

EPBC 2021/9069 OFFSET

LOT 333 MANDURAH ROAD WARNBRO TUART TEC REVEGETATION MANAGEMENT PLAN

Prepared for: The Trustee for Hamersley Sub Trust

Report Date: 23 June 2026

Version: 7

Report No. 2023-749

The logo for PGV Environmental. It features the letters 'pgv' in a large, bold, white sans-serif font. Below 'pgv', the word 'ENVIRONMENTAL' is written in a smaller, all-caps, white sans-serif font. The background of the logo area is a vibrant orange with a subtle, wavy pattern of thin white lines.

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DECLARATION OF ACCURACY

I declare that to the best of my knowledge, all the information contained in, or accompanying this document is complete, current and correct. I am duly authorised to sign this declaration on behalf of the proponent/approval holder. I am aware that:

- a. giving false or misleading information is a serious offence under section 137.1 of the Criminal Code Act 1995 (Cth)
- b. section 137.2 of the Criminal Code Act 1995 (Cth) makes it an offence for a person to produce a document to another person in compliance or purported compliance with a law of the Commonwealth where the person knows that the document is false or misleading;
- c. section 490 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading; and
- d. section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) (EPBC Regulations) where the person knows the information or document is false or misleading.

Signed:



Full name (please print): Paul van der Moezel

Organisation (please print): PGV Environmental

EPBC Referral Number: EPBC Ref: 2021/9069

Name of Action Management Plan this document and declaration refers to:

Tuart Revegetation Management Plan

Date: 23 June 2026

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Part A

1 INTRODUCTION

1.1 Background

Lots 12 and 13 Lodge Drive, East Rockingham (Lots 12 and 13) are in the City of Rockingham approximately 36km south of the Perth Central Business District (Figure 1). Lots 12 and 13 are bound to the north and east by cleared land in the Clipper Precinct of the Rockingham Industry Zone (RIZ), to the south by cleared rural land and to the west by native vegetation in the Rockingham Industrial Zone Conservation Area.

Lots 12 and 13 are currently utilised for light industry purposes and contain a large shed, office, and carparks. The balance of the lots contains isolated Tuart Trees (*Eucalyptus gomphocephala*) over a weedy understorey and large areas of mulch (Plates 1 and 2).

According to the *Approved Conservation Advice (incorporating listing advice) for the Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain ecological community* (Tuart Woodland Conservation Advice) the Tuarts on Lots 12 and 13 are representative of the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Threatened Ecological Community (Tuart Woodland TEC) which is listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Tuart trees were deemed to meet the criteria for a Tuart Woodland ecological community based on the size of the area (>5ha) that the trees covered (Appendix 2). The density and species diversity in the understorey did not rate in the criteria due to the cleared understorey, weeds and level of mulching.

Plate 1: Vegetation on Lots 12 and 13



Plate 2: Vegetation on Lots 12 and 13



1.2 Proposed Action

Lots 12 and 13 were referred (EPBC 2021/9069) to the Department of Agriculture, Water and Environment (DAWE). The Referral of the proposed commercial development was accepted by DAWE (now Department of Climate Change, Energy the Environment and Water (DCCEEW)) on 1 November 2021.

The action to clear the native vegetation for the proposed development was determined as a 'Controlled Action' on 25 November 2021. The Controlled Action decision was made for impacts pursuant to Section 18 and 18A; Listed threatened species and communities, specifically:

- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Threatened Ecological Community (Tuart Woodland TEC) – Critically Endangered; and
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) – Endangered;

The proposed action was approved with environmental conditions by the Minister for the Environment on 17 April 2023 (Appendix 1).

Figure 1: Lots 12 and 13 Lodge Drive East Rockingham

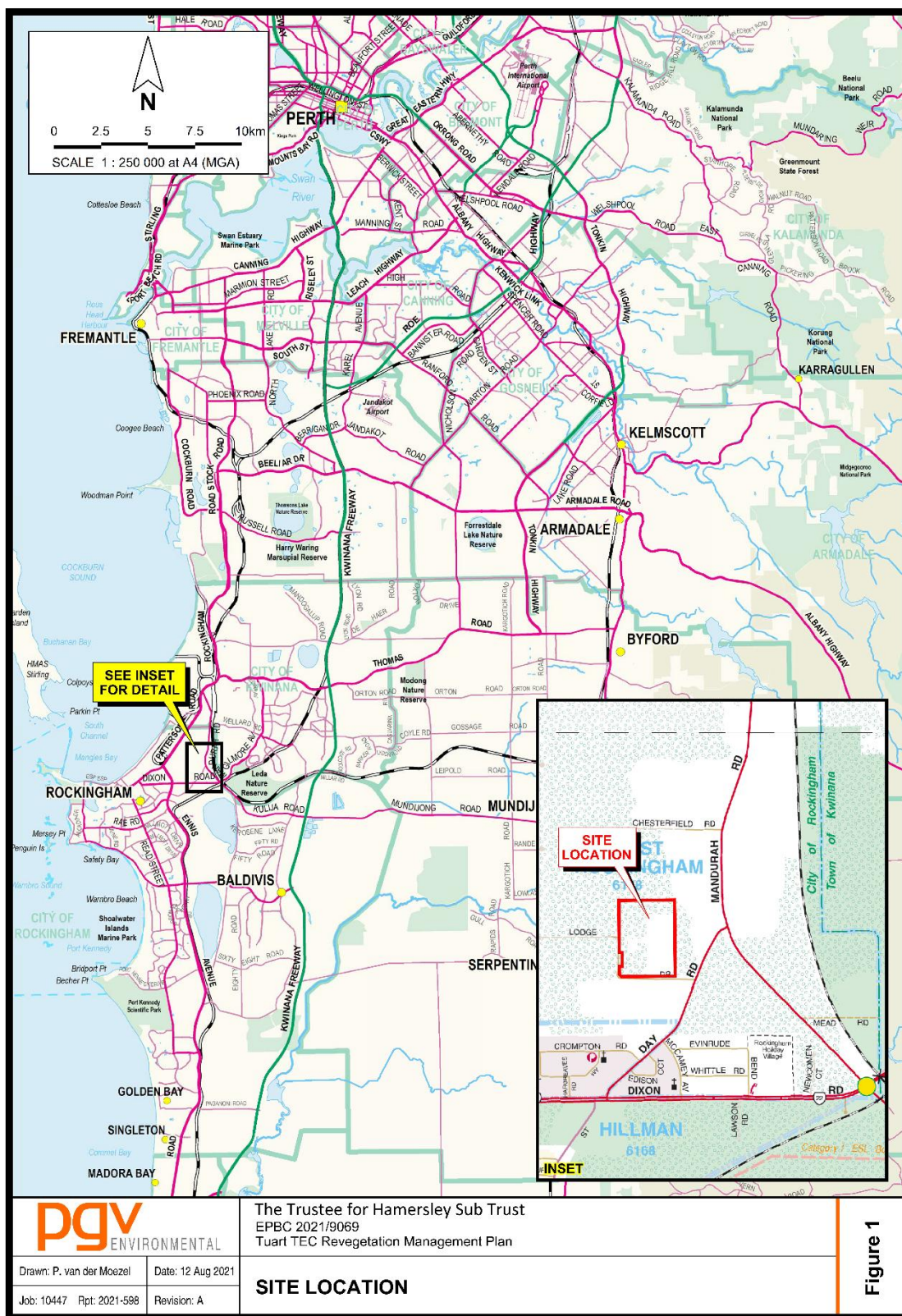
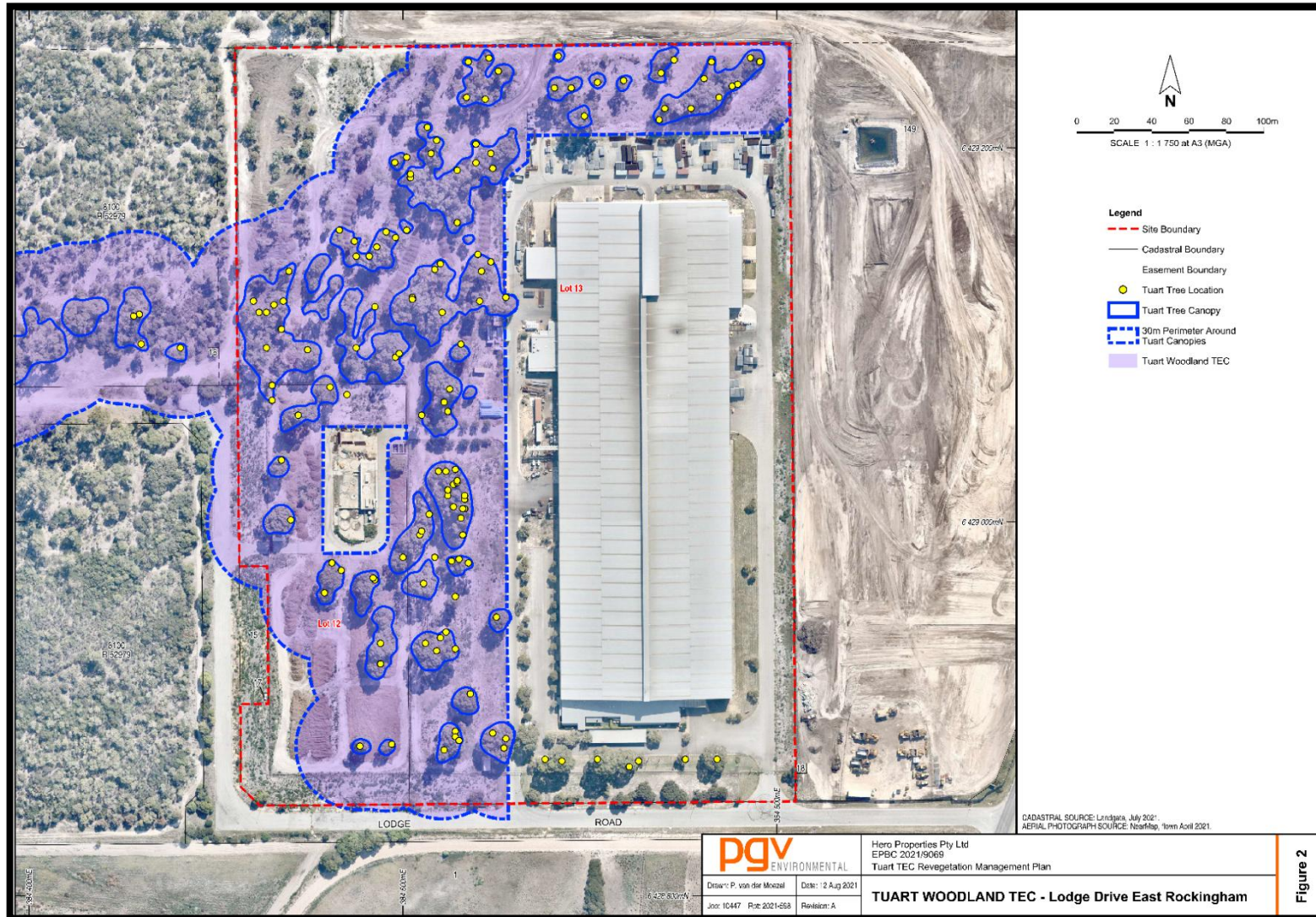


