Iluka Resources Limited

South Capel Remediation Project

South Capel

Revegetation Management Plan

EPBC 2018/8250

Iluka Ref: 0058-1624046663-2152

July 2019

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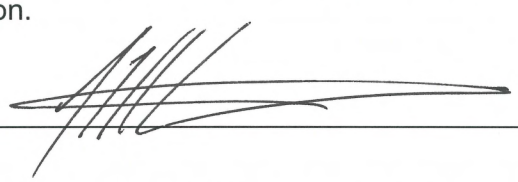
Document control

Revision	Details of review or changes	Prepared by	Date created	Document reference
0	Submission to DoEE	Karina Tedesco	31 July 2019	0058-1624046663-2152

Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environmental 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 I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed: 

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1 Introduction and project background

1.1 Introduction

Iluka Resources Ltd (Iluka) proposes to commence its South Capel Remediation Project (SCRP) to perform remediation works at its Capel Dry Plant (CDP) and South Capel sites. This remediation is being undertaken as part of Iluka's commitment to obligations under the Western Australian (WA) *Contaminated Sites Act 2003* by remediating point sources of groundwater contamination associated with historic by-product storage at these sites. All remediation activities for the SCRP are regulated by the WA Department of Water and Environmental Regulation (DWER).

1.2 Background

The CDP commenced operation in the mid-1950s to process mineral sands. Historically, management of mineral sands processing undertaken at the CDP and at South Capel resulted in the storage of by-products on site. Mining and mineral separation commenced at South Capel in the mid-1950s and Synthetic Rutile (SR) processing commenced in 1968. The South Capel mining and processing areas have not supported production activities since operations ceased in 1999 and the CDP is also no longer in operation.

Iluka's groundwater monitoring has indicated there are levels of manganese and sulfate above environmental standards in the shallow groundwater directly underneath and adjacent to by-product storage areas at both CDP and South Capel. The levels do not pose a risk to human health, but may impact water quality with respect to aesthetics (taste/odour). The levels pose a potential risk to the environment if left unabated. Therefore, Iluka proposes to commence activities to consolidate and contain the material impacting this shallow groundwater to minimise the potential for further contamination, and to allow a natural attenuation of the currently elevated levels.

The remediation work proposed involves constructing an extension to a purpose-designed by-product storage facility at South Capel (the Hutton Road Containment Facility extension) and relocating quantities of process by-product from both South Capel and the CDP to this facility. Approximately 60,000 m^3 of historic by-products stored at CDP and approximately 407,000 m^3 from South Capel will be relocated to the purpose-built consolidated storage facility at South Capel. Uncontaminated fill will be sourced from areas within South Capel and an area known as the CMNE (Capel Mine Northern Extension) area. Figure 1 shows the locations covered by the proposed action area.

The by-product storage areas have planted and regrowth vegetation growing in and around them that is currently providing habitat for the critically endangered Western Ringtail Possum. These areas require clearing in order to enable remediation. Figures 2a and 2b show the WRP habitat to be cleared within the controlled action area at the CDP and South Capel areas, respectively.

On 5 July 2018, Iluka referred the SCRP to the Department of the Environment and Energy (DoEE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Iluka was notified on 14 October 2018 that the project was a controlled action, to be assessed by Preliminary Documentation. The controlling provisions were listed threatened species and ecological communities (section 18 and 18A of the EPBC Act), with the Western Ringtail Possum (WRP) being the relevant Matter of National Environmental Significance (MNES).

Clearing native vegetation providing habitat to the WRP required assessment under the WA *Environmental Protection Act 1986* (EP Act). Therefore, two clearing permit applications were lodged for the SCRP: one with DWER (CPS 8066/1) for the CDP and the other with the Department of Mines, Industry Regulation and Safety (DMIRS) (CPS 8092/1) for South Capel.

As part of the above State and Federal assessment processes, it was determined that residual impacts to habitat for WRPs were likely to be significant and, therefore, offsets would be required.

Iluka intends to provide offsets through revegetation of WRP habitat that provides linkages to surrounding WRP habitat.

1.3 Objective

The objective of this Revegetation Management Plan is:

"To create 14.6 ha of WRP habitat".

The aim is that this habitat will be cultivated to a quality habitat score of "6" within ten years of revegetation.

This plan outlines the methods to be used in implementing the objective, including species to be planted, proposed monitoring and standards to be met (completion criteria).

Iluka is committed to achieving the objective of this Revegetation Management Plan.

1.4 Schedule

As the SCRP predominantly involves earthworks, it is time constrained to undertaking the works during the dry season. In order to complete the works within one dry season, Iluka intends to commence the action August 2019 (subject to approvals). Key target dates for the project include:

- August 2019 – commence action, including relocation of WRPs and clearing
- October 2019 – commence remediation works
- June 2020 – complete remediation works and final landform development
- May 2021 to June 2021 – undertake revegetation works (exact timing dependant on sufficient rainfall).

2 Risk Assessment

A risk assessment was conducted in April 2019 to identify risks and management controls associated with achieving the overall objective and successful revegetation at South Capel (Table 1).

Risks were identified and assessed according to Iluka's risk assessment methodology: *Risk Group Procedure PRC6806 – Risk Assessment* (Iluka, 2018a), which is consistent with the risk management standard AS/NZS ISO 31000:2009 *Risk Management – Principles and Guidelines* (AS/NZS, 2009). Risk assessment criteria is provided in Appendix 1.

Six key risk events were identified (Table 1) and from this, five were identified as having a 'moderate' residual risk (after management controls are implemented) and one was identified as having a 'low' residual risk.

Table 1 Risks to achieving the objectives of the plan (creating 14.6 ha of WRP habitat)

Factor	Risk to achieving objective (14.6 ha of WRP habitat)	Management Controls	Likelihood after management controls put in place	Consequence after management controls put in place	Residual Risk*
Fire	Fire event(s) prevents suitable cover, connected canopy and species from developing.	Powerline corridors surround the revegetation areas and therefore provide a firebreak. Firebreaks around the property will be maintained as per requirements under the WA *Bushfires Act 1954*.	Rare (1)	Significant (4)	Moderate (4)
Weeds	Weeds outcompete native vegetation.	Any declared weeds will be removed or treated. Weeds will be sprayed annually irrespective of percentage cover observed in monitoring. Access to the area will be restricted via fencing and locked gates. Fencing will be erected prior to planting to prevent general access by vehicles.	Unlikely (2)	Moderate (3)	Moderate (6)
Vegetation / Fauna	Non suitable plant species are selected which are unfavourable to possums.	In selecting suitable revegetation plant species, consideration has been given to: • providing both trees and shrubs to ensure continuity of canopy cover and protective understorey; • providing preferred foraging species; • selecting species currently in use by WRPs within the SCRP area; • suitability of soil types; • whether the species is found locally; • preferred growth position in the landscape; • inclusion of dieback resistant species; and • ensuring fast growing species are included (such as the Acacias).	Rare (1)	Significant (4)	Moderate (4)

Factor	Risk to achieving objective (14.6 ha of WRP habitat)	Management Controls	Likelihood after management controls put in place	Consequence after management controls put in place	Residual Risk*
Vegetation / Fauna	Planting does not create connected canopy.	Planting density will provide a continuous canopy cover to minimise exposure of WRPs to predators. Access to the area will be restricted via fencing and locked gates. Fencing will be erected prior to planting to prevent grazing of plant seedlings. Any declared weeds will be removed or treated. Weeds will be sprayed annually irrespective of percentage cover observed in monitoring. Infill planting will be conducted if scheduled monitoring shows completion criterion has not been met.	Unlikely (2)	Moderate (3)	Moderate (6)
Vegetation / Fauna	Understorey does not provide protection from predators.	Planting density will provide understorey cover to minimise exposure of WRPs to predators. Access to the area will be restricted via fencing and locked gates. Fencing will be erected prior to planting to prevent grazing of understorey plant seedlings. Any declared weeds will be removed or treated. Weeds will be sprayed annually irrespective of percentage cover observed in monitoring. Infill planting will be conducted if scheduled monitoring shows completion criterion has not been met.	Unlikely (2)	Minor (2)	Moderate (4)
Vegetation	Dieback and grazing prevents vegetation survival.	In selecting suitable revegetation plant species, consideration was given to the inclusion of dieback resistant species. Vehicles and machinery entering the area will be required to be free of weed and seed material. Access to the area will be restricted via fencing and locked gates. Fencing will be erected prior to planting to prevent grazing of plant seedlings.	Rare (1)	Moderate (3)	Low (3)

* Residual risk after management controls have been implemented

3 Environmental offsets (revegetation)

The SCRP will impact upon a total 8.44 ha of WRP habitat (1.34 ha at CDP and 7.10 ha at South Capel) that Iluka proposes to offset through revegetation of 14.6 ha WRP habitat as discussed below.

