

Practical Ecology Pty Ltd

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Net Gain Offset Assessment and Management Plan

For

55 Brunnings Road, Carrum Downs

November 2008

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Net Gain Offset Management Plan 55 Brunnings Road Carrum Downs

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1. INTRODUCTION

Practical Ecology Pty Ltd was commissioned by Brentwood Homes to provide an Offset Management Plan to address losses of native vegetation at 55 Brunnings Road Carrum Downs. Offsetting unavoidable vegetation losses are necessary actions required under local government permit conditions.

This management plan supplements the initial flora and fauna assessment and Net Gain analysis by ABZECO Pty Ltd (Cochrane *et al.* 2008). Please note that this report relies on habitat hectare data and Net Gain assessment for 55 Brunnings Road from the ABZECO report.

The development will result in the loss of indigenous vegetation which has been documented in the previous report. Native vegetation management and Net Gain requirements are necessary actions required under the VCAT determination related to planning permit 413/2007/P. These impacts are proposed to be offset within two public land conservation reserves managed by Frankston City Council.

1.1 Aims

This report aims to:

- present accurate and defensible data to identify the achievable Net Gain Offsets able to be met in the nominated sites;
- explore all criteria to achieve Net Gain Offsets;
- ensure the Department of Sustainability and Environment (DSE) guidelines and policy documents are met by the proposed works;
- prepare a 10 Year Net Gain Offset Action Program (Net Gain Offset Management Plan) to detail practical and economical methods to achieve the Net Gain Offsets required for this project; and
- prepare cost estimates to complete the Schedule of Works.

This report does not contain flora and fauna survey results which have been previously documented by Cochrane *et al.* (2008).

1.2 Study Area

The study area consists of the site of vegetation removal at 55 Brunnings Road, Carrum Downs and the proposed offset sites, Austin Road reserve and “ Cell 3” restoration site (a former tip site adjacent to the Pines Flora and Fauna Reserve) shown in Maps 1 and 2. A detailed description of the area of vegetation removal is provided in Cochrane *et al.* (2008). The study areas lie within the Gippsland Plain bioregion (DSE 2008 online).

Briefly, the land where vegetation removal is permitted is located at 55 Brunnings Road, Carrum Downs, a 2.1 hectare residential development site within the City of Frankston. The site is zoned

Residential 1 (R1Z) under the Frankston Planning Scheme. The site is bound by residential properties to the north and west and beyond Brunnings Road to the south. The southern portion of the eastern boundary lies adjacent to a small remnant Heathy Woodland reserve attached to Carrum Downs Secondary College and the northern portion of this boundary abuts the school's cleared grounds (Cochrane *et al.* 2008).

The majority of the study site is characterised by intact but relatively species - poor Heathy Woodland (EVC 48) with an understorey dominated by Austral Bracken *Pteridium esculentum* (Cochrane *et al.* 2008). The site has been subject to substantial disturbance in the past resulting in the loss of most species characteristic of Heathy Woodland and the dominance of Austral Bracken.

A planning permit has been granted for removal of all native vegetation on the site, consisting of 1.6 hectare of Heathy Woodland.

Two offset sites have been proposed by Frankston City Council. The proposed offset site at Austin Road reserve consists of approximately 2.5 hectares of Heathy Woodland and Swamp Scrub (EVC 53). Despite a relatively high cover of weeds, the Heathy Woodland sections of the reserve are considered to be of medium conservation significance with a moderate diversity of shrubs, grasses and herbs in the understorey. The Swamp Scrub section of the reserve is of relatively high quality, with a low weed cover. Two sections of the reserve, within Heathy Woodland and Swamp Scrub have been recently burnt (see Map 1). Austin Road reserve can be divided into three separate habitat zones based on EVC and vegetation quality (Map 1) and all habitat zones are included in the offset site. An on-going environmental weed control program has been implemented within sections of the reserve over the past year.

An additional offset site is proposed within "Cell 3" a former tip site, adjoining the Pines Flora and Fauna reserve, currently undergoing rehabilitation. As the proposed offset sites within Cell 3 do not support an EVC, revegetation is proposed as a contribution to the offsets. The area proposed for revegetation is approximately 4.7 hectare. Cell 3 would have formerly supported Heathy Woodland and Sand Heathland EVCs.

2. METHODS

Cochrane *et al.* (2008) was relied upon for vegetation data within 55 Brunnings Road. Austin Road reserve was surveyed in detail by Practical Ecology in 2007 (Fairbridge *et al.* 2007) including a vegetation quality assessment according to the Habitat Hectare methodology required under the Native Vegetation Framework (DNRE 2002). This information in conjunction with on-site discussions with City of Frankston Conservation Management staff was utilised to determine its suitability as an offset site and determine management actions required under an offset management plan. A site meeting and inspection of "Cell 3" was conducted with City of Frankston Conservation Management staff in October 2008.

Determination of native vegetation losses and calculation of offset targets was undertaken by Cochrane *et al.* (2008). These calculations were reviewed and confirmed.

Losses were determined according to the method required by *Victoria's Native Vegetation - a Framework for Action* (the Native Vegetation Framework - DNRE 2002) and Net Gain targets were calculated according to the Framework and the *Port Phillip and Western Port Native Vegetation Plan* (PPWPCMA 2006).

Appropriate offset responses to permitted vegetation clearance were determined according to the Native Vegetation Framework. Gains for vegetation protection, maintenance and improvement activities were determined according to the two DSE guidelines and methodology for gain scoring:

Native Vegetation: Scoring Gain from an offset - DSE Gain Calculator user instructions (DSE 2006a) and *Vegetation Gain Approach - Technical Basis for calculating gains through improved native vegetation management and revegetation* (DSE 2006b).

The DSE guidelines for revegetation planting standards (DSE 2006c) was used to assist in determination of revegetation offsets.

Consistent with the project brief, cost estimates are included with this plan. Cost estimates are based on costing expectations and methodologies from October 2008 from Practical Ecology a current bushland contractor to the Council and following discussions with Council.

Appendix 1 presents cost estimates based upon the best available information at the time (October 2008). It is difficult to anticipate the costs of works over a 10 year period, given that numerous variables exist and may influence the costs of carrying out bushland works in the future (for example the price of vehicle fuel, unexpected natural fluctuations in vegetation and habitat).

2.1 Limitations

All vegetation information relies on previous assessments, although general site inspections were undertaken as part of developing this offset plan.

While information presented in maps has been produced with all possible care, it is important to note that inaccuracy may have occurred during the study site mapping and subsequent graphical presentation. Hence the location of the features presented on included maps should only be used as a guide to their exact locality. While it is expected that maps are sufficiently accurate for the purpose of this report, Practical Ecology Pty Ltd provides no guarantee that the representation of features presented in maps are an accurate representation of features within the study site.

3. NET GAIN REVIEW

3.1 Vegetation permitted to be removed

A detailed description of the vegetation within 55 Brunnings Road Carrum Downs is contained in Cochrane *et al.* (2008).

Heathy Woodland, the EVC within the site, is classified as 'Least Concern' within the Gippsland Plain Bioregion (DSE 2008 online).

Two Habitat Zones of Heathy Woodland were identified by Cochrane *et al.* (2008) – Zone 1 and Zone 2. The results of the Habitat Hectare assessments for these two Habitat Zones are presented in Table 1 (adapted from Cochrane *et al.* 2008). The habitat scores are used to calculate the losses in Habitat Hectares and determine the required offsets under the Native Vegetation Framework.

Table 1 shows an estimated 0.664 habitat hectares of Low Conservation Significance Heathy Woodland is permitted to be removed for the development. The extent of the native vegetation permitted to be cleared is shown in Figure 1 in Cochrane *et al.* (2008).

Five Very Large Old trees (VLOT) and 36 Large Old Trees (LOT) and 25 Medium Old Trees (MOT) in habitat zones are permitted to be removed as a result of the development.

Table 1. Quantification of Native Vegetation Habitat Zones within 55 Brunnings Road Carrum Downs (adapted from Cochrane *et al.* 2008)

EVC Name		Heathy Woodland	Heathy Woodland
EVC number		48	48
Habitat Zones		Zone 1	Zone 2
Site Condition	Large Old Trees	10	3
	Canopy Cover	3	2
	Lack of Weeds	5	5
	Understorey	7	9
	Recruitment	5	5
	Organic Litter	5	5
	Logs	3	3
Multiplier	X 1	38	32
Subtotal		0.38	0.32
Land scape	Patch Size	4	4
	Neighbourhood	0	0
	Distance to Core Area	1	1
Habitat Score		43	37
Habitat Score (out of 1.0)		0.43	0.37
Area		0.717 ha	0.961 ha
Habitat Hectares		0.308	0.356
Area of Habitat Zone cleared (ha)		0.717 ha	0.961 ha
Area retained		0	0
Habitat Hectares of loss		0.308	0.356
Bioregion		GP	GP
EVC Conservation Status		LC	LC
Conservation Significance	Cons. status x Habitat score	LOW	LOW
	Threatened species (presence)^	LOW	LOW
	Other site attributes	LOW	LOW
	Overall Conservation Significance	LOW	LOW

GP: Gippsland Plain; LC: Least Concern

3.2 Offset Targets

As the avoidance and minimise decision guidelines under the Native Vegetation Management Framework (DNRE 2002) have been well explored, the actual losses of native vegetation needs to be accounted for and offset appropriately according to like-for-like criteria.