Figure 2: Tuart Woodland TEC on Lots 12 and 13 Lodge Drive East Rockingham



1.3 Requirement for the Plan

Under Condition 4 of the EPBC Approval 2021/9069, the Proponent is required to offset the residual impacts from clearing Tuart Woodland TEC from Lots 12 and 13. Condition 4 states the following:

*4) Prior to **commencement of the action** and to compensate for the residual significant impact under condition 3, the approval holder must submit to the **department** for the **Minister's approval** a Revegetation Management Plan (RMP). The RMP must be included as part of the **Offset Strategy** under condition 3. The environmental outcome of implementing the RMP must be to recreate at least 3.5 ha of the **Tuart Ecological Community** within the Rockingham Lakes Regional Park, 7km south of **development envelope**, that meets the listing criteria for high quality **Tuart Ecological Community** and is self-sustaining by 30 April 2063. The RMP must be consistent with the **department's** Environmental Management Plan Guidelines, and include:*

*a) Details of the relevant **protected matter/s** and a reference to **EPBC Act** approval conditions to which the plan refers.*

b) A table of commitments made in the plan to achieve the environmental outcomes, and a reference to exactly where these commitments are detailed in the plan.

c) Commitments capable of ensuring that the environmental outcomes are achieved. These commitments must include:

*i) To commence revegetation across at least 3.5ha within 2 years of **commencement of the action**.*

ii) The species and their provenance, and the approximate numbers of individuals of each species to be planted and/or seeded and the approximate timing of planting/seeding and milestones and success criteria for revegetation.

iii) Measures, including for hygiene, ground preparation and weed and herbivore control, and the approximate timing of the measures, to be undertaken prior to, during and following planting/seeding to ensure the success of the revegetation.

d) Reporting and review mechanisms to ensure compliance with the commitments made in the plan.

e) An assessment of risks relating to achieving the environmental outcomes and risk management strategies and/or mitigation measures that will be applied to address identified risks.

f) Impact avoidance, mitigation and/or repair measures, and the timing of those measures.

g) A monitoring program, which must include:

i) measurable performance indicators and completion criteria, which must include:

*I. survival 40 years after planting, of at least 1.6 **Tuart trees** per 100m²*

II. at least 12 local native understorey species per 10 m x 10 m plot

III. native vegetation coverage of at least 80% of the total vegetation cover at least 40 years after planting/seeding

ii) trigger values for corrective actions.

iii) the timing and frequency of monitoring, ensuring monitoring is capable of detecting trigger values and changes in the performance indicators.

iv) proposed corrective actions if trigger values are reached.

*v) the timing and methods of submitting **monitoring data** to the **department**.*

h) Links to other relevant plans or conditions of approval (including state/local government approval conditions).

Under condition 5, the Proponent must provide written evidence that the Western Australian Department Biodiversity, Conservation and Attractions (DBCA) confirm the goals and actions of the Revegetation Management Plan are achievable. Condition 5 states the following:

*5) When submitting the RMP to the **department** for the **Minister's** approval, the approval holder must provide the **department** with written evidence from the Western Australian Department Biodiversity, Conservation and Attractions (DBCA) confirming that DBCA considers that the outcomes and goals specified in the Revegetation Management Plan are achievable using the methods and within the timeframes specified in the Revegetation Management Plan.*

The Proponent cannot commence action until the Revegetation Management Plan has been approved by the Minister. Condition 6 states the following:

*6) The approval holder must not **commence the action** until the **Minister** has approved the Revegetation Management Plan in writing. The approval holder must commence implementing the approved Revegetation Management Plan within 2 years of the **commencement of the action** and thereafter must continue to implement the RMP until the expiry of this approval.*

This Revegetation Management Plan (RMP) has been prepared to satisfy condition 4 of the EPBC Act Approval.

1.4 Scope of Work

PGV Environmental were commissioned by The Trustee for Hamersley Sub Trust to prepare a Tuart Woodland TEC Revegetation Management Plan (RMP) in accordance with the *Environmental Management Plan Guidelines* (DoE, 2014) to set out the strategies for the design, implementation, monitoring and maintenance activities for revegetation works required to offset the residual impacts from clearing 5.49ha of Tuart Woodland on Lots 12 and 13.

This RMP has been prepared in accordance with the condition 4 of the EPBC Act Approval. The DBCA has been consulted during the preparation of this RMP as required under condition 5 of the approval and a letter of support for the RMP (Appendix 5).

1.5 Report Structure

This RMP has been structured to meet the requirements of Environmental Management Plan Guidelines 2014 (DoE, 2014) as shown in Table 1 and specifically the requirements set out in Condition 4 of the EPBC 2021/9069 Approval.

Table 1: Revegetation Management Plan Structure

Management Issue	Section	Addressed
Details of the relevant protected matter/s and a reference to EPBC Act approval conditions to which the plan refers.	1.3 Page 9	The RMP provides the framework for creating 3.5ha of Tuart Woodland TEC in accordance with Condition 2.
A table of commitments made in the plan to achieve the environmental outcomes, and a reference to exactly where these commitments are detailed in the plan	This table	
Commitments capable of ensuring that the environmental outcomes are achieved. These commitments must include: i) To commence revegetation across at least 3.5ha within 2 years of commencement of the action. ii) The species and their provenance, and the approximate numbers of individuals of each species to be planted and/or seeded and the approximate timing of planting/seeding and milestones and success criteria for revegetation. iii) Measures, including for hygiene, ground preparation and weed and herbivore control, and the approximate timing of the measures, to be undertaken prior to, during and following planting/seeding to ensure the success of the revegetation.	5 Page 31-42 6 Page 43	Section 5 provides the planting ground preparation, planting design and maintenance activities for the revegetation project. Section 6 provides the monitoring framework to ensure that completion criteria are on track to being achieved.
Reporting and review mechanisms to ensure compliance with the commitments made in the plan	6.3 and 6.4 Page 45	Section 6.3 details reporting requirements and highlights any management issues that require addressing. Section 6.4 outlines contingency actions
An assessment of risks relating to achieving the environmental outcomes and risk management strategies and/or mitigation measures that will be applied to address identified risks.	6.6 Page 47	Section 6.6 provides a risk assessment matrix.
Impact avoidance, mitigation and/or repair measures, and the timing of those measures.	6.4 Page 45	Section 6.4 addresses contingency actions
A monitoring program, which must include: - measurable performance indicators and completion criteria, which must include: - survival 40 years after planting, of at least 1.6 Tuart trees per 100m² - at least 12 local native understorey species per 10 m x 10 m plot	6.1 and 6.2 Page 43	Section 6 provides the monitoring framework to ensure that completion criteria are on track to being achieved.

– native vegetation coverage of at least 80% of the total vegetation cover at least 40 years after planting/seeding • trigger values for corrective actions. • the timing and frequency of monitoring, ensuring monitoring is capable of detecting trigger values and changes in the performance indicators. • proposed corrective actions if trigger values are reached. • the timing and methods of submitting monitoring data to the department. • Links to other relevant plans or conditions of approval (including state/local government approval conditions)		
Roles and responsibilities	6.5 Page 47	Table 7 lists the Roles and responsibilities
Time frames for the implementation of the above measures	7 Page 51	Schedule for implementation is provided in section 7
Who will be responsible for the long-term management of the retained land, and how the land will be protected in the long-term	3 Page 21	The offset site is in the Rockingham Lakes Regional Park in a designated conservation zone. The long term management of the offset site will be undertaken by the DBCA under the Rockingham Lakes Regional Park Management Plan.

1.6 National Standards for Ecological Restoration

The National Standards for the Practice of Ecological Restoration in Australia (the ‘Standards’) has been prepared by the Society for Ecological Restoration Australasia (SERA) in collaboration with 12 not-for-profit Partner and advisor organisations; all of whom, like SERA, are dedicated to effective conservation management of Australia’s native ecological communities (SERA, 2021).

The Standards identifies the principles underpinning restoration philosophies and methods, and outlines the steps required to plan, implement, monitor and evaluate a restoration project to increase the likelihood of its success.

Ecological Restoration is defined under the Standards “as the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. (SER 2004)”. Full recovery is defined as the state whereby all ecosystem attributes closely resemble those of the reference ecosystem.

The fully restored state can only be considered achieved when the ecosystem’s attributes are on a secure trajectory (pathway) to highly resemble those of the reference ecosystem without further restoration-phase interventions being needed. After full recovery has been attained, ongoing management interventions would be viewed as a form of ecosystem maintenance.

The Standards have been reviewed and the general principles and terminology has been adopted in this revegetation project. Restoration has been defined in this project as revegetation to ensure consistency with the EPBC Approval and conditions.

