INDIGENOUS DESIGN
ENVIRONMENTAL MANAGEMENT

Report for Major Road Projects Authority

South Gippsland Highway Realignment, Koonwarra (Black Spur)
Environment Protection & Biodiversity Conservation Act 1999 (2017/8070)
Strzelecki Gum Offset Management Plan

September 2018

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Disclaimer

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Declaration of Accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed _____

Full name (please print) DAVID GELLION
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Organisation (please print) Major Road Projects Authority (formerly Roads Corporation trading as VicRoads)

Date 4 / 9 / 2018.

Executive Summary

Indigenous Design has been commissioned by the Major Road Projects Authority (MRPA) to prepare an Offset Management Plan (OMP) for offsets required for losses associated with the realignment of the South Gippsland Highway at Koonwarra (Black Spur) (the Project).

The Department of the Environment and Energy (DoEE) determined that the realignment is likely to have a significant impact on Strzelecki Gum (*Eucalyptus strzeleckii*). By determining the Project is a controlled action, compensatory offsets are required for residual impacts to Strzelecki Gum. The impacts to Strzelecki Gum under the Project amount to the removal of 181 trees.

This OMP has been developed to support the submission of Preliminary Documentation for the South Gippsland Highway realignment, Koonwarra, Victoria (EPBC 2017/8070) and follows the DoEE Environmental Management Plan Guidelines (DoEE, 2014).

A suitable offset site has been identified at Koonwarra, Victoria. The site, measuring approximately 8.7 hectares in size, includes a remnant patch of native vegetation within and adjacent to the Great Southern Rail Trail, the Black Spur Creek wetlands and the bank of Tarwin River West Branch. The remnant patch areas host a total of 232 Strzelecki Gums of varying sizes from very small recruits to very large mature trees recorded. It also includes a degraded area, 1.2 hectares in size, which is to be used as a Strzelecki Gum revegetation site.

A licence agreement between VicRoads and the Great Southern Rail Trail Committee of Management under Section 17B of the *Crown Land (Reserves) Act* (1978) will be used to allow for MRPA to become the land manager of the selected offset site for a 10-year period. MRPA will therefore be responsible for the management and implementation of the OMP. To permanently secure this area, a Crown Land Offset Memorandum of Understanding (MOU) will be signed by the Crown land manager and the Department of Environment, Land, Water and Planning (DELWP) Secretary and included as an encumbrance on the Crown Land Register.

An enhancement of the quality of vegetation within remnant patch areas, additional natural recruitment and the establishment of a Strzelecki Gum canopy layer across the degraded areas of the site is expected at the completion of the 10-year active management period outlined in this plan.

This plan specifies a range of management actions including the encouragement of recruitment, revegetation, weed management, pest animal control and protection of the site from stock and unauthorised access. To facilitate adaptive management a monitoring and auditing program are incorporated, and a risk matrix is included that identifies triggers for plan review if any objectives or targets are at risk of not being completed within the 10-year implementation of the Plan.

1. Introduction

1.1 Project Description

Indigenous Design has been commissioned by Major Road Projects Authority (MRPA) to prepare an Offset Management Plan (OMP) for the impacts on *Eucalyptus strzeleckii* (Strzelecki Gum), a Matter of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) relating to the South Gippsland Highway realignment at Black Spur, Koonwarra.

The South Gippsland Highway is the main arterial route connecting South Gippsland with Melbourne and the rest of Victoria. MRPA proposes to realign the South Gippsland Highway at Black Spur (the Project), approximately 500 metres east of the township of Koonwarra in South Gippsland, between Old Koonwarra-Meeniyan Road and extending 2.3 kilometres to the south east to 300 metres east of Minns Road. The location of the Project is shown in *Figure 1*.

A *High Risk-Based Pathway Biodiversity Assessment Report* (Bowler, Doherty, & Brooker, 2017) addressing State native vegetation clearing regulations was completed in September 2017. In January 2018, the Department of the Environment and Energy (DoEE) decided the Project was a controlled action for both Strzelecki Gum and Australian Grayling (*Prototroctes maraena*) and requested that further information be provided for assessment by preliminary documentation. The *EPBC Act Preliminary Documentation for the South Gippsland Highway Realignment* (Brooker, 2018) report was prepared by Indigenous Design in June 2018 that addressed this requirement.

The impacts to Strzelecki Gum under the Project amount to the removal of 181 Strzelecki Gum and approximately two hectares of Strzelecki Gum habitat. This Offset Management Plan specifies a range of management actions to offset residual impacts to Strzelecki Gum by the Project including the encouragement of recruitment, revegetation, weed management, pest animal control and protection of the site from stock and unauthorised access. A detailed description of the proposed action, mitigation measures and residual impacts is provided in the Preliminary Documentation report (Brooker, 2018).

The offset site is located adjacent to the Project area, on Crown Land alongside the Tarwin River West Branch, and has been identified as meeting the Commonwealth offset policy requirements (DoEE, 2012).

1.2 Objectives

The objectives of this OMP are to provide details of the clearing and offset site to the satisfaction of DoEE and any EPBC Act approval requirements which may be applied for residual impacts to Strzelecki Gum for the Project. The OMP will provide direction on the conservation and enhancement of remnant Strzelecki Gum and associated habitat within the offset site and outline the natural recruitment and revegetation program that establishes and extends the species throughout the more degraded areas of the site.

The OMP includes the following:

- Location of the offset site;
- Type of offset to be provided;
- Calculation of compensatory offset requirements;
- Description of management actions to protect and improve remnant native vegetation, Strzelecki Gums and associated habitat within the site;
- Description of management actions to encourage recruitment and revegetate degraded areas of the site with Strzelecki Gum plants;
- Detail on 'security' arrangements;
- A map that identifies the offset site including identification of areas of remnant vegetation, existing Strzelecki Gum individuals and areas suitable for revegetation;
- A timetable of management actions, targets and reporting requirements; and
- Monitoring and evaluation schedule.

2. Clearing Site

This section provides details of the clearing and offset sites, including an assessment of the offset sites suitability to offset the residual impact for the removal of 181 Strzelecki Gums.

2.1 Site Description

A detailed description of the Project area, its ecological values and offset calculations of the Project impacts can be found in the *EPBC Act Preliminary Documentation for the South Gippsland Highway Realignment* (Brooker, 2018), with a summary provided below.

Landowner of clearing site:	Public road reserve (managed by VicRoads), Crown land and Private property (to be acquired prior to construction)
Location and address of clearing site:	Black Spur, Koonwarra, Victoria
Local Government Area:	South Gippsland Shire
Catchment Management Authority:	West Gippsland Catchment Management Authority
Proponent undertaking works	Major Road Projects Authority
EPBC Reference No.	2017/8070

The Project area footprint encompasses an area of 18 hectares.

2.2 Site Impacts

All native vegetation requiring removal under the Project is described in the *High Risk-Based Pathway Biodiversity Assessment Report* (Bowler, Doherty, & Brooker, 2017) and totals 4.76 hectares.

The Project will result in the removal of 181 Strzelecki Gums of varying sizes contained within approximately two hectares of Strzelecki Gum habitat. A breakdown of Strzelecki Gum tree sizes to be removed (according to the assigned overlying Ecological Vegetation Class (EVC)) is provided below:

- 10 very large old trees;
- 9 large old trees;
- 9 medium old trees;
- 41 small trees; and
- 112 very small trees.

Native vegetation within the Project area affected by the Project range from moderate quality to relatively poor-quality Lowland Forest (EVC 16), Riparian Forest (EVC 18) and Herb-rich Foothill Forest (EVC 23). The native vegetation ranges from relatively intact remnant forest vegetation with moderate disturbance, to areas of remnant canopy trees above a heavily disturbed and exotic vegetation dominated understorey.