Net Gain targets were calculated according to the Native Vegetation Management Framework and Port Phillip and Western Port Native Vegetation Plan (PPWPCMA 2006). The calculations of offsets and Net Gain targets are detailed in Table 2. A total of 0.664 Habitat Hectares of low conservation significance Heathy Woodland or an equivalent area of revegetation is required to be generated within the Gippsland Plain Bioregion in order to meet the Net Gain policy requirements for removal of native vegetation at the study site.

For low conservation significance vegetation the offset requirement for clearing native vegetation is an equivalent gain i.e. at least 1 X the calculated loss in habitat hectares (i.e. gain of 0.664 Habitat Hectares). All of this gain (100%) can be achieved through revegetation or through any combination of protection and improvement of remnant patches and revegetation (PPWPCMA 2006).

Given the 'Low' conservation significance of the Heathy Woodland to be removed, the Framework and Port Phillip Native Vegetation Plan list no specific offset requirements for protecting and recruiting large old trees in compensation for old trees lost during development. Therefore, as all old trees occur within Habitat Zones, offsets for these trees are included within offsets for the Habitat Zones.

Table 2. Habitat Hectare targets

Habitat Zone	Conservation Significance	Habitat Hectares Target			
		Target EVC	Total Losses in Habitat Ha (#.##)	Net Gain Multiplier	Net Gain Target (Habitat Hectares)
Zone 1	Low	Heathy Woodland	0.308	1	0.308
Zone 2	Low	Heathy Woodland	0.356	1	0.356
Total Net Gain Target					0.664

4. IDENTIFICATION OF OFFSETS AND GAIN SCORING

4.1 4.1 Review of potential offset sites

This section summarises the proposed offsets. Following on from this, management actions required for habitat gain over 10 years are described.

Under the Native Vegetation Framework, the offset responses for permitted clearance of low conservation significance vegetation must meet the following like-for like criteria:

- Any EVC in the same bioregion or a High or Very High significance vegetation type in an adjacent bioregion.
- Similar or more effective land protection function as impacted by the loss.
- The existing vegetation proposed as an offset must be at least 50% of the quality of the area of loss.
- The proportion of revegetation included in the offset is not limited.
- Offsets are to be initiated as soon as possible but not more than one year after the loss occurs.

Two offset sites proposed by the City of Frankston meet the above criteria and include protection and improvement of existing vegetation in Austin Road reserve and a component of revegetation in “Cell 3” restoration zones.

The area available for offsets within Austin Road is 2.5 hectares and within “Cell 3” 4.7 hectares – a total of 7.2 hectares. Section 4.2 below demonstrates that the required gain can be achieved through enhancement of existing vegetation in Austin Road and revegetation in Cell 3.

4.2 4.2 Gains available in proposed offset sites.

The habitat gain scores utilized within this document have been derived from the Department of Sustainability and Environment May 2006 publication entitled *‘Vegetation Gain Approach – Technical basis for calculating gains through improved native vegetation management and revegetation’*. Refer to this publication for a full description of the methodology.

4.2.1 Austin Road

In order to determine the gains available from enhancement of a site supporting existing native vegetation an assessment of the quality of the vegetation is required (i.e. habitat score using the habitat hectare methodology).

The quality of the proposed offset site within Austin Road reserve was assessed using Habitat Hectare methodology as a basis for calculating gains available in the area. The gain scoring presented below is based on this assessment.

Austin Road Reserve is considered an appropriate site to provide the offsets for losses at 55 Brunnings Road as it meets or exceeds the 'like - for - like' criteria required under the Framework and detailed above.

Table 3 summarises the habitat scores and gains available through management of the three Habitat Zones within Austin Road. Table 3 shows that gains of 0.38 Habitat Hectares of gain are available through management and improvement of Austin Road reserve - approximately half the required offsets. The additional 0.28 Habitat Hectares of gain can be generated through revegetation in "Cell 3".

The following provides an explanation for the gain scoring calculations in the table.

Under Net Gain policy (DSE 2006b) some security and improvement gains are available within Austin Road reserve. However, as the reserve is public land prior management gains and maintenance gains are not available.

Austin Road reserve is a public conservation reserve, but a small amount of security gain is available as the proposed offset site is located on public land where conservation is an objective and there is an existing on-title agreement (DSE 2006b). Therefore a security gain of 20% of the improvement gain is available (DSE 2006b). Improvement gains are also available within the offset site (DSE 2006b).

Table 3. Gains available through management of Austin Road reserve

OFFSET IDENTIFIER			HZ1			HZ2			HZ3		
EVC Number			48			48			53		
EVC name (Initials)			HW			HW			Swamp Scrub		
	Current habitat score of zone ¹	0.##	0.42			0.35			0.47		
	Conservation Significance ²		Low			Low			Very High		
		Possible Score	Current Score	Maintenance	Improvement	Current Score	Maintenance	Improvement	Current Score	Maintenance	Improvement
Site Condition ³	Large Old Trees	10	2			0					
	Canopy Cover	5	4		0.4	2		0.4	5		0.0
	Understorey	25	15		2.5	15		2.5	15		5.0
	Lack of Weeds	15	4		2.0	4		2.0	9		4.0
	Recruitment	10	3		2.0	3		4.0	5		4.0
	Organic Matter	5	5		0.0	2		2.0	5		0.0
	Logs	5	5		0.0	5		0.0	3		0.0
Maintenance & improvement totals		##			6.9			10.9			13.0
Total unadjusted site condition gain		###			6.9			10.9			13.0
Site Condition score out of? ⁴		##			75			75			55
Adjusted total site condition gain ⁵		###			6.9			10.9			17.7
Prior Management Gain ⁶		##			0.0			0.0			0.0
Improved Security Gain* ⁷		##			1.4			2.2			3.5
Total habitat gain points out of 100 ⁸		###			8.3			13.1			21.2
Rate of gain per hectare - HHA/ha ⁹		0.##			0.08			0.13			0.21
Area of the offset zone (ha)		##			0.85			1.25			0.70
Gain available (in HHA) ¹⁰		###			0.07			0.16			0.15
Which gain target in table 2 does this gain contribute to? (A1, B1 etc) ¹¹											
Very large old trees available for protection		#			0			0			0
Large old trees available for protection		#			0			0			0
Medium old trees available for protection		#			0			0			0

¹ The habitat score of the offset zone using the habitat hectare method as a 2 decimal place number between 0.00 and 1.00

- 2 The conservation significance of the site as assessed using Table 5, page 53 for the Framework
- 3 Substitute the appropriate maintenance and improvement gain points associated with the management proposed for the offset zone as identified in the DSE Vegetation Gain Approach manual – Mar 2006
- 4 For EVCs where all 7 site condition components are present in the EVC Benchmark, this is 75. It may be as low as 55 for treeless EVCs.
- 5 The site condition gain will adjust automatically if the default "75" that the score is out of is reduced (eg to 65 if there are no large old trees, or to 55 if there are no trees at all in the EVC benchmark)
- 6 Only available on freehold land – see DSE gain guide – equals 10% of the current habitat score for the offset zone (See point 1 above)
- 7 Only available if the site is to be made legally more secure such as by an on–title conservation agreement or reservation etc, or the works are in a secure reserve – (see the DSE Vegetation Gain Approach manual)
- 8 Totals the gain points available from the 4 possible sources (maintenance, improvement, prior management and security)
- 9 Converts the gain points to a rate of gain in Habitat Hectares per hectare (HHA/ha) by dividing the total gain points by 100 and rounding to 3 decimal places
- 10 The total gain available from the offset zone = the rate of gain per hectare (9) multiplied by the area of the offset zone in hectares rounded to two decimal places.
- 11 This is the opportunity to say which target from Table 2 – the summary of gain targets – this offset zone will contribute to. Each target in Table 2 has a letter/number code such as A1, A2, A3 etc for the Very high conservation targets for each EVC affected
- 12 Offset value for protecting old trees is only available if the security of the trees is being improved – not available on Crown land for example.
This is worth recording if trees are being protected, even if this gain is not required
Maintenance not possible on public land

4.2.2 Cell 3

The balance of the offset target (0.28 Habitat Hectares) is proposed to be derived from revegetation of zones within the Cell 3 offset site. For revegetation that meets a defined DSE standard (DSE 2006a) an assigned gain score is applied to the site. In general, revegetation proposals that meet DSE minimum standards will receive an assigned site condition gain score of seven points per hectare. There may be capacity for additional site condition gain for higher quality revegetation. There is also capacity to score gains for logs introduced into the site from the permitted clearing site (DSE 2006a). In addition to gains in the site condition components, revegetation also has the capacity to achieve landscape context gains depending on the size, shape and location of the revegetation in relation to other native revegetation.