2 Tuart Woodland TEC

2.1 Conservation Listing

The Tuart Woodlands and Forests of the Swan Coastal Plain were listed as a Threatened Ecological Community (TEC) with a rating of Critically Endangered under the Commonwealth EPBC Act on 4 July 2019 (for brevity the community will be called the Tuart Woodland TEC in this report). A description of the Tuart Woodland TEC is available through the EPBC Act listing and more specifically in the Tuart Woodland Conservation Advice (DoEE, 2019).

Unlike most ecological communities, the Tuart Woodland TEC is largely defined by the ecological values associated with the tree canopy rather than the diversity of flora and fauna species associated with the Tuarts. This is reflected in the Tuart Woodland Conservation Advice and referral guidelines for the Tuart Woodland TEC (DoEE, 2019).

2.1.1 Description

This nationally protected ecological community is comprised of woodlands or forests within which the presence of Tuart (*Eucalyptus gomphocephala*) trees in the uppermost canopy are the primary defining feature. The community also often contains other native trees such as *Agonis flexuosa* (Peppermint), *Banksia grandis* (Bull Banksia), *Banksia attenuata* (Candlestick Banksia) or *Eucalyptus marginata* (Jarrah), with a substantial diversity of understorey plants (DoEE, 2019).

The ecological community varies in structure, with variable height and canopy closure across its range. It occurs in a variety of forms, most commonly open forest, woodland and open woodland, but can also include other forms including various mallee structural formations (NVIS Technical Working Group, 2017). The Tuart trees themselves include multi-stemmed mallee that can be less than 10 m in height and single trunked trees in a range of heights, generally smaller in the northern part of the range, with large trees of up to 40 m in height, particularly in the southern part of the range. Landscape position also influences the form and size of the trees (Keighery et al 2002). There will also be a substantial sub-canopy, for example dominated by *Agonis flexuosa* (Peppermint). The understorey is often relatively open, including many non-woody species from the Asteraceae, Cyperaceae, Restionaceae and Orchidaceae families as well as lilies (DoEE, 2019).

Plate 3: Tuart Trees - Coastal Mallee Structure Alkimos



Plate 4: Tuart Trees – Tall Structure Mandurah East



2.1.2 Location and Physical Environment

The Tuart Woodland TEC occurs on the Swan Coastal Plain between Jurien in the north and Busselton in the south of South West Western Australia. The ecological community is strongly associated with calcareous soils of the western part of the plain, including those very close to the coast. While it mainly occurs where soils are sandy and well drained, it can also occur in other areas such as on protected swales, saline and freshwater wetlands, close to river banks and on limestone slopes (Keighery *et al.*, 2002; Keighery 2002).

Tuart woodlands and forests are most found on the Spearwood dune systems, also occurring on the Quindalup dune systems and in some places also found on the Bassendean dune systems. It also occurs in between the dunes in sheltered swales and on the margins of wetlands, as well as on the margins of rivers further inland, including some on very saline soils. Tuart is one of the few eucalypts known to be well adapted to calcareous alkaline soils (Gibson *et al.* 2002; Ruthrof *et al.*, 2002), although it occasionally also occurs on the more acidic soils of the Bassendean dunes and Pinjarra Plain (Coates *et al.*, 2002).

Tuarts have complex physiology related to their access and use of water that varies seasonally, as both surface and groundwater availability responds strongly to rainfall (Franks *et al.*, 2007). As Tuart trees mature, they develop deep roots and so are better able to extract groundwater seasonally.

2.2 Creating Tuart Woodland TEC

PGV Environmental has previous experience in successfully creating Tuart Woodland communities on completely cleared paddocks.

The first example was undertaken in Yellagonga Regional Park as an offset for EPBC 2010/5777. The project rehabilitated two areas of Yellagonga Regional Park that were cleared paddocks. Initially, in 2014 topsoil from a recently cleared site was transferred onto the paddock and additional seed was spread onto the site. However, the results from that method did not meet the completion criteria. Therefore, the whole area was planted with forest tubestock in the following year. The results of that planting have been very successful, with the completion criteria being met after 5 years. Plate 5 shows one part of the site at the commencement of the rehabilitation programme with site works having just been finished. Plate 6 shows the exact same spot and angle in November. Plate 7 and 8 show another part of the site prior to rehabilitation Plate 7 and 3 years after planting tubestock (Plate 8).

One area of revegetation (350m²) was not as successful and after investigation it was found that this was once the location of a home and outer sheds of a market garden. These learnings were taken and in the second stage of the revegetation project, soil testing was undertaken to identify any issues related to compaction and nutrients and management strategies were put in place for identified areas to improve survival rates.

Plate 5: Yellagonga Site 1 in 2016



Plate 6: Yellagonga Site 1 in 2022



Plate 7: Yellagonga Site 2 in 2015



Plate 8: Yellagonga Site 2 in 2018



The twice-yearly monitoring of the Yellagonga Regional Park rehabilitation project site over 6 years documented the survival of many native tree, mid-shrub and small shrub species. Tuart trees are surviving in all six monitoring plots and are up to 6m tall. Fruit has developed on some trees within 8 years of planting. Table 1 lists the native species present in each of the monitoring plots after 5 years. Each plot is 100m² in size. One plot meets the species diversity of a Tuart Woodland TEC in Moderate Condition, two meet the High Condition category and three meet the Very High condition threshold (Table 2).

The Yellagonga Regional Park rehabilitation project was only an offset for Carnaby's Black Cockatoo and not for the Tuart Woodland TEC. The results provided here demonstrate that it is possible to create a Tuart Woodland TEC without that being the objective of the programme. If the objective were to re-create the TEC, the outcome would be superior with more focus on diversity and stratification of the planted vegetation.

Table 2: Species Recorded in Yellagonga Monitoring Plots

Species	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6
<i>Eucalyptus gomphocephala</i>	4	3	5	1	2	2
<i>Acacia cyclops</i>	+					+
<i>Acacia huegelii</i>				+		
<i>Acacia lasiocarpa</i>		+				+
<i>Acacia pulchella</i>			+		+	+
<i>Allocasuarina fraseriana</i>	+	+				
<i>Allocasuarina humilis</i>	+	+				+
<i>Banksia attenuata</i>				+	+	+
<i>Banksia dallanneyi</i>						+
<i>Banksia menziesii</i>			+	+	+	+
<i>Banksia prionotes</i>		+		+	+	+
<i>Calothamnus quadrifidus</i>	+			+		
<i>Calothamnus sanguineus</i>	+		+	+		+
<i>Corymbia calophylla</i>	+			+	+	+
<i>Eucalyptus marginata</i>		+				+
<i>Eucalyptus totidiana</i>	+	+	+			+
<i>Hakea prostrata</i>	+			+		+
<i>Hakea lissocarpa</i>	+	+				+
<i>Hakea trifurcata</i>		+				+
<i>Jacksonia calcicola</i>	+	+			+	
<i>Jacksonia furcellata</i>					+	+
<i>Kunzea glabrescens</i>	+	+	+	+	+	+
<i>Lomandra maritima</i>	+					
<i>Melaleuca huegelii</i>	+					+
<i>Melaleuca systema</i>	+	+	+	+	+	+
Number of Native Species	15	12	7	11	10	20

The rehabilitated areas in the Yellagonga Regional Park are starting to provide foraging habitat for Black Cockatoos with foraging recorded in 2020 on Marri nuts (Plate 9) (four years after planting) and 2022 on Banksia species (Plate 10 and 11) (six years after planting). The rehabilitation undertaken on the Yellagonga site clearly shows that a rehabilitation program is capable of re-creating a Tuart Woodland that meet the criteria of a TEC in High condition as stated in the Tuart Woodland Conservation Advice, as well as provide foraging habitat for Black Cockatoos within 6 years.

Plate 9: Foraging on Planted Marri, 2020



Plate 10: Foraging on Planted Acorn Banksia 2022



Plate 11: Foraging on Planted Parrot Bush 2022



The second example of successfully creating a Tuart woodland also started out as an offset for Carnaby's Black Cockatoo (EPBC2010/5337). The revegetation project was undertaken over four areas of bare paddock within the Rockingham Lakes Regional Park, one area of which is directly to the east of the proposed offset site in this report. Rehabilitation work commenced in 2016 and by 2021 the project was deemed to have met the completion criteria due to the number of Tuart trees surviving.

Plate 12 shows one of the bare areas prior to planting. Plate 13 shows a healthy stand of Tuart trees 6 years after planting.

Plate 12: Cleared Paddock that was part of the Revegetation Project



Plate 13: Healthy Tuarts 6 Years Post Planting



The rehabilitation work was not undertaken to create a Tuart Woodland TEC, however some native understorey species were planted in the revegetation programme. Monitoring was undertaken for Tuart tree survival therefore there are no monitoring data over the 5 year trial to assess against the Tuart Woodland TEC condition criteria. A site visit undertaken in January 2023 recorded eight native species in the understorey of one of the rehabilitated areas being:

- *Acacia pulchella* (Prickly Moses);
- *Acacia rostellifera* (Summer-scented Wattle);
- *Acacia saligna* (Coojong);
- *Daviesia* sp.
- *Hakea prostrata* (Harsh Hakea);
- *Jacksonia furcellata* (Grey Stinkwood);
- *Macrozamia riedlei* (Zamia Palm) (mature plants); and
- *Xanthorrhoea preissii* (Grass Tree) (juvenile plant).

As with the Yellagonga Regional Park project, the creation of a Tuart Woodland TEC in the Rockingham Lakes Regional Parks site was not the key objective of the revegetation. Had it been a greater number of understorey species would have been planted. The results here demonstrate that Tuarts can be established easily on this site as well as understorey species.

Previous experience on both sites shows that the use of forestry tubestock over planting seed is more successful in these weedy paddock situations. The use of watering over at least two summers after planting was shown to greatly improve the seedling survival over summer on one site and result in healthy growth in the tubestock. These learnings as well as the use of current best practice management will be utilised in the establishment of the Tuart Woodland TEC vegetation for this project.