3. Offset Site

An offset site immediately adjacent to the Project area, located on Crown Land alongside the West Branch of the Tarwin River, has been identified as meeting the Commonwealth offset policy requirements (DoEE, 2012). *Figure 1* shows the location of the offset site at Black Spur wetlands in relation to the closely located clearing site and area assessed for environmental impacts associated with the Project (the Black Spur study area) and *Table 1* provides additional detail.

The following sections describe the existing condition of the offset site and summarises the assessment of its suitability against the Commonwealth offset policy requirements (See *Section 3.4*).

3.1 Site Description

The offset site is located approximately 1.2 kilometres south east of the township of Koonwarra and 9.5 kilometres south of the nearest major town centre of Leongatha. The offset site has been selected based on its proximity to the clearing site, the presence of numerous remnant Strzelecki Gum trees and the scope it provides for protecting and enhancing the connectivity of the Strzelecki Gum population in the local area and improvement and expansion of existing Strzelecki Gum habitat.

The offset site, *Map 1*, is approximately 8.7 hectares in area and includes a remnant patch of native vegetation within and adjacent to the Great Southern Rail Trail, the Black Spur Creek wetlands and the bank of Tarwin River West Branch. The remnant patch areas host a total of 232 Strzelecki Gums of varying sizes from very small recruits to very large mature trees. It includes a degraded area, 1.2 hectares in size, which is to be used for Strzelecki Gum revegetation.

The Great Southern Rail Trail is a recreational trail for walking and cycling which traverses through the western side of the offset site for a length of approximately 350 metres and is roughly four metres wide and formed from gravel.

Table 1: Offset Site Details

Offset Site Details	
Land owner of Offset Site	Crown Land
Land manager of Offset Site	Great Southern Rail Trail Committee of Management & DELWP
Type of Offset	Direct Offset
Location and Address of Offset Site	Black Spur Creek, Koonwarra, Victoria
Area of Offset Site	8.68 Hectares
Allotment / Plan Subdivision	Allot. 84M Allot. 2014
Parish	Leongatha
Local Government Area	South Gippsland
Catchment Management Area	West Gippsland
SPI	N/A
Council Property Number	N/A
Bioregion	Gippsland Plain, Strzelecki Ranges

3.2 Site Condition

Strzelecki Gums are the dominant Eucalypt species along the banks of Tarwin River West Branch, sections of the adjacent floodplain and adjoining slopes. 232 Strzelecki Gums of varying sizes from very small recruits to very large mature trees have been recorded within the offset site (*Map* 1) including:

- 20 very large old trees;
- 35 large old trees;
- 26 medium old trees;
- 100 small trees; and
- 51 very small trees.

The eastern section of the offset site includes the riparian zone of the Tarwin River West Branch, sections of floodplain and adjoining escarpment/slopes. A contiguous canopy of Strzelecki Gums is present across much of the riparian zone and the central eastern floodplain with scatterings of *Eucalyptus globulus* subsp. *globulus* (Southern Blue Gum) and *Eucalyptus viminalis* (Manna Gum) on the slopes and escarpment.

Much of the riparian zone and escarpment retains a native understorey with shrubs including *Acacia melanoxylon* (Blackwood) and *Kunzea ericoides* (Burgan) lining the sides of the river bank and the native graminoid *Poa ensiformis* (Sword Tussock-grass) dominant across the escarpment ground layer. The central eastern floodplain holds a minimal weed presence in the form of scatterings of woody weeds such as *Crataegus monogyna* (Hawthorn) and *Rubus fruticosus spp. agg.* (Blackberry) with the native *Carex appressa* (Tall Sedge) dominant within the damp depressions. The northern most floodplain holds a ground layer dominated by exotic pasture grasses and a *Salix* spp. (Willow) infestation is located in the far northern corner.

The western section of the offset site also includes the riparian zone of the Tarwin River West Branch, sections of adjacent floodplain and adjoining lower slopes. Strzelecki Gum is dominant across the riparian zone with scatterings of the species throughout the slopes surrounding the Black Spur Creek wetland. The floodplain areas in the south east corner of this section have a mixed understorey of exotic species including Blackberry and native shrubs and graminoids. Blackwood and *Melaleuca ericifolia* (Swamp Paperbark) dominate the shrub layer across the riparian zone and surrounds of the Black Spur Creek wetland.

Rubus fruticosus spp. agg. (Blackberry) and *Tradescantia fluminensis* (Wandering Creeper) form significant sized infestations in the south of the western section of the offset site. *Solanum pseudocapsicum* (Madeira Winter-cherry) and *Ranunculus repens* (Creeping Buttercup) form scattered infestations within the riparian zone and floodplain areas, while more open areas on the slope are dominated by *Cenchrus clandestinus* (Kikuyu) and *Holcus lanatus* (Yorkshire Fog). *Cirsium vulgare* (Spear Thistle) and *Jacobaea vulgaris* (Ragwort) were also recorded in low densities across the offset site.

No signs of current activity by rabbits, deer or livestock was observed in the offset site.

3.3 Existing Offset Arrangements

The offset site is Crown Land managed by the Great Southern Rail Trail Committee of Management and has no existing offset arrangements in place, through either EPBC offsetting or State offsets under the current Victorian policy *Guidelines for the Removal, Destruction or Lopping of Native Vegetation* (DELWP, 2017) or previous iterations, *Biodiversity Assessment Guidelines* (DELWP, 2013) and *Victoria's Native Vegetation Management - A Framework for Action* (DSE, 2002).

