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Final Report

Kangaroo Management Plan: 510 Summerhill Road, Wollert, Victoria

Prepared for

Cleanaway Operations Pty Ltd

March 2023

Ecology and Heritage Partners Pty Ltd

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Ecology and Heritage Partners acknowledge the Traditional Owners of the country we live and work on, and we pay our respect to Elders past, present and emerging.

FULL KANGAROO MANAGEMENT PLAN

510 Summerhill Road, Wollert

16/03/2023

This Kangaroo Management Plan (KMP) has been prepared on behalf of Cleanaway Operations Pty Ltd by Callum Luke (Senior Zoologist). It provides details of the planned management of Eastern Grey Kangaroos at 510 Summerhill Road, Wollert.

Site address: 510 Summerhill Road, Wollert, Victoria

Local government area: City of Whittlesea

PLANNING PERMIT APPLICANT

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SITE INDUCTION

Does the site induction for construction workers cover this KMP, and what to do if they find evidence of kangaroos in the construction area?	Yes

SITE INDUCTION

Site inductions are to be completed by a suitably qualified Ecologist, and cover the following details:

No.	Induction Requirement	Required details
1	A brief overview	1. KMP Rationale – why a KMP is necessary, and the objectives of a successful KMP (Section 2) including: i. Reducing the risk of negative interaction between humans and EGKs; ii. Reducing the risk of landlocking and wildlife-vehicle collisions; and, iii. Reducing impacts to natural areas, conservation reserves and other threatened species. 2. Population survey results (likely locations of EGKs during construction) (Section 5) i. Kangaroo populations are predominantly to the south; ii. Conservation Area is of paramount importance in relation to EGK movements. 3. What to do if you find a Kangaroo in a construction area (Further detail and a printout for office/site display can be found in Appendix 1): i. Let the kangaroo leave of its own accord and do not herd the kangaroo; ii. Try to identify where the kangaroo entered the construction area. Temporarily widening the entry point might encourage the kangaroo to leave through it. If the kangaroo leaves, securely close off the entry point as soon as possible; iii. Report seeing the kangaroo (within the construction site) to the ecologist; iv. If there are things attracting kangaroos in the construction area, contact the ecologist immediately about amending the site's kangaroo management plan to possibly remove the attractants; v. If the kangaroo is injured, or will not leave by itself, contact one of the agencies listed in Appendix 1; vi. If a kangaroo is injured or killed the Department of Energy, Environment and Climate Action (DEECA) must be notified; and, vii. All people must obey standard construction area speed limits.
2	A detailed overview of the **Preventative Actions** (Section 10) of the following report. *The attached tables in the following sections can be used as a guide, and can be provided to workers if required, to encourage thorough understanding of the responsibilities of workers during construction.*	1. Management/preventative actions as detailed in **Section 10**; 2. The workers' roles in implementing actions detailed in **Section 10**, including reporting kangaroo sightings and follow stop work procedures; 3. Implement and/or follow regular monitoring procedures detailed in **Section 10**; and, 4. For more complex actions (such as fencing), the information in **Section 10** will be used to by relevant project managers and officers to prepare specific instructions for workers on the requirements of tasks and/or outcomes including Kangaroo Exclusion Fencing.

CONTENTS

1 INTRODUCTION

Habitat for Eastern Grey Kangaroo *Macropus giganteus* (referred to in this plan as 'EGKs') in Melbourne's growth corridors is being reduced with the loss of grassland, grassy woodland and farmland as a result of urban growth and implementation of the Delivering Melbourne's Newest Sustainable Communities program (DPCD 2010). If poorly managed, development in and around the habitat of EGKs can land-lock populations, or force them to leave their home range in ways that endanger their welfare or lead to adverse human interactions.

This Kangaroo Management Plan (KMP) has been prepared to minimise risks to EGKs, people and the broader environment that may occur as a result of unmitigated development within the home ranges of EGKs. It provides a long-term, adaptable plan aimed at minimising risks over the life of development at the subject site.

The project area occurs within the proposed Northern Quarries Precinct Structure Plan (PSP) (Figure 1). The Northern Quarries Precinct is yet to be finalized, however occurs north of Cooper Street West PSP, east of Craigieburn North Employment Area PSP and the proposed Craigieburn South Employment Area PSP, south of Shenstone Park PSP, and west of Wollert PSP.

Please note: *Development cannot start until the Department of Energy, Environment and Climate Action (DEECA) (formerly the Department of Environment, Land, Water and Planning) approves this plan.*

1.1 Proposal Description

Cleanaway Operations Pty Ltd (Cleanaway) is an Australian waste management, recycling, and industrial services company. Cleanaway is developing a waste-to-energy (WtE) facility in Victoria known as the Melbourne Energy and Resource Centre (MERC) (the Proposal).

The MERC has been designed to thermally treat a design capacity of 380,000 tonnes per annum (tpa) of waste feedstock, consisting of residual Municipal Solid Waste (MSW) and residual commercial waste, which is waste that would otherwise be sent to landfill. Waste feedstock processed by the MERC will be subject to a Waste Acceptance Protocol to determine eligibility and suitability for processing both prior to arrival and upon arrival on-site. The Proposal will also incorporate maturation and processing of bottom ash to recover recyclable metals, with the intent to utilise the remaining ash as an aggregate in construction.

Residual waste is waste that is left over from recycling and resource recovery operations and waste from source separated collections. Source separation involves separating waste into common material streams or categories for separate collection. Waste processed at the site will be subject to a Waste Acceptance Protocol to ensure only appropriate waste is used as feedstock.

The WtE process would generate approximately 46.3MW gross of electricity, 4.7MW of which would be used to power the facility itself and the associated on-site by-product and residue handling processes, with 41.6MW (328,700 MWh/year) exported to the grid as base load electricity. In addition to supplying electricity to the grid, there is also potential to supply energy in the form of heat and/or process steam to local industrial users.

Some residual materials are produced because of the WtE process, including Incinerator Bottom Ash (IBA), boiler ash and flue gas treatment residue. The boiler ash and flue gas treatment residue are typically combined and together are referred to as Air Pollution Control residue (APCr). Overall, the WtE process typically leads to about 90% reduction in the volume, or 80% reduction in mass (tonnes), of waste that would otherwise go to landfill. If IBA is reused as an alternative construction product to virgin materials, this percentage increases

further to approximately 95% reduction in volume and mass of waste that would otherwise go to landfill. The final volume of waste diverted from landfill is dependent on the classification and market for the residues and by-products generated by the WtE facility.

The Proposal includes the construction and operation of an IBA maturation and processing facility on site. The purpose of this facility is to store the IBA to mature (stabilise) it, before mechanically processing IBA from the WtE facility into an aggregate for reuse. As part of this process, both ferrous and non-ferrous metals will be recovered from the IBA for recycling and sale to market.

The Proposal also includes a stabilisation facility for APCr, a necessary treatment step to immobilise leachable components of the APCr prior to removal from site by vehicle and disposal at an appropriately licenced landfill.