Table 4 sets out the offset gains available from revegetation of a section of Cell 3, including landscape gains and introduction of logs from the permitted clearing site. Table 4 shows that revegetation of 1.7 hectare of the Cell 3 site would achieve the required 0.28 Habitat Hectares of gain.

Table 4. Offset Gains from revegetation of sections of Cell 3.

OFFSET IDENTIFIER		Possible	HZ1-1
EVC Name (initials)			HW
EVC Number			48
Offset Site			1
Site Condition	Large Old Trees	10	7
	Canopy Cover	5	
	Understorey	25	
	Lack of Weeds	15	
	Recruitment	10	
	Organic Matter	5	
	Logs	5	5
Total unadjusted site condition gain		#	12
Site Condition score out of? ¹			75
Total of the adjusted site condition gain			12.0
Landscape Gain (3-10 pts)		10	5
Habitat Gain Points		100	17.0
Security Gain (10% s173, etc)		##	0.0
Total Gain in habitat points		###	17.0
Rate of Gain - HHA/ha		0.##	0.17
Size of Revegetation Zone (ha)		##	1.70
Gain (in HHA)		###	0.29

5. GUIDELINES FOR MANAGEMENT

The objective for this section is to outline work areas and the work schedule for conserving and improving the nominated offset areas to achieve the required Net Gain. The work schedule is designed for specific on-ground actions which provide the backbone for contract specifications.

Management of these areas is based on a 10-year period, as per the Framework. This is the minimal time period based on estimates of plant growth from revegetation, restoration and habitat improvement to achieve a Net Gain in vegetation cover and quality.

5.1 Management Commitments

5.1.1 Austin Road Reserve

The commitment required in order to achieve the available gain points within Austin Road reserve as set out in Table 3 will be:

- to reduce the cover of high – threat woody environmental weeds within the three Habitat Zones to < 1% cover and ensure that cover of other high threat weeds does not increase beyond current levels;
- to reduce the cover of all high threat weeds within the recently burnt areas in Habitat Zones 1 and 3;
- to fence off habitat zone 1 to protect the understorey from disturbance and spread of weeds;
- retain all standing trees dead or alive –this will occur automatically as the offsets occur within a conservation reserve; and
- retain all fallen timber, branches and leaf litter – this will occur automatically as the offsets occur within a conservation reserve.

Management actions focus on control of the high-threat woody and herbaceous weeds within the reserve. These actions will supplement the on-going woody weed control program within Habitat Zone 1.

The priorities for management of Habitat Zone 1 in Austin Road reserve are as follows.

Habitat Zone 1

Control of high threat weeds.

A woody weed control program has removed most woody weeds within Habitat Zone 1. However, two sections of this zone was recently burnt in an accidental fires (see Figure 2 and Map 1). Follow up intensive woody, grassy and herbaceous weed control is required in this burnt section during the first year of the Offset Management Plan. On-going woody weed control to remove emerging seedlings is required within the unburnt section of Habitat Zone 1.

Fencing to protect of the understorey

Disturbance due to pedestrian traffic, trail bikes and bicycles through Habitat Zones 1 and 2 is resulting in degradation of the understorey and spread of weeds. Fencing of the southern boundary of the bushland zone is required to protect the understorey. This fencing will result in improvement to the condition of the understorey in these zones and contribute significantly to the required understorey gain score. Figure 1 shows the required fence boundary. The length of fencing required is 198m with maze entrances at the northern and southern ends of the reserve to exclude cycles.

Habitat Zone 2

This zone is the most modified in the reserve, with a total habitat score of 0.35. Sections of this zone were recently burnt and a suite of high threat weeds has invaded following the fires (see Figure 2). Major soil disturbance has also occurred from motorcycle use on the tracks. Despite its modified state the understorey score of 15/25 indicates that the diversity of understorey species is similar to that in Habitat Zone 1.

The proposed fence will also protect the vegetation within Habitat Zone 2 (see Figure 1).

However, while relatively diverse, recruitment of woody species is poor. Large logs have also been retained within the habitat zone.

Control of high threat weeds

The fire has provided an opportunity for woody weed control and rehabilitation of this area. Woody weed control should be commenced during the first year of the Offset Management Plan.

Supplementary planting

Recruitment of woody species is poor in Habitat Zone 2. Supplementary planting of canopy trees and shrubs is required to improve the understorey condition score in this habitat zone and link the Habitat Zone with higher quality vegetation in Habitat Zone 1.

According to DSE's Revegetation Planting Standards, there are no specific standards for supplementary planting within indigenous remnants as vegetation quality and cover can vary significantly from site to site. As natural recruitment is more prolific within remnant patches, plant numbers required for supplementary planting per hectare are generally less than that required for revegetation purposes.

DSE's Revegetation Planting Standards and Bioregional Benchmarks (DSE 2008) indicate that the minimum planting density for offsets of Heathy Woodland EVCs is approximately 4000 plants per

hectare. For Habitat Zone 2 this equates to 2720 plants. The density of supplementary planting of Habitat Zone 2 should be approximately 50% of this density (i.e. install 1360 plants).

Grassy and herbaceous weed control in areas where plants are installed will be required in addition to woody weed control.

Landscaping to discourage cycle access

Habitat Zone 2 is illegally used as a BMX and Trail-bike course, resulting in extensive disturbance to the existing understorey and spread of weeds. Landscaping is required to remove and flatten areas of fill used by cyclists as obstacles. Follow-up weed control and revegetation is required following landscaping. The cost of landscaping should be borne by Council. Offset funding should be used for revegetation and weed control.

Habitat Zone 3

The highest quality section of the reserve is the Swamp Scrub (Habitat Zone 3). However, this section is subject to disturbance through building of cubby houses and dumping of rubbish.

Control of high threat weeds

Approximately 50% of the Swamp Scrub was burnt in Summer 2007 (see Figure 2). This has resulted in regeneration of Swamp Paperbark but also spread of High-threat herbaceous weeds. The section of Swamp Scrub provides the best habitat for a number of frog species within the reserve therefore herbicides should not be used in this section and hand-weeding is required. Hand weeding should be undertaken in a monthly “sweep” of the burnt area.

The remaining Swamp Scrub is relatively weed-free. A yearly weed sweep is sufficient to ensure cover of High-threat weeds in the unburnt Swamp Scrub remains at current levels or lower.

The initial management period of three years will involve the bulk of the weed control works. On-going management after three years will predominantly involve maintenance of the offset site. Offset works will be undertaken by a suitably qualified bush regeneration company or by in-house Shire management staff.

5.1.2 Priority Weeds – Austin Road

Priority weed species for Austin Road Reserve are listed in Table 5.

Table 5. Priority weeds for control – Austin Road Reserve

Keystone	Scattered S1	Scattered S2	Scattered S3	Ubiquitous	Regional status	Origin	Scientific Name	Common Name
X						#	<i>Acacia longifolia subsp. longifolia</i>	Coast/ Sallow Wattle
X						*	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
X					R	*	<i>Asparagus asparagoides</i>	Bridal Creeper
X						*	<i>Briza maxima</i>	Large Quaking Grass
	X				C	*	<i>Chrysanthemoides monilifera</i>	Boneseed
	X					*	<i>Coprosma repens</i>	Mirror Bush
X						*	<i>Ehrharta erecta var. erecta</i>	Panic Veldt-grass

Keystone	Scattered S1	Scattered S2	Scattered S3	Ubiquitous	Regional status	Origin	Scientific Name	Common Name
X						*	<i>Ehrharta longiflora</i>	Annual Veldt-Grass
		X				*	<i>Fumaria bastardii</i>	Bastards Fumitory
	X					*	<i>Genista monspessulana</i>	Montpellier Broom
				X		*	<i>Hypochoeris radicata</i>	Cat's Ear
	X				P	*	<i>Moraea flaccida</i>	One-leaf Cape-tulip
	X					*	<i>Pennisetum clandestinum</i>	Kikuyu
		X				*	<i>Romulea rosea</i>	Onion Grass
			X			*	<i>Solanum nigrum sensu Willis (1972)</i>	Black Nightshade
	X					*	<i>Sollya heterophylla</i>	Blue-bell Creeper
			X			*	<i>Sonchus oleraceus</i>	Common Sow-thistle
		X				*	<i>Stellaria media</i>	Chickweed
X						*	<i>Tradescantia fluminensis</i>	Wandering Jew

KEY

Keystone – weeds which can alter the structure of the vegetation and have widespread impacts. The management of keystone weeds has to be a staged, slow process with care not to alter the balance of the understorey to encourage more weeds. Removal of keystone weeds such as Sallow Wattle/Coast Wattle from intact areas is a priority.