The ease at which Tuart trees and many of the Tuart Woodland TEC understorey species are able to be grown on bare sites indicates the completion criteria to meet the definition of the Tuart Woodland TEC would not be difficult to achieve.

The following section provides further detail on the RMP that will guide the site preparation, planting and maintenance of the rehabilitation area in order to meet the objective of restoring the bare paddock to a Very High condition Tuart Woodland TEC.

3 ROCKINGHAM LAKES REGIONAL PARK

Regional Parks comprise Crown lands vested in State government agencies and local governments, as well as private lands where the agreement of the landowner is obtained. As such, regional parks can comprise lands with a variety of tenures and reserve purposes, drawn together for integrated management which is coordinated by DBCA.

Rockingham Lakes Regional Park (RLRP) consists of land comprising Crown reserves vested in the City of Rockingham, the Conservation and Parks Commission of Western Australia and the Minister for Community Services, as well as freehold land owned by the Western Australian Planning Commission (WAPC) and the Western Australian Water Corporation (WAWC), and privately owned land (DEC, 2010).

The RLRP is a network of environmentally and geomorphically significant lands containing coastal, wetland and upland ecosystems that together form a significant recreation and sanctuary zone in what is otherwise an urbanised area (Appendix 3). The vegetation communities in the Park represent a sequence from west to east; from coastal shrubland, permanent and ephemeral wetlands, to Quindalup woodlands including stands of Tuart, Jarrah and Marri.

Four threatened ecological communities listed as Critically Endangered under the EPBC Act occur in the RLRP (Table 3). Two of these communities are listed as Critically Endangered in Western Australia.

Table 3: Threatened Ecological Communities that Occur in the RLRP

Ecological Community	EPBC Listing
Sedgeland in Holocene Dune Swales	Critically Endangered
Thrombolites In Lake Richmond	Critically Endangered
Tuart Woodlands and Forests of the Swan Coastal Plain	Critically Endangered
Banksia Woodlands of the Swan Coastal Plain	Endangered

The RLRP is divided into five management zones including a conservation and protection zone (Appendix 3). Management zones provide a broad guidance to public use and management activities that are appropriate in certain park areas. The RLRP is managed through the RLRP Management Plan (DEC, 2010).

All national parks, conservation areas, regional parks, nature reserves, and other similar reserves are vested in the Conservation and Parks Commission. These reserves are managed on behalf of the Conservation and Parks Commission by the DBCA under section 8a of the *Conservation and Land Management Act 1984* (CALM Act).

PART B

4 OFFSET SITE

4.1 Location

The offset site (Lot 333 Mandurah Road, WAPC REF 1386/2) (the site) is located 7km to the south of Lots 12 and 13 and is within the Rockingham Lakes Regional Park (Bush Forever Site No. 356) at the south-west corner of Safety Bay Road and Mandurah Road. The site is in the vicinity of large areas of mature Tuart woodland (Figure 3).

The site is located on the north-east side of Lake Walyungup and is in a large conservation and protection zone identified as part of Management Area 12 under the RLRP Management Plan.

Tall, open Tuart forests are common to the surrounds of Lake Cooloongup to the north, and Lake Walyungup, Tamworth Hill, Anstey and Paganoni Swamps to the east. Some soils support understorey species such as Candle Banksia (*Banksia attenuata*) under the Tuart. An overstorey of Swamp Banksia (*Banksia littoralis*) occurs at Lake Walyungup (DEC, 2010).

Under the RLRP Management Plan, the management emphasis for Area 12 is as follows:

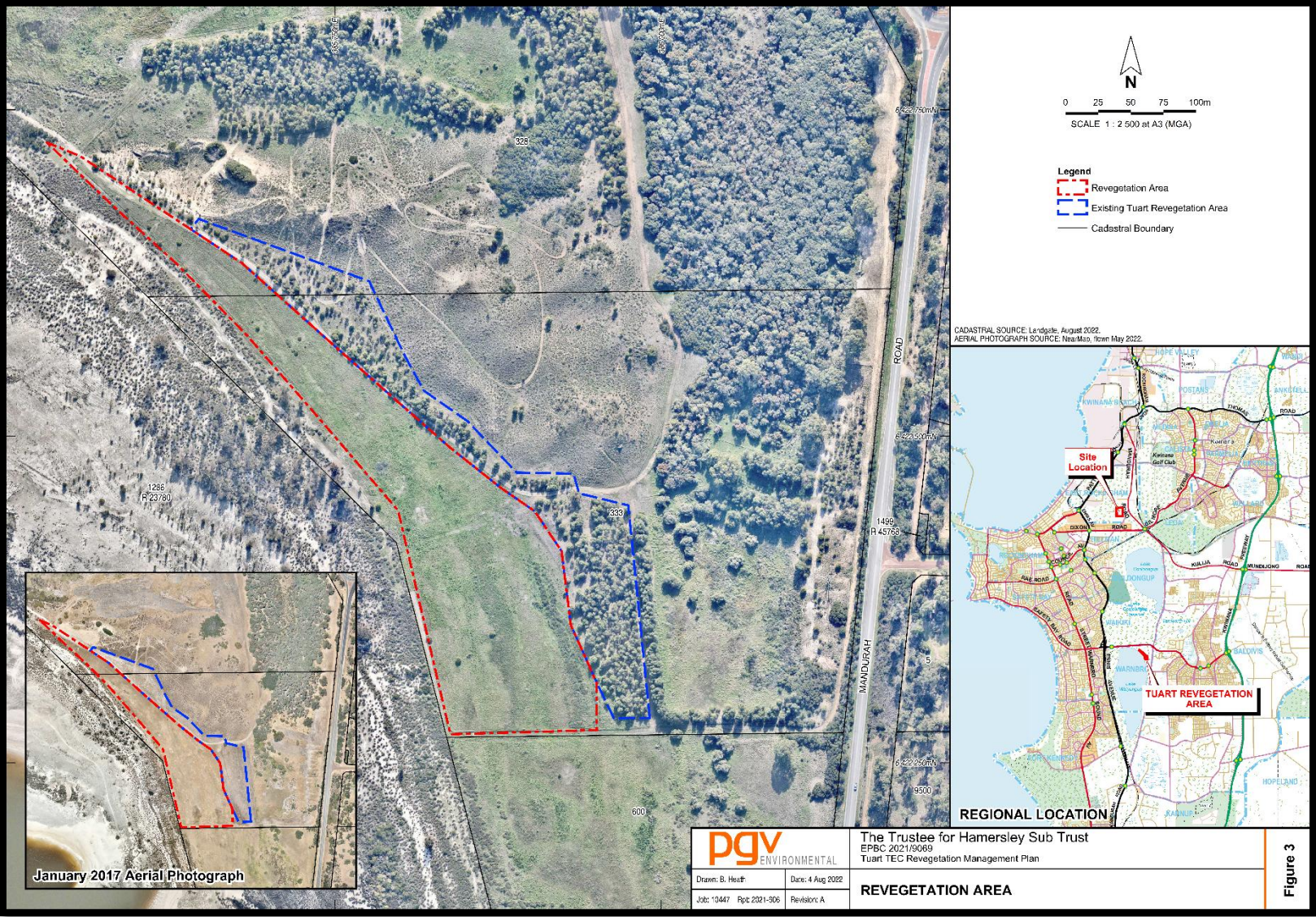
To protect and where possible enhance the conservation values (biota and heritage) as well as landscape qualities of the Park. Priority to be given to restoring and maintaining the natural state of conservation and protection areas.

The site has been discussed with DBCA, the land manager, and the Western Australian Planning Commission (WAPC), the landowner of the proposed offset site. The DBCA has confirmed that the site is satisfactory for revegetation from their perspective and that the WAPC have agreed to the proposed revegetation of the site.

Revegetation of the site will result in the following outcomes:

- An increase the regional and local extent of Tuart Woodland ecological community protected in conservation estate by 3.5ha and complement the existing areas of Tuart Woodland in the Regional Park and adjacent private owned lands;
- The quality and value of the revegetation will be greater than that being cleared from the action site as the Tuart Woodland TEC will have a greater diversity of native species and strata levels than what is currently represented on Lots 12 and 13;
- The offset site is protected for conservation purposes under the Rockingham Lakes Regional Park – management Area 12;
- The offset site will provide a non-contiguous link between other areas of mature Tuart Woodland TEC ensuring a mixed age of Tuart Trees in the Rockingham Lakes Regional Park; and
- The revegetation will provide habitat suitable for Black Cockatoos and increase the regional and local extent of habitat by 3.5ha.

Figure 3: Offset site



4.2 Existing Environment

4.2.1 Land Use

The site was largely cleared prior to 1953 (earliest aerial photography) and completely cleared between 1965 and 1970 for grazing purposes (Plates 14). A small sand mine was in operation for a period in the late 1970s to the north of the site (Plate 15).

The condition site is completely degraded as it was historically cleared for stock grazing purposes, therefore a baseline Flora and Vegetation Survey has not been undertaken as there are only weed species present.

The site is fenced and isn't currently used for any purpose. The site is kept mown for fire management purposes during summer (Plates 16 and 17).

Plate 14: Aerial photography 1965 (Landgate 2023)



Plate 15: Aerial Photography 1979 (Landgate, 2023)



Plate 16: Offset Site Looking South Over Existing Revegetation (August 2022)



Plate 17: Offset site Looking South East (August 2022)



4.2.2 Topography

The site is largely flat at 4-6 m AHD (Plate 18).

Plate 18: Site Topography



4.2.3 Geology and Soils

The soils in western parts of the Park are typical of the Quindalup Dune System. They are calcareous, having been built up from marine deposits, and are deficient in trace elements (Woods, 1988). The most extensive geological unit is the Safety Bay Sands.

DPIRD geological and soil mapping indicates the site sits on the interface between the following (Landgate, 2023):

- Quindalup South Qp1 - Described as complex of nested low relief parabolic dunes with moderate to steep slopes and uniform calcareous sands showing variable depths of surface darkening; and
- Vasse V6 phase which is described as upper level sandy terrace and gently undulating beach ridges with deep grey or bleached pale brown siliceous sands overlying soft shelly limestone generally aligned in a south-west to north-east orientation, with swales between dune ridges.