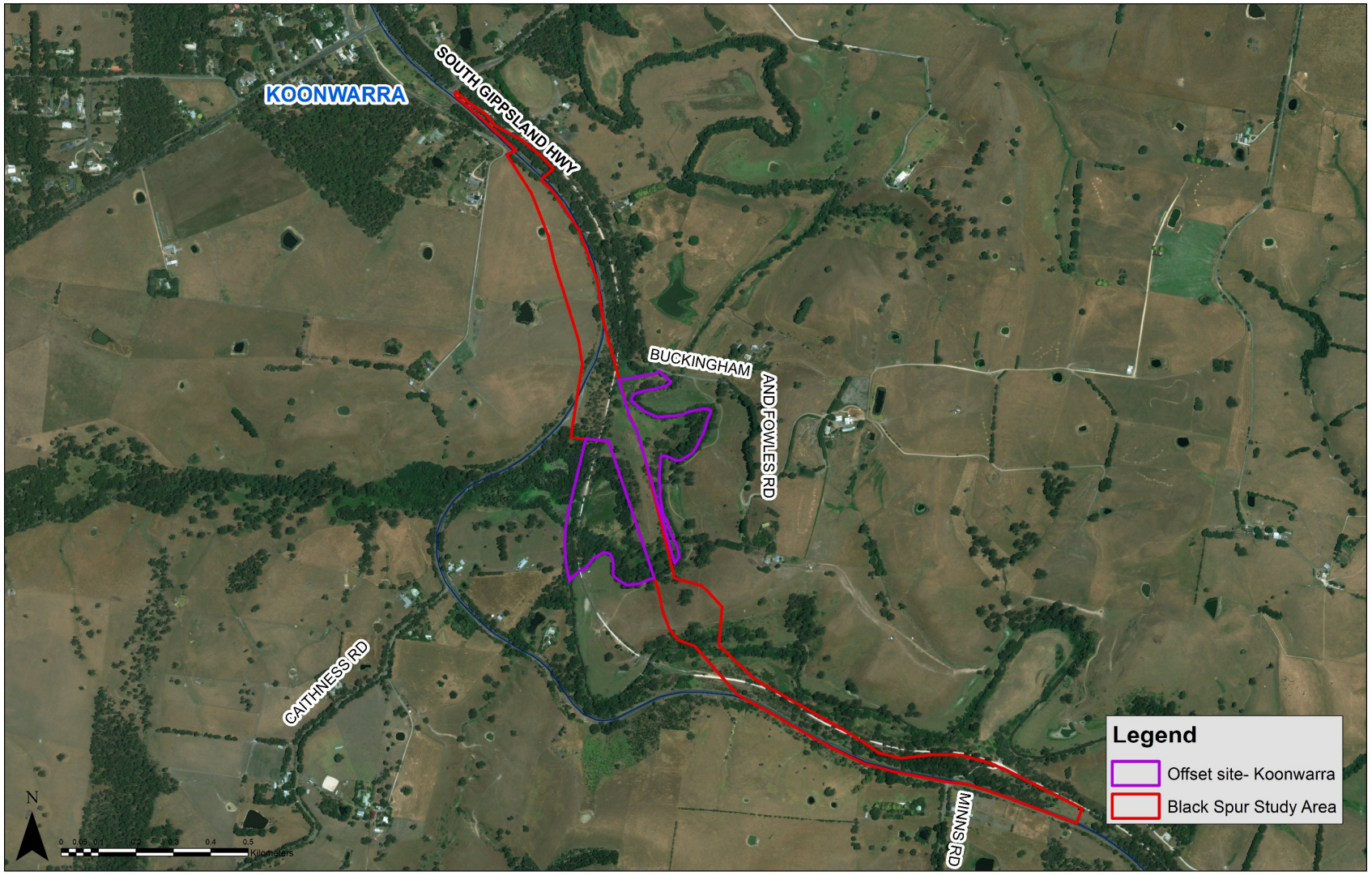

Figure 1: Location of the offset site in relation to the clearing site (Black Spur Study Area)

3.4 Assessment of Offset Suitability

The EPBC Offset Assessment Guide (the calculator) has been used to determine if the offset site meets the requirements of the EPBC Act Offsets Policy (DoEE, 2012). The calculator has been provided in *Appendix 1* and a summary of the inputs described below.

Offset Site

The offset site is 8.68 hectares, within the Black Spur Creek wetlands and adjacent to the Tarwin River West Branch, immediately adjacent to the Project area.

Time Horizon

The implementation of the offset plan and management arrangement will be in place for a 10-year period.

Start Value

All Strzelecki Gum within the offset site have been spatially located and had their diameter at breast height (DBH) recorded to determine the current number and size of Strzelecki Gum within the offset site. This was either completed as part of the previously recorded survey undertaken in June 2017 or during a site visit by Indigenous Design in July 2018. A total of 232 trees were recorded. This number does not include any dead trees or trees that were not positively identified as Strzelecki Gum.

Future Value without offset

A reduction of 50% in the number of very small trees currently recorded at the site (26), due to high weed coverage and potential for grazing has been applied.

Future Value with offset

Weed control activities and prevention of any future grazing within the site are likely to result in an increase in natural recruitment surrounding mature Strzelecki Gums. A rapid reduction in weed cover may result in additional recruitment events and if successful in establishing, management actions such as enhanced weed control adjacent to the seedlings and protection using tree guards could increase the chance of these new recruits surviving until maturity. Schinagl *et. al* (2013) provides figures for newly recruited Strzelecki Gums as constituting 11% of the population number (Schinagl, *et. al.*, 2013). An additional 26 recruits have therefore been added to the current numbers recorded to reflect this potential for recruitment.

A proportion of the site is either devoid of native vegetation or contains large amounts of weed species (approximately 1.2 hectares). If natural recruitment attempts are unsuccessful, propagation of seed from mature trees within the site and replanting of Strzelecki Gum to recreate habitat and an associated EVC will be undertaken. Schinagl *et. al* (2013) provides data for the average density of canopy height Strzelecki Gums within remnant vegetation, which was found to be approximately 90 trees per hectare for a Swampy Riparian Woodland EVC (Schinagl, *et. al.*, 2013). Canopy height Strzelecki Gums were also found to make up an average 46% of the total number of Strzelecki Gums within a population (Schinagl, *et. al.*, 2013). Based on these figures an estimated 196 Strzelecki Gums occur within a 1 hectare area of Swampy Riparian Woodland EVC, or 235 trees can be accomodated within the 1.2 hectares available for revegetation activites.

Confidence in Result

Confidence in the result has been estimated as 80%, with a high degree of certainty that the offset measures can compensate for the residual impact of the action within the 10-year period. This is due to the following:

1. *Conservation outcomes are achievable for the site within the 10-year period.*
   Indigenous Design has been involved in the protection and enhancement of Strzelecki Gum populations and habitat over the past 15 years within the Gippsland region. Natural recruitment has been observed both in remnant populations and in revegetation sites and has been encouraged through selective weed control and browsing exclusion. Collection of seed, propagation and revegetation of the species has also been very successful. This includes a number of projects along the Morwell River and associated wetlands and offset plantings for both Hazelwood Power and Energy Australia. Since 1999, Indigenous Design has planted in excess of 25,000 Strzelecki Gums in the Latrobe Valley area. Revegetation data collected from more recent revegetation projects has shown that the height of Strzelecki Gums averages 2.2 metres after 2 years post planting; 4.8 metres after 4 years and 9 metres after 6 years (Indigenous Design, unpublished data, August 2018). Once a plant exceeds 5 metres in height, it becomes largely self-sufficient and likely to be vulnerable only to unpredictable natural events.

   Revegetation efforts by the local Landcare Group of Strzelecki Gum immediately adjacent to the Black Spur Creek offset site in 1998 have also proven to be largely successful, further supporting the reduced risk in revegetation efforts as part of any offsets within the vicinity.

   The Black Spur area was, up until the cessation of the operating railway line, devoid of much of its native vegetation, primarily due to agricultural activities and the requirement to keep the railway line clear of vegetation. A comparison of historical imagery from 1975, 2001 and 2015 shows the changes in vegetation cover since the decommissioning of the rail line, with Strzelecki Gum constituting a large number of the regenerated vegetation within the northern and southern extent of the Project area, further providing confidence in the offset site being able to achieve recruitment outcomes.

   The OMP details targets for weed control coverage within the 10-year implementation period (See *Sections 4.3.2 & 4.3.3*), with monitoring and reporting designed to ensure these targets will be achieved within the 10-year timeframe.

2. *Unexpected or unpredictable impacts from herbivore grazing, fire, flood and frost.*
   The success of revegetation plantings from previously mentioned projects has been impacted by natural events, which are difficult or unable to be controlled. Events such as fire, frost and flood are unable to be foreseen and therefore mitigated against entirely. However, strategies such as the use of core flute tree guards will provide some protection against frost damage and rabbit browsing and the use of wallaby / deer guards will assist in prevention of browsing by both native (kangaroos and wallabies) and introduced (deer) herbivores. If deer or rabbit numbers are posing a threat to the site, a plan for their control will also be implemented.

   The OMP will also include monitoring of recruitment / revegetation success and replanting of any losses will be undertaken to meet identified targets.

4. Offset Implementation

The OMP details methods for the management and conservation of Strzelecki Gums and their habitat, as well as other native vegetation within the site, over the ten-year management period. It aims to achieve an improvement in the site through management techniques including weed control, fencing, pest animal management, encouragement of recruitment and revegetation. All works must be undertaken by suitably qualified and experienced personnel who hold all appropriate permits.

The management actions must be measurable against the commitments made in the EPBC Offset Calculator for the target conservation gains for the protected matter (Strzelecki Gum) and able to be adapted and / or reviewed if additional issues are identified following commencement.

4.1 Responsibility for Site Security, Management and Reporting

A licence agreement between VicRoads, the Great Southern Rail Trail Committee of Management and DELWP under Section 17B of the *Crown Land (Reserves) Act* (1978) will be used to allow for MRPA to become the land manager of the selected offset site for a 10-year period. MRPA will therefore be responsible for the management and implementation of the OMP. To permanently secure this area, a Crown Land Offset Memorandum of Understanding (MOU) will be signed by the Crown land manager and DELWP Secretary and included as an encumbrance on the Crown Land Register.