The Proposal will use best available techniques and technologies in the engineering design, operation, maintenance and monitoring activities associated with the MERC. Moving grate technology has been chosen as the means to thermally treat incoming waste to recover energy and other resources. Current international best-practice techniques, including automated combustion controls and advanced flue gas treatment technology will be applied so that air emissions meet stringent emission standards. The moving grate combustion system is a common form of thermal WtE technology in which the waste is fed through the combustion chamber on a travelling grate. This enables efficient and complete combustion of the waste, with primary combustion air introduced from below the grate and secondary combustion air introduced directly into the combustion zone above the grate. Moving grate technology has been used globally for over 100 years, and in that time the technology has been subject to continual improvement responding to regulatory, industry and public demands. There are approximately 500 similar operational examples across Europe alone, the majority of which use the moving grate-type technology being proposed for the MERC.

The Proposal involves the building of all onsite infrastructure required to support the WtE facility, including site utilities, internal roads, weighbridges, parking and hardstand areas, stormwater infrastructure, fencing and landscaping. The Proposal will also include a visitor and education centre to help educate and inform the community on the circular economy, recycling, resource recovery, the benefits of landfill diversion and the WtE process. The intent behind this education is to drive a shift in community thinking and actions around waste management.

The Victorian Waste to Energy Framework (2021) recognises the role of WtE to divert waste from landfills, helping Victoria transition to a circular economy. Recycling Victoria recognises a role for WtE investment and supports WtE facilities where they meet best-practice environment protection requirements. This includes reducing waste to landfill, supporting waste avoidance, reusing and recycling, and demonstrating social license with affected communities. The Victorian Environment Protection Authority (EPA) Energy from Waste Guideline (Publication 1559, 1 July 2017) also notes that efficient recovery of energy from the thermal processing of waste is considered a resource recovery as opposed to a waste disposal option.

The EPA VIC Guideline: Energy from Waste stipulates that '*Proponents of EfW proposals…will be expected to demonstrate that the siting, design, construction and operation of EfW facilities will incorporate best practice measures for the protection of the land, water and air environments as well as for energy efficiency and greenhouse gas emissions management. Facilities should be able to provide evidence of how they minimise and manage emissions (including pollutants, odour, dust, litter, noise and residual waste) in accordance with relevant statutory requirements*.'

The WtE facility has been designed to meet the European Industrial Emissions Directive (IED) (2010) and the associated Best Available Techniques Reference (BREF) Document for Waste Incineration published December 2019, which sets the European Union environmental standards for waste incineration. The facility will also comply with the technical criteria set out in the EPA Victoria Guideline: Energy from Waste publication 1559.1.

The purpose of this specialist assessment is to demonstrate compliance with the various authority requirements, develop community support and social license.

2 KANGAROO MANAGEMENT RATIONALE

2.1 Human: Eastern Grey Kangaroo Interactions

Suitable habitat for EGKs is present both within the project area and in areas surrounding the project area and the development of the site may result in adverse interactions between humans and EGKs. One of the goals of this KMP is to reduce the likelihood and the severity of these interactions. These negative interactions may include:

- Collisions between vehicles and EGKs
- Attacks on EGKs by unrestrained dogs
- Very occasional reported 'attacks' by EGKs on humans.

These interactions may occur in the Northern Quarries Precinct due to:

- An increase in the residential human population, while suitable habitat for EGKs is retained on the undeveloped portion of the precinct during development
- EGKs moving into the precinct from other areas that have been developed.

2.2 Animal Welfare Considerations

As a result of the development in surrounding precincts (i.e. Craigieburn North Employment Area, Shenstone Park, English Street, Wollert) and the proposed Northern Quarries Precinct (Figure 1), and concurrently, the increase in the human population in the area, there are a range of potential impacts to the welfare of EGKs (Herbert, 2004; Coulson, 2007), including:

- Starvation due to lack of food resources (i.e. removal of grassland habitats)
- Exposure to disease
- Malnutrition causing parasite infestations
- Injury and mortality associated with fence and vehicle collisions
- Increased interactions with humans (i.e. EGKs becoming dependent and possibly aggressive).

The development of the Northern Quarries PSP and other developments in the surrounding area increase the likelihood of negative impacts to EGK welfare.

2.3 Protection of Ecosystem Health

Primarily, the objective of a KMP is to ensure the safety and welfare of EGKs throughout the development process. Furthermore, the implementation of a considered and functional KMP prior to the development of previously vacant land is also important for the safeguarding of ecosystem health, including threatened or vulnerable ecological communities or outstanding flora and fauna values. These values may include previously designated conservation areas (i.e. Biodiversity Conservation Strategy), waterways, or known habitat for threatened flora and fauna.

2.4 Legislative Requirements and Policy

In Victoria, EGKs, like all indigenous fauna, are protected under the *Wildlife Act 1975* and the *Prevention of Cruelty to Animals Act 1986*. This KMP is needed in accordance with the requirements of the Whittlesea Planning Scheme. The development at 510 Summerhill Road, Wollert, Victoria will ensure the protection of EGKs in accordance with the relevant Acts.

3 PLAN GOALS

The goals of this KMP are to minimise risks to animal welfare, public safety and the environment through the preparation of a management plan and other initial and responsive management actions. This KMP is based on a consideration of the lifetime, and completion, of the development of the waste facility (i.e. when the facility is operational). Following completion of construction, a population of EGK may persist within the BCS Conservation Area to the north and west (Figure 2), and the undeveloped portion of the project area to the north (Figure 2). No EGK will remain within the development area at the end point of the development. This KMP acknowledges that kangaroo management must be responsive to the changing needs and behaviours of the kangaroo population.

4 EASTERN GREY KANGAROO ECOLOGY

EGKs live in mobs of 10 or more with a home range extending up to five kilometres. Males grow larger than females typically weighing up to 66 kilograms, with a body length of up to 1.3 metres and a tail length up to one metre. Females can weigh up to 37 kilograms and have a body length of up to one metre and tail up to 0.84 metres. Male EGKs stand around 1.5 metres tall (Burrell 2015, DSE 2010) (Plate 1).

EGKs are found in a wide range of habitats from semi-arid mallee scrub through to woodland, forest and farmland. EGKs are herbivorous, predominantly eating grasses, although they can also eat a range of other plants. They favour the protein rich young green grass shoots as dry grass is difficult for them to digest (Burrell 2015). A summary of EGK ecology is outlined below (Table 1).