4.2.4 Hydrology

Groundwater

Groundwater data from the Perth Groundwater Atlas shows that depth to groundwater levels across the site are between 3 and 4m AHD with groundwater flowing towards Lake Walyungup in the west (DoW, 2023).

Surface water

The hydrological characteristics of the site are dominated by the high infiltration capacity of the soils. This results in little to no surface runoff except during extreme events.

Wetlands

The site is located to the east of Lake Walyungup which is mapped as a Conservation category wetland under the Geomorphic Wetlands of the Swan Coastal Plain dataset (Landgate, 2023).

Lake Walyungup is a shallow, saline lake that was once connected to the ocean. The water levels in the wetland are dependent on groundwater flows and rainfall, with depths ranging from 0.5 to 3.5 metres with the deepest areas being in the permanent pools of Lake Walyungup (DEC, 2010).

The dunes separating the Lakes Coo loongup and Walyungup act as groundwater divide such that each lake has a separate hydrological system. Lake Walyungup is a closed system with evapotranspiration the only form of discharge (Tingay and Associates, 1996).

Plate 19: Looking west over offset site to Lake Walyungup



4.2.5 Vegetation

Sub-regional Description

The site is in the Perth subregion of the Swan Coastal Plain, which is characterised as containing mainly *Banksia* low woodland on leached sands with *Melaleuca* swamps where ill- drained; and woodland of *Eucalyptus gomphocephala* (Tuart), *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) on less leached soils (Beard, 1990). This subregion is recognised as a biodiversity hotspot and contains a wide variety of endemic flora and vegetation types.

Vegetation Complex

Variations in native vegetation within the site can be further classified into Vegetation Complexes which are a broad level of vegetation description which is based on the underlying geomorphology and rainfall (Hedde *et al.*, 1980). The vegetation is part of the Quindalup Complex which is described as a 'Low dune complex – low closed forest and closed scrub.

Vegetation Types

The site has been cleared for over 70 years and no longer contains any native vegetation. The RLRP Management Plan states the following:

- Tall, open Tuart forests are common to the surrounds of Lakes Cooloongup and Walyungup;
- *Melaleuca systema*, *Phyllanthus calycinus* and Balga (*Xanthorrhoea preissii*) are common around Lakes Cooloongup and Walyungup, and
- Some soils support understorey species such as Candle Banksia (*Banksia attenuata*) under the Tuart. An overstorey of Swamp Banksia (*Banksia littoralis*) occurs at Lake Walyungup (DEC, 2010).

Bush Forever Site No. 356

The Bush Forever Site No. 356 Lake Cooloongup, Lake Walyungup and adjacent bushland, Hillman to Port Kennedy is a reference site on the Swan Coastal Plain. Being a Bush Forever reference site, a number of flora and vegetation surveys have been conducted in BF 356 which can provide information on species composition for the revegetation project.

A description of the vegetation and flora list for Bush Forever Site No. 356 Lake Cooloongup, Lake Walyungup and adjacent bushland, Hillman to Port Kennedy is provided at Appendix 4.

5 REVEGETATION MANAGEMENT PLAN

5.1 Target

The revegetation target is to create 3.5ha of Tuart Woodland that meets the ecosystem attributes of the Tuart Woodland TEC on the action site (Reference Area). The action site meets the criteria to be a threatened ecological community according to the Conservation Listing Advice for the Tuart Woodland and Forests of the Swan Coastal Plain ecological community.

The offset site is in an area of bare ground within the Rockingham Lakes Regional Park that is in close proximity to existing areas of Tuart Woodland TEC. The revegetated area will contain Tuart trees and 12 native understorey species to 3m high that meet the definition of a Tuart Woodland TEC in Very High condition as defined in the Tuart Woodland Conservation Advice (DoEE, 2019). The species mix will include tree and shrub species suitable for Black Cockatoo foraging and potential future breeding.

5.2 Goals

The revegetation goals are to achieve:

- An intact and recovering composition, structure and function of the offset site within five years;
- 3.5ha of revegetated non-contiguous ecological link between the offset site and other Tuart Woodland TEC remnants within 10 years; and
- Foraging evidence of Carnaby's Black Cockatoo within 10 years.

According to the National Standards for the Practice of Ecological Restoration in Australia (2021):

"A restored (revegetated) state is considered to have been achieved when the ecosystems attributes are on a secure trajectory approximating those in the ecological reference area without further repair-phase interventions being needed other than ongoing protection and maintenance. At that stage the ecosystem under recovery would be considered self organising and increasingly resilient to natural disturbances".

5.3 Objectives

The objectives of the RMP are as follows:

- Create a Tuart Woodland TEC in very high condition as defined in the Tuart Woodland TEC Conservation Advice (DoEE, 2019) as follows:
 - ≥80 % of all understorey vegetation cover is native; and
 - At least 12 native understorey species per 0.01 ha (10m x 10m plot or equivalent sample unit) that are likely to reach maturity.
- To revegetate using local provenance native species;
- To control and prevent the spread of woody weeds within the revegetation area;
- Protect tubestock from animal predation;
- Define a monitoring program to demonstrate progress towards meeting the target and goals;

- Outline contingency measures if the monitoring program indicates that the trajectory towards maturity is not being achieved; and
- Outline the reporting requirements.

5.4 Timeframes

Condition 4 of the EPBC approval states:

*Prior to **commencement of the action** and to compensate for the residual significant impact under condition 3, the approval holder must submit to the **department** for the **Minister's approval** a Revegetation Management Plan (RMP). The RMP must be included as part of the **Offset Strategy** under condition 3. The environmental outcome of implementing the RMP must be to recreate at least 3.5 ha of the **Tuart Ecological Community** within the Rockingham Lakes Regional Park, 7km south of **development envelope**, that meets the listing criteria for high quality **Tuart Ecological Community** and is self-sustaining by 30 April 2063.*

The RMP has been written for the life of the plan (40 years) with a review of outcomes at 5 years. The five year review will allow for an adaptive management approach to ensure that the project is on target to meet the goals.

The 40 year timeframe has been discussed with DCCEEW and it was recognised that if the revegetation project has met the completion criteria and stated goals, a request can be made to DCCEEW to recognise that the RMP has been completed.

5.5 Responsibilities

After the approval of this RMP by DCCEEW, the proponent will prepare the offset site for planting in consultation with DBCA.

The Proponent will retain responsibility for the revegetation of the site until the 3.5ha of Tuart Woodland TEC is on a trajectory to be self-sustaining and the completion criteria has been achieved.

Management of the offset site will return to the DBCA once the completion criteria have been met and DCCEEW agree that the RMP has been fully implemented.

5.6 Site Preparation

To meet the objectives of this RMP the following rehabilitation approach will be implemented.

5.6.1 Soil Testing

The revegetation consultant will undertake soil testing across the offset site to identify any issues relating to compaction, nutrients and salinity that can impact on the revegetation. If any areas of concern are identified, treatments will be undertaken to minimise the potential impacts. The soil testing results, and proposed treatments will be provided to DBCA prior to site works commencing.

5.6.2 Reference Site Survey

The action site meets the criteria under the Tuart Woodland TEC conservation advice largely due to the size of the area being greater than 5ha. The understorey has been cleared, therefore a understorey species list cannot be prepared.

The project botanist will survey the reference sites that include Tuart Woodland vegetation type in Bush Forever No. 356 Lake Cooloongup, Lake Walyungup and adjacent bushland, Hillman to Port Kennedy and review the species list provided in Table 4. The final species list will be provided to DBCA for information.

5.6.3 Survey and Fencing

The offset site will be surveyed by a licensed survey company and fenced off. Standard construction fencing (1.8m tall) with a rabbit skirt will demarcate the revegetation area. On completion of the project, the construction fencing will be removed unless otherwise determined by DBCA. Replacement standard conservation fencing will not be the responsibility of the project.

The fence and rabbit skirt will assist in keeping the rabbits and kangaroos out of the revegetation area and prevent grazing on tubestock.

A single point of access to allow machinery and management vehicles onto the site will be via a locked double gate. The current access point to the site is off the west bound lanes of Safety Bay Road. This location will be assessed from a safety perspective and if required an alternate access point will be determined with DBCA. The gate will be locked using the recommended master key provided by DBCA.

5.6.4 Weed Control

Weeds have the potential to limit the success of the revegetation works if not managed appropriately.

Priority weeds are defined in this management plan as any Weed of National Significance and any Declared Pest. There are 32 *Weeds of National Significance* (WoNS) which are listed by the Federal Government based on their invasive tendencies, impacts, potential for spread and impact on socioeconomic and environmental values. A *Declared Pest* is a plant that impacts on individual people, agricultural production and the community. These are plants declared under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and all landholders are obliged to control these on their properties according to the rankings and information provided by the Department of Primary Industry and Regional Development (DPIRD).

The offset site will be earthworked and potentially subject to the importation of weeds in the period between civil works and revegetation. Weeds can also spread from adjacent areas onto the offset site.

A weed survey will be conducted by the project environmental consultant in accordance with the DBCA Standard Operating Procedure 221 for weed mapping. The survey will provide baseline information on weed species and their location within the offset site.

A site visit will be conducted with the weed control contractor and revegetation contractor prior to commencement of the revegetation program.

Weeds will be controlled approximately 1 month prior to planting. Thereafter weed control will be implemented twice a year (Autumn and Spring) for the first two years after planting to minimise competition and to increase the survival rate of tubestock.

If any Priority weeds are observed during site visits, they will be reported immediately to the environmental consultant and or revegetation contractor. Additional weed control will be undertaken to minimise spread of these weeds:

- Narrow Leaf Cottonbush (*Gomphocarpus fruticosus*)
- *Pelargonium capitatum* (Rose Pelargonium);
- *Euphorbia terracina* (Geraldton Carnation Weed);
- Castor Oil Plant (*Ricinus communis*); and
- Pampas Grass (*Cortaderia selloana*).