Scattered – weeds which are distributed throughout the study area at a small scale, but have the potential to spread and become a keystone weed. A priority for control through many areas.

S1 – Weeds capable of invading and dominating – High risk, high priority. Eliminate across site

S2 – Generally restricted to disturbed areas – Moderate risk Moderate priority. Eliminate from highest quality areas first.

S3 – little recruitment and generally not aggressive. Negligible risk, lowest priority.

Ubiquitous – weeds which are widespread through the study area, with various degrees of intensity. Some of these weeds, such as Cat's Ear *Hypochoeris radicata*, should only be controlled in areas where there are direct threats to significant flora (orchid beds). Otherwise, weed control of these weeds should aim to maintain at current levels and not allow them to become overly invasive.

R – Regionally restricted weed **P** – prohibited (Port Phillip East region)

C – Regionally controlled weed

Offset requirements can be met by targeting woody weeds with the objective of reducing the cover of these weeds to < 1% of current levels over 10 years.

The Objective for grassy and herbaceous weed control is to ensure cover of these weeds does not increase beyond current levels.

With on-going spraying targeting herbaceous weeds the cover of these weeds can be reduced over 10-years, more than adequately meeting the Net Gain requirement.

However, in the recently burnt areas, the objective should be to reduce the cover of grassy and herbaceous weed to < 1% of current levels.

It is likely that additional areas will be burnt during the 10-year offset period. As areas are burnt – the opportunity to undertake follow-up control of all high threat weeds should be taken.

The aim of woody weed control within the offset area is to cut-and-paint, drill-and-fill or spray all mature plants in Years 1–3, which should then be followed up with an annual weed “sweep” where any seedlings or plants that have been missed can then be controlled.

Woody weed control efforts should be concentrated in the burnt areas and Habitat Zone 2, with an annual woody weed sweep in the remainder of the reserve.

Generally all weed management undertaken within the site should aim to have the least ecological impact. The strategic use of selective herbicides aims to control specific weeds with the maximum efficacy and least off-target damage. Table 6 lists appropriate methods for control of pest plants within the offset areas.

Appendix 1 sets out the works schedule required to achieve the weed control gains required.

Table 6. Appropriate Methods for the Control of Pest Plants

Control Method	Application within Study Site
Hand Weeding	<ul style="list-style-type: none"> orchid and sensitive sites where off target damage would be too high high quality vegetation around significant species
Knapsack Spot Spraying	<ul style="list-style-type: none"> where low volume herbicide applications are required emphasize the strategic use of selective herbicides (see note below) in reasonable quality vegetation for selective grassy and herbaceous weed control
General Knapsack Spraying	<ul style="list-style-type: none"> blackberry infestations
Rig Spraying	<ul style="list-style-type: none"> where broad areas of weeds occur and there is no risk of off target damage to indigenous species
Cut and Paint	<ul style="list-style-type: none"> low volume Blackberry and small woody weed areas within reasonable and high quality vegetation small–medium sized (up to 4m high) woody weeds such as Sweet Pittosporum and Privet
Frill and Fill and Drill and Fill	<ul style="list-style-type: none"> large woody weeds left <i>in situ</i> (involves injecting stem of tree with herbicide)
Burning with a flame thrower	<ul style="list-style-type: none"> low level burning can eliminate seedling beds of weed species through radiant heat allowing for immediate recovery of fire tolerant indigenous species
Biological Control	<ul style="list-style-type: none"> biological controls for certain plants are available but these are unlikely to be a practical application within the study site.

5.1.3 Cell 3

In order to meet the Net Gain target of 0.664 Habitat Hectares, an area of revegetation of 1.7 hectare within “Cell 3” reserve is required to provide the balance of the Net Gain target (0.3 Habitat Hectares) in addition to the works proposed for Austin Road.

The most suitable sections of Cell 3 to provide these offsets are sections 1,3,4,5, and 7 (shown in Map 2). These sites total 1.65 hectare and have been mulched using a forestry mulcher to remove existing woody weeds and provide a mulched substrate for planting.

The commitment required over 10–years in order to achieve the required gain points within Cell 3 set out in Table 3 will be:

- to selectively remove remaining woody weeds within the mulched sections; to reduce the cover of all high threat weeds within the recently burnt areas in Habitat Zones 1 and 3;
- to spray high priority groundcover weeds African Lovegrass *Eragrostis curvula* and Patterson’s Curse *Echium vulgare*;
- to revegetate at one plant per 2m² with species characteristic of Heathy Woodland and Sand Heathland;
- to retain all fallen timber, branches and leaf litter – this will occur automatically as the offsets occur within a conservation reserve;
- to introduce logs from the permitted removal area into the revegetation zone. Only logs from tree genera, including understorey trees, applicable to the offset area should be introduced;
- to control rabbits to protect tube–stock.

Revegetation requirements within Cell 3

All revegetation works should be undertaken using indigenous plant species sourced from local provenance seed stock. It is required under Net Gain policy to source plants for revegetation that are grown from seed of local provenance (from the local area with similar environmental conditions such as geology and rainfall). As a priority, seeds for plants should be collected from adjacent areas (e.g. The Pines Flora and Fauna Reserve).

The general procedure for implementing Net Gain revegetation plans is to:

- Select site according to ecological and landscape function relative to the project
- Identify the EVC that previously occurred in the site
- Establish the benchmark cover for each life form category
- Establish planting densities depending on EVC considerations (woodland or forest, wet, damp or dry)
- Establish a planting schedule with due consideration of
 - Locally indigenous species
 - The full suite of life form categories and
 - Natural densities of species and life forms
 - Implementation and management for a minimum of ten years.

Revegetation specifications for the site in regard to species selection, life form and plant densities have been determined according to EVC benchmarks for Heathy Woodland and Sand Heathland (DSE 2008) and shown in Appendix 2.

DSE's Revegetation Planting Standards indicate that the minimum planting density for offsets of Heathy Woodland and Sand Heathland EVCs is approximately 4000 plants per hectare.

However, as the site is highly disturbed and has a high weed cover, previous revegetation at the site has resulted in a high rate of loss of plants. Therefore it is considered that a rate of 4800 plants/hectare will be required to compensate for the high rate of loss during the establishment phase of the revegetation. This equates to 8160 plants for the 1.7 ha offset area.

In general the DSE minimum revegetation standards do not require the planting of ground covers and native grasses due to the high risk of failure associated with establishing such life forms. In the case of Cell 3, this guideline is appropriate as the site has a high weed cover and rabbit infestation. Swamp Wallabies, which will browse on new plants, are also present. Therefore species selection should be limited to hardy canopy species and understorey shrubs.

Tree guards and stakes

Due to the exposure, hardness of the soil and rabbit infestation at the site, Council has specified that rigid, core-flute plastic tree guards, bamboo stakes and a square wooden stakes are required for plant protection at the site.

Rabbit Control

Cell 3 and the surrounding area is currently infested by rabbits. Rabbit control is essential to ensure the survival of installed plants. Control is best done in cooperation with neighbouring landholders as part of an ongoing integrated plan. In general, management of rabbits across a site involves an integrated approach using a combination of improved poisoning, warren fumigation and/or collapsing, and where appropriate, fencing. Table 7 provides information on each of these methods.

The primary component of rabbit control within the revegetation areas of Cell will be poison baiting with follow - up warren fumigation if necessary. Poisoning in late summer/early autumn should be followed by warren fumigation.

The offset site forms part of a larger revegetation area and should be treated as part of a larger rabbit control program incorporating Cell 3 and the adjoining Pines Flora and Fauna reserve.

Swamp Wallabies occur within Cell 3 and, while they impact on newly established tube stock, it is imperative that during any control rabbit regime, that precautions are taken to reduce the potential danger to Swamp Wallabies and other native wildlife and ensure only the target species (rabbits) are affected. These precautions include:

- matching the amount of poison to the number of rabbits that are present;

- if using a contractor, asking them about their method of determining the amount of poison required and the baiting method they prefer;

- using bait stations, such as cage like structures to exclude large mammals as baits, particularly carrots, can be attractive to marsupials;
- placing bait stations in the area of rabbit feeding activity and not next to the burrow entrance;
- collecting any uneaten baits the morning after baits are laid; and
- following up baiting with an ongoing integrated long-term control regime, including harbour removal and the destruction or fumigation of warrens.