Plate 1. Eastern Grey Kangaroo (Ecology and Heritage Partners Pty Ltd 2013)

Table 1. Summary of EGK Ecology

Feature	Description
Distribution	Wide distribution from North Queensland to Tasmania
Home Range	Sex-biased, smaller range for females
Sexual maturity	Males approximately 4 years old Females approximately 1.5 years old
Reproductive cycle	Seasonal breeding: Most young born in summer with pulse of emergent pouch young in spring Oestrus cycle 46 days Gestation 36 days First pouch exit at 283 days (or 9 months) Permanent pouch exit at 319 days (or 10 months) Weaning typically 540 days (or 18 months – sub adult)
Mortality	Mortality is mainly due to lack of nutrition, predation (including human actions that reduce population numbers) and disease High mortality of young prior to breeding age, especially for males Few males live more than 10 years old in the wild
Fecundity	Data shows very high levels of fecundity even at high population densities and low *per capita* food availability

Source: Territory and Municipal Services (2010).

5 SITE DESCRIPTION

5.1 Site Information

The project area is located at 510 Summerhill Road, Wollert, Victoria approximately 26 kilometres north of Melbourne (Figure 1). The southern boundary of the project area is bound by Summerhill Road and is surrounded by undeveloped pastureland to the north, east and west. According to DEECA's Native Vegetation Information Management (NVIM) Tool (DELWP 2022), the project area is located in the Victorian Volcanic Plains bioregion, within the City of Whittlesea.

The project area covers approximately 82 hectares and predominantly comprises open pasture with a few trees and shrubs present across the project area (Plate 2 and 3). The surrounding properties have more extensive coverage of larger native trees and shrubs (Plate 4). Patches of the invasive weed Gorse *Ulex europaeus* exist throughout the site (Plate 5). The project area is generally flat and consists of mixed grassland containing both native and invasive species, both of which are considered palatable to EGKs. Further potential habitat or refugia is in the form of rocky outcrops. EGK scat was found throughout project area and surrounds (Plate 6).

Five water sources were located within the project area; one in the form of a shallow dam (Plate 7); and four pre-existing water troughs in the southern extent of the project area close to Summerhill Road (Plate 8; Figure 2). All fences separating property borders and internal paddocks are standard livestock fences (Plate 9). EGKs will easily traverse these fences allowing them to move freely around the property and surrounding landscape. Multiple fence breaks exist that EGKs likely utilise to manoeuvre throughout the landscape, between properties along Summerhill Road. An overview of the habitat features identified within the project area is provided in Figure 2.

Plate 2. Open pasture within the project area. Ecology and Heritage Partners 07/09/2022.

Plate 3. Scattered trees within the project area. Ecology and Heritage Partners Pty Ltd 07/09/2022.

Plate 4. Native trees in property to the north of the project area. Ecology and Heritage Partners Pty Ltd 07/09/2022.

Plate 5. Patch of Gorse *Ulex europaeus*. Ecology and Heritage Partners Pty Ltd 07/09/2022.

Plate 6. Kangaroo scat. Ecology and Heritage Partners Pty Ltd 07/09/2022.

Plate 7. Dam which acts as a suitable water source for EGK populations. Ecology and Heritage Partners Pty Ltd 07/09/2022.

Plate 8. Water trough in the south of the project area. Ecology and Heritage Partners Pty Ltd 07/09/2022.

Plate 9. Standard livestock fencing bordering the property. Ecology and Heritage Partners Pty Ltd 07/09/2022.

5.2 Home Range and Refuge Habitat (parks, reserves and conservation areas)

EGK home range is likely to encompass the entire project area. The project area is accessible from all directions surrounding the property, with fence breaks present and being used by EGKs to the east and west of the project area. A small portion of the project area in the north-east is covered by a Biodiversity Conservation Strategy (BCS) Conservation Area, where native vegetation is identified as 'to be retained' for conservation purposes (Figure 2). EGK are likely to utilise the conservation area in the north and in the surrounding landscape for protective habitat and to enable safe movement through the landscape.

5.3 Threatened Species and Ecological Communities

BCS Conservation Areas are present to the north of the project area (Figure 2). The *in situ* management of EGKs through the application of this KMP within the project area is unlikely to negatively affect the surrounding habitat of threatened species or ecological communities through overgrazing or the displacement of resident EGK populations.

5.4 Landscape Features and Major Hazards

Summerhill Road to the south of the project area exists as a hazard between the project area (i.e. development area) and nearby suitable EGK habitat. EGKs were observed moving into the project area from properties to the south across Summerhill Road using numerous fence breaks on the roadside reserve. A quarry and associated brick manufacturing plant is also present approximately 500 metres to the south of the project area, which may affect the movement patterns of EGK in the surrounding area.

6 SURVEY METHODOLOGY

Surveys were undertaken by a qualified zoologist experienced in EGK surveys. The survey methods followed DEECA's *Interim advice for consultants on the contents of a Kangaroo Management Plan* (DELWP 2015).

6.1 Habitat Assessment

A habitat assessment was undertaken in conjunction with presence/absence surveys, to determine habitat and resource availability (including watering points) within the project area. Areas of potentially suitable habitat in adjacent properties were also considered as part of the habitat assessment, which took place on 6 September 2022 (Table 2).

6.2 Population Density Assessment

Population density assessments were undertaken using a Direct Observation Count. The Direct Observation Count is the simplest method of estimating absolute abundance of EGKs per hectare on medium sized sites (Territory and Municipal Services 2010). Surveys were conducted over four half-days with the hours of observation including dawn to daylight or late afternoon to dusk when EGKs are more active (Table 2). Surveys involved walking or driving throughout the project area and included visual observations for EGKs as well as searches for scats, tracks, fur caught in fences and other evidence (i.e., roadkill, carcass, etc.). Areas of protective habitat in adjacent properties (within approximately one kilometre of the site), were visually surveyed using binoculars.

The population density assessments took place between 7 September and 21 September 2022 (Table 2).

7 POPULATION SURVEY RESULTS

A total of four visits to the project area to search for EGKs were completed. Up to 161 EGKs were observed in the project area and within adjacent areas during the four population density surveys (Table 2).

Table 2. EGK Survey Results

Date	Time	EGKs Observed
07/09/2022	06:50 – 09:00	161
14/09/2022	16:30 – 18:30	72
20/09/2022	16:30 – 18:30	72
21/09/2022	06:50 – 09:00	93

7.1 Patterns of Movement

EGKs were observed moving throughout the project area by utilising multiple fence breaks between livestock fences between paddocks (Figure 3). They were also observed moving into adjacent properties to the north, east, west, and south. However, this is likely to be due in part to the fact that the disturbance (the surveyor) approached from the south. The EGK population appeared to be resident in the project area and surrounding properties to the north, south and east, with large groups being present within the project area during all surveys. Observed movements of EGKs during each population survey count are mapped on Figure 3.

7.2 Protective Habitat

Protective habitat provides shade and shelter for EGKs. Protective habitat within the project area exists in the form of scattered Eucalypts and patches of Gorse. EGKs were not observed sheltering in protective habitat on the project area, however, were observed using a denser collection of eucalyptus trees to the north of the project area as shelter.