Table 2 provides detail on the security arrangements, management responsibility and reporting requirements of the offset site.

Table 2: Security and Management Responsibility and Reporting Requirements

Responsibility	
Type of security	Section 17B licence agreement for management responsibility and Memorandum of Understanding (MOU) for security
10-year offset management to commence	Date of the Sec 17B licence agreement
10-year offset management expires	10 years from the date of the Sec 17B licence agreement
Meeting of Offset Site targets	MRPA
Offset Site Management Responsibility	MRPA – Senior Project Engineer
Offset Site Monitoring Responsibility	MRPA – Senior Project Engineer
Offset site Auditing Responsibility	MRPA – Senior Project Engineer
Internal reporting/record keeping responsibility	MRPA – Senior Project Engineer
Reporting responsibility to DoEE / DELWP	MRPA – Senior Project Engineer
Offset Management Plan Review	MRPA – Senior Project Engineer

4.2 Environmental Outcomes to be Achieved

The key environmental outcomes to be achieved through protection and management of the offset site are:

- Legal protection through the use of an MOU agreement of an approximate 8.7 hectare offset site that includes 7.5 hectares of existing Strzelecki Gum habitat and a 1.2 hectare Strzelecki Gum revegetation site;

- Protection of 232 Strzelecki Gum trees;
- Physical protection of the site from manageable threats including stock, weed invasion, firewood collection and inappropriate access;
- Improvement in the condition of existing areas of Strzelecki Gum habitat through weed control and pest animal control actions; and
- Increase in the number of Strzelecki Gum through the encouragement of recruitment and revegetation to achieve 235 additional seedlings.

Key performance and completion criteria are listed below:

- Establishment of legal protection;
- Successful management of threats, including exclusion of stock grazing, firewood collection, weeds, pest animals and inappropriate access (*Section 4.3*);
- Successful recruitment or establishment of 235 additional Strzelecki Gum trees (*Section 4.3.5*);
- Completion of scheduled management actions (*Section 4.3*);
- Completion of scheduled monitoring activities (*Section 4.5*);
- Completion of scheduled reports and audits (*Section 4.7 & 4.8*).

4.3 Management Actions

The offset site will be managed in accordance with any EPBC Act approval conditions, with management designed to achieve the objective of the conservation and enhancement of Strzelecki Gum individuals and associated habitat.

The management actions described in this OMP will be implemented for a period of 10 years in accordance with the objectives of the OMP and the EPBC Act approval conditions. These actions have been developed to protect the existing remnant Strzelecki Gums on site and to encourage their natural recruitment. This will ensure genetic diversity and long-term viability of the population. Revegetation activities are designed to supplement this natural recruitment, where required, and to improve the quality of open, degraded sections of the site which currently have little or no native vegetation cover.

From the commencement of the agreement, MRPA agrees to undertake the following management commitments for the 10-year licence period:

- Eliminate all woody weeds to less than 1% cover;
- Eliminate high threat herbaceous and grassy weeds to less than 1% cover;
- Ensure other herbaceous and grassy weed cover does not increase beyond current levels;
- Monitor for any new and emerging woody and herbaceous weeds and eliminate to <1% cover;
- Control rabbits and deer or their impacts if they pose a threat to the offset site;
- Retain all standing trees, dead or alive;
- Retain all fallen logs and fallen timber;
- Exclude stock; and
- Successfully establish 235 Strzelecki Gum trees through the encouragement of natural recruitment and revegetation.

Table 4 provide details in regard to the implementation of management actions for the Offset site, with associated monitoring (*Section 4.5*) and reporting (*Section 4.7*) programs. A risk assessment associated with the implementation of these actions is provided in *Section 5*.

4.3.1 Fencing

Threats, in particular stock, must be excluded from the site at all times, along with unauthorised access. This will be achieved by the installation or maintenance of existing stock-proof fencing around the perimeter of the site. This excludes areas where the offset site interfaces with the Tarwin River West Branch, which acts as a natural barrier on the eastern and southern perimeter edges.

Fencing must be installed or maintained to ensure threats from stock and unauthorised access are satisfactorily excluded across the 10-year active management period and in perpetuity. In addition, the current fencing surrounding Landcare plantings will be extended to combine the site into one traversable area and to ensure site boundaries are delineated / established following completion of the new road alignment.

4.3.2 Woody Weeds

Eliminate all woody weeds

Four woody weeds were identified within the offset site; Blackberry, Hawthorn, Madeira Winter-Cherry and Willow. Blackberry forms the most significant coverage across the riparian zone, with infestations of Madeira Winter-cherry and Willows relatively low in overall coverage.

Blackberry and Hawthorn are listed as 'Regionally Controlled' and Willows are listed as 'Restricted' under the *Catchment and Land Protection Act 1994* (CaLP Act). Weeds listed by the CaLP Act (noxious weeds) require landowners to take reasonable steps to prevent the spread of, eradicate and / or control these noxious weeds on their land.

All woody weeds must be eliminated (to less than 1%) by the end of year 5 and maintained at this level beyond year 5. Monitoring for any re-sprouting or seedlings must be undertaken and plants eradicated (either spot spray or hand pull). Off-target damage must be minimised and impact on all native plants avoided during control treatment of these species.

Appendix 2 specifies woody weed species to be controlled, along with the recommended method and timing.

New and emerging woody weeds

Monitoring for new and emerging woody weeds will be conducted throughout each year of the OMP and any new and emerging woody weeds incorporated into the control program and eliminated. This must include elimination of any new and emerging noxious weeds listed under the CaLP Act.

4.3.3 Herbaceous Weeds

Noxious herbaceous weeds recorded within the offset site, *Cirsium vulgare* (Spear Thistle) and *Jacobaea vulgaris* (Ragwort), are both listed under the CaLP Act as Regionally Controlled.

High threat herbaceous weeds form high cover concentrations in some sections of the site, particularly *Tradescantia fluminensis* (Wandering Creeper) in dense remnant vegetation in the south of the site, and *Ranunculus repens* (Creeping Buttercup) in damp depression areas.

High threat grassy weeds are also found in relatively high coverage, particularly in cleared areas with little to no canopy cover. This is predominantly *Cenchrus clandestinus* (Kikuyu), with areas of *Holcus lanatus* (Yorkshire Fog) and *Dactylis glomerata* (Cocksfoot) across the hillside and *Phalaris arundinacea* (Reed Canary Grass) in damp depressions, particularly at the north of the site and on the margins of the Black Spur Wetland.

Targets to be achieved for herbaceous weeds are:

- Spear Thistle and Ragwort must be eliminated (to less than 1% cover) by year 5 of management;
- Due to the highly invasive nature of Wandering Creeper, the species must be eliminated (to less than 1% cover) by year 5 of management, with all other high threat and grassy weeds to be controlled and prevented from increasing in coverage from current condition; and
- The weed cover of all other weeds must not increase beyond current levels.

Appendix 2 specifies herbaceous weed species to be controlled, along with recommended method and timing.

New and Emerging Herbaceous Weeds

Monitoring for new and emerging herbaceous weeds will be conducted throughout each year of the management plan and any new and emerging herbaceous weeds incorporated into the control program and eliminated. This must include elimination of any new and emerging noxious weeds listed under the CaLP Act.

4.3.4 Pest Animals

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

Monitoring of rabbits will be undertaken throughout the year, and if rabbit activity is observed on site, an integrated approach will be taken to reduce their impact. This will include fumigation, warren destruction and baiting. Carcasses are to be removed from site to prevent the poisoning of native predators.

Deer have been observed within the vicinity of the site in the past, with potential impacts from this species therefore a consideration. If damage is observed (i.e. browsing) that impact on the survival of Strzelecki Gum plantings, additional deer proof tree guards will be installed.

Monitoring and control of pest animals, including new and emerging pest animals, will take place throughout the year.