3.1 Type of offset proposed

The Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan (DPaW 2017) identifies habitat loss and fragmentation as one of the principle factors threatening WRPs. As such, Iluka proposes to offset the temporary loss of habitat by recreating WRP habitat and improving linkages between existing WRP habitat areas as identified by the Department of Biodiversity, Conservation and Attractions (DBCA) WRP suitability mapping (Shedley and Williams 2014) and on-site fauna surveys (Harewood 2018b).

A total of 14.6 ha will be planted with native species (detailed in Section 3.4) known to be preferred by WRPs as outlined in Harewood (2018a and 2018b) and other literature. The offset area will be more consolidated and provide better linkages to adjacent WRP habitat than the current fragmented habitat patches within the controlled action area.

The proposed offset strategies are additional to any other requirements as the current plan for the offset site is to return it to the pre-mining land use of agriculture as outlined in the approved South Capel Closure Plan (Iluka 2018b).

3.2 Location

The proposed offset areas are located on land held by Iluka as shown in Table 2.

Table 2 Offset Area Tenure

Land Description	Tenure	Holder	Security
Lot 2039 on Plan 140224; Wellington Location 2039	Freehold	Iluka Resources Ltd	Conservation Covenant to be placed over offset area
Lot 7 on Diagram 26769	Freehold	Iluka Resources Ltd	Conservation Covenant to be placed over offset area

Figure 3 identifies the area to be revegetated at South Capel with WRP habitat post remediation. The area has been determined based on the following:

- its location within areas that either do not require remediation or will be remediated as part of the SCRP;
- its ability to enhance linkages between existing WRP habitat areas as shown in Figure 4;
- powerline set back requirements;
- firebreak requirements; and
- access requirements.

If during the project implementation phase any further constraints or opportunities are revealed, Iluka will ensure that the total area of native vegetation to be included in the offset area remains 14.6 ha. This may involve minor spatial changes to the area proposed to be revegetated; however, will ensure linkages are still established as per Section 3.5.

Once revegetation works have been undertaken, the offset area will be managed and monitored to ensure the conservation gains are realised as outlined in Section 3.8.

The area will also be placed under a Conservation Covenant under the *Soil and Land Conservation Act 1945* to ensure protection in perpetuity.

3.3 Offset site current and future condition

3.3.1 Current condition

The proposed revegetation offset site is located within the South Capel processing site and largely within the SCRP area as shown in Figure 3. It is currently a highly degraded environment due to its former use for mining activities and current contamination. The area is classified as Contaminated – Remediation Required under the *Contaminated Sites Act 2003* (WA). Following remediation, it will be revegetated to WRP habitat. The offset site is currently comprised of the following areas:

- by product dams currently in use;
- former by product dam currently used to collect contaminated surface water, which is then pumped to the treatment ponds;
- areas that previously contained mine processing infrastructure;
- artificial hill (referred to as “B-Plant hill”) created on which to situate the mine processing infrastructure;
- 1.9 ha of degraded vegetation considered to be WRP habitat (Harewood 2018b) as shown in Figure 3; and
- highly degraded vegetation and scattered trees not considered to be WRP habitat.

The WRP habitat to be cleared for the controlled action was given a habitat quality score of 4 based on an assessment of the site condition, context and species stocking rate and taking into account both the CDP and South Capel areas to be cleared (Iluka 2019). For the South Capel site, the following factors were taken into consideration as outlined in the SCRP Preliminary Documentation (Table 6 in Section 2.4.8 Calculator Inputs) (Iluka 2019).

Site Condition

Structure and condition of the vegetation:

- vegetation condition mapping (degraded to completely degraded, mostly non-endemic species) (Endemic 2013; Harewood 2018b)
- habitat quality (very poor) (Harewood, 2018b)
- offset site highly degraded due to previous disturbance (Harewood 2018b) and contamination. Areas within offset area have previously been completely cleared

Diversity of relevant habitat species present:

- three habitat types were described at South Capel within the offset area by Harewood (2018b) as shown in Figure 3

Relevant habitat features on site:

- small patches of habitat within the offset area has reasonably dense midstorey vegetation largely represented by planted non-endemic plant species (Harewood 2018b)
- DBCA WRP Habitat Suitability Mapping of impact areas (“Low suitability” to “Unsuitable” (Shedley and Williams (2014), including supporting GIS files)

Site Context

Connectivity to surrounding habitat:

- small patch of habitat at northern extent offset area as mapped by Harewood (2018b) is connected to adjacent habitat in Settlers Reserve

- habitat fragmented/patchy (Harewood 2018b)

Importance of the site in relation to the overall species population or occurrence of the community:

- habitat category – "supporting habitat" as described in the Significant Impact Guidelines for WRPs (DEWHA 2009b)
- connectivity to adjacent habitat:
  - small patch of habitat at northern extent offset area as mapped by Harewood (2018b) is connected to adjacent habitat in Settlers Reserve
- habitat fragmented/patchy (Harewood 2018b)

Threats on or near site:

- introduced predators assumed present – foxes and feral cats

Species Stocking Rate

Presence of species on the sites:

- six WRPs were found during night time surveys within the offset area (Harewood 2018b)

Density of species within the site:

- very low (Harewood 2018b)

Role of the site population in regards to the overall species population:

- area used by a relatively small number of WRPs (Harewood 2018b)

Based on the above considerations in assessing site condition, site context and species stocking rate, the habitat quality is considered to be low.

3.3.2 Future condition

The offset areas will be remediated, with by-product removed and areas backfilled with suitable uncontaminated fill tying in to the surrounding landscape, providing a consolidated area to create 14.6 ha of WRP habitat. The WRP habitat to be created was given a habitat quality score of 6 based on an assessment of the anticipated site condition, context and species stocking rate. The following factors were taken into consideration, as outlined in the SCRP Preliminary Documentation (Table 7 in Section 2.4.8 Calculator Inputs) (Iluka 2019).

Site Condition

Structure and condition of the vegetation:

- species known to provide favourable structure (Harewood 2018a and 2018b) have been selected and, with fencing to exclude grazers, maintenance to control weeds and infill planting where required, are expected to thrive
- vegetation expected to provide medium to good quality habitat for WRPs due to species selection providing continuous canopy cover, mid storey cover and understorey to provide refuge
- contamination remediated

Diversity of relevant habitat species present:

- at least 15 suitable species will be planted within the offset area as per Section 3.4 and Table 3

Relevant habitat features on site:

- connected canopy cover
- understorey capable of providing refuge should WRPs head to the ground

- connection to adjacent habitat as per Section 3.5

Site Context

Connectivity to surrounding WRP habitat:

- will increase as per Section 3.5
- habitat will be consolidated as much as possible, as opposed to current patchy habitat

Importance of the site in relation to the overall species population or occurrence of the community:

- habitat category – "supporting habitat" (DEWHA 2009)
- the site is expected to improve the availability, quality and connectivity of habitat for the species

Threats on or near site:

- predators may remain; however, connected canopy cover and dense understory are expected to provide protection for the WRPs in the long term

Species Stocking Rate:

Presence of species on the sites:

- WRPs are expected to repopulate the area once suitable

Density of species within the site

- expected to increase with increase in site condition, density of favourable species, consolidation of habitat and increased connectivity to adjacent habitat

Role of the site population in regards to the overall species population

- the species stocking rate is expected to increase and the offset area will provide an additional 14.6 ha of habitat for the overall species population

There is a high level of confidence in result due to Iluka's extensive experience with rehabilitation in the region (over 40 years) and internal expertise including native vegetation research scientists, rehabilitation specialists, environmental scientists and on-ground rehabilitation technicians. Where internal resources are not available, Iluka seeks assistance from appropriately qualified professionals, including fauna specialists.

Recent rehabilitation of 12 ha of native vegetation at the Yoganup minesite has demonstrated Iluka's ability to achieve successful outcomes with regards to DoEE offset requirements (Tranen 2019). Iluka was a finalist in the Golden Gecko awards in 2016 for this project due to developing and implementing innovative rehabilitation techniques, setting a new standard for the industry.

Ongoing monitoring and maintenance of the site will ensure actions are taken to increase the confidence of success of revegetation efforts.

3.4 Revegetation species

Native plant species known to provide habitat for WRPs have been selected for inclusion within offset areas, with preference being for those species within the SCRP currently providing habitat for WRPs.

These include, but are not limited to, the species shown in Table 3. The species listed provide the following functions, noting that an individual species can provide for more than one function:

- foraging – 14 species;
- canopy – 13 species; and
- ground protection – 16 species.

A minimum of 15 species will be used from the list as per completion criteria (Table 5).