7.3 Watering Points

Multiple water sources are present within the project area in the form of dams and livestock troughs. Numerous dams and livestock troughs in the surrounding landscape may also provide a water source for EGK populations all year. Additionally, Merri Creek occurs approximately one kilometre west of the project area, which runs north-south, and would act as a suitable water source for EGK populations within the wider landscape.

8 STAGED FENCING PLAN

The project is proposed to be delivered in a single stage however, due to the large size of the project a staged fencing plan is proposed to be implemented over six days. The aim of the staged fencing plan is the avoidance of land-locking EGKs with minimal human intervention, during the construction phase and at the completion of the development. Actions such as herding or scaring EGKs out of the construction area must be avoided as this can cause undue stress and confusion to kangaroos, causing them to behave erratically (Appendix 1). This may result in kangaroos and people being injured as EGKs move onto nearby roads or into residential areas. If EGKs are present on site at any stage during construction, they must be allowed to disperse to the north, east and south into the adjacent undeveloped areas.

The project area is proposed to be developed in one stage, due to the requirement of having a fully functional waste-to-energy facility upon day one of operation. However, the project will be fenced in six smaller stages to ensure EGKs don't become landlocked, with internal fencing removed once all six stages are complete. Due to the inherent risk that EGKs will enter the construction site, a staged fencing plan has been prepared to ensure that EGKs can safely disperse through the landscape without the risk of becoming land-locked within the development area (Figure 4). The staged fencing plan over consecutive days is outlined in Table 3.

Table 3. Development Staging details and fencing requirements

Stages	Fencing Requirements
1 - 6	Stages 1-6 comprises the entirety of the development footprint in the south of the project area. Kangaroo exclusion fencing must be erected around the entire boundary of the development footprint; however, due to the inherent risk of land-locking EGKs within the project area, this must be achieved in a staged approach. Access gates will be installed around the perimeter of the fencing to allow construction vehicle to enter the site. Installation of EGK warning signs on either side of the southern boundary at Summerhill Road will be implemented, as a warning to incoming vehicles of EGK movement throughout the project area. The entirety of the development area must be fenced off over six consecutive days, starting from the southern extent, close to Summerhill Road. Each Stage, as per Figure 4, will be consecutively fenced off over a 6-day period, enabling the safe dispersal of EGKs from the development area. On day one, fencing will be erected around the entirety of Stage 1 and along the entire southern boundary of the project area to ensure EGKs are not encouraged to cross Summerhill Road. Each day will involve the fencing of an additional Stage, consecutively, until all six Stages are fenced off entirely. As the fencing for additional stages are completed, the internal boundaries may be removed. Although the staging of the development will occur over consecutive days (Figure 4), Kangaroo Proof Fencing will be erected around the entire boundary of Stages 1-6 after six days to avoid the risk of land-locking EGKs. If EGKs are identified within a fenced area of a Stage, they must not be herded; rather gaps in the fencing should be left open until EGKs disperse of their own accord. Staging must cease until EGKs have left the Stage.

Stages	Fencing Requirements
	If EGKs are present on site, they must be allowed to disperse to the north, east and west into adjacent farmland and reserves or into unoccupied areas of the project area in the north (Figure 3). Fencing must remain around the entire boundary of the development until development has been completed. **Land-Locking Risk**: Low **Fencing Requirements:** The entirety of the development must be fenced off over six consecutive days, allowing for EGK to slowly disperse into un-developed portions of the project area. **Water Resource Decommissioning:** Prior to construction commencing or once the area is fully fenced off.

The entire development area must be completely fenced with temporary kangaroo proof fencing (as defined by DELWP 2015, pg. 26-27) prior to the commencement of construction. EGKs can disperse to the north, east, and west into adjacent open areas. Land-locking of EGKs is considered low risk however the project area will need to be checked prior to the installation of fencing to ensure EGKs do not become trapped.

Although the land adjacent to the project area is currently undeveloped, future development in the area may cause increasing pressures to the resident EGK populations, and EGK movements within and surrounding the project area may change.

In combination with erecting temporary construction fencing and removing food resources (where required), the development plan reduces the likelihood that an issue with EGKs accessing construction areas will arise. However, construction areas must be searched each day before the commencement of works to determine if EGKs are present. Permanent fencing will be erected as part of the landscape plan and this will prevent encroachment by EGKs once the development has been completed. If EGKs are found in the construction area or in an area at risk of land-locking, DEECA must be contacted immediately to determine an appropriate course of action.

9 ASSESSMENT OF OTHER MANAGEMENT OPTIONS

9.1 Management Overview

This section assesses the suitability of other allowable management options as ways to prevent EGKs from using the site. Possible management options, including non-lethal options, are developed and considered by reviewing current industry best practice, research on latest methods and through consultation with State Government agencies and other organisations.

The management options reviewed include:

- No management (self-regulation)
- Direct management (fertility control, lethal methods)
- Complementary management (habitat manipulation).

9.2 Desktop Review of Current Industry Practice

A desktop review was undertaken to ensure the most up to date information and existing technical knowledge on current industry practice of the management of EGKs was reviewed in the assessment of management options. This involved a review of:

- Published EGK research and State management documents (TAMS 2009; Pople and Grigg 1999)
- Current environmental resource management guidelines (Allan and Stansky 2009)
- Update on Situation Analysis Report: Current state of scientific knowledge on EGKs in the environment, including ecological and economic impact and effect of culling. Report to the EGK Management Advisory Committee (Olsen and Low 2006)
- RSPCA Policies and Position Papers (RSPCA 2014).

9.3 Assessment of Management Options

Each identified management option was assessed against the various criteria outlined below. With each option the following questions were asked. In order to sustainably manage the EGK population, is the option:

- Fit for purpose (i.e. will it fulfil intention and specification)?
- Supported by government agencies (DEECA)?
- Supported by animal welfare groups (RSPCA)?
- Scientifically proven and commercially available?
- Practical?
- Known to be humane, safe and without impacts to non-target individuals or populations?

A detailed analysis of options and their suitability for any population of EGKs potentially using the project area is shown in Table 4. Any option which failed more than one of the assessment criteria was not considered further. Management options that met all the criteria specified are shown in bold in Table 4.