4.3.5 Natural Recruitment & Revegetation

Weed control activities and the prevention of grazing within the site are likely to result in an increase in natural recruitment of Strzelecki Gum. It is expected that the reduction in the coverage of high threat weeds and targeted control within the vicinity of large remnant trees will provide greater opportunities for this recruitment to occur. Grazing pressure from both native and introduced herbivores will be prevented by adequate fencing and protection of new recruits through the use of tree guards. Any new Strzelecki Gum recruits will also be recorded by GPS when found and recommendations to prevent any identified threats to their continued survival implemented.

A number of methods can be used to encourage natural recruitment within the site, as per Moxham & Dorrough (2008) and suggested in Schinagl *et. al.* (2013):

- Reduce pasture grass cover around the drip line of mature Strzelecki Gum trees;
- Remove grazing impacts;
- Disturb the soil;
- Introduce fire; and
- Sow or spread Strzelecki Gum seed or mature fruit.

To encourage recruitment, the offset plan will focus on reducing competition from pasture grass and the protection of the site and any new recruits from grazing. If required additional actions to disturb the soil and spread reproductive material can be investigated and used to improve success of recruitment. The use of fire, its frequency and intensity for Strzelecki Gum conservation still requires further research.

Degraded areas of the site are available to be revegetated using Strzelecki Gum seedlings from seed sourced on site, in conjunction with a range of understorey trees and shrubs typical to the vegetation community. This will expand and recreate Strzelecki Gum habitat in these poorer quality areas and supplement the expected occurrence of natural recruitment. *Map 1* shows the location of the approximate 1.2 hectare revegetation site, *Table 3* provides the species and number of plants to be established and *Table 4* provides the standards to be achieved by the revegetation over the ten year management period. The density of Strzelecki Gum trees has been determined using existing population data for similar vegetation communities to that found within the offset site (Schinagl, Wright, & Rayment, 2013).

The following methodology will be employed in undertaking the revegetation program:

- Prepare the site appropriately to ensure optimal establishment of the vegetation. Site preparation weed control and pest animal control must begin as early as possible in year 1 to adequately prepare planting areas. At least 2 cycles of weed elimination is required for any areas where planting will occur. A weed free buffer must be maintained around planted vegetation to ensure the best chance of survival;
- Preparation for the planting of canopy trees will be undertaken by spot spraying circles of approximately 1 metre diameter, using a non-selective appropriate herbicide, at spacing sufficient to evenly distribute plants across each zone;
- Preparation for medium shrubs will be undertaken by spot spraying small plots of approximately 15 m^2 with a non-selective appropriate herbicide. These plots are to be evenly

distributed across the planting zone so as to ensure maximum distribution of understorey throughout the area;

- Use of seed or tube stock (seedlings) from seed sourced from within the offset site or immediately adjacent and from the same soil type.

(DELWP, 2018)

In addition to the above, the use of wallaby guards and /or core flute guards must be used to protect the establishing recruited seedlings and revegetation plantings from frosts and browsing by native herbivores (i.e. kangaroos and wallabies). Wallaby guards must be stapled and pinned to prevent herbivores accessing the plant from underneath the guard.

Table 3: Revegetation planting – species and plant numbers to be established

Strzelecki Gum Revegetation Offset			**Area available to be planted:** 1.2 ha		
Life form		**Common name**	**Scientific name**	**Density/ha**	**Number of plants**
Canopy species		*Eucalyptus strzeleckii*	Strzelecki Gum	196 / ha	235
Understorey	**Understorey Tree** (5m +)	*Acacia melanoxylon*	Blackwood	50 / ha	20
		Melaleuca ericifolia	Swamp Paperbark	50 / ha	20
		Leptospermum lanigerum	Woolly Tea-tree	50 / ha	10
	Medium Shrubs (1-5 m tall)	*Leptospermum continentale*	Prickly Tea-tree	800 / ha	300
		Coprosma quadrifida	Prickly Currant-bush	800 / ha	300
		Bursaria spinosa	Sweet Bursaria	800 / ha	200
				Total Survival Target	1085

Strzelecki Gum plantings are to achieve a 100% of survival target and all other species included to recreate the associated EVC, will achieve a target of 85% survival.

4.4 Adaptive Management & Review

The OMP is inherently adaptive, with the implementation of actions, monitoring and a review cycle developed to enable revision of management actions. This will enable actions to be adapted to still meet required targets if issues such as seasonal conditions or other site risks become apparent. Additionally, new management techniques may become available and be of benefit for the conservation of Strzelecki Gum, their habitat and natural recruitment success through ongoing conservation and distribution research being undertaken by organisations such as DELWP's Arthur Rylah Institute (ARI). Developments in the control of pest plants and animals can also be incorporated into the management plan if additional benefits can be identified.

This plan provides direction on management actions for a period of 10 years. Review of the OMP will be required if monitoring identifies that an action is not meeting the specified standard or will not meet the standard within the 10-year implementation period. Corrective action will then be identified and implemented, and the plan updated to reflect this change. In addition to this, a Plan review will also be necessary in the event of a major incident such as wildfire or flood that significantly alters the

condition of the offset site. *Section 5* provides further detail on the risks associated with the implementation of the OMP and the corrective action to be undertaken.

In the event of plan review being triggered, any future adaptive management changes will be incorporated into the plan and an updated version supplied to DoEE for approval.

4.5 Monitoring

Monitoring of the success of management activities within the offset site must be undertaken by a suitably qualified and experienced ecologist annually for the term of the Licence Agreement.

4.5.1 Strzelecki Gum condition

In order to monitor the long-term survival of existing Strzelecki Gums on site, a biennial assessment of remnant trees will be completed. This will include observations on health, natural recruitment and any identifiable threats to the viability of the trees.

Where a threat is identified that can be addressed as part of the implementation of the OMP, management actions will be undertaken such as additional weed control, pest animal management or tree guarding to address the identifiable threat. Threats beyond the scope of the management plan or as part of a region-wide issue, will require a review of the OMP to determine what actions may be required for future management such as additional revegetation activities. This is likely to be in conjunction with and following advice from DELWP and ARI.

4.5.2 Fence condition

Monitoring of the perimeter fence will be undertaken during each monitoring activity, with any damage that could allow stock or unauthorised access to be repaired upon identification.

4.5.3 Weed monitoring

Weed monitoring will be undertaken by the following components:

- Annual inspection of areas containing woody weeds (*Map 2*) to record coverage and note progression towards the overall cover target of less than 1% by year 5;
- Annual inspection of whole offset site for Spear Thistle and Ragwort, including their previously recorded locations (*Map 2*), to record coverage and note progression towards target of less than 1% cover by year 5;
- Annual inspection of areas containing Wandering Trad (*Map 2*) to record coverage and note progression towards the overall cover target of less than 1% by year 5;
- Annual assessment of weed cover of all other weeds (*Appendix 2*) to determine progress toward target of no increase in coverage; and
- Annual inspection of the site to identify any new and emerging weed species.

4.5.4 Pest animal monitoring

Signs of pest animal activity will be recorded during the implementation of other management activities within the site, with locations of warrens and other activity to be recorded using a GPS. If pest animal activity damages Strzelecki Gum revegetation areas, pest animal control is to be undertaken or additional tree protection (i.e. guards) installed.

Annual inspection of these identified locations will determine whether pest animal activity is still present, or control / prevention activities have been successful.

4.5.5 Natural Recruitment & Revegetation

An annual count of new recruits within the remnant Strzelecki Gum habitat of the site, along with revegetation survival numbers will be undertaken to determine the success of management actions to encourage recruitment and revegetation plantings to ensure establishment targets will be achieved.

Annual monitoring will also determine whether recruits / plantings have become self-sufficient, with threats to their survival reduced to the point where tree guarding can be removed.