Table 3 identifies the WRP habitat functions each species provides, as well as factors taken into consideration when deciding if the species was suitable at the South Capel location. In selecting these species, consideration has been given to:

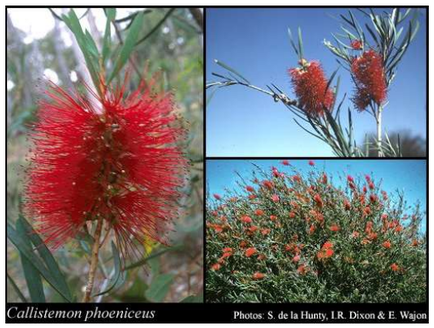
- providing both trees and shrubs to ensure continuity of canopy cover and protective understorey;
- providing preferred foraging species;
- selecting species currently in use by WRPs within the SCRP area;
- suitability of soil types;
- whether the species is found locally;
- preferred growth position in the landscape;
- inclusion of dieback resistant species; and
- ensuring fast growing species are included (such as the Acacias).

Table 3 Revegetation Species

Species Characteristics						Suitability		
Scientific Name	**Common Name**	**Naturalised Status[1]**	**Soils[2]**	**Height[3]**	**Photo[4]**	**Local Provenance Species (Yes/No)[5]**	**Preferred Growth Position in the Landscape[6]**	**Possum Habitat (Foraging, Ground Protection, Canopy)[7]**
Trees								
Acacia saligna	Orange Wattle	Native	Various	1.5 to 9 m		Yes (found in Endemic 2013, Ecoedge 2015, Ecosystem Solutions 2017).	Variety of habitats and soil conditions. Tends to grow wherever soil has been disturbed.	**Foraging**: a high quality food source for WRPs, WRP feed on new shoots, flowers, leaves and/or fruiting bodies. **Ground Protection**: a fast growing species (grows over 1m per year when young), seeds germinate readily and spread by ants, has a short trunk thereby increasing the level of ground cover. **Canopy**: a dense and spreading tree, provides a weeping canopy cover and can grow up to 9 m.
Agonis flexuosa	Peppermint	Mixed (Native in Part of Range, Naturalised Elsewhere)	White or grey sand, sandy soils, laterite, limestone.	6 to 15 m		Yes (found in Endemic 2013, Ecoedge 2015, Ecosystem Solutions 2017, Ecoedge 2018).	Coastal sand dunes, granite outcrops, limestone areas.	**Foraging**: a high quality food source for WRPs, peppermint leaves comprise the major component of their diet. **Canopy**: a primary tree used for drey building (nests), a weeping tree canopy, the number of trees can be maximised by 'clumping', i.e. planting 3 or more trees about 1.5m apart, good for habitat.
Allocasuarina fraseriana	Sheoak	Native	Lateritic soils, white, grey or yellow sand.	5 to 15 m		Yes (found in Ecosystem Solutions 2017).	Jarrah forest, sand dunes.	**Foraging**: prolific nuts and needle like leaves, WRP feed on new shoots, flowers, leaves and/or fruiting bodies. **Canopy:** can offer canopy connectivity if grown near other plant species, WRP are known to build nests in these trees and have been utilised for travel/connection in wildlife corridors and bushland areas.

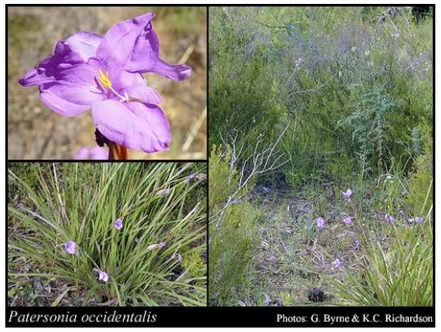
Species Characteristics						Suitability		
Scientific Name	**Common Name**	**Naturalised Status[1]**	**Soils[2]**	**Height[3]**	**Photo[4]**	**Local Provenance Species (Yes/No)[5]**	**Preferred Growth Position in the Landscape[6]**	**Possum Habitat (Foraging, Ground Protection, Canopy)[7]**
Corymbia calophylla	Marri	Native	Red-brown clay loam, orange-brown sandy clay, gravel, grey sand over limestone, granite, laterite.	40 to 60 m		Yes (found in Endemic 2013, Ecoedge 2015, Ecosystem Solutions 2017, Ecoedge 2018).	Flats, hills, slopes, breakaways, wetlands, fringing salt marches, beside drainage lines. Will grow on relatively poor soil.	**Foraging**: New growth, large nuts/seeds and flowers are a high quality food source for WRPs, propagated readily from seeds. **Canopy:** WRP friendly, provide height from predators and can offer canopy connectivity if grown near other plant species, usually dominates in the upper storey.
Eucalyptus rudis	Flooded Gum	Native	Sandy or loam soils.	5 to 20 m		Yes (found in Endemic 2013, Ecoedge 2015, Ecoedge 2018).	Wetter parts of south-western WA, flats, hillsides. Grows in remediated areas with moderate levels of salinity.	**Foraging**: New growth and flowers are a high quality food source for WRPs, WRP feed on new shoots, flowers, leaves and/or fruiting bodies. **Canopy:** WRP friendly, has a spreading crown, provide height from predators and can offer canopy connectivity if grown near other plant species.
Melaleuca viminea	Mohan	Native	Sandy or clayey soils.	0.6 to 5 m		Yes (found in Endemic 2013, Ecoedge 2015).	Near creeks or wet depressions, along watercourses, rocky coastal areas, flats. Tolerates shade.	**Foraging**: edible flowers for WRPs, WRP feed on new shoots, flowers, leaves and/or fruiting bodies, WRP will use as protection from predators and travel routes (Possum Centre), WRP feed on new shoots, flowers, leaves and/or fruiting bodies. **Ground Protection**: grows in high density, large amount of leaf litter, domed shrub, dense nature provides ideal nesting sites and shelter. **Canopy:** densely branched, can offer canopy connectivity if grown near other plant species, helpful for protection and drey building.

Species Characteristics						Suitability		
Scientific Name	**Common Name**	**Naturalised Status[1]**	**Soils[2]**	**Height[3]**	**Photo[4]**	**Local Provenance Species (Yes/No)[5]**	**Preferred Growth Position in the Landscape[6]**	**Possum Habitat (Foraging, Ground Protection, Canopy)[7]**
Melaleuca preissiana	Moonah	Native	Sandy soils.	3 to 9 m		Yes (found in Endemic 2013, Ecoedge 2015, Ecosystem Solutions 2017, Ecoedge 2018).	Swamps.	**Foraging**: attractive flowers, variety of flowers and leaves, which may be palatable to WRP at times. **Ground Protection**: papery bark provides abundant leaf litter, WRP will use as protection from predators and travel routes. **Canopy:** densely branched, can offer canopy connectivity if grown near other plant species.
Paraserianthes lophantha	Albizia	Mixed (Native in Part of Range, Naturalised Elsewhere)	Sandy or granitic soils.	1 to 10 m		Yes (found in Endemic 2013, Ecosystem Solutions 2017).	Winter-wet depressions, near creeks or swamps, granite outcrops.	**Foraging**: flowers attractive to WRPs. **Ground Protection**: large amount of leaf litter, fast growing and provides quick cover for shade. **Canopy:** upper storey canopy provided in later years of growth, short lived species
Shrubs								
Acacia cyclops	Red Eye Wattle / Coastal Wattle	Native	White/grey sand.	0.8 to 4 m		Yes (found in Endemic 2013).	Coastal sand dunes and limestone. Tolerates shade.	**Foraging**: edible flowers and highly palatable leaves, WRP will sometimes feed from leaves/flowers. **Ground Protection**: a densely domed shrub, habitat shrubs which provide protection. **Canopy**: middle storey canopy cover provided in later years of growth.

Species Characteristics						Suitability		
Scientific Name	**Common Name**	**Naturalised Status[1]**	**Soils[2]**	**Height[3]**	**Photo[4]**	**Local Provenance Species (Yes/No)[5]**	**Preferred Growth Position in the Landscape[6]**	**Possum Habitat (Foraging, Ground Protection, Canopy)[7]**
Acacia pulchella	Prickly Moses	Mixed (Native in Part of Range, Naturalised Elsewhere)	Sandy soils, clay loam over laterite.	0.3 to 3 m		Yes (found in Endemic 2013, Ecoedge 2015).	Low-lying areas, swamps, near watercourses.	**Ground Protection**: a tall spreading shrub, provide protection to WRP.
Callistemon glaucus	Sweet – Albany Bottlebrush	Native	White or grey sand, clay.	1 to 3 m		Yes (found in Endemic 2013).	Swampy flats. Wetlands tolerant.	**Foraging**: new growth, leaves and flowers are attractive to WRPs, WRP will occasionally use as a food source. **Ground Protection**: fast growing, good lifespan, tall shrub (Wikipedia), good habitat shrub and WRP sometimes build nests. **Canopy:** middle storey canopy cover provided in later years of growth.
Callistemon phoeniceus	Lesser Bottlebrush	Mixed (Native in Part of Range, Naturalised Elsewhere)	Sandy soils, laterite.	1 to 6 m		Yes (found in Endemic 2013).	Found along watercourses.	**Foraging**: occasionally used by WRP as a food source. **Ground Protection:** Good habitat shrubs. **Canopy:** WRP sometimes build nests.