Table 1. Rabbits Control Methods

Poisoning*	<p>For the best results, poison in late summer/early autumn period because: diseases and natural causes, such as food shortages, have reduced rabbit numbers; rabbit population is substantially adult as young rabbits are not old to enough to emerge; from burrows; breeding is usually over and so rabbits range over greater distances.</p> <p>Poisoning of rabbits can take place using one of two poisons, depending on the situation:</p> <p>1080 (sodium monofluoroacetate)</p> <ul style="list-style-type: none"> ▪ A lethal poison registered to control vertebrate pest species (rabbits, foxes, wild dogs and wild/feral pigs), applied to carrot or oats and laid in a trail, ground or aerially broadcast. Rabbit poisoning must be used in combination with other control measures to ensure long-term cost effective rabbit control. ▪ 1080 poison baits currently registered for use are 1080 Carrots Rabbit Bait; 1080 Oats Rabbit Bait; 1080 Pellets Rabbit Bait; and RABBAIT <p>Pindone</p> <ul style="list-style-type: none"> ▪ Active ingredient in the registered rabbit poisons is Pindone Carrots Rabbit Bait (PIN25®) and <i>Rabbait</i>® Aqueous Pindone Concentrate, applied to either oat or carrot bait. <p>To be a long-term cost effective method, rabbit poisoning must be used in combination with other control measures. As Wallabies known to occur across the study site it is essential that poison dose rates and the bait used are appropriate. It is important to note that the use of 1080 and Pindone baits is strictly controlled by legislation and DSE/DPI policies and guidelines, and that it can only be supplied to persons who have completed a Farm Chemical User Course and are in possession of a valid Agricultural Chemical User Permit.</p>
Warren Fumigation*	<p>Fumigation of rabbit warrens can be carried out by depositing a chemical inside the entrances of a warren (diffusion fumigation) or by using a machine to blow a toxic gas mixture throughout the warren system (pressure fumigation).</p> <p>The chemicals currently registered for use as rabbit fumigants are aluminium phosphide and chloropicrin</p>

* Information regarding poisoning and fumigation adapted from Department of Primary Industries (DPI 2007)

Phytophthora

Phytophthora *Phytophthora cinnamomi* is a widespread and destructive plant disease causing dieback and death of indigenous and introduced species of plants by limiting the flow of nutrients and water the plant needs for healthy growth.

“*The spread of Phytophthora cinnamomi from infected sites into parks and reserves, including roadsides, under control of a state or local government authority*” is listed as a potentially threatening process under Victoria’s Flora and Fauna Guarantee Act 1988 and its spread is listed as a key threatening process under the Federal Environment Protection and Biodiversity Conservation Act 1999.

Phytophthora has been identified in sections of Cell 3.

Phytophthora is dispersed throughout the environment in a number of ways. Road construction and maintenance involving the transportation of soil and gravel and movement of people (on footwear) and vehicles are all known to play a role in the spread of Phytophthora.

The most feasible management approach to Phytophthora within Cell 3 is to limit the spread of the pathogen from infested areas and to prevent further isolated outbreaks.

Management activities and movement of vehicles and machinery within Cell 3 may potentially result in the spread of Phytophthora and requires a range of management procedures to prevent its spread within Cell 3 and to other locations.

Contractors and Council personnel undertaking work within Phytophthora infested or bushland reserves should have an established system of weed and pathogen hygiene implemented at each site.

The aim of prevention measures is to prevent spread of *Phytophthora cinnamomi* within the Cell 3 and from Cell 3 to other areas. To meet this aim, the entire area of Cell 3 site should be treated as positive for Phytophthora when moving equipment and personnel between sites.

The following measures are required to prevent the spread of Phytophthora during revegetation and maintenance within Cell 3:

- Contractor/s engaged to carryout works within the study site should be provided with a Management Plan outlining procedures to prevent the spread of Phytophthora;
- All Council and contacting staff should receive a Phytophthora awareness induction prior to works commencement. This induction should include:
 - A basic understanding of Phytophthora dispersal mechanisms and environmental impact;
 - The hygiene protocols for plant and equipment to be followed during construction of the Arthur's Seat Shared Trail and
 - The hygiene procedures required for staff to enter and leave the phytophthora infested and environmentally sensitive zones of the site and the site in general.
- Contractors are required to wash footwear, plant (machinery), equipment and vehicles with an appropriate fungicide upon arrival and departure of worksite. Further, the contractor is required to make as few exits and entries of the worksite as possible.
- Hand tools will be used in the infested areas, reducing the potential impact on the site and potential for spread of pathogens.
- All materials or sources of potentially infected material will be certified Phytophthora-free or alternatively tested for Phytophthora before being brought onto the site.

6. MANAGEMENT SCHEDULE

Tables 7–10 below present the broad management actions to occur over the ten year management period. Scores and increases discussed in the table are relevant to the current habitat score for Austin Road Reserve, the gains required through revegetation of Cell 3 and the projected increase in that score due to the management actions proscribed. Habitat score increases are calculated using the Vegetation Gain Approach DSE (2006a).

Table 7. Austin Road Reserve Offset Site. Habitat Zone 1

Canopy Cover	Understorey	Lack of weeds	Recruitment	Organic Matter	Logs
<p>Current score is 2. An increase of 0.4 is achievable.</p> <p>Woody weeds occur throughout the canopy.</p> <p>There are some regenerating eucalypts.</p> <p>Actions: Retain all trees/large shrubs and encourage recruitment through removal of woody weeds.</p>	<p>Understorey life form diversity is relatively high. Current score is 15. An increase of 2.5 is achievable.</p> <p>Actions: Facilitate natural recruitment with sensitive, strategic weed control.</p> <p>Eliminate all high threat woody environmental weeds (<1% cover) and ensure that cover of other high threat weeds does not increase beyond current levels. ^</p> <p>Eliminate all high threat woody, grassy and herbaceous environmental weeds (<1% cover) within the burnt area.</p> <p>Install a fence to prevent damage to understorey and spread of weeds.</p>	<p>Current score is 4. An increase of 2.0 is achievable.</p> <p>Actions: Eliminate all high threat woody environmental weeds (<1% cover) and ensure that cover of other high threat weeds does not increase beyond current levels. ^</p> <p>Eliminate all high threat woody, grassy and herbaceous environmental weeds (<1% cover) within the burnt area.</p> <p>Install a fence to prevent damage to understorey and spread of weeds.</p> <p>Woody weed removal must be strategic and ongoing with regular follow up. All weed control must be with aim to eliminate and prevent the production of seed in weed species. All indigenous species must be protected from off target damage.</p>	<p>Current scores is 3. An increase of 2.0 is achievable.</p> <p>Actions: Current levels of recruitment should increase subsequent to woody weed control and grassy and herbaceous weed control. All indigenous species must be protected from off target damage.</p>	<p>Current score is 5. An increase of 0 is achievable.</p> <p>Actions: Allow litter to continue to build up.</p>	<p>Current score is 5. No further increase is possible.</p> <p>Actions: To maintain the current log score, all logs should be retained.</p>

Table 8. Austin Road Offset Site Habitat Zone 2.

Canopy Cover	Understorey	Lack of weeds	Recruitment	Organic Matter	Logs
<p>Current score is 2. An increase of 0.4 is achievable.</p> <p>Some large and medium Eucalypts present</p> <p>Actions: Retain all trees/large shrubs and encourage recruitment through weed control.</p>	<p>Understorey life form diversity is moderate. Current score is 15. An increase of 2.5 is achievable.</p> <p>Actions: Facilitate natural recruitment with sensitive, strategic weed control.</p> <p>Eliminate all high threat woody environmental weeds (<1% cover) and ensure that cover of other high threat weeds does not increase beyond current levels. ^</p> <p>In addition, ensure that cover of other herbaceous, grassy and woody environmental weeds do not increase beyond current levels over 10 years.</p> <p>Undertake supplementary revegetation of canopy trees and shrubs.</p> <p>Install a fence to prevent damage to understorey and spread of weeds.</p> <p>Remove areas of dumped fill.</p>	<p>Current score is 4. An increase of 2.0 is achievable.</p> <p>Actions: Eliminate all high threat woody environmental weeds (<1% cover) and ensure that cover of other high threat weeds does not increase beyond current levels. ^</p> <p>Weed control must be strategic and ongoing with regular follow up. All weed control must be with aim to eliminate and prevent the production of seed in weed species. All indigenous species must be protected from off target damage.</p>	<p>Current scores is 3. An increase of 4 is achievable.</p> <p>Actions: Current levels of recruitment should increase subsequent to woody weed control and grassy and herbaceous weed control. All indigenous species must be protected from off target damage during weed control works.</p> <p>Undertake supplementary revegetation of canopy trees and shrubs.</p> <p>Install a fence to prevent damage to understorey and spread of weeds.</p>	<p>Current score is 2. An increase of 2.0 is achievable</p> <p>Actions: Allow litter to continue to build up.</p> <p>This should occur as understorey cover increases following weed control</p>	<p>Current score is 5. An increase of 0 is achievable.</p> <p>Actions: To maintain the current log score, all logs should be retained.</p>

Table 9. Austin Road Offset Site Habitat Zone 3.