4.5.6 Photo Points

Photo points (at least 5) will be installed across the offset site to visually capture a record of the progress of the site towards its targets, with photos to be taken annually. Recommended photo point locations are provided in *Map 2*.

4.6 Summary of Management Actions

Table 4 provides a summary of the management actions, their standard to be achieved, timing, monitoring and reporting arrangements.

Table 4: Management actions timetable

#	Year	Management Action	Timing	Standard to be achieved	Monitoring
Strzelecki Gum Condition					
1	Year 1 - 10	Monitor health of and threats to remnant Strzelecki Gum on site.	Spring	• Retain all remnant Strzelecki Gums on site. • Encourage recruitment events of Strzelecki Gum from remnant mature trees through management actions such as weed control and prevention of grazing. • Record new Strzelecki Gum recruits. • Protect Strzelecki Gum recruits as found. • Investigate other recruitment techniques as further information becomes available.	Biennial Section 4.5.1 Section 4.5.5
Fencing					
2	Year 1 - 10	Maintain fencing in good condition around entire boundary of all sites where fencing exists or is required.	On-going	• Maintain current fencing to exclude stock. • No firewood collection within the offset site. • Repair fence immediately upon identification of damage.	Each management activity Section 4.5.2
Woody Weeds					
3	Year 1 - 5	Eliminate all woody weeds. Monitor for any re-sprouting or seedlings and eradicate.	Various	• Aim to eliminate all listed woody weeds by end of Year 5. • <1% cover of all listed woody weeds at the end of Year 10. • Minimise off-target damage from control activities (avoid all native plants). • Further detail provided in *Appendix 2* for control method and timing.	Annual Section 4.3.2 Section 4.5.3
4	Year 1 - 10	Monitor for and eliminate all new & emerging woody weeds	On-going	• <1% cover of all woody weeds at the end of Year 10.	Annual Section 4.5.3
Herbaceous Weeds					
5	Year 1 -5	Eliminate all high threat herbaceous and grassy weeds.	Various	• Aim to eliminate all listed high threat herbaceous weeds by end of Year 5. • <1% cover of all high threat herbaceous and weeds at the end of Year 10.	Annual Section 4.3.3 Section 4.5.3

#	Year	Management Action	Timing	Standard to be achieved	Monitoring
				• Minimise off-target damage from control activities (avoid all native plants). • Further detail provided in *Appendix 2* for control method and timing.	
6	Year 1 -1 0	Ensure all other herbaceous and grassy weeds do not increase in cover across the site.	Various	• No increase beyond existing cover for all herbaceous weeds. • Minimise off-target damage from control activities (avoid all native plants). • Further detail provided in *Appendix 2* for control method and timing.	Annual Section 4.5.3
7	Year 1 -10	Monitor for and eliminate all new & emerging herbaceous weeds	On-going	• <1% cover of all new and emerging herbaceous weeds at the end of Year 10.	Annual Section 4.5.3
Pest Animals					
8	All	Monitor for and control impacts from rabbits and deer.	Spring / Summer	• No surface disturbance within the site. • No active rabbit warrens to be present. • No damage to Strzelecki Gum plantings from deer activity. • No rubbish. • Minimal artificial piles of logs and rocks.	Biannual Section 4.5.4
9	All	Monitor for and control all new and emerging pest animals	Spring / Summer	• Control numbers of any new and emerging pest animals.	Biannual Section 4.5.4
Revegetation Planting					
10	Years 1 -3	Collect seed from mature Strzelecki Gum from the offset site and adjacent Project Area and provide to local indigenous nursery.	Spring	• Collect seed / propagate tube stock (seedlings) for species listed in *Table 3* from seed sourced on site or as locally as possible and from the same soil type. • Provenance principles should be followed of seed collected from within the offset site or immediately adjacent within the Project Area.	N/A
11	Years 1-3	Prepare the site to ensure optimal establishment of the vegetation	Autumn	• To ensure plants have greatest chance of survival, planting circles should be weed free with no high threat weed cover at time of planting.	N/A

#	Year	Management Action	Timing	Standard to be achieved	Monitoring
		For areas where planting will occur complete at least 2 cycles of weed elimination.		• Undertake revegetation activities outside of the canopy drip-line of all indigenous trees and avoid disturbing any existing native vegetation.	
12	Years 1-3	Sow seeds / plant seedlings with species specified and guard seedlings with core flute or wallaby guards.	Winter	• By the end of Year 3 – all plantings have been completed within the revegetation area.	Section 4.3.5 Section 4.5.5
13	Year 4 - 10	Replace unsuccessful seedlings if losses observed.	Winter	• 100% survival of Strzelecki Gum plantings and 85% of all other planting numbers as specified in *Table 3* by the end of Year 10. • Replace lost plantings if required to ensure numbers are maintained.	Annual Section 4.3.5
14	Year 1 - 10	Undertake plant maintenance post planting including weed control and guard re-establishment / removal.	Spring / Summer	• Control all high threat weeds to plants survival. • Minimise off-target damage from control activities (avoid all native plants). • Removal of guards once plantings are self-sufficient and risk reduced to survival.	Annual Section 4.3.5
Annual reporting					
15	Year 1- 10	Prepare and submit an annual report.	Annual	• Report provides enough detail in the form of written comments and supporting evidence that an assessor can easily determine the completion of / progress against the management commitments.	N/A

4.7 Reporting

A report detailing the results of monitoring must be prepared annually for each of the ten years of this management plan. Reports are to be submitted at least two months prior to the anniversary date of the execution of the OMP to allow compliance to be assessed prior to the anniversary date.

The annual report must identify the progress towards meeting the management action targets and will include:

- Details of management actions completed within the reporting period;
- Results of the monitoring activities, fencing status, weed status, pest animal presence and revegetation work status;
- Identify management actions that have met the targets identified in *Table 4*;
- Identify any management actions that have not met the targets identified in *Table 4*;
- Details of any incidents of unauthorised access, vandalism, new and emerging threats and recommendations for corrective actions and management plan review.

4.8 Auditing

MRPA is responsible for undertaking an independent audit of the implementation of management actions outlined in *Table 4*. Auditing must be undertaken by an independent ecologist at the following milestones:

- **End of year one**- to ensure fencing has been appropriately installed or maintained, that the approved security mechanisms are in place, identifying that revegetation site preparation has been initiated and that other management actions have commenced;
- **End of year four and eight**- to review the previous four annual monitoring reports and management action status reports; and
- **End of year ten**- final audit of the implementation of the OMP and achievement of targets.

An audit report will be provided with recommendations to be implemented for any non-conformance or risk to the OMP not achieving identified targets within the 10-year time frame.

5. Risk Assessment

An assessment of the potential risks associated with the implementation of the OMP are provided in *Table 5*. This follows the evaluating risk framework identified in the DoEE Environmental Management Plan Guidelines (DoEE, 2014). All risks have been identified as Low to Medium.