Species Characteristics						Suitability		
Scientific Name	**Common Name**	**Naturalised Status[1]**	**Soils[2]**	**Height[3]**	**Photo[4]**	**Local Provenance Species (Yes/No)[5]**	**Preferred Growth Position in the Landscape[6]**	**Possum Habitat (Foraging, Ground Protection, Canopy)[7]**
Calothamnus quadrifidus	One-sided bottlebrush	Mixed (Native in Part of Range, Naturalised Elsewhere)	Wide variety of soils.	0.5 to 3 m		Yes (found in Endemic 2013).	Wide variety of habitats.	**Ground Protection**: can provide protection for WRPs in later growth years.
Kunzea glabrescens	Spearwood	Native	Sandy soils.	1.5 to 4 m		Yes (found in Endemic 2013, Ecoedge 2015, Ecosystem Solutions 2017, Ecoedge 2018).	Edges of swamps, lakes, rivers, moist depressions.	**Foraging**: attractive leaves and flowers, flowers may be palatable to WRP although should be interplanted with or near peppermint trees, WRP feed on new shoots, flowers, leaves and/or fruiting bodies, is the main food source in the absence of peppermint. **Ground Protection**: fast growing, good lifespan. **Canopy:** middle storey canopy cover provided in later years of growth, WRPs will sometimes build nests.
Spyridium globulosum	Basket Bush	Native	Sand	0.3 to 5 m		Yes (found in Endemic 2013, Ecoedge 2015).	Sand. Coastal sand dunes and limestone. Lime and wind tolerant.	**Foraging**: new growth and flowers attractive to WRPs. **Ground Protection**: low erect dense shrub. **Canopy:** middle storey canopy cover provided in later years of growth. WRP will often build nests in these shrubs.

Species Characteristics						Suitability		
Scientific Name	**Common Name**	**Naturalised Status[1]**	**Soils[2]**	**Height[3]**	**Photo[4]**	**Local Provenance Species (Yes/No)[5]**	**Preferred Growth Position in the Landscape[6]**	**Possum Habitat (Foraging, Ground Protection, Canopy)[7]**
Viminaria juncea	Swish Bush	Native	Sandy and clayey soils. Prefers acidic to neutral soil with ample moisture.	1 to 4 m		Yes (found in Endemic 2013, Ecoedge 2015, Ecosystem Solutions 2017).	Near lakes and swamps, river banks, winter-wet depressions.	**Ground Protection**: grows as an erect or weeping shrub.
Climbers and Understorey								
Anigozanthos manglesii	Mangels Kangaroo Paw	Native	White, yellow or grey sand, sandy loam.	0.2 to 1.1 m		Yes (found in Endemic 2013, Ecoedge 2015).	Various	**Ground Protection**: WRP may utilise when on the ground for protection.
Gahnia trifida	Coast Saw-sedge	Native	Grey or white sand, clay, sometimes saline.	1.5 m		Yes (found in Endemic 2013)	Swamps, creeks.	**Ground Protection**: provides protection for WRP when on the ground, WRP will at times rest within the sedges during the day and sleep, sedge leaves are used for nest materials.

Species Characteristics						Suitability		
Scientific Name	**Common Name**	**Naturalised Status[1]**	**Soils[2]**	**Height[3]**	**Photo[4]**	**Local Provenance Species (Yes/No)[5]**	**Preferred Growth Position in the Landscape[6]**	**Possum Habitat (Foraging, Ground Protection, Canopy)[7]**
Hardenbergia comptoniana	Native Wisteria	Native	Sandy soils.	Climber Twining vine		Yes (found in Endemic 2013, Ecoedge 2015, Ecosystem Solutions 2017).	Coastal limestone, sandplains, dunes.	**Foraging**: attractive flowers, unknown values as food source, WRP feed on new shoots, flowers, leaves and/or fruiting bodies. **Ground Protection**: a climber that offers good habitat for WRPs when grown thickly on a fence, can cover a 3 by 3 m area in two years, smothering smaller plants it is allowed to grow over, can grow high into trees, WRP are known to build nests within the densely vegetated areas of this climber when growing on fence lines or sheds.
Patersonia occidentalis	Purple Flag	Native	Grey-brown sand or sandy clay, red-brown clayey loam, gravel, laterite, ironstone, granite, limestone.	1.5 m		Yes (found in Endemic 2013, Ecoedge 2015, Ecosystem Solutions 2017).	Winter-wet areas, dunes, granite outcrops.	**Ground Protection**: WRP may utilise these species when on the ground for protection.

Reference List

1. Florabase.
2. Florabase, AMRS & NCMRR.
3. Florabase, AMRS & NCMRR.
4. Florabase, Wikipedia.
5. Ecoedge 2018 – EPBC Protected Matters (Threatened Flora) Survey & Habitat Assessment at South Capel, Ecosystem Solutions 2017 – Flora Investigations South Capel Site, Ecoedge 2015 - CDP Flora and Vegetation Survey, Endemic 2013 – South Capel Flora and Vegetation Assessment.
6. Florabase, Wikipedia.
7. AMRS & NCMRR, Wikipedia, Possum Centre, Shedley and Williams 2014.

3.5 Linkage

In addition to replacing WRP habitat cleared as part of the SCRP, the offset of WRP habitat revegetation is designed to enhance linkages between existing habitat areas as shown in Figure 4.

The revegetation will enhance linkages between existing remnant vegetation by providing continuity of WRP habitat between adjacent areas of suitable WRP habitat, as evidenced by:

- the Department of Parks and Wildlife publication (Shedley, E. & Williams, K., 2014[1]) and associated spatial files, which show that areas immediately adjacent to the South Capel proposed action area on both the west and east side are considered to be of value to WRPs;
- the survey by Harewood (2018b) found both dreys and WRPs located on the edges of the SCRP disturbance boundary at South Capel where it is likely that the WRPs are utilising the adjacent remnant vegetation where it provides suitable habitat;
- mapped vegetation adjacent to the disturbance area by Endemic (2013) identified several units that contain species known to be preferred by WRPs (Coastal peppermint, coastal peppermint-tuart, jarrah-marri associations, sheoak woodland, and eucalypt woodland and mallee as outlined by Harewood (2018a and 2018b)), including:
  - EmBaAf – contains Jarrah and *Agonis flexuosa*;
  - EmBa – contains Jarrah;
  - CcEm – contains Jarrah-Marri association; and
  - Mp – the Mp unit directly north of the EmBaAf unit contains a patch of *Agonis flexuosa* (Endemic 2013).

3.6 Method

Iluka has over 40 years' experience in mine site rehabilitation and has the required resources available to undertake the rehabilitation, with activities including:

- replacement of topsoil;
- ripping the soil generally along the contour in meandering rows;
- planting and fertilisation of tube stock;
- fencing and gates to reduce grazing pressure while plants establish;
- infill planting as required;
- weed control as required; and
- rehabilitation vegetation monitoring.

Revegetation of the offset area will be designed to ensure continuity of canopy cover from mature trees whilst providing space for vehicles to move through the area for monitoring and maintenance activities.

[1] Can be found at:
https://www.dpaw.wa.gov.au/images/shedley_and_williams_2014_an_assessment_of_habitat_for_western_ringtail_possum_on_the_southern_swan_coastal_plain_-_binningup_to_dunsborough._department_of_parks_and_wildlife.pdf

Once remediation and earthworks are complete with the final landform achieved, the rehabilitation works will commence and are likely to be comprised of the following:

- surface treatment and erosion prevention measures – the area will be deep ripped to function as interceptor and water harvesting banks across the slope;
- mulching – due to mining methods at the time of mining South Capel, topsoil was not stockpiled. A surface treatment of 25mm thick compost and mulch will be sourced locally to ensure adequate organic nutrient availability, protection from wind damage and improving moisture retention. The 90% mulch to 10% compost ratio will have a mineral fertiliser / microbial blend to encourage successful plant establishment and growth;
- fencing – this will be erected prior to planting to prevent grazing of the seedlings;
- species selection and sourcing – species listed in Table 3 are available locally;
- planting – planting will be timed as much as possible after sufficient rainfall and predictable follow up rain;
- weed control – weeds will be sprayed annually and declared weeds removed or treated;
- dieback hygiene measures – prior to entering site, all machinery will be clean of any potential pathogens and monitored for any incursion;
- monitoring set up – ten 10m x 10m quadrats will be established as per completion criteria (see Table 5).

3.6.1 Timeline of revegetation works

The revegetation works are expected to be undertaken as outlined in Table 4. This timeline assumes the project commences in Q3 2019.

