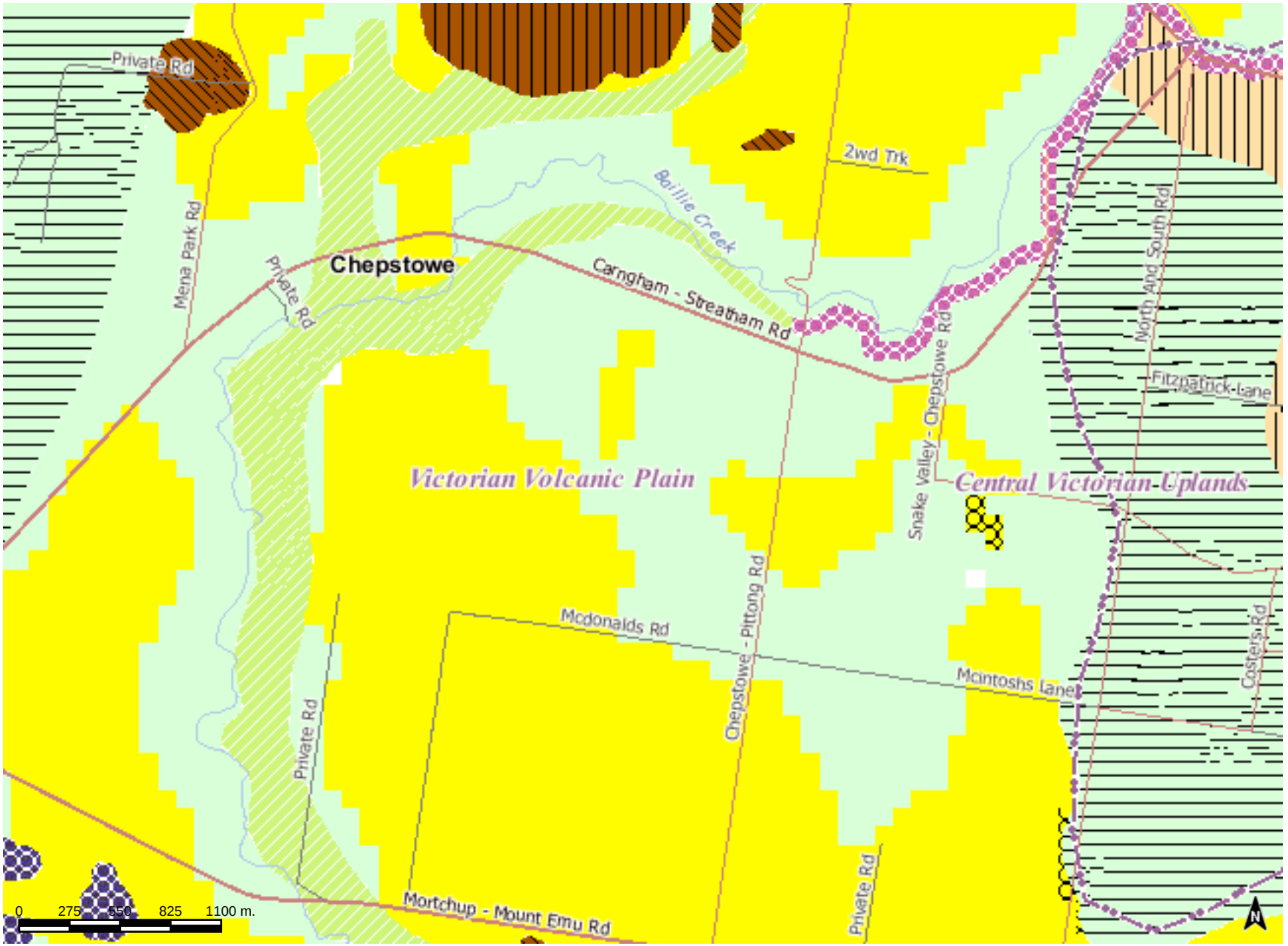
DEWHA (2009) *Background Paper to EPBC Act Policy Statement 3.12 – Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (Synemon plana)*. Australian Government Department of the Environment, Water, Heritage and the Arts, Canberra.

DEWHA (2009a) *EPBC Act Policy Statement 3.12 - Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (Synemon plana).* Australian Government Department of the Environment, Water, Heritage and the Arts, Canberra.

Appendix 8: Pre-European EVC mapping of the third-party (offsite) offset site

Map created Wed Nov 26 13:54:26 EST 2014



BIOREGION BOUNDARY

ROADS
- Freeway
- Highway
- Main Road
- Secondary Road
- Local Road
- 2WD (Unsealed)
- 4WD Only
- Walking or Cycle Track

WATERCOURSES
- Major Watercourse
- Minor Watercourse

ECOLOGICAL VEGETATION CLASSES
- 68 Creekline Grassy Woodland
- 641 Riparian Woodland
- 132 Plains Grassland
- 55 Plains Grassy Woodland
- 175 Grassy Woodland
- 20 Heathy Dry Forest
- 691 Aquatic Herbland/Plains Sedgy Wetland Mosaic
- 647 Plains Sedgy Wetland

1750 EVCs
- 68 Creekline Grassy Woodland
- 641 Riparian Woodland
- 125 Plains Grassy Wetland
- 132 Plains Grassland
- 897 Plains Grassland/Plains Grassy Woodland Mosaic
- 55 Plains Grassy Woodland
- 175 Grassy Woodland
- 20 Heathy Dry Forest
- 691 Aquatic Herbland/Plains Sedgy Wetland Mosaic
- 647 Plains Sedgy Wetland

WATERBODIES
- Watercourse Area
- Permanent Waterbody
- Wetland Area

BUILT UP AREAS

Map Scale 1:30,373

Biodiversity Interactive Map A4 Landscape

Produced on Wed Nov 26 13:54:33 EST 2014