Table 5 - Risk assessment of the OMP

Management Action	Event	Likelihood	Consequence	Risk level	Trigger	Response
1	Remnant Strzelecki Gum numbers decline	Possible	Moderate	Medium	Death of remnant Strzelecki Gums on site observed	• Determine cause of death; • Undertake additional threat abatement for weeds or pest animals; • Consult with DELWP/ARI to determine potential cause if unknown; • Review entire OMP including targets and activities.
2	Domestic stock observed in the offset site	Unlikely	Minor	Low	Stock observed in offset site or evidence of recent entry	• Remove stock from site; • Replace / repair fencing; • Assess if additional fencing is required; • Monitor recovery of remnant native vegetation; • Monitor revegetation plantings; • Replace lost / damaged plantings; • Monitor for any new and emerging weeds.
2	Damage to fencing observed	Possible	Minor	Low	Damage to fence observed or recent vehicle activity	• Replace / repair fencing; • Assess if additional fencing is required.
2	Unauthorised access	Possible	Minor	Low	Signs of vehicle activity or collection of firewood from offset site	• Replace / repair fencing; • Assess if additional fencing is required; • Erect signage to advise of the sites significance and activities which are prohibited.
3	Targeted woody weeds or new and emerging woody weeds are present at >1% coverage	Possible	Minor	Low	Monitoring shows greater than 1% coverage	• Increase weed control activities.
5, 6	Targeted herbaceous weeds exceed target thresholds or new and emerging herbaceous weeds are present	Possible	Minor	Low	Monitoring shows greater than 1% coverage Monitoring shows coverage is increasing from current levels	• Increase weed control activities.
8	Pest animals observed within site	Possible	Minor	Low	Monitoring shows presence of pest animals	• Undertake pest animal control or prevent impacts to Strzelecki Gum.
2, 3, 4, 5, 6, 7	A flood or wildfire event within the site which may result in:	Possible	High	Medium	Wildfire / Flood event within the offset site	• Replace lost / damaged fencing; • Monitor recovery of remnant native vegetation;

Management Action	Event	Likelihood	Consequence	Risk level	Trigger	Response
	• Loss of fencing • Loss of revegetation plantings • Increase in weed levels					• Monitor revegetation plantings and reinstall numbers if targets not met; • Monitor weed levels and increase frequency of control works to meet targets; • Review entire OMP including targets and activities.
2, 8, 13, 14	Herbivore grazing on Strzelecki Gum recruitment or revegetation plantings	Possible	Minor	Low	Damage from browsing observed in revegetation areas or on regenerating Strzelecki Gums	• Replace lost / damaged plantings; • Protect Strzelecki Gum recruits with rabbit/wallaby/deer proof guards; • Undertake targeted control if identified as pest animals.
1, 13, 14	Natural recruitment or revegetation plantings are unsuccessful	Possible	Minor	Low	Death of recruitment / revegetation plantings observed	• Monitor natural recruitment / revegetation plantings; • Determine cause of death; • Undertake additional threat abatement for weeds or pest animals; • Replace lost / damaged plantings.

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Glossary

CaLP	Victorian legislation - *Catchment & Land Protection Act 1988*
DELWP	Victorian Department of Environment, Land, Water & Planning
DoEE	Commonwealth Department of the Environment & Energy
Diameter at Breast Height (DBH)	The diameter of the trunk of a tree measured over bark at 1.3m above ground level.
Ecological Vegetation Class (EVC)	A type of native vegetation classification that is described through a combination of its floristic, life form and ecological characteristics, and through an inferred fidelity to particular environmental attributes.
EPBC Act	Commonwealth legislation - *Environment Protection & biodiversity Conservation Act 1999*
EVC Benchmark	A standard vegetation-quality reference point relevant to the vegetation type that is applied in habitat hectare assessments. Represents the average characteristics of a mature and apparently long-undisturbed state of the same vegetation type.
Habitat Hectares	Combined measure of condition and extent of native vegetation. This measure is obtained by multiplying the site's condition score (measured between 0 and 1) with the area of the site (in hectares).
High Threat Weed	Introduced plant species (including non-indigenous 'natives') with the ability to out-compete and substantially reduce one or more indigenous life forms in the longer term.
Large Old Tree (LOT)	A tree with a Diameter at Breast Height equal to or greater than the large tree diameter as specified in the relevant EVC benchmark.
MNES	Matters of National Environmental Significance
Medium Old Tree (MOT)	A tree with a Diameter at Breast Height (DBH) equal to or greater than 0.75 of the large tree diameter in the relevant EVC benchmark but less than the DBH for a large old tree.
MOU	Crown Land Offset Memorandum of Understanding (MOU) as an encumbrance on the Crown Land Register.
MRPA	Major Road Projects Authority, an administrative office in relation to the Department of Economic Development, Jobs, Transport and Resources.
Offset	Protection and management (including revegetation) of native vegetation or MNES at a site to compensate for the loss of the removal of native vegetation or residual impact to MNES.
OMP	Offset Management Plan
Recruitment	The production of new generations of plants, either by allowing natural ecological processes to occur (regeneration etc), by facilitating such processes such as regeneration to occur, or by actively revegetation (replanting, reseeding).
Revegetation	Establishment of native vegetation to a minimum standard in formerly cleared or degraded areas.
Small Tree (ST)	A tree with a Diameter at Breast Height (DBH) equal to or greater than 0.25 of the large tree diameter in the relevant EVC benchmark but less than the DBH for a medium old tree.
Supplementary Planting	Establishment of over storey and/or understorey plants within an area of native vegetation. Typically includes the planting or direct-seeding of understorey life forms.
Very Large Old Trees (VLOT)	A tree with a Diameter at Breast Height (DBH) of at least 1.5 times that of the large tree DBH as specified in the relevant EVC benchmark.
Understorey	The lower layers of vegetation, including the shrub layer, grass layer and ground layer. The understorey may comprise native and non-native species.

Appendices

Appendices commence on next page

Appendix 1- Offset Calculator

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Eucalyptus strzeleckii
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community Clear row	No		Area			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat Clear row	No		Area			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees Clear row	No					
Condition of habitat Change in habitat condition, but no change in extent Clear row	No					
Threatened species						
Birth rate e.g. Change in nest success Clear row	No					
Mortality rate e.g Change in number of road kills per year Clear row	No					
Number of individuals e.g. Individual plants/animals Clear row	Yes		181		Count	

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset									
									Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0								
					Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
Threatened species habitat																				
Area of habitat	No				Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset									
									Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0								
					Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	Yes	181	Count	MOU agreement - Crown Land	10		232		206		493		287	80%	229.60	225.06	124.34%	Yes	$1,200,000.00	Site Assessment Quote estimate

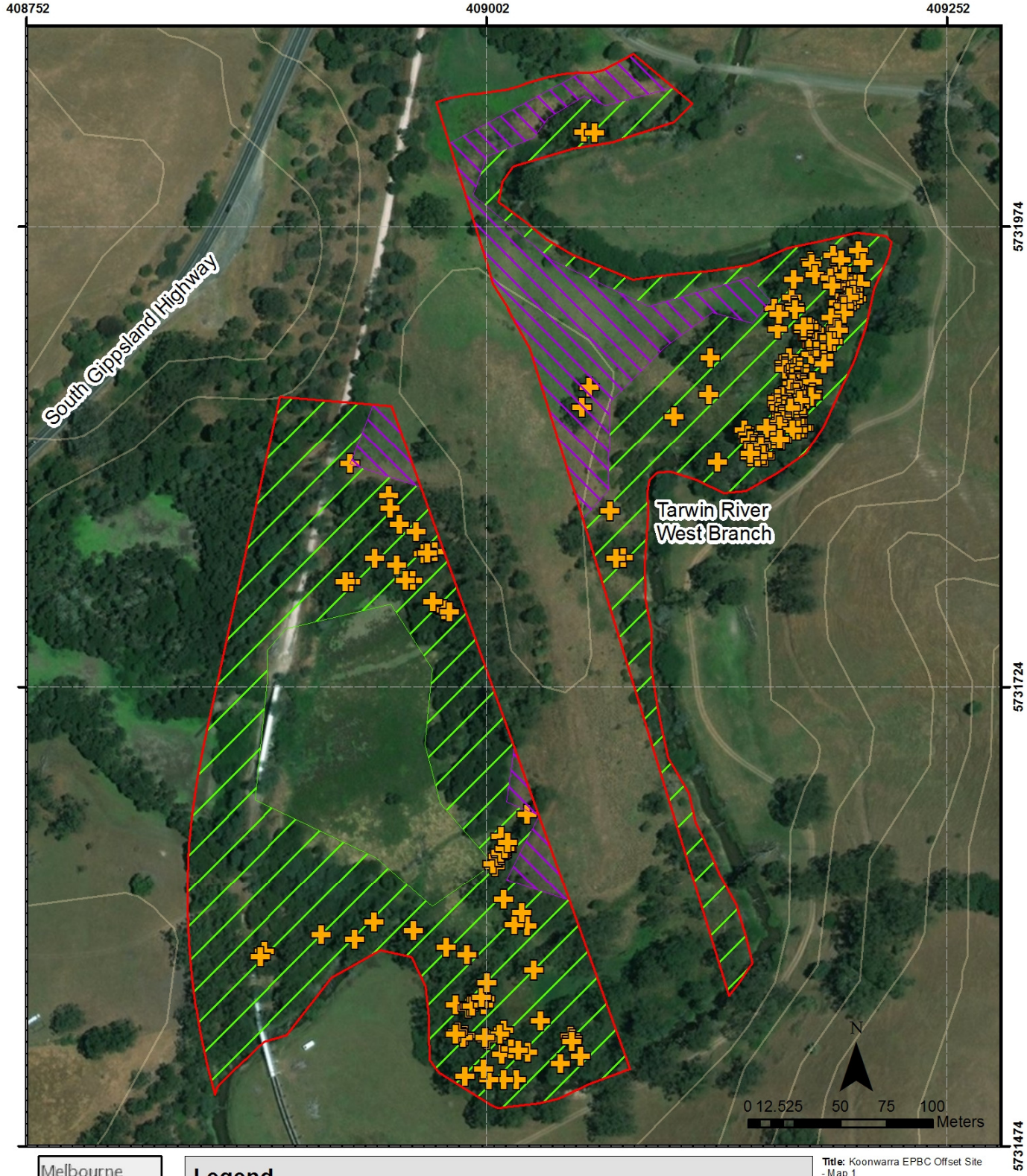
Appendix 2- Weed species to control, method and timing