Canopy Cover	Understorey	Lack of weeds	Recruitment	Organic Matter	Logs
<p>Current score is 5. An increase of 0 is achievable.</p> <p>Low weed cover and good regeneration.</p> <p>Actions: Retain all trees/large shrubs and encourage recruitment through removal of woody weeds.</p>	<p>Understorey life form diversity is relatively high. Current score is 15. An increase of 5 is achievable.</p> <p>Weed cover is low and elimination of all high threat weeds is achievable.</p> <p>Actions: Facilitate natural recruitment with sensitive, strategic weed control.</p>	<p>Current score is 9. An increase of 4.0 is achievable.</p> <p>Actions: Eliminate all high threat woody environmental weeds (<1% cover) and ensure that cover of other high threat weeds does not increase beyond current levels. ^</p> <p>Eliminate all high threat woody, grassy and herbaceous environmental weeds (<1% cover).</p> <p>On-going hand weeding within the burnt area and spot-spray twice-yearly in the unburnt area.</p>	<p>Current score is 5. An increase of 4.0 is achievable.</p> <p>Actions: Current levels of recruitment should increase subsequent to woody weed control and grassy and herbaceous weed control. All indigenous species must be protected from off target damage.</p>	<p>Current score is 5. An increase of 0 is achievable.</p> <p>Actions: Allow litter to continue to build up.</p>	<p>Current score is 5. No further increase is possible.</p> <p>Actions: To maintain the current log score, all logs should be retained.</p>

General Management Considerations:

- ^ As per DSE (2006a).
- Weed control focusing on the staged removal of woody weeds and control of herbaceous and weedy grasses will have the most impact on vegetation/habitat gains.
- Contractors engaged to undertake weed management works must have a proven track record of working within ecologically sensitive environments.

Table 10. Cell 3 Revegetation site

Canopy Cover	Understorey	Lack of weeds	Recruitment	Organic Matter	Logs
<p>Current score is 0.</p> <p>No score increase possible as canopy takes a number of decades to form structure.</p>	<p>Current score is 0. An increase of 7 is achievable.</p> <p>Actions: Undertake revegetation with 8160 trees and shrubs.</p>	<p>Current score is 0</p> <p>Actions: Reduce all woody weed cover to negligible levels over 10 years.</p> <p>Control spread of African Lovegrass and Patterson’s Curse.</p> <p>Weed control must be strategic and ongoing with regular follow up. Control must be with aim to eliminate and prevent the production of seed in weed species. All indigenous species must be protected from off target damage.</p>	<p>Current score is 0.</p> <p>Actions: Current levels of recruitment should be encouraged through revegetation, direct seeding and any other means possible.</p> <p>All indigenous species must be protected from off weed control damage.</p>	<p>Current score is 0. An increase of 0 is achievable.</p> <p>Actions: allow build up organic litter content in topsoil.</p>	<p>Current score is 0. Gain of 5 is available.</p> <p>Actions: Introduce logs cleared from permitted removal site.</p>

- ^ As per DSE (2006c).

6.1 Work schedule

Provided with this management plan is a 10 year work schedule (Appendix 1). This work schedule provides a general calendar of works and also provides specific actions for each work area where required.

The schedule is intended to provide a planning guide to contractors and project coordinators. It is also anticipated that the contractor is well skilled in weed control methods and the safe and appropriate use of herbicide. It is critical that contractors are skilled in the identification of indigenous plants at all stages of their life cycle development. The contractor's ability to identify newly germinated plants and seedlings and to avoid these plants in weed control works is essential for the success of the recruitment prescriptions proposed in this plan.

6.1.1 Cost estimates

Consistent with the project brief, cost estimates are included with this plan. Costs are based on the management schedule timing and estimated level of work required to manage bushland. The estimates are based on costing expectations and methodologies from November 2008 from the City of Frankston and Practical Ecology, a current bushland contractor.

The table in Appendix 1 presents cost estimates based upon the best available information at the time (November 2008). It is difficult to anticipate the costs of works over a 10 year period, given that numerous variables exist and may influence the costs of carrying out bushland works in the future (for example; the price of vehicle fuel, unexpected natural fluctuations in vegetation and habitat). Despite this, an estimate has been made to help understand the potential costs of the works.

7. MONITORING AND ACCOUNTABILITY

Monitoring is required to track the habitat improvements of the sites to ensure management provides the anticipated Net Gain outcomes. The monitoring proposed below is intended to provide both valuable information on ecological restoration and the ability to meet the policy of Net Gain in actual, on-ground improvements in bushland quality. It is also intended to ensure management, particularly weed control works, are consistent with the objectives of the Management Plan.

Below are a series of monitoring methodologies including modified quadrat monitoring, modified habitat hectare assessments, photo points and work summary assessments to be used in conjunction to determine the effectiveness of management and final outcomes.

Quadrat monitoring, modified habitat hectares and photo points are considered to be consulting works which require the skills of suitably qualified personnel. Field ecologists with experience in these fields are the ideal candidates, however trained bush regenerators can also undertake these works.

The schedule for monitoring is shown in Appendix 1 with the schedule of works. Throughout the 10 years, it is only the summary of annual works which occurs every year. All other monitoring tools occur at the start, after 3 years or after 10 years.

7.1 Quadrat Monitoring

This proposed method of monitoring is through the use of quadrats (20 x 20m) following a modified example of the Braun-Blanquet scale, described in Specht (1981), outlined in the table below.

Table 11. Quadrat cover abundance methodology

Cover value	Cover of foliage/branch	Number of individuals
+	<5%	Few
1	<5%	Many
2	5 - 25%	Any number
3	25 - 50%	Any number
4	50 - 75%	Any number
5	75 - 100%	Any number

The data will be recorded on a flora data recording sheet then sent to DSE's Flora Information System (FIS) for permanent record keeping. The flora data recording sheets need to be archived for comparison in future monitoring also. The quadrats will also be permanently marked in the field with a star picket and recorded with a GPS. The advantage of using permanently marked quadrats in the field allows for precise repetition of sampling, in addition to the GPS co-ordinates. The permanent sites can be visited with the author and the preferred contractor as required.

7.2 Reviewed Habitat Hectare Assessment

It is also important to assess selected criteria from the habitat hectare assessment to determine if the goal of Net Gain is being achieved after 10 years. The monitoring and documentation of these criteria will establish the relative success of the Net Gain management actions. The collection and presentation of this data must be undertaken in a manner that is repeatable allowing consistency across ten years of assessment, and most likely different assessors. Assessors should use the October 2004 version 1.3 version of the Vegetation Quality Field Assessment Sheet published by DSE. The permanently marked monitoring quadrat within each habitat zone should be used for follow-up Habitat Hectare assessments to ensure an accurate representation of improvements in vegetation quality.

7.3 Photo Points

A number of photo points should be set up at some key sites throughout the offset sites. In order to gain a valuable visual comparison of the changes likely to occur, the photo point should have a number of requirements including:

- The choice of location which is both permanent and easy to relocate;
- Representative capture of the vegetation/habitat in each photo;
- Adequate number of photos to represent the condition at the time of the photo; and
- Documentation stating the place description, photo direction, date and storage location.

7.4 Summary of Works

A summary of works should be completed by each contractor at the end of each individual contract and at the end of each financial year. A summary of annual works has been factored into the cost estimates. The format of the works summary should be established by both the management authority and the contractor to easily identify and provide comment on the status of each management action as discussed in this plan.

While accountability is one consideration, this system of reporting will also ensure the programme of works is on schedule.

A summary of works should cover the following items:

- Scope of works (e.g. brief to control all blackberry on site over three month period);
- Works completed and the consistency with the contract brief;
- Any variation in the contract brief;
- Target species kill rate (expressed as a percentage);
- Any off-target damage;

- Any recommendations for future works.