Table 4. Assessment of EGK Management Options

Option	Description	Fit for purpose	Supported by Gov. Agencies	Supported by RSPCA	Proven and available	Practical	Animal Welfare
No Management							
No management	EGK population left to self-regulate	×	×	×	✓	×	×
Direct Management							
Surgical sterilisation	Tubal-ligation or ovariectomy - females. Vasectomy or castration - males.	×	✓	✓	✓	×	✓
Immuno-contraception	Vector carries agent that initiates auto-immune response rendering animal sterile.	×	×	✓	×	×	✓
Chemical castration	Injection of toxin that causes castration of males or atrophy of the testes.	×	×	✓	×	×	✓
Chemo-sterilants	Injection of the chemical which eliminates primordial and primary follicles.	×	×	✓	×	×	✓
Contraceptive implants	Peptide hormone implants.	×	✓	✓	✓	×	✓
Contraceptive implants	Steroid hormone implants.	×	✓	✓	✓	×	✓
Euthanasia injection	Capture of animals via darting and euthanasia by lethal injection.	×	✓	×	✓	×	×
Shooting	Shooting to reduce population size by licensed operators following approved guidelines.	×	✓	✓	✓	✓	✓
Translocation	Capturing animals via darting then transporting to another area.	×	×	×	×	×	×
Relocation	Herding animals out of a particular area to another	×	×	×	×	✓	×
Poisoning	Poison added to supplementary feed for the population	×	×	×	×	×	×

Option	Description	Fit for purpose	Supported by Gov. Agencies	Supported by RSPCA	Proven and available	Practical	Animal Welfare
Complementary Management							
Staging development	**Site developed in a staged approach to encourage movement to other areas**	✓	✓	✓	✓	✓	✓
Decommissioning dams	**Decommissioning dams outside conservation areas, in areas of future development.**	✓	✓	✓	✓	✓	✓
Removal of food	**Scrape/cut grassy areas to remove EGK food sources outside of conservation areas**	✓	✓	✓	✓	✓	✓
Revegetation	Revegetating areas of grassland to woodland.	×	✓	✓	×	×	✓
Removing fencing in specific areas	Remove fencing in areas to encourage emigration.	×	✓	✓	×	×	✓
Temporary exclusion fencing	**Use of fencing with kangaroo-proof features (as defined in DELWP 2015, p. 26) to exclude EGK from hazardous areas**	✓	✓	✓	✓	✓	✓
Permanent fencing	Erecting fencing with kangaroo-proof features (as defined in DELWP 2015, p. 26) to contain or exclude kangaroos to/from a particular area indefinitely	×	✓	×	✓	×	✓
Signs along roads	**Increased use of signs along surrounding public roads and internal roads.**	✓	✓	✓	✓	✓	✓
Site user education	**Information for site inductions and education material relating for all site users.**	✓	✓	✓	✓	✓	✓

Notes: Options that are in bolded text are the management measures that meet all of the relevant approval criteria (i.e. supported, proven and available).

10 PREVENTATIVE ACTIONS

Drawing on the options assessment and supporting information in Table 4, the activities and responsibilities for undertaking management actions are detailed in Table 5. This information is to be referenced throughout the construction phase to record progress and detail the outcomes of all implemented actions.

Preventative actions to be undertaken will include:

- Staging fencing plan (Figure 4). The site will be fenced through a staged approach to limit the risk of land-locking
- Decommissioning dams and water sources (Figure 2) within the construction area (outside of conservation areas)
- Searches of the construction area for EGKs each day before the commencement of construction
- Temporary exclusion fencing. Use of fencing with kangaroo proof features to exclude EGKs from construction areas. According to DELWP (2015) kangaroo exclusion fencing for kangaroos should:
    - Be chain-link (cyclone) fencing or deer mesh (also known as K wire)
    - Not be ring-lock-style fencing (which is an entanglement hazard)
    - Be high-tensile, heavy galvanised wire
    - Be at least 1.9-metre high (deer mesh is produced in this size)
    - Have no barbs
    - Have no loose or open wires
    - Be completely free of holes and gaps in, and under, the fence to stop the kangaroos trying to escape, and to stop them being injured.
- The scraping/cutting of grassy areas, outside of conservation areas, to remove food sources if EGKs are found during construction
- Establishment of signs along roads: Increased use of signs along surrounding public roads and internal roads
- Site user education: Information for site inductions and education material relating for all site users.

10.1 Adaptive Management

Adaptive management measures can be implemented in response to changing conditions at the site. In the event that EGKs appear on site in construction areas or areas at risk of land-locking, temporary exclusion fencing will be erected to exclude EGKs from entering these areas.

10.2 Monitoring

Monitoring of EGK populations within the construction area and surrounding habitat is a key element of any KMP. The aim of undertaking regular monitoring is to determine the success and effectiveness of the controls and management strategies implemented as part of this KMP.

During development, if a kangaroo is observed in the construction area, the observer must report it immediately to the site manager. The site manager must address the situation as advised in the site induction and report the presence of the kangaroo(s) to the ecologist.

The developer is responsible for arranging an ecologist to conduct a formal site visit every 6 months, for monitoring purposes. Site visits will be required for the entire duration of the construction phase of the development, and for 6 months after construction has completed. During the visit, the ecologist must determine whether kangaroos are using the project area or not, using the same method that was implemented when undertaking the original presence/absence survey. If kangaroos are present, the ecologist should make note of:

- The total number of kangaroos
- Any evident sign that any kangaroo is diseased or lame
- Assessment of compliance with any relevant approved kangaroo management plan
- Any notable information.

The ecologist must submit a report for DEECA's consideration, outlining their findings subsequent to each formal site visit.

Failure to notify DEECA and address the management of a local EGK population may result in risks to animal welfare and public safety. Failing to notify DEECA may be considered wilful negligence in the event that an animal experiences or is likely to experience injury, pain or suffering.

DEECA Authorised Officers have the power to investigate potential breaches of the *Wildlife Act 1975* or the *Prevention of Cruelty to Animals Act 1986*.

All construction personnel will be briefed regarding this requirement as part of the site induction.

10.3 Response to Future Kangaroo Presence

In the event, after construction has commenced, EGKs become land-locked within the site, DEECA must be notified. A suitably qualified ecologist with consultation from DEECA will then provide instruction regarding the available options including appropriate management actions in this plan. In this instance, this KMP must be updated to note where kangaroo incursion occurred and how to minimise future incursion, using the expertise of a qualified ecological consultant and must be re-submitted to DEECA for approval.

10.4 Reporting and Review

After completing monitoring activities, the ecologist must report on the implementation of the KMP every six months following commencement of construction, and for six months after the completion of construction to the local government, DEECA and the permit applicant (Cleanaway). This report should include:

- A brief statement (1–2 pages) summarising progress to date and the success or failure of actions, drawing on the information in Table 2
- The updated Table 2, which is the record of management actions and how they are progressing
- Reports from any site visits required for the particular management actions (that is, formal site visit, in situ management monitoring and the sustainable population limit assessment) that have occurred since the last report.

If the monitoring determines that the KMP is not meeting its goals, management options and actions must be reassessed in consultation with DEECA, and a revised table of actions must be submitted to DEECA within one month of determining the KMP is not meeting its goals.

DEECA may at any time intervene in the implementation of the KMP if it considers there is a risk to animal welfare, public safety or significant native vegetation or threatened species.