Table 4 Timeline of revegetation works

Activity	2019		2020				2021				2022	2023	2024	2025	2026	2027	2028	2029	2030
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4									
Remediation																			
Final landform development																			
Installation of interceptor and water harvesting banks								*											
Deep ripping																			
Mulching																			
Fencing																			
Weed control									*										
Planting											*	*	*		*		*		*
Monitoring																			

* if required

3.7 Standards to be met (completion criteria)

Standards assist in being able to measure whether the offset is providing the desired WRP habitat features to enable return of WRPs to the area. The standards to be achieved are outlined in Table 5, along with the active management and monitoring of the site proposed to provide confidence in a successful outcome.

Table 5 Standards to be met (completion criteria) for the WRP offset area

Standard (Completion Criteria)	Monitoring (method, frequency)	Timing	Threshold triggers and remedial actions	Evidence to demonstrate completion
CC01: No declared weeds present in revegatation.	Visual inpsection for weeds bi-annually to identify declared weeds.	By 10 years post planting	Any declared weeds will be removed or treated.	Visual inpsection at completion to verify absence of declared weeds. Third party report by suitably qualified professional verifying completion criteria have been met.
CC02: Weed cover is less than 20% at completion.	Spring survey year 1, 2, 3, 5, 7 and 10 post planting. A minimum of ten 10x10m quadrats will be established.	By 10 years post planting	Weeds will be sprayed annually irrespective of percentage cover observed in monitoring.	Third party report by suitably qualified professional verifying completion criteria have been met.
CC03: A minimum of 15 species will be selected from Table 3 (WRP habitat/foraging species) and established in revegetation prior to completion and will include at least: - 5 species that provide foraging value - 5 species that provide canopy value - 5 species that provide understorey value *(note that one species can provide more than one value).*	Spring survey year 1, 2, 3, 5, 7 and 10 post planting. A minimum of ten 10x10m quadrats will be established.	By 10 years post planting	Infill planting will be conducted if scheduled monitoring shows completion criterion has not been met.	Third party report by suitably qualified professional verifying completion criteria have been met.
CC04: A density of 800 stems per hectare of species contributing to canopy (trees and shrubs) will be established at completion.	Spring survey year 1, 2, 3, 5, 7 and 10 post planting. A minimum of ten 10x10m quadrats will be established.	By 10 years post planting	Infill planting will be conducted if scheduled monitoring shows completion criterion has not been met.	Third party report by suitably qualified professional verifying completion criteria have been met.
CC05: No areas greater than 250m^2 without a developing understorey (foliage cover between 1-50cm height) at completion.	Spring survey year 1, 2, 3, 5, 7 and 10 post planting. A minimum of ten 10x10m quadrats will be established.	By 10 years post planting	Infill planting will be conducted if scheduled monitoring shows completion criterion has not been met.	Third party report by suitably qualified professional verifying completion criteria have been met.

Standard (Completion Criteria)	Monitoring (method, frequency)	Timing	Threshold triggers and remedial actions	Evidence to demonstrate completion
CC06: A minimum of 30%[1] cover by species contributing to canopy (trees and shrubs) will be established in revegetation at completion.	Spring survey year 1, 2, 3, 5, 7 and 10 post planting. A minimum of ten 10x10m quadrats will be established.	By 10 years post planting	Infill planting will be conducted from 5 years post planting if scheduled monitoring shows completion criterion is unlikely to be met by 10 years post planting (as assessed by a suitably qualified professional).	Third party report by suitably qualified professional verifying completion criteria have been met.
CC07: A perpetual covenant will be established two years prior to completion.	n/a	By 8 years post planting	n/a	Conservation covenant will be registered on the freehold title at time of completion.

[1] "30% cover by species contributing to canopy" is taken to mean any species that is contributing to canopy cover and is not limited to "canopy species" as identified in Table 3. e.g. many shrubs in Table 3 can contribute to canopy cover once they reach maturity.

3.8 Monitoring

Monitoring will be undertaken to ensure the objective of the Revegetation Management Plan is being met. The parameters to be measured are based on demonstrating successful achievement of completion criteria which will, in turn, demonstrate achievement of the objective of this plan.

3.8.1 Parameters

Ten 10 m x 10 m quadrats will be established throughout the offset area with the corners of each quadrat and a permanent photo reference point marked by fence droppers. Each quadrat will be monitored for the following parameters to demonstrate successful achievement of the completion criteria as outlined in Table 5:

- species richness;
- stem density;
- percentage weed coverage;
- percentage canopy cover; and
- size of bare areas.

In addition to the above parameters and reference photo, general observations will be undertaken including vegetation condition, mulch cover, erosion, and signs of dieback.

Aerial photographs will be used to assess canopy cover across the whole offset area at 5 years and 10 years post planting.

3.8.2 Timing

The parameters mentioned in Section 3.8.1 will be monitored during spring at the following intervals as outlined in Table 5:

- Year 1 – first spring following planting;
- Year 2 post planting;
- Year 3 post planting;
- Year 5 post planting;
- Year 7 post planting; and
- Year 10 post planting.

3.8.3 Contingency and management measures

If monitoring indicates completion criteria are not being met or on track to being met by 10 years post planting, the following contingency actions will be undertaken as required:

- infill planting;
- weed control;
- pest control;
- fence repairs; and/or
- other actions as required.

3.9 Reporting and Revision

Table 6 outlines key milestones of reporting to DoEE with regards to the revegetation outcomes.

Table 6 Key Reporting Milestones

Timing	Action
Within one year of revegetation works	Report to DoEE on the completion of the revegetation works within the annual compliance report
Every 12 months	Report on compliance with EPBC approval conditions Report on activities completed in the previous 12 months and activities proposed for the following 12 months, including any remedial activities resulting from monitoring thresholds being triggered
At Year 5, 7 and 10	Report on progress against completion criteria and implementation of remedial actions as per Table 5
Years 7 and 9 post planting	Report on signs of WRP usage of the offset area as identified by a suitably qualified third party. If no signs are found, possible reasons will be explored and reported on.

This Revegetation Management Plan will be reviewed and amended as required but, as a minimum, every three years following revegetation up to year 10 post planting.

3.10 Reconciliation against the EPBC Act Environmental Offsets Policy

Detail regarding how the proposed offset package aligns with the EPBC Act Environmental Offsets Policy (DSEWPC 2012) is described in Table 7.

Table 7 Reconciliation against the EPBC Act Environmental Offsets Policy

Offset Principle (DSEWPC 2012)	Alignment of Offset with Principle
1. *Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.*	The proposed offset package targets WRP habitat and results in: • The creation of new WRP habitat (approximately 14.6 ha) • An overall increase in the presence of WRP habitat in better condition to that cleared • Improved linkages between existing areas of WRP habitat • Consolidation of WRP habitat into a large area, as opposed to patchy habitat • The conservation in perpetuity of the WRP habitat through a conservation covenant.
2. *Be built around direct offsets but may include other compensatory measures.*	The proposed offset package is comprised of 100% direct offsets.
3. *Be in proportion to the level of statutory protection that applies to the protected matter.*	The level of statutory protection (Critically Endangered) has been used for classifying the EPBC Act Status within the Offsets Assessment Guide (the offset calculator) (DSEWPC 2012a). The guide takes into consideration the level of statutory protection for the protected matter.
4. *Be of a size and scale proportionate to the residual impacts on the protected matter.*	The size and scale of the residual impact (adjusted hectares = 2.53 ha) has been accounted for when implementing the EPBC Act Offsets Assessment Guide (DSEWPC 2012a). The guide takes this into consideration for the protected matter. A total of 14.6 ha of WRP habitat will be created to offset the clearing of WRP habitat required to conduct remediation works. This is a ratio of approximately 1:5.8, adjusted impact area to offset area ratio. Using the EPBC Act Offsets Assessment Guide, it is considered the proposed offset is proportionate to the final residual impact.
5. *Effectively account for and manage the risks of the offset not succeeding.*	An adaptive management approach will be implemented to evaluate the effectiveness of the offset and whether the offset requirements have been achieved. Actions will be undertaken as required to ensure success as outlined in Table 5.
6. *Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action)*	The tenure of the proposed offset areas is described in Section 3.2. The proposed offset strategies are additional to any other requirements as the current plan for the offset site is to return it to the pre-mining land use of agriculture.