The following woody weeds will be controlled if there are any observations of these species during the monthly site visits by the revegetation contractor and by the project botanist during the twice-yearly compliance monitoring, they will be managed in accordance with the recommended guidelines:

- Japanese Pepper Tree (*Schinus terebinthifolius*);
- Common Fig (*Ficus carica*);
- *Leptospermum laevigatum* (Victorian Tea Tree). and
- Buckthorn (*Rhamnus alaternus*).

The Proponent will undertake a final weed control program prior to handing management of the offset site back to DBCA to ensure that the weed completion criteria have been met.

Herbicide Application

Herbicides will be applied from a four-wheel drive with a mounted spray unit. Spraying will cease immediately if the wind is stronger than 15km/hr or in heavy rainfall. If necessary, a wetting agent will be mixed with the herbicide in accordance with the manufacture's recommendation. A non-toxic, water soluble, biodegradable coloured dye will be added to the herbicide mix that will remain visible for 48 hours after the application. This will alert any visitors to the offset site that herbicide application has been recently applied to the area.

All persons engaged in herbicide spraying will have a current Pesticides Operators License in accordance with the *Health (Pesticide) Regulations 2011*. The following procedures and processes will be followed during applications:

- Erect suitable signage at entrance ways;
- Ensure weather conditions are optimal for the chemicals to be used;
- Select the least toxic chemical for the weed species being controlled;
- Ensure the locations of sensitive habitats are known;
- Ensure target species and locations are well understood to reduce the time spent searching and the amount of chemical used; and
- Follow standard safety measures in the case of accidental spills.

5.6.5 Soil Management

The site will be deep ripped prior to planting to loosen the soil and provides a soft soil surface for the plants to establish their root system. Ripping will also promote aeration of the soil assisting in the breakdown of organic matter and water infiltration.

Any issues in relation to nutrients and salinity and potential treatments will be discussed with DBCA once the soil testing results have been received by the revegetation consultant.

Soil Hygiene measures to prevent the spread of soil borne pathogens, particularly *Phytophthora multivora*, commonly known as Tuart Dieback, which, while not often causing the death of Tuarts unless the tree is already stressed, can impact on the health of Tuart trees.

Standard soil hygiene protocols will be applied by the revegetation consultant and any soil brought on to the site will be Dieback free.

5.7 Vegetation Planting

It is proposed to revegetate using forestry tubestock rather than seed broadcasting and natural propagation. The larger tubestock is more mature and contains a root ball and is found to be more successful in revegetation projects.

5.7.1 Species Selection

The following species list will be used in the revegetation of the Tuart Woodland TEC. The focus of the revegetation effort is to create the *Eucalyptus gomphocephala* dominated overstorey interspersed with *Callitris preissii* and *Allocasuarina fraseriana*. The mid and understorey will include a minimum of 12 species from the Table 4.

The final species list and planting schedule will be prepared and attached to this document by the revegetation contractor once the soil testing has been completed and stock availability is known. The species list will be provided to the DBCA for review by September 2026.

Table 4: Revegetation Species List

Scientific Name	Common Name	Strata	Black Cockatoo Foraging Species	Black Cockatoo Breeding
<i>Eucalyptus gomphocephala</i>	Tuart Tree	Tree	Yes	Yes
<i>Callitris preissii</i>	Rottnest Pine	Tree	Yes	No
<i>Allocasuarina fraseriana</i>	Western Sheoak	Tree	Yes	No
<i>Banksia littoralis</i>	Swamp Banksia	Tree	Yes	No
<i>Acacia cochlearis</i>	Rigid Wattle	Shrub	Yes	No
<i>Acacia cyclops</i>	Red Eyed Wattle	Shrub	Yes	No
<i>Acacia lasiocarpa</i>	Panjang	Shrub	Yes	No
<i>Acacia pulchella</i>	Prickly Moses	Shrub	Yes	No
<i>Acacia truncata</i>	West Coast Wattle	Shrub	Yes	No

<i>Acacia saligna</i>	Golden Wreath Wattle	Shrub	Yes	No
<i>Banksia sessilis</i>	Parrot Bush	Shrub	Yes	No
<i>Banksia menziesii</i>	Firewood Banksia	Shrub	Yes	No
<i>Hakea prostrata</i>	Harsh Hakea	Shrub	Yes	No
<i>Logania vaginalis</i>	White Spray	Shrub	No	No
<i>Leucopogon parviflorus</i>	Coast Beard Heath	Shrub	No	No
<i>Melaleuca raphiophylla</i>	Swamp Paperbark	Tall Shrub	No	No
<i>Melaleuca teretifolia</i>		Shrub	No	No
<i>Templetonia retusa</i>	Cockies Tongue	Shrub	No	No
<i>Xanthorrhoea preissii</i>	Grass Trees	Shrub	Yes	No
<i>Jacksonia furcellata</i>	Grey Stinkwood	Low Shrub	No	No
<i>Lobelia alata</i>		Low Shrub	No	No
<i>Melaleuca systema</i>	Coastal Honey myrtle	Low Shrub	No	No
<i>Macrozamia riedlei</i>	Zamia Palm	Low Shrub	No	No
<i>Clematis linearifolia</i>	Slender Clematis	Climber	No	No
<i>Hardenbergia comptoniana</i>	Native Wisteria	Climber	No	No
<i>Muehlenbeckia adpressa</i>	Climbing Lignum	Climber	No	No
<i>Baumea juncea</i>	Bare Twigsedge	Sedge (wetter areas)	No	No
<i>Gahnia trifida</i>	Cutting Grass	Sedge (wetter areas)	No	No
<i>Acanthocarpus preissii</i>		Ground Cover	No	No
<i>Conostylis aculeata</i>	Prickly Conostylis	Ground cover	No	No
<i>Olearia axillaris</i>	Coastal Daisy Bush	Ground Cover	No	No

5.7.2 Planting

Tubestock size is important for survival, especially in fast drying nutrient and structure poor sandy soils such as those found at the offset site. Forestry tubes (local provenance where possible) will be used in the revegetation program, as by placing the active roots deeper into the soil profile they are less susceptible to soil moisture fluctuations and survival rates will therefore be optimised.

Planting will occur after the first 100mm of rain has fallen in Autumn to maximise soil moisture levels. Tubestock (rooted forestry tubes 50mm*50mm*120mm) will be hardened, vigorous and free of Dieback, disease, and insect pests at the time of planting and will have adequate and healthy root mass readily evident when removed from the tube.

The planting design and schedule and densities will be determined by the revegetation contractor in consultation with the project environmental consultant. Density of planting of each strata to establish vegetation that is varied to have a level of naturalness as well as to ensure the overstory, understory and climbing species are evenly distributed throughout the rehabilitated area.

Small augers and drills will be used to install tubestock and will adhere to the following procedure:

- Individual seedlings will be removed from their container as to minimise damage to leaves, stem and root ball;
- The root ball will not be exposed or left to dry out and will be planted immediately;
- Fertiliser will be placed in the bottom of the hole (if fertiliser tablets used) and cover with soil to ensure there is no contact between the roots and fertiliser;
- The plant will be placed into the hole and backfill with soil free from weeds, stones, clods of sub soil and other extraneous matter;
- The soil will be lightly compacted by hand or foot to remove air pockets; and
- Plants will be set and level with the adjacent soil ensuring no soil is placed against the stem of the root crown.

Tree guards will not be required as the revegetation area will be fenced with an attached rabbit skirt to prevent rabbits from burrowing under the fence.

5.8 Maintenance

Monitoring of revegetation works is required to determine if any additional management measures are required such as infill planting to meet target indicators, weed control, pest control and fence repairs.

5.8.1 Infill Planting

Infill planting of tubestock will be required if survival rates are low or if improved structure and density is required. The annual autumn and spring monitoring of vegetation quadrats will provide the data to determine if the trajectory towards meeting the goals and final outcome is on track. Any infill planting will be undertaken consistent with the planting procedure stated in Section 5.7.2.

5.8.2 Weed Control

Weed control will be implemented twice a year post planting based on the revegetation contractor's appraisal every three months. Any weed control will follow the procedures set out in section 5.6.4.

If any Priority Weeds and woody weeds occur, they will be controlled on an as needs basis to minimise their spread.

5.8.3 Pest Control

The perimeter fence will keep kangaroos out of the revegetation area. Rabbits will be managed through the installation of a skirt to prevent rabbits from burrowing under the fence. If rabbits get into the revegetation area a baiting program will be undertaken to eliminate them.

5.8.4 Fence and Gate Management

The perimeter fence will be checked by the site contractor on a monthly basis to ensure that it remains intact and that the rabbit skirt is in place. The perimeter fence and gates will be repaired if required during the life of the project.

At the completion of the project the perimeter fence will be removed by the fencing contractor unless otherwise determined by DBCA.

5.8.5 Signage and Access

A sign will be placed at each access point stating that revegetation works are in progress and that entry must be authorised by the site manager. The sign will be provided to DBCA for approval. General public access will not be allowed during revegetation works.

5.8.6 Rubbish Removal

Any rubbish on the site will be removed by the revegetation contractor. If asbestos sheeting is found on the site, DBCA will be contacted and their contractor will be used to remove the sheeting.

5.8.7 Bushfire Management

The site will be managed in accordance with the Fire Response Plan for the RLRP which has been developed by DBCA, in conjunction with FESA and the City of Rockingham. Pre and post fire suppression activity on lands adjacent the offset site is not the responsibility of this project.

Pre suppression works on site will include managing the fuel load from pasture species prior to each upcoming fire season. Fire breaks will not be installed within the revegetation area as this will become an environmentally sensitive area as the Tuart Woodland TEC matures.

Access to the site will be via a locked double gate. The key for the gate will be a DBCA standard master key for access into all fenced areas within the RLRP.