Table 5. Initial Preventative Actions

Action	Steps	Deadline	Performance Indicator	Responsible Person	Date Completed	Did the action work?	Comments / follow-on action
1. Staging development	Plan development to minimise land-locking of EGKs	Planned at the design phase, implemented throughout life of development	No land-locking potential identified	Developer			
2. Decommissioning dams	Fill in dams located within development footprint (outside of conservation areas), remove water troughs.	Prior to construction commencing	Dams and troughs are not providing a water source for EGKs	Developer			
3. Determine if EGKs are present in construction areas	Search the construction area for EGKs	Each day before the commencement of construction	No EGKs within construction area(s)	Developer			
4. Removal of food	Scrape/cut grassy areas to remove food sources (outside of conservation areas) if EGKs are found during Action 3	Immediately, if EGKs are found during Action 3	No EGKs within construction area(s)	Developer			
5. Temporary exclusion fencing	Install kangaroo-proof fencing (as defined in DELWP 2015, p. 26) prior to the commencement of construction in each stage. An inspection should be carried out the day after fencing is installed to ensure no EGKs are trapped in the area. Fencing design must consider EGK welfare.	Prior to the commencement of construction in each stage.	No EGKs within construction area(s)	Developer			

Action	Steps	Deadline	Performance Indicator	Responsible Person	Date Completed	Did the action work?	Comments / follow-on action
6. Implement site user education	Include information on EGKs in site inductions. All site workers are to participate in an environmental induction.	At each development stage and as required	No incidents between site workers and EGKs	Developer			

Table 6. Responsive Actions

Action	Steps	Deadline	Performance Indicator	Responsible Person	Date Completed	Did the action work?	Comments / follow-on action
1. Review of KMP	Consider all aspects of the KMP in regard to EGKs on site, and other relevant information Any updates to the KMP to be agreed to by DEECA, and completed within three weeks of the review	Biannual review of the KMP	DEECA satisfied with updated KMP.	Developer			
2. Further resource removal	Scrape/cut grassy areas to which continue to encourage EGKs (excluding conservation areas)	Immediately, if EGKs are found during site inspections	No further EGKs entering construction area	Developer			

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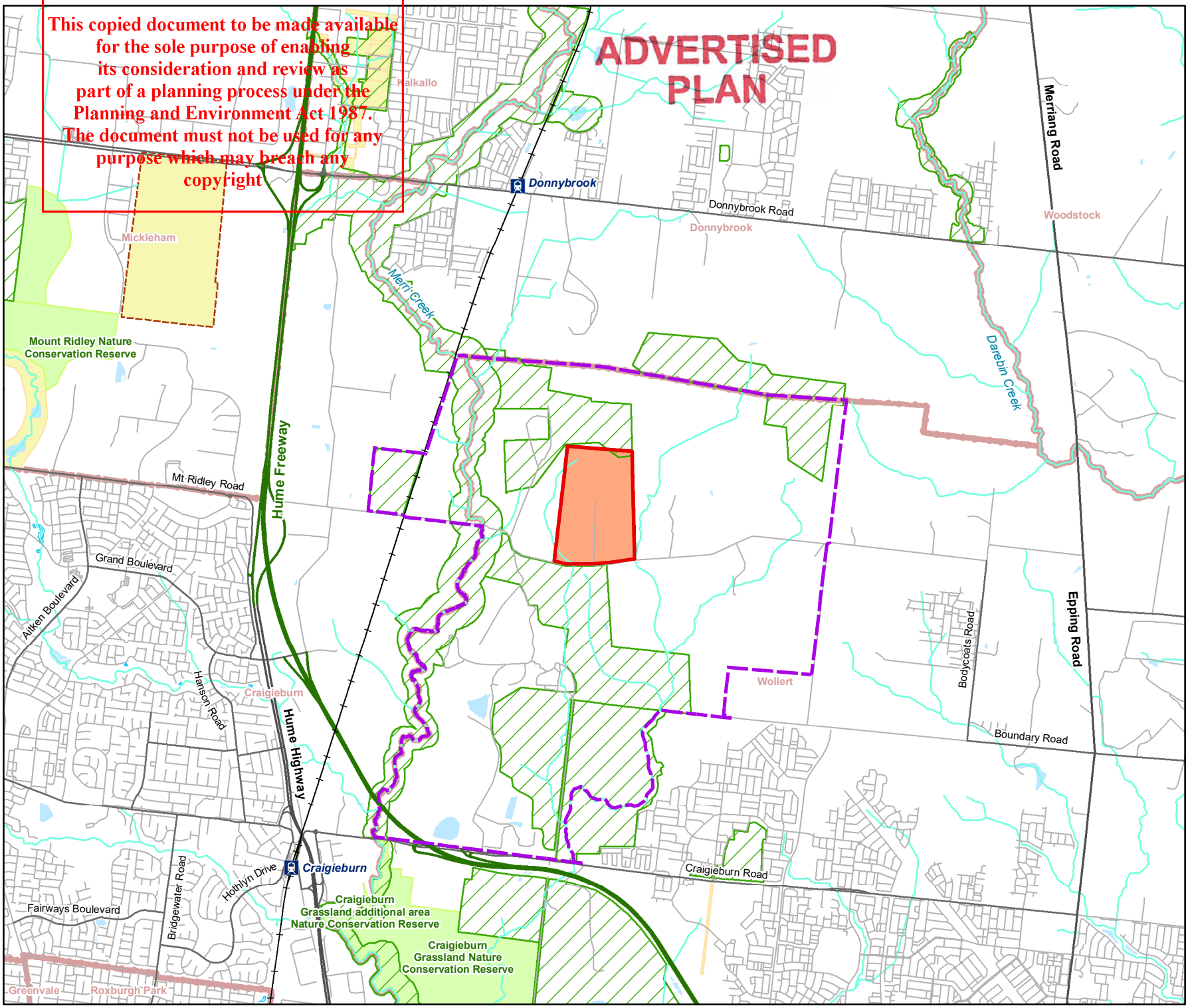
FIGURES



Legend

- Project Area
- Northern Quarries PSP
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Road
- Minor Watercourse
- Permanent Waterbody
- Wetland/Swamp
- Parks and Reserves
- BCS Conservation Area
- Commonwealth Land
- Crown Land
- Localities