Offset Principle (DSEWPC 2012)	Alignment of Offset with Principle
7. *Be efficient, effective, timely, transparent, scientifically robust and reasonable.*	The proposed offset package is described in Section 3 and is designed to be efficient, effective, timely, transparent, scientifically robust and reasonable. **Efficient and Timely** Commencement of revegetation of WRP habitat will be efficient and timely as it will occur during the first Autumn following remediation and final landform development, reducing the time between clearing and habitat recreation. This will occur during one autumn season, expected to be around 2 months. **Effective** Monitoring of the site will assess progress and identify any rectification works such as infill planting or weed control, for example, to ensure the offset is effective. Species selected have been confirmed as suitable by Harewood (*pers. comm.* 12/12/2018), available literature and by identifying species currently in use by WRPs within the disturbance footprint. **Transparent** Approvals documents will be publicly available and monitoring will occur to demonstrate effectiveness. As the offset will also be required under the EP Act, they will be listed on the publically available WA Environmental Offsets Register, providing transparency. **Scientifically Robust** The proposed revegetation of WRP habitat is considered to be scientifically robust and effective in increasing the area of habitat as well as improving linkages with adjacent habitat, addressing the key threatening processes for WRPs as outlined in the Recovery Plan for the species. Species to be used provide canopy, foraging and/or ground protection functions for WRPs and are suitable for the site. **Reasonable** The proposed offset is reasonable as determined by the offset calculator.
8. *Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.*	Iluka recognise that governance arrangements will be set by the Department of the Environment and Energy. Iluka has environmental management systems in place which allow for monitoring, measurement, auditing, inspections, reporting, checking and review.

3.10.1 Alignment with State Offset Requirements

Clearing permits under Part V of the *Environmental Protection Act 1986* (WA) are required for the SCRP as follows:

- Capel Dry Plant Clearing Permit (CPS 8066/1) – assessed by DWER; and
- South Capel Clearing Permit (CPS 8092/1) – assessed by Department of Mines, Industry Regulation and Safety (DMIRS).

The offset proposal outlined in this section has been developed in consultation with both Commonwealth (DoEE) and State (DWER and DMIRS) agencies to ensure alignment. The offsets proposed in this document are also proposed to ensure offset requirements are met for the State clearing permits.

This is consistent with the WA Environmental Offsets Policy (2011) which states that *"The Western Australian Government will endeavour to work cooperatively with the Australian Government to avoid duplication of offsets, however, this may not be possible where a proposal or action is not jointly assessed under a bilateral agreement or a strategic assessment. It is intended that as far as possible there will be minimal duplication between State and Commonwealth requirements for environmental offsets".*

4 Roles and responsibilities

Table 8 outlines the responsibilities to be assigned to each component of the Revegetation Management Plan.

Table 8 Responsibilities

Action	Responsibility
Ensure adequate provisioning is identified to meet the requirements of the Plan	Manager Rehabilitation: Australian Operations
Planning and management of revegetation	Manager Rehabilitation: Australian Operations
Implementation of revegetation	Rehabilitation Supervisor
Maintenance of offset site and implementation of contingency measures	Rehabilitation Supervisor
Monitoring of offset site	Qualified revegetation contractor or fauna specialist as required
Reporting	Manager Environmental Regulations

5 Glossary

Abbreviation	Term
CDP	Capel Dry Plant
CMNE	Capel Mine Northern Extension
CPS	Clearing Permit System
DBCA	Department of Biodiversity, Conservation and Attractions
DEWHA	Department of Environment, Water, Heritage and the Arts
DMIRS	Department of Mines, Industry Regulation and Safety
DoEE	Department of the Environment and Energy
DWER	Department of Water and Environmental Regulation
EP Act	Environmental Protection Act
EPBC	Environment Protection and Biodiversity Conservation
ha	Hectare
m	Metre
MNES	Matters of National Environmental Significance
SCRP	South Capel Remediation Project
WA	Western Australia
WRP	Western Ringtail Possum

6 References

AS/NZS (2009). AS/NZS ISO 3100:2009 Risk Management – Principles and Guidelines. Standards Australia, Sydney, NSW.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (2012). *Environment Protection and Biodiversity Conservation Act 1999,* Environmental Offsets Policy, October 2012.

Department of the Environment, Water, Heritage and the Arts (2009). Significant impact guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the Swan Coastal Plain, WA. Canberra, ACT: Department of the Environment, Water, Heritage and the Arts.

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Ecoedge (2015). *Report of a Level 1 Flora and Vegetation Survey at the Capel Dry Plant*, Capel, Unpublished Report Prepared for Iluka Resources Limited, November 2015.

Endemic (2013). *South Capel Flora and Vegetation Assessment*, Prepared by for Iluka Resources Ltd, Perth, Western Australia.

Harewood, G. (2018a). *Fauna Assessment, Capel Dry Plant, South Capel Remediation Project*, Prepared for Iluka Resources Ltd. Perth, Western Australia.

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Shedley, E. & Williams, K. (2014). An assessment of habitat for Western Ringtail Possum, (*Pseudocheirus occidentalis*) on the southern Swan Coastal Plain (Binningup to Dunsborough). Department of Parks and Wildlife, February 2014.

Tranen Revegetation Southwest (2019). *P564E Iluka Yoganup Minesite Rehabilitation Monitoring Spring 2018.* Unpublished report prepared for Iluka Resources, 2019.

Figures

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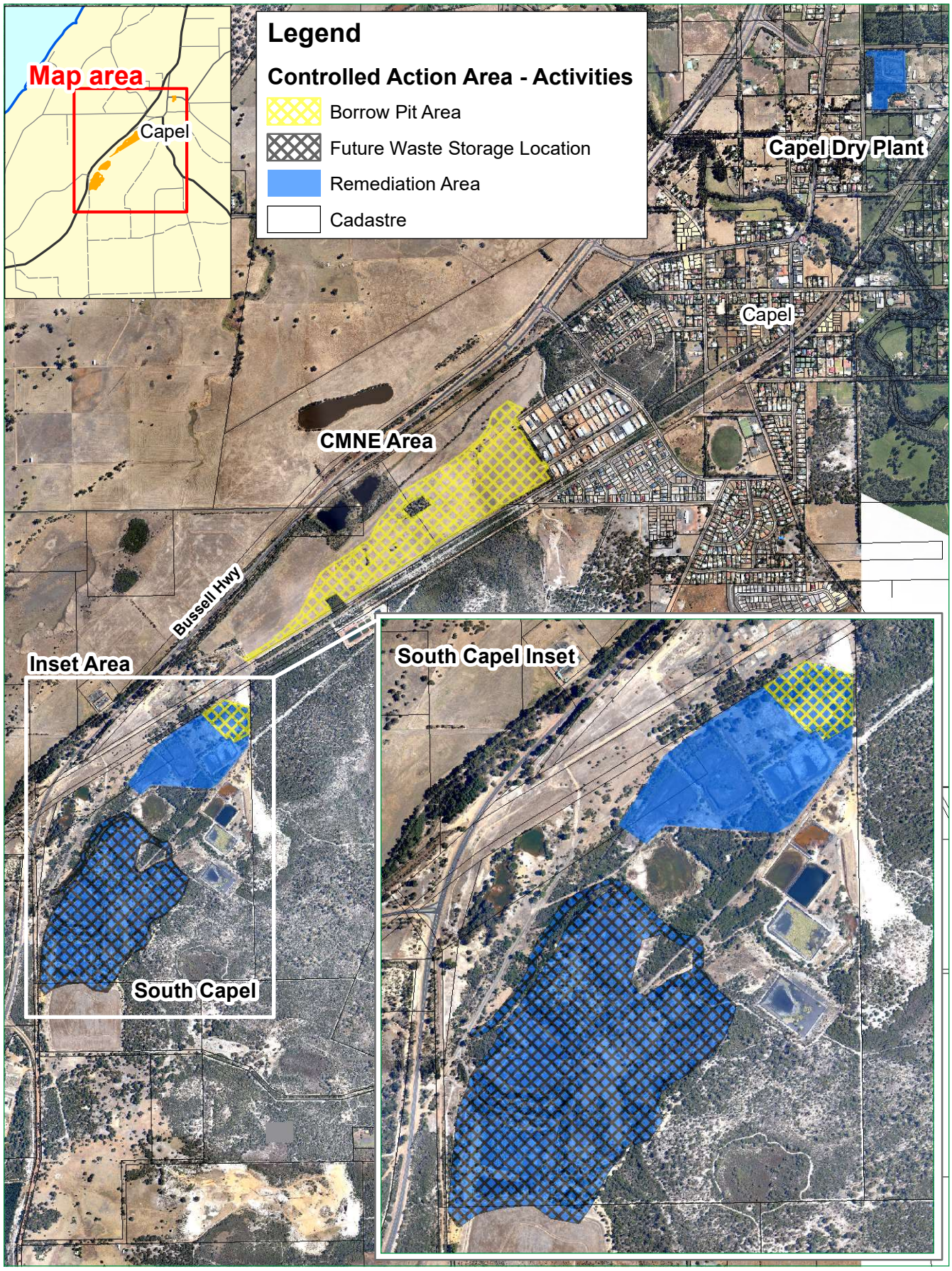

N

Aerial Photograph: 2018

0 500 1,000 m

MGA Coordinates, GDA94

SOUTH CAPEL REMEDIATION PROJECT

Proposed Action

ILUKA

ORIG: K. Tedesco DRAWN: K. Tedesco SCALE: 1:25,000 (A4) DATE: 17/07/2019 DWG No: SCRP_RevegMP_Fig1.mxd