5.9 Management Actions

The management actions listed in Table 5 below outline the prescribed actions for implementing this RMP. The table addresses the actions listed in the Sections 5 and 6 of this document and outlines relevant timing for implementation. The following phases are referred to in the management action table:

- Pre-revegetation (PR) refers to the period prior to any site works on the offset site;
- Construction (C) refers to the period of initial clearing from Lots 12 and 13 Lodge Drive ;
- Revegetation (R) refers to the actions to be undertaken at RLRP; and
- Ongoing (O) refers to an action that is ongoing for the life of the project.

Table 5: Management Actions

Key Tasks	Phase	Action	Action	Purpose	Priority	Timeframe	Responsibility	Status
Implement RLRP Revegetation Plan	PR	1	Contract a qualified rehabilitation and revegetation contractor to undertake on-ground planning for and revegetation works at RLRP site.	To ensure success of revegetation works	H	Aug 2026	Proponent	
Soil Testing	PR	2	Undertake soil testing at offset sites and provide results to DBCA. Discuss potential treatments if there are any areas of concern.	Identify any soil condition issues prior to planting	H	Aug 2026	Revegetation Contractor	
	PR	3	Prepare a plan to address any soil conditions that require treatment prior to planting.	Ensure optimum conditions for plant survival	H	Aug 2026	Revegetation Contractor	
Species Selection Strategy	PR	4	Survey Tuart Woodland vegetation in Bush Forever Site No 356 and revise species list if required based on survey results.	Provide baseline species for Tuart Woodland TEC	H	Sep 2026	Environmental Consultant	
	PR	5	Finalise species selection list based on the Bush Forever Site 356 Reference Sites.	Correct species for Tuart Woodland TEC	H	Sep 2026	Revegetation Contractor/Environmental Consultant	
	PR	6	Review stock availability	Ensure that correct stock will be available for 2027 early winter planting	H	Aug 2026	Revegetation Contractor	
	PR	7	Provide the species list to DBCA for review.	Keep DBCA informed of proposed species to be planted.	H	Sep 2026	Environmental Consultant	
RLRP Planting Schedule	PR	8	Prepare planting design, schedule and costs for RLRP site based on agreed species list	To inform the design of the Tuart Woodland TEC and CBC habitat.	H	Sep 2026	Revegetation Contractor	

	PR	9	Discuss with the DBCA and agree on planting design and schedule	To have an agreed approach to the revegetation	H	Sep 2026	DBCA/Revegetation Contractor	
	PR	10	Order forestry Tube Stock as per agreed schedule	Ensure forestry tubestock is available for 2027 planting.	H	Sep 2026	Revegetation Contractor	
	PR	11	Provide the planting design and species list in the annual Compliance Report provided to the Department to meet Condition 25 of the EPBC 2021/9069 approval.	Keeping the Department informed an ensuring compliance with EPBC 2021/9069 Approval	M	April 2027	Proponent/Environmental Consultant	
Site Works	PR	12	Revegetation contractor to meet with fencing and civil contractors to discuss site works and fencing requirements. ensure correct style of fencing is constructed.	Strong communication between fencing, civil and revegetation contractors to ensure that fencing and site works meet the requirements for native revegetation.	H	Feb 2027	Revegetation Contractor	
	PR	13	Discuss locked access points with DBCA	Get DBCA master key for gates	H	Feb 2027	Revegetation Contractor	
	PR	14	Survey site and fence with 1.8m construction style fence with rabbit curtains.	Prevent access and grazing animals from entering the site	M	Feb 2027	Revegetation Contractor	
	R	15	Implement weed management, ripping, and fencing as per site works plan	Site to be prepared prior to first delivery of topsoil	M	Mar 2027	Revegetation Contractor	
	R	16	Minimise the use of herbicides in riparian areas.	Protect wetland ecosystems from herbicide run-off	H	Mar 2027	Revegetation Contractor	
	R	17	DBCA approved sign indicating that rehabilitation work is occurring will be erected on access gates to site (e.g. No access – rehabilitation in progress).	Keeping the public informed	L	April 2027	Revegetation Contractor/DBCA	
	R	18	Tubestock planting as per schedule	To maximise species for Tuart Woodland TEC and CBC habitat	H	May/June 2027	Revegetation Contractor	

	R	19	Undertake short term monitoring of weed control success to identify any outbreaks following weed removal or suppression.	To manage weed outbreaks post planting	H	Jun-Sep 2027	Revegetation Contractor	
	R	20	Monitor for any of the listed woody weeds on the site.	Manage outbreak of woody weeds post planting.	H	Ongoing	Revegetation Contractor/Environmental Consultant	
	PP	21	Implement vegetation monitoring program on a twice-yearly basis (Autumn and Spring)	Monitor success of revegetation	M	Oct 2027	Environmental Contractor	
	PP	22	Provide annual monitoring report to DBCA and include in DCCEEW Compliance Report for EPBC 2021/9069.	Show status of project	H	Apr 2027	Environmental Contractor	
	PP	23	Supplement with infill planting when required.	To ensure completion criteria is met	M	Ongoing	Revegetation Contractor/Environmental Consultant	
	R and PP	24	Site maintenance to be carried out. This will include maintenance of perimeter fence, weed management and rabbit/kangaroo control as required on a monthly basis.	To minimise impacts to new Tuart TEC Woodland	M	Ongoing	Revegetation Contractor	
	R and PP	25	Maintenance issues to be reported to the Environmental Consultant	Keep informed of any issues to ensure they are adequately addressed.	M	Ongoing	Revegetation Contractor	
	R and PP	26	Keep fuel load weeds mown prior to fire seasons.	Manage Fire risk	M	Ongoing	Revegetation Contractor	
	PR and P	27	Remove all waste from site, consult with DBCA if asbestos is located.	Keep site clean	M	Ongoing	Revegetation Contractor	
Reporting	R and PP	28	Prepare annual monitoring report on project status.	Project progress	H	Annual	Environmental Contractor	

Project Completion	R and PP	29	Provide monitoring report to DBCA and DCCEEW	Project progress	H	Annual	Environmental Contractor	
	PP	30	Provide a 5 year Progress Report to DCCEEW and DBCA	Project progress	H	December 2031	Environmental Contractor	
	PP	31	Once completion criteria and goals have been met, inform DBCA and DCCEEW and request recognition that the project is completed.	Project Complete	M	ongoing	Environmental Contractor/Proponent	
	PP	32	The Proponent will undertake a final weed control program prior to handing management of the offset site back to DBCA to ensure that the weed completion criteria have been met. Remove fence on advice from DBCA.	Project Complete	M	End of project	Revegetation Contractor/Proponent	
	PP	32	Inform DBCA that management of the revegetation is complete	Hand revegetation back to DBCA	M	End of project	Environmental Contractor/Proponent	

6 MONITORING

6.1 Completion Criteria

In order for a site to be considered revegetated (or progressing satisfactorily towards being revegetated) a number of factors need to be considered in both the short and long term, with the most appropriate factors to the offset site being:

- Native plant density;
- Species richness;
- Weed competition; and
- Ecological processes (i.e. flowering and reproduction, fauna utilisation, etc.).

By setting target levels for these factors, a quantitative measure of progress can be made. If the required levels are not being achieved, not only will this trigger remedial action, but will also determine the extent of the action required.

The following indicators have been established using the SMART criteria which is accepted as common best practice in the field of monitoring and evaluation (Table 6).

Table 6: SMART Criteria

Criteria	Definition
Specific	The indicator clearly and directly relates to the outcome. It is described without ambiguities. Parties have a common understanding of the indicator. (
Measurable	The indicator has the capacity to be counted, observed, analysed, tested, or challenged.
Achievable	The indicator is achievable if the performance target accurately specifies the amount or level of what is to be measured in order to meet the result/outcome. The indicator will be achievable both as a result of the program and as a measure of realism. The target attached to the indicator will be achievable.
Relevant	An indicator is a valid measure of the result/outcome and be linked through research and professional expertise. The best way to think about relevance is to ensure that there is a relationship between what the indicator measures and the theories that help create the outcomes for the client, program, or system.
Time	The system [monitoring and evaluation system and related indicators] allows progress to be tracked in a cost-effective manner at the desired frequency for a set period, with clear identification of the particular stakeholder group(s) to be affected by the project or program.

6.1.1 Tuart Woodland TEC Completion Criteria

Completion criteria to be achieved within 10 years will ensure the creation of the Tuart Woodland TEC meets the definition of High quality as per the Tuart Woodland conservation listing advice. The goals are:

- Survival of, on average, at least 1.6 Tuart trees per 100m²;
- Diversity of at least 12 understorey species (includes species to 3m in accordance with the Tuart Woodland Conservation Advice) in each monitoring quadrat (10m x 10m plot); and
- Native vegetation coverage of 80% of the overall vegetation cover or maturing to a cover of 80%.

6.1.2 Weed Species

The following weed completion criteria are for the life of the project:

- No introduction of Priority weed species to the offset site;
- No introduction of the following woody weeds
 - Japanese Pepper Tree (*Schinus terebinthifolius*);
 - Common Fig (*Ficus carica*); and
 - Buckthorn (*Rhamnus alaternus*);
- Maintain general weed cover to less than 20% of the overall vegetation cover (in each 10m x 10m plot or equivalent sample unit).

6.2 Monitoring

6.2.1 Quadrat Establishment and Monitoring

Vegetation monitoring will be conducted with permanent quadrats (100m²) which will be marked on site with fence droppers at each corner. The number and location of quadrats will be determined once revegetation has been completed. There will be a minimum of five quadrats. Quadrats will be established in areas that provide a good representative sample of the revegetation activities.

Monitoring data obtained from the quadrats will be used to assess the success of revegetation against completion criteria in section 6.1.

The quadrats will be monitored (spring and autumn) on an annual basis. The following parameters will be recorded including:

- A photo to be taken on the south-western corner;
- weed species;
- weed density (% cover);
- Native species;
- Number of native plants per species;
- Native species health;
- Vegetation condition; and
- Visual signs of disturbance.