Figure 1

Location of the project area

Kangaroo Management Plan for 510 Summerhill Road, Wollert

0 500 1,000
Metres

Map Scale: 1:50,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

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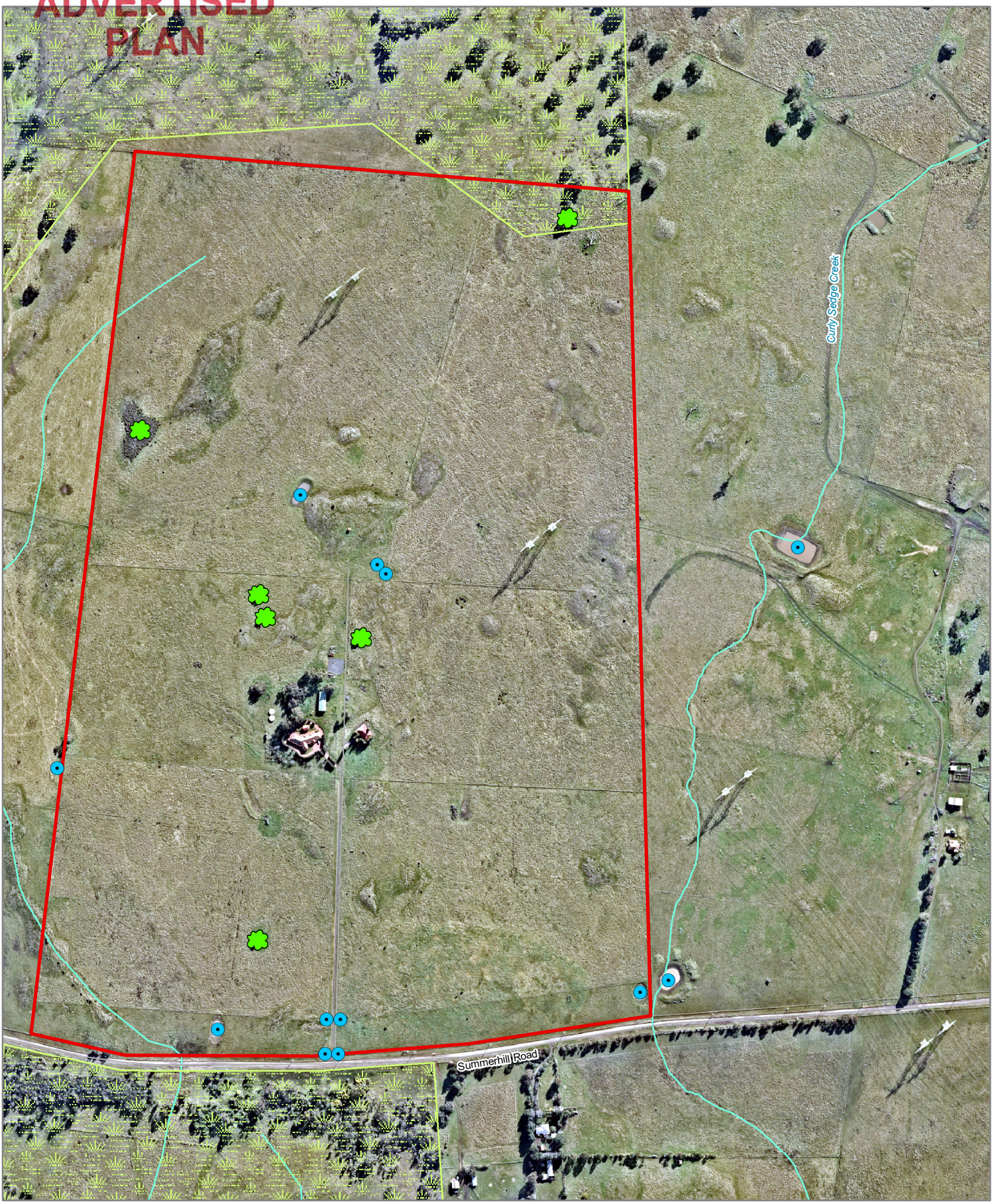


Figure 2
Habitat features
Kangaroo Management Plan for 510 Summerhill Road, Wollert

Legend

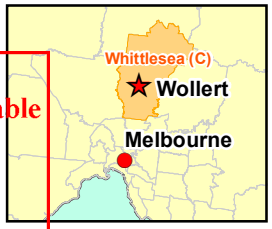
- Project Area
- BCS Conservation Area

Habitat features

- Protective habitat

Watering points

- Water source / dam
- Minor Watercourse



N

0 70 140
Metres

Map Scale: 1:6,500 @ A4
Coordinate System:
GDA2020 MGA Zone 55

Aerial source: Nearmap 2022

ecology & heritage partners

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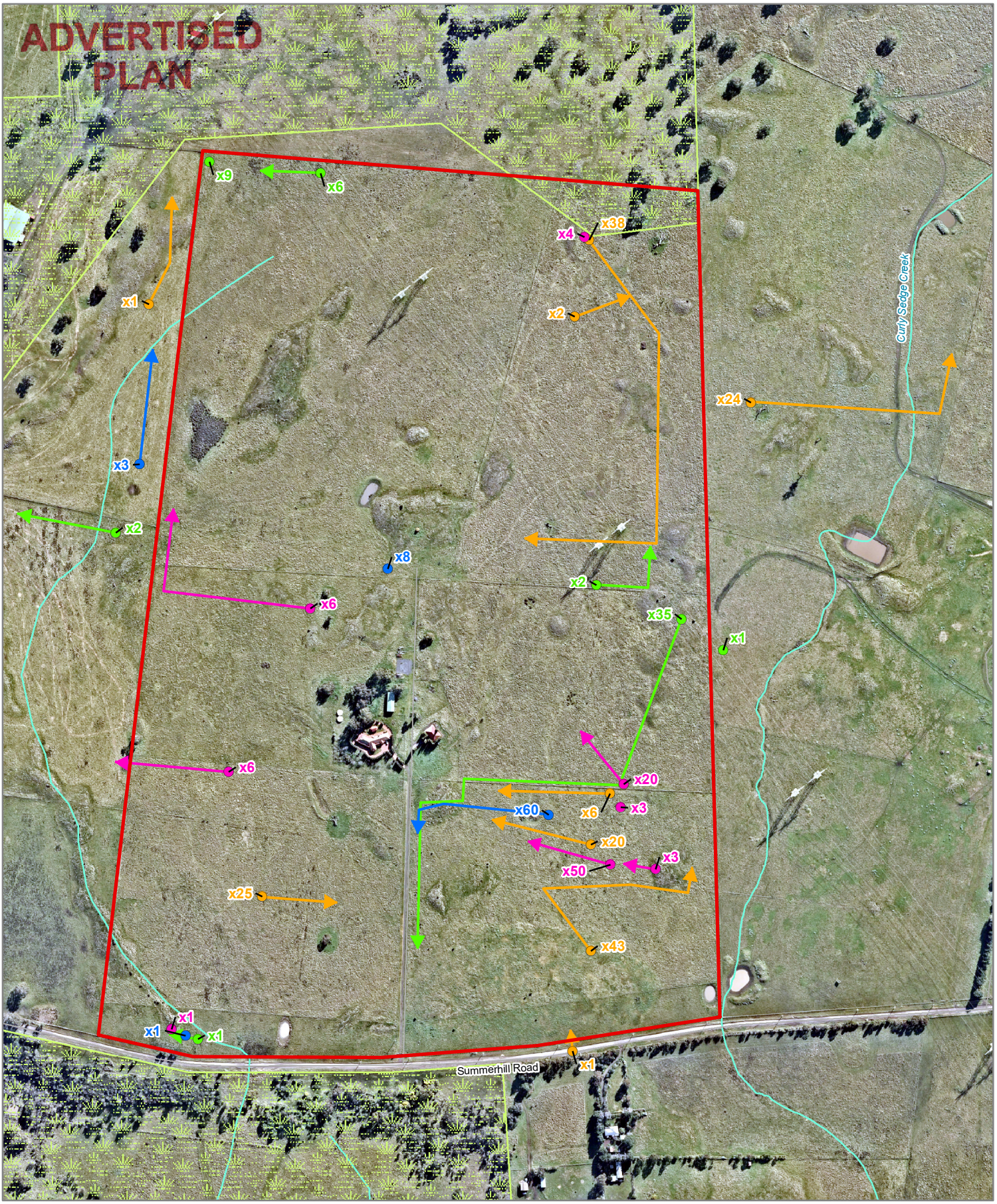