FIGURE: 1

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N

Aerial Photo. 2016

0 25 50 m

CAPEL DRY PLANT

WRP FORAGING HABITAT TO BE CLEARED

ILUKA

ORIG: K.Tedesco DRAWN: D.G.S. SCALE: 1:2,000 (A4) DATE: 31 July 2019 DWG No: 256320 ver.00

FIGURE: 2a

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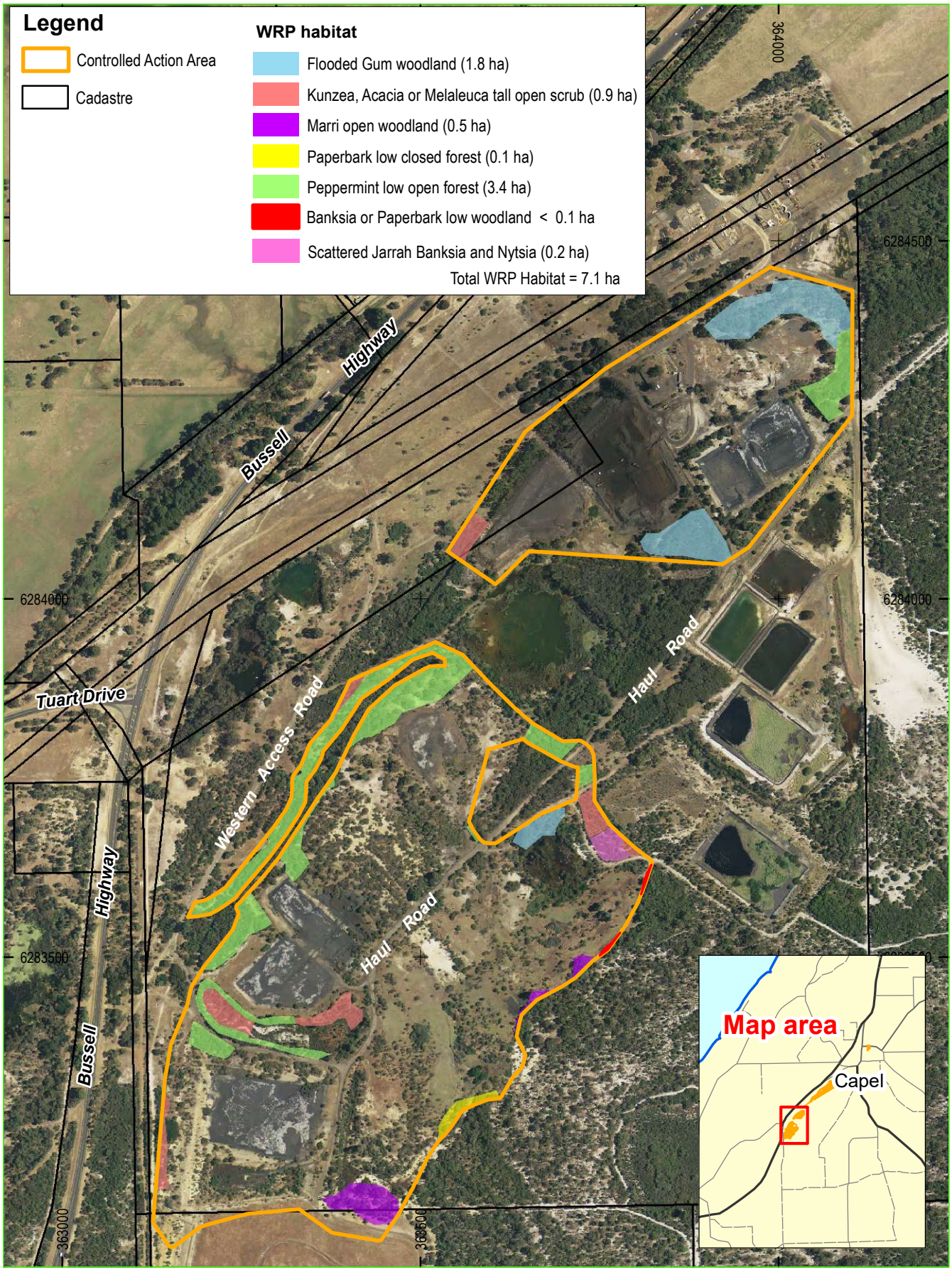

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Aerial Photograph: Dec. 2013

0 100 200 m

MGA Coordinates, GDA94

SOUTH CAPEL

WRP FORAGING HABITAT TO BE CLEARED

ILUKA

ORIG: K.Tedesco DRAWN: D.G.S. SCALE: 1:7,500 (A4) DATE: 31 July 2019 DWG No: 256321 ver.00

FIGURE: 2b

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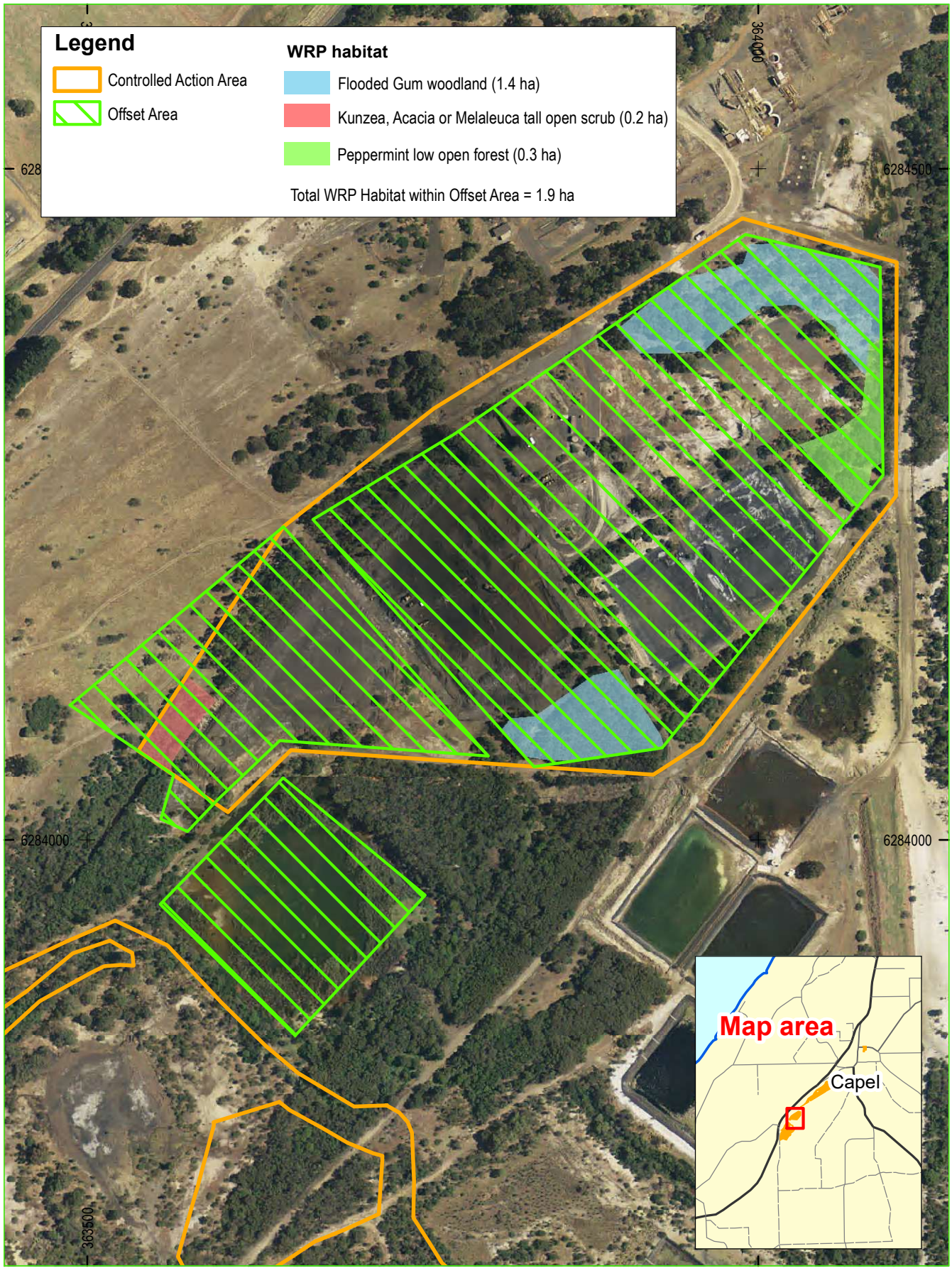