A summary of works is not intended to be onerous. A short one or two page letter format expressing the above points is all that is required. This form of annual review can enable adaptive management of a site and help keep maintenance works within an area focused and site specific by enabling an assessment of past practices and their success to plan appropriately for the year ahead.

In addition, the works achieved after the 10-year Net Gain period should be examined to see if there really has been a `Net Gain` in vegetation/habitat cover. Information from this should be sent to DSE`s Native Vegetation Tracking System when it is formally established.

8. CONCLUSION

This report supplements a previous report by Cochrane *et al.* and documents the loss of native vegetation as a result of development at 55 Brunnings Road Carrum Downs, the Net Gain target required to offset this loss and a 10-year offset management plan.

It is estimated that 0.664 Habitat Hectares of Low conservation significance Heathy Woodland is permitted to be removed during the development.

Net Gain calculations according to the methodology defined in the Native Vegetation Framework determined that a total of 0.664 Habitat Hectares of Low conservation significance Heathy Woodland or another EVC is required to be generated within the Gippsland Plain Bioregion in order to meet the Net Gain policy requirements for removal of native vegetation at the study site.

In summary, gains are available through management of existing native vegetation in Austin Road Reserve and revegetation in Cell 3.

Management of these two zones would meet the offset target required for the vegetation cleared for construction of the residential development.

A 10-year Management Plan is presented, as required by the Framework, which focuses actions on control of the high-threat woody and herbaceous weeds within both offset areas and revegetation.

Cost estimates are provided for a 10-year management program. Estimates for implementation of the management plan including monitoring/auditing (required under the Framework) total **\$105,200**.

9. REFERENCES

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APPENDIX 1. Schedule of Works and Cost Estimates

The costs for the schedule of works are estimated using an hourly rate price, based on information from the City of Frankston and Practical Ecology (November 2008).

AUSTIN ROAD RESERVE

Year	Work Area	Timing	Objective	Management Actions	Person hrs/ unit	rate	Total cost (GST exclusive)
Year 1		Intensive phase					
	Habitat Zone 1 Burnt Area	6 yearly sweeps	Climbing, herbaceous and grassy weed control throughout 100% of area. Woody weeds - treat mature and emerging Pittosporum, Boneseed, Pine, Blackberry and Sallow Wattle.	Spraying using spray packs and /or rig depending on access. Other techniques as necessary. Woody weeds – hand weeding, cutting and painting and frill and fill.	50	\$45.00	\$2,250.00
	Habitat Zone 1 unburnt area	Yearly sweep	Remove emerging woody weeds as necessary.	Woody weeds – hand weeding, cutting and painting and frill and fill.	15	\$45.00	\$675.00
	Habitat Zone 1 and 2		Protect understorey	Fence off Zones 1 and 2 to restrict access	198m	\$56.00	\$11,250.00
	Habitat Zone 2	3 yearly sweeps	Climbing, herbaceous and grassy weed control treat mature and emerging woody weeds throughout	Spraying using spray packs and/or rig depending on access	30	\$45.00	\$1,350.00

Offset Management Plan 55 Brunnings Road

Year	Work Area	Timing	Objective	Management Actions	Person hrs/ unit	rate	Total cost (GST exclusive)
			100% of area	Other techniques as necessary			
	Habitat Zone 3 – burnt area	4 yearly sweeps	Climbing, herbaceous and grassy weed control throughout 100% of area	Hand weed	30	\$45.00	\$1,350.00
	Habitat Zone 3 – unburnt area	Yearly sweep	Climbing, herbaceous and grassy weed control throughout 100% of area	Hand weed	15	\$45.00	\$675.00
			Set up quadrats and photo points		8	\$45.00	\$360.00
							\$17,910.00
Year 2							
	All Habitat Zones	Weed control works As for year 1	Weed control works As for year 1	Weed control works As for year 1	140 hrs	\$45.00	\$6,300.00

Year	Work Area	Timing	Objective	Management Actions	Person hrs/ unit	rate	Total cost (GST exclusive)
	Habitat Zone 2	Spring	Revegetation - Supplementary planting of Heathy Woodland	Revegetaion - Installation of 1360 plants in gaps created by weed control - with jute squares and guards.	1300 plants	\$2.86	\$3718.00
		Spring	Revegetate 1300 plants	Labour costs for installation	40	\$45.00	\$1,800.00
							\$11,818.00
Year 3							
	All Habitat Zones	Weed control works As for year 1	Weed control works As for year 1	Weed control works As for year 1	140 hrs	\$45.00	\$6,300.00

Offset Management Plan 55 Brunnings Road

Year	Work Area	Timing	Objective	Management Actions	Person hrs/ unit	rate	Total cost (GST exclusive)
			Undertake and submit annual review and 3 year review	Undertake 3-year review of works in Austin Road and Cell 3, Check of annual goals, undertake habitat hectare assessment and quadrats, check photo points		\$2,000	\$2,000
							\$8,300.00
				Sub-total yrs 1-3			\$38,028.00
Years 4-10		Management phase					
	All Habitat Zones	2 maintenance runs of 25 hours each per year total of 50 hrs per year	Follow-up grassy, herbaceous and woody weed control	Grassy, herbaceous and woody weeds - follow-up on all previously managed areas	350	\$45.00	\$15,750.00
Year 10		Final review	Undertake and submit annual review and 10-year Net Gain review.	Undertake annual review of works, check of annual goals, undertake habitat hectare assessment and quadrats. Redo and compare photo points. Review success of Net Gain project.		\$2,500	\$2,500
						Sub-total for Years 4-10	\$18,250.00
Sub-total for 0-3 years works							\$38,028.00

Year	Work Area	Timing	Objective	Management Actions			Person hrs/ unit	rate	Total cost (GST exclusive)
Sub-total for 4 - 10 years works								\$18,250.00	
GRAND TOTAL							GST exclusive	\$56,278.00	

CELL 3 RESTORATION SITE (Sections 1,3,4,5 and 7)

Year	Work Area	Timing	Objective	Management Actions	Person hrs/ unit	rate	Total cost (GST exclusive)
Year 1		Intensive phase					
	Sections 1,3,4,5,7	3 yearly sweeps	To control high threat ground-cover weeds. High priority weeds are African Lovegrass and Paterson's curse.	Spraying using spray packs and /or rig depending on access. Other techniques as necessary.	45	\$45.00	\$2025.00
		Prior to revegetation	Selectively remove any remaining woody weeds following forestry mulching	Chainsaw and leave on-site	8	\$45.00	\$360.00
		Spring	Revegetate at approx 1 plant per 2 m ²	Install plants with guards and stakes	8160 plants	\$2.86	\$23,337.00
		Spring	Revegetate at approx 1 plant per 2 m ²	Labour costs for installation	160	\$45.00	\$7,200.00
		Late summer/Autumn for baiting Autumn – Winter for fumigation	Rabbit control	Assess rabbit numbers through night and day inspections; if necessary implement appropriate control technique .		\$500.00*	\$500.00
			Increase habitat value by installing logs	Install felled logs from 55 Brunnings Road			Cost of removal and transport to be covered by developer as part of vegetation clearing

Year	Work Area	Timing	Objective	Management Actions	Person hrs/ unit	rate	Total cost (GST exclusive)
							\$33,422.00
Year 2							
	Sections 1,3,4,5,7	3 yearly sweeps	Intensive maintenance phase to control high threat ground-cover weeds. High priority weeds are African Lovegrass and Paterson's curse.	Spraying using spray packs and /or rig depending on access. Other techniques as necessary.	45	\$45.00	\$2,025.00
		Late summer/Autumn for baiting Autumn – Winter for fumigation	Rabbit control	Assess rabbit numbers through night and day inspections; if necessary implement appropriate control technique .		\$500.00*	\$500.00
							\$2,525.00
Year 3							
	Sections 1,3,4,5,,7	3 yearly sweeps	Intensive maintenance phase to control high threat ground-cover weeds.	Spraying using spray packs and /or rig depending on access. Other techniques as necessary.	45	\$45.00	\$2,025.00

Year	Work Area	Timing	Objective	Management Actions	Person hrs/ unit	rate	Total cost (GST exclusive)
			High priority weeds are African Lovegrass and Paterson's curse.				
		Late summer/Autumn for baiting Autumn – Winter for fumigation	Rabbit control	Assess rabbit numbers through night and day inspections; if necessary implement appropriate control technique .		\$500.00*	\$500.00
							\$2,525.00
						Sub-total for Years 1-3	\$38,472.00
Years 4 and 5		Management phase					
	Sections 1,3,4,5,7	2 maintenance runs of 15 hours each per year total of 30 hrs per year	Follow-up grassy, herbaceous and woody weed control	Grassy, herbaceous and woody weeds - follow-up on all previously managed areas	60	\$45.00	\$2,700.00
		Late summer/Autumn for baiting	Rabbit control as for years 1-3			\$1000*	\$1000