Scientific name	Common name	% cover	Target	CALP Listed Weed	5 Year Target Cover	10 Year Target Cover	Method	Timing
Cirsium vulgare	Spear Thistle	1%	Eliminate to <1% cover	Regionally Controlled	<1%	<1%	Dig out or spot spray with an appropriate herbicide	Spring
Cenchrus clandestinus	Kikuyu	10%	Actively control to ensure no increase in % cover		10%	10%	Spray with appropriate herbicide	Spring and Summer
Holcus lanatus	Yorkshire Fog	2%	Actively control to ensure no increase in % cover		2%	2%	Spray with appropriate herbicide	Summer
Ranunculus repens	Creeping Buttercup	2%	Actively control to ensure no increase in % cover		2%	2%	Spray with appropriate herbicide	Spring
Solanum pseudocapsicum	Madeira Winter Cherry	1%	Eliminate to <1% cover		<1%	<1%	Dig out or Cut & Paint	All Year
Dactylis glomerata	Cocksfoot	1%	Actively control to ensure no increase in % cover		1%	1%	Hand weed or spray with appropriate herbicide	Winter and Spring
Phalaris arundinacea	Reed Canary Grass	2%	Actively control to ensure no increase in % cover		2%	2%	Spray with appropriate herbicide	Spring and Summer
Tradescantia fluminensis	Wandering Trad	4%	Eliminate to <1% cover		<1%	<1%	Hand weed or spray with appropriate herbicide	All Year
Jacobaea vulgaris	Ragwort	1%	Eliminate to <1% cover	Regionally Controlled	<1%	<1%	Dig out or spot spray with an appropriate herbicide	Spring and Summer
Salix spp.	Willow	1%	Eliminate to <1% cover	Restricted	<1%	<1%	Cut & Paint	Spring to Autumn
Rubus fruticosus spp. agg.	Blackberry	5%	Eliminate to <1% cover	Regionally Controlled	<1%	<1%	Cut & Paint, spray with appropriate herbicide	Summer
Crataegus monogyna	Hawthorn	<1%	Eliminate to <1% cover	Regionally Controlled	<1%	<1%	Cut & Paint	Spring to Autumn

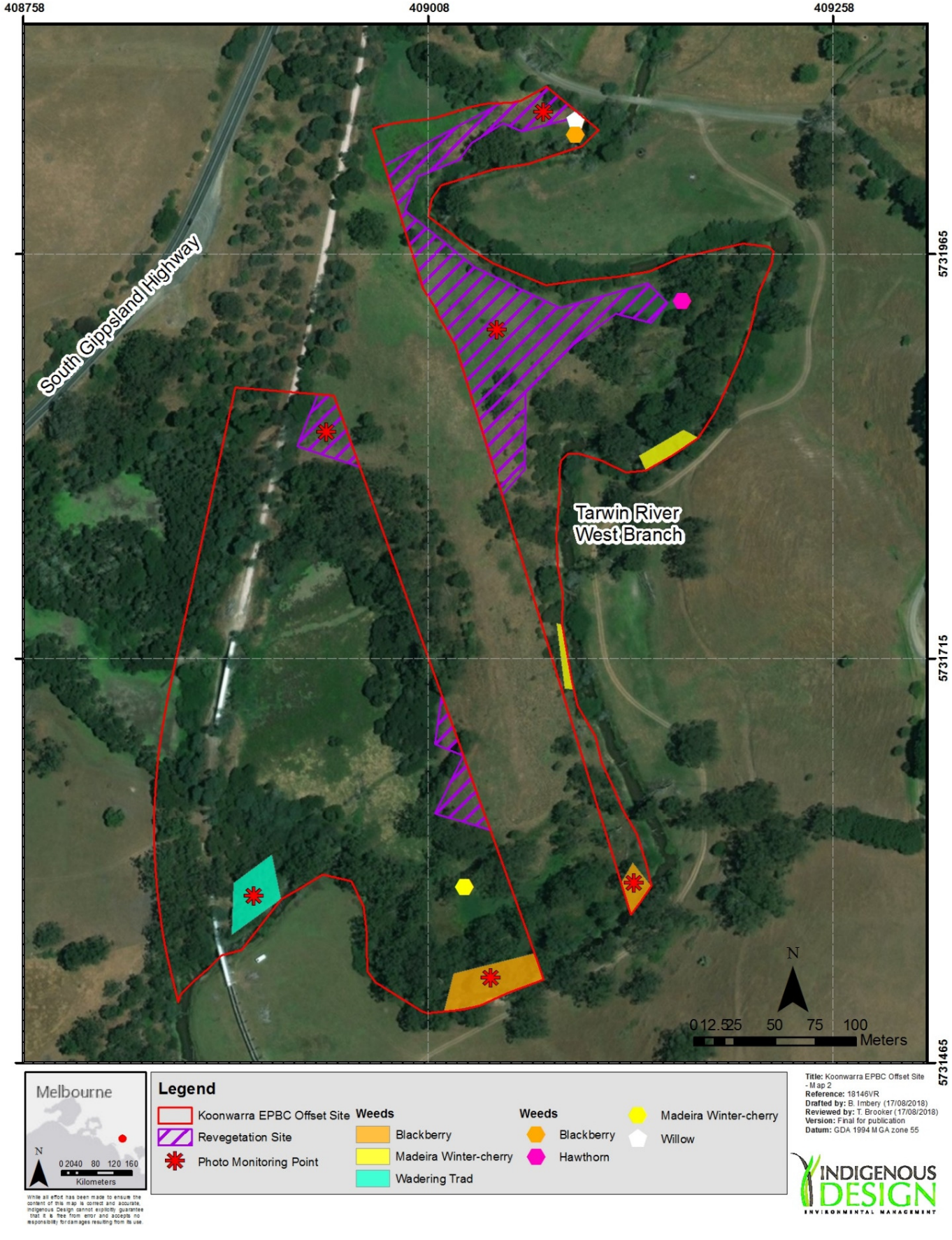
Maps

Maps commence on the next page

Map 1 – Offset site boundaries and location of key features



Map 2 - Offset significant weed locations and monitoring points



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