N

Aerial Photograph: Dec. 2013

0 50 100 m

MGA Coordinates, GDA94

SOUTH CAPEL

WRP HABITAT TO BE CLEARED WITHIN WRP HABITAT OFFSET AREA

ILUKA

ORIG: K.Tedesco DRAWN: D.G.S. SCALE: 1:4,000 (A4) DATE: 18 July 2019 DWG No: 256322 ver.00

FIGURE: 3

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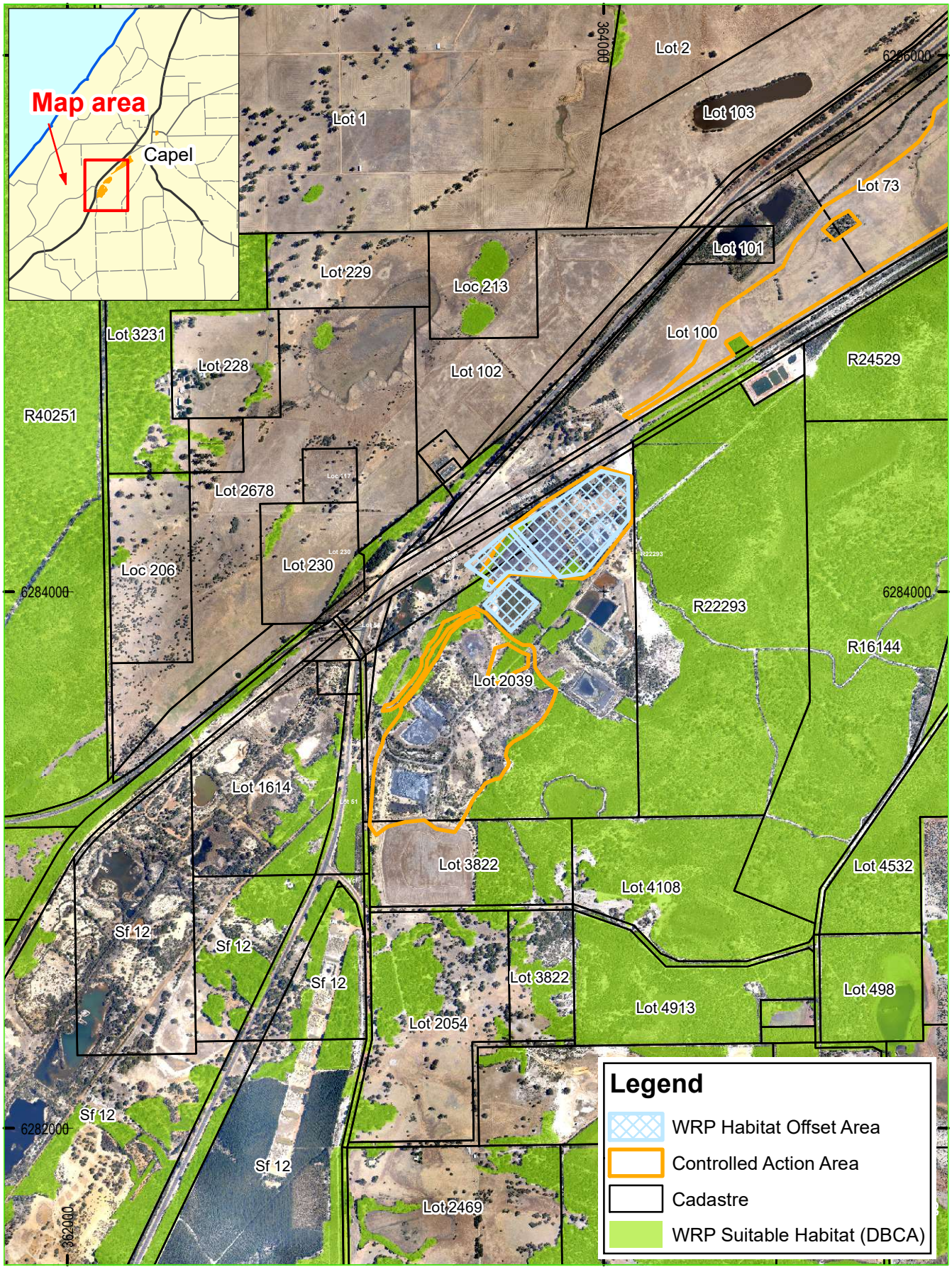

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Aerial Photograph: 2018

0 0.25 Kilometers

MGA Coordinates, GDA94

SOUTH CAPEL REMEDIATION PROJECT

WRP HABITAT OFFSET AREA
LINKAGE TO SURROUNDING HABITAT

ILUKA

ORIG: K.Tedesco DRAWN: K. Tedesco SCALE: 1:20,000 (A4) DATE: 31/07/2019 DWG No: 2018-8250_SCRP_Linkage.mxd

FIGURE: 4

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Appendices

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Appendix 1: Risk Assessment Criteria

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ILUKA

Risk Assessment Criteria

4 Step Approach to Determine Risk Level

1. Determine a plausible worst case event for the identified risk
2. Select a consequence rating based on the indicator that best fits the event and where multiple indicators are valid adopt the higher rating
3. Select a likelihood rating based on the indicator that best fits the event, answer question "how often will the described event cause the consequence selected?"
4. Plot consequence and likelihood ratings on risk matrix to obtain risk level

Further detailed guidance is provided in the Risk Assessment Procedure (PRC6806)

Consequence		Indicators						
Descriptor	Rating	Financial (AUD)	Company Objective	Injury / Illness	Environment	Stakeholder	Reputation	Compliance
Negligible	1	< 100K	The impact can be dealt with by routine operations.	No medical treatment required.	Limited damage to minimal area of low significance.	Low-level repairable damage to commonplace structures.	Public concern restricted to local complaints.	Technical breach of legal obligations without penalties or damages claims.
Minor	2	100K – 1M	The impact would threaten the ability to achieve current year objectives.	First aid with no permanent disability.	Minor effects on biological or physical environment.	Minor medium-term social impacts on local population. Mostly repairable.	Minor, adverse local public or media attention and complaints.	Breach of legal obligations resulting in minor penalties or damages claims.
Moderate	3	1M – 10M	The impact would threaten the ability to meet strategic objectives in short term.	Medically treated injury with no permanent disability	Moderate, short-term effects but not affecting ecosystem function.	Ongoing social issues. Permanent damage to items of cultural significance.	Attention from media and/or heightened concern by local community. Criticism by NGOs.	Breach of legal obligations resulting in moderate penalties, or damages claims.
Significant	4	10M - 100M	The impact would threaten the ability to meet strategic objectives in medium term.	Permanent disabling injury or Lost Time Injury.	Serious medium term environmental effects.	Ongoing serious social issues. Permanent damage to items of cultural significance.	Significant adverse national media /public/NGO attention	Breach of legal obligations resulting in significant penalties or damages claims.
Major	5	>100M	The impact is beyond ability to manage or resource and threatens the survival of the company.	Fatality or serious permanent disabling injury.	Very serious, long-term environmental impairment of ecosystem function.	Very serious widespread social impacts. Irreparable damage to highly valued items.	Serious public or media outcry (International coverage).	Breach of legal obligations resulting in major penalties or damages claims, or prosecution of the Company.

Likelihood		Indicators		
Descriptor	Rating	Description	Probability*	Frequency*
Rare	1	The event may occur only in exceptional circumstances	< 10%	Less than once in 25 years
Unlikely	2	The event could occur at some time	11 - 25%	At least once in 25 years
Possible	3	The event should occur at some time	26 - 75%	At least once in 5 years
Likely	4	The event will probably occur in most circumstances	76 – 90%	At least once a year
Almost certain	5	The event is expected to occur in most circumstances	>90%	At least once per month

* **Note** Probability and Frequency are not intended to correlate, select the indicator which best suits the event

Risk Matrix

LIKELIHOOD RATING		1 Negligible	2 Minor	3 Moderate	4 Significant	5 Major
	5 Almost Certain	5	10	15	20	25
	4 Likely	4	8	12	16	20
	3 Possible	3	6	9	12	15
	2 Unlikely	2	4	6	8	10
	1 Rare	1	2	3	4	5

CONSEQUENCES RATING

Risk Level

Risk Level	Descriptor	Required Reporting	Required Approval
17 - 25	Extreme	Board / Audit & Risk Committee / Exec	Continued express approval of Board to continue activity
13 - 16	Very High	Board / Audit & Risk Committee / Exec	Continued express approval of Exec to continue activity
7 - 12	High	Responsible General Manager	Continued express approval of General Manager to continue activity
4 - 6	Moderate	Department / Project Manager	Approval of Department / Project Manager to continue activity
1 - 3	Low	Department / Project Manager	Department / Project Manager review

Risk Treatment

ACCEPT	Accept the risk with current controls and continue to monitor and review
ADDRESS	Address the risk by implementing further treatments to reduce the risk
AVOID	Avoid the risk by deciding not to start or continue with the activity that gives rise to the risk