Year	Work Area	Timing	Objective	Management Actions	Person hrs/ unit	rate	Total cost (GST exclusive)
		Autumn – Winter for fumigation					
							\$3,700.00
Years 6-10							
	Sections 1,3,4,5,,7	2 maintenance runs of 15 hours each per year total of 30 hrs per year	Follow-up grassy, herbaceous and woody weed control	Grassy, herbaceous and woody weeds - follow-up on all previously managed areas	150	\$45.00	\$6,750.00
Sub-total for years 0-3 works							\$38,472.00
Sub-total for years 4 - 5 works							\$3,700.00
Sub-total for years 6 - 10 works							\$6,750.00
GRAND TOTAL						GST exclusive	\$48,922.00

*contribution to rabbit control for years 1-5

APPENDIX 2. Suggested Revegetation Template

Suggested revegetation
template for Austin Road
Reserve and Cell 3

EVC 48: Heathy Woodland
EVC 006: Sand Heathland

Plant life form & Species name	Common Name	Suggested Plant order list *	
		Austin Road	Cell 3
Large Trees			
<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	Coast Manna Gum (Heathy Woodland only)	50	300
Medium Shrub			
<i>Acacia melanoxylon</i>	Blackwood (Heathy Woodland only)	138	828
<i>Allocasuarina littoralis</i>	Black Sheoak (Heathy Woodland only)	60	360
<i>Allocasuarina paludosa</i>	Dwarf Sheoak	60	360
<i>Melaleuca ericifolia</i>	Swamp Paperbark	90	840
<i>Leptospermum myrsinoides</i>	Heath Tea-tree	135	812
<i>Acacia paradoxa</i>	Hedge Wattle	50	300
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	20	120
<i>Bossiaea cinerea</i>	Showy Bossiaea	115	600
<i>Banksia marginata</i>	Silver Banksia	50	600
<i>Acacia oxycedrus</i>	Spike Wattle	20	120
<i>Aotus ericoides</i>	Common Aotus	50	300
<i>Correa reflexa</i>	Common Correa	50	600

<i>Acacia suaveolens</i>	Sweet Wattle	50	300
<i>Olearia ramulosa</i>	Twiggy Daisy-bush	20	120
Small Shrubs			
<i>Amperea xiphoclada</i> var. <i>xiphoclada</i>	Broom Spurge	50	300
<i>Platylobium obtusangulum</i>	Common Flat-pea	50	300
Large Tufted Graminoid			
			300
<i>Austrostipa rudis</i>	Veined Spear-grass	50	
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	50	400
Medium to small tufted Graminoid			
<i>Poa morrisii</i>	Soft Tussock-grass	50	
Medium to tiny non-tufted graminoid			
<i>Dianella revoluta</i>	Black-anther Flax-lily	80	300
Climbers			
<i>Billardiera scandens</i>	Common Apple-berry	35	
<i>Clematis microphylla</i>	Small-leaved Clematis	35	
Total number of plants		1358	8160



Map 01
Austin Road Reserve Offset Sites
for 55 Brunnings Road
Carrum Downs

Legend

- ▲ Quadrats
 - ★ Large Old Tree
 - Study Area
 - ▨ Recently burnt areas
 - Proposed open space
 - Existing fence
- Habitat Zones**
- Habitat Zone 1
 - Habitat Zone 2
 - Habitat Zone 3

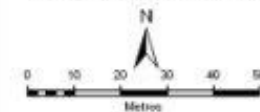
NOTES:

Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

MAP AND SURVEY DETAILS

Surveyed by: David Fairbridge and
 Nic McCaffrey
 Mapping by: Staci Timms and
 Michael Reynolds
 Generated from: Field Surveys and Aerial
 Photograph Interpretation

Datum: GDA 94 MGA Zone 55



VERSION 02 DATE 24/11/08

Practical Ecology Pty Ltd

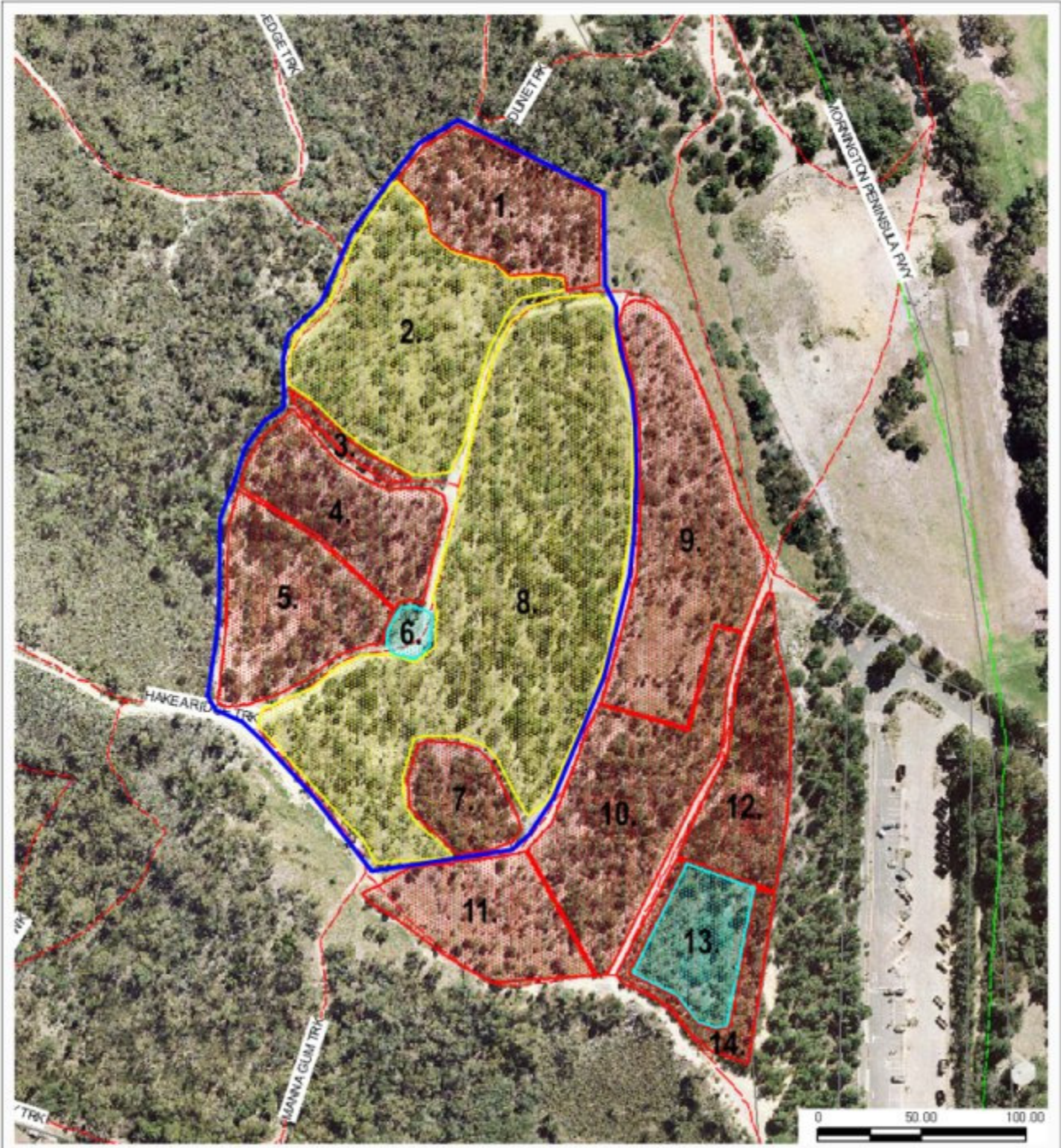
Contracting and Consulting in Environmental
 Planning and Ecological Restoration
 PO Box 228, Preston VIC 3072
 phone: 9484 1555 fax: 94849133
 enquiries@practical-ecology.com.au



Figure 1: Austin Road Reserve proposed fence

Figure 2: Recent fires within Austin Road Reserve





Map 2
Cell 3
Revegetation Offset Site for
55 Brunnings Road, Carrum Downs

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VERSION	01	DATE	28/10/08
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MAP AND SURVEY DETAILS

Inspected by: David Fairbridge
 and Nic McCaffrey

Survey date: October 2008

Mapping by: Michael Reynolds

Generated from aerial imagery
 and layers supplied by Frankston
 City Council

Legend

Revegetation Offset Site

Weed Control Zones

Mulch (4.2ha)

Chainsaw (3.1ha)

Retain (0.3ha)