Figure 3

Kangaroo observations

Kangaroo Management Plan for 510 Summerhill Road, Wollert

Legend

Project Area

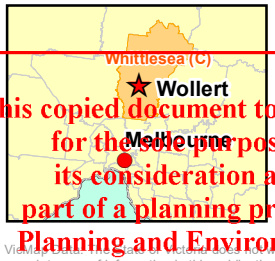
BCS Conservation Area

Direction of movement

- Survey date: 07/09/2022
- Survey date: 14/09/2022
- Survey date: 20/09/2022
- Survey date: 21/09/2022

Kangaroo observations

- Survey date: 07/09/2022
- Survey date: 14/09/2022
- Survey date: 20/09/2022
- Survey date: 21/09/2022



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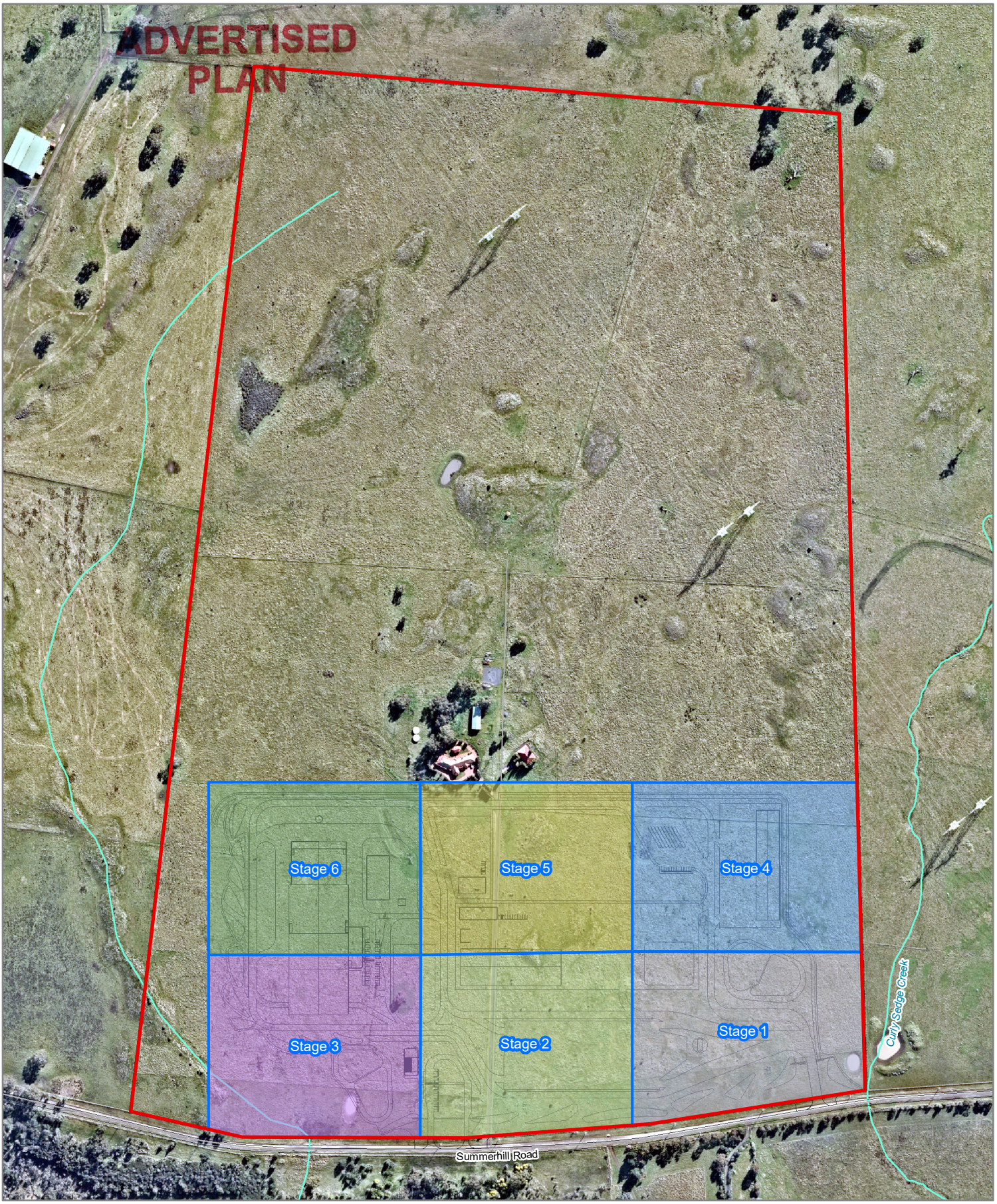

Figure 4
Staged Fencing Plan
Kangaroo Management Plan for 510 Summerhill Road, Wollert

Legend

Project Area

Staging Plan

- Stage 1
- Stage 2
- Stage 3
- Stage 4
- Stage 5
- Stage 6

N

0 50 100
Metres

Map Scale: 1:5,500 @ A4
Coordinate System: GDA2020 MGA Zone 55

Aerial source: Nearmap 2022

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APPENDIX 1 – INFORMATION SHEET: KANGAROOS IN ACTIVE CONSTRUCTION SITES

If you see a kangaroo in the construction area...

- Let the kangaroo leave of its own accord.
- Don't herd the kangaroo: it is an offence under the *Wildlife Act 1975*. Herding can stress and confuse a kangaroo, and make it behave erratically. This can result in the kangaroo, and people, being injured.
- Try to identify where the kangaroo entered the construction area. Temporarily widening the entry point might encourage the kangaroo to leave through it. If the kangaroo leaves, securely close off the entry point as soon as possible.
- Report seeing the kangaroo to the ecologist (who might need to reassess the kangaroo management plan, and increase monitoring).
- If there are things attracting kangaroos (such as food, shade, water and habitat) in the construction area, contact the ecologist immediately about amending the site's kangaroo management plan to possibly remove the attractants.
- If the kangaroo is injured, or will not leave by itself, contact one of these agencies for advice:
    - Help for Wildlife (0477 555 611)
    - Wildlife Victoria (03 8400 7300)
    - BADGAR emergency 24-hour wildlife rescue centre (1300 223 427).
- If a kangaroo is injured or killed in a construction area covered by a kangaroo management plan, and the Department of Energy, Environment and Climate Action must be notified as soon as possible on 136 186.
- All people must obey standard construction area speed limits.