6.2.2 Broader Vegetation Monitoring

Vegetation monitoring will be conducted across the entire site on an annual basis using aerial photography to determine any areas where the native vegetation growth appears to be poor. If any areas of greater than 250m² are identified where plant growth is sparse (no Tuart seedlings and very

few other native plants) the revegetation consultant will determine the reasons for the poor growth. Contingency planning will be implemented as per section 6.4.

6.2.3 Timeline

Monitoring will be undertaken for the life of the plan (40 years) or until transfer to DBCA is completed.

6.3 Reporting

6.3.1 Annual Compliance Reporting

Monitoring results will be provided in an annual monitoring report for the revegetation area. Monitoring reports will be compiled within three months following each formal monitoring event (timing is outlined in Section 8 below). These reports will be sent to DCCEEW attached to the yearly compliance report prepared in accordance with the EPBC approval and will:

- Outline the date and description of works undertaken during the reporting period;
- Record and evaluate the success of revegetation works compared to the completion criteria, in a consistent manner;
- Identify any follow up remedial or maintenance works to be undertaken to meet the completion criteria; and
- Set out a program for the remedial or maintenance works.

6.3.2 Five Year Progress Report

As indicated in section 6.2, a Progress Report will be provided summarising the RMP implementation over the first five years, the progress towards meeting the project goals, any contingency actions taken and recommendations on monitoring for the next five year increment. This will allow for an adaptive management approach to the revegetation project.

The progress report will be provided to DBCA and DCCEEW for information and comment.

6.4 Contingency Planning

Contingency planning will detail trigger levels that would require the contingency plan to be implemented that will be measured during monitoring or if an event occurred such as fire or vandalism.

If there is a decline in the vegetation health or condition within rehabilitation site as measured during monitoring and compared to previous monitoring results, the following contingency plan will be implemented:

1. Consider potential causes for decline in vegetation health or increase in weed cover.
2. Determine if the decline is within normal limits, ie a result of seasonal fluctuations or timing of scheduled weed control.
3. If decline in health is not within normal limits, determine the most likely cause of this decline.
4. Prepare a management plan to remediate and mitigate the impacts on the vegetation once the source of the decline is known, for example if the site becomes infested with

dieback prepare a dieback management plan detailing the treatment using phosphite and ongoing monitoring and testing to ensure the disease does not cause the loss of Tuarts.

5. Undertake infill planting and weed management once the source of the decline has been mitigated.
6. Continue monitoring vegetation health and the effectiveness of remedial actions.

If new infestations of invasive weeds are recorded in the rehabilitation site the following will be undertaken:

1. Investigation of the potential sources of the weeds.
2. If the weeds originate in adjacent areas:
 - Liaison with DBCA to manage the weeds in the adjacent area; and
 - The weeds occurring on the site will be managed by an appropriate weed contractor that is proficient in managing weeds in bushland.
3. Follow-up monitoring will be undertaken on a monthly basis to ensure the weeds have been managed.

If the site is damaged by fire the following will be undertaken:

1. Consider potential causes of the fire and liaise with DBCA if the cause can be mitigated to prevent further fires.
2. Review the recovery of the vegetation including weed emergence and resprouting.
3. Manage any weed emergence in accordance with the weed contingency plan.
4. If the planted tubestock do not survive then arrangements to be made for replanting in the following autumn.
5. Ongoing monitoring of recovering and/or planted tubestock until the completion criteria are met.

If the site is damaged by vandalism the following will be undertaken:

1. Consider potential access point and liaise with DBCA if additional fencing or other access restriction methods can be employed.
2. Repair any fences that could have provided the access point.
3. Review the recovery of the vegetation including weed emergence and resprouting.
4. Manage any weed emergence in accordance with the weed contingency plan.
5. If the planted tubestock do not survive then arrangements to be made for replanting in the following autumn.
6. Ongoing monitoring of recovering and/or planted tubestock until the completion criteria are met.

All contingency actions and outcomes, if required, will be reported in the annual compliance report.

6.5 Implementation

The Trustee for Hamersley Sub Trust has overall responsibility to implement this RMP. The breakdown of responsibilities is shown below in Table 7.

Table 7: Responsibilities

Action	Responsibility
Contracting the RMP	Realside Ovest
Civil Works	Realside Ovest/Mecon Construction
Fencing revegetation area	Realside Ovest/Mecon Construction
Finalise the RMP	Project Environmental Consultant
Ongoing Weed Control	Licensed Weed Contractor
Planting	Revegetation Contractor
Compliance Monitoring and Reporting	Qualified Botanist and Project Environmental Consultant
Maintenance Monitoring (fencing, rubbish removal, weed management)	Revegetation Contractor
Implementation of Contingency Measures	Revegetation Contractor and Project Environmental Consultant
Liaison with DBCA	Revegetation Contractor and Project Environmental Consultant
Liaison with DCCEEW	Project Environmental Consultant

The RMP will be considered to be fully implemented at the completion of all management actions and when all completion criteria have been met and approved by DCCEEW.

6.6 Risk Assessment

A risk assessment of the potential impacts to the Tuart Woodland TEC discussed above has been undertaken, based on the definitions in Table 8 and the risk matrix provided in Table 9. The risk assessment has calculated the residual risk of the proposed impacts when implementation of the proposed mitigation measures is considered. The results of the risk assessment are provided in Table 10.

Table 8: Potential Impacts to Tuart Woodland TEC

Qualitative measure of likelihood (how likely is it that this event/circumstance will occur after management activities are implemented)	
Highly likely (E)	Is expected to occur in most circumstances
Likely (D)	Will probably occur during the life of the project
Possible (C)	Might occur during the life of the project
Unlikely (B)	Could occur but considered unlikely or doubtful
Rare (A)	May occur in exceptional circumstances
Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor (1)	Minor incident of environmental damage that can be reversed (e.g. short-term delays to achieving plan objectives, implementing low-cost, well-characterised corrective actions)
Moderate (2)	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts (e.g. short term delays to achieving plan objectives, implementing well-characterised, high-cost/effort corrective actions)
High (3)	Substantial instances of environmental damage that could be reversed with intensive efforts (e.g. medium-long term delays to achieving objectives, implementing uncertain, high-cost/effort corrective actions)

Major (4)	Major loss of environmental amenity and real danger of continuing (<i>e.g. plan objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies</i>)
Critical (5)	Severe widespread loss of environmental amenity and irrecoverable environmental damage (<i>e.g. plan objectives are unable to be achieved, with no evidenced mitigation strategies</i>)

Table 9: Risk Assessment Matrix

		Likelihood				
		Rare (A)	Unlikely (B)	Possible (C)	Likely (D)	Highly Likely (E)
Consequences	Minor (1)	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	Moderate (2)	Acceptable	Acceptable	Acceptable	Moderate	Moderate
	High (3)	Acceptable	Moderate	Moderate	High	High
	Major (4)	Moderate	Moderate	High	High	Extreme
	Critical (5)	Moderate	High	High	Extreme	Extreme

Inherent risk to the MNES assumes all controls are not implemented in accordance with best practice. The residual risk is determined with the development and implementation of this RMP and the VFMP that are specifically developed to mitigate the onsite impacts on MNES. As the impacts are to the Tuart Woodland TEC vegetation as well as vegetation that provides Black Cockatoos Habitat the risks are considered for the two MNES. The risk analysis is provided in Table 10. All risks have been managed and are Acceptable.

Table 10: Risk Analysis

Potential Impact	Inherent Risk			Controls	Residual Risk		
	Likelihood	Consequence	Significance		Likelihood	Consequence	Significance
Direct impacts from clearing or damaging native vegetation on the adjacent area is unlikely as surrounding area is managed for conservation so clearing is unlikely.	A	3	Acceptable	No Management Required	A	3	Acceptable
Damage to the root zones on vegetation in the adjacent area unlikely due to the currently cleared track providing separation	A	3	Acceptable	No management required	A	3	Acceptable
The spread of weeds from the site into the adjacent area	B	3	Moderate	Access control, regular monitoring and control if required as per the RMP	A	2	Acceptable

Potential Impact	Inherent Risk			Controls	Residual Risk		
	Likelihood	Consequence	Significance		Likelihood	Consequence	Significance
The spread of dieback from the offset site into the adjacent area	C	3	Moderate	Hygiene procedures as per RMP	B	2	Acceptable
Damage to tubestock from soil salinity and nutrient deficiencies	C	3	Moderate	Undertake soil testing and treatment if required and use of salt tolerant species in areas of concern.	B	2	Acceptable
Rubbish blowing off the offset site into the adjacent area	B	1	Acceptable	Adopting clean work practices as per the RMP	B	1	Acceptable
Increased illegal dumping	A	1	Acceptable	No controls proposed – currently dumping is not an issue due to distance from road	A	1	Acceptable
Fire damage	C	3	Moderate	Ensure that fuel loads are kept to a minimum prior to fire season and that fire breaks are constructed on neighbouring lots in accordance with City of Rockingham fire management policy.	A	2	Acceptable
Insect and Pathogens	C	2	Acceptable	No control proposed however if damage to plant stock is observed, DBCA will be informed	C	2	Acceptable

7 TIMING

Implementation of this RMP has already commenced with the first planting undertaken in 2025. Activities of the Project are summarised in Table 11 for the first five years of the project. The table has not been extended out for the full 40 years as each year is repetitive.

Planting activity is anticipated to be completed after year 3. Annual monitoring (spring and autumn) and reporting (yearly) of the vegetation will continue by the Proponent for the life of the project.

Once the project has been completed, DCCEEW will be informed and any future maintenance of the site will be managed by the DBCA under the Rockingham Lakes Regional Park Management Plan.

Table 11: Indicative Revegetation Schedule for First Five Years

Activity	Year 1				Year 2				Year 3				Year 4				Year 5			
	summer	Autumn	Winter	Spring	summer	Autumn	Winter	Spring	summer	Autumn	Winter	Spring	summer	Autumn	Winter	Spring	summer	Autumn	Winter	Spring
Civil Works																				
Weed Control																				
Appraise Vegetation condition for Brushing																				
Plant Tube Stock																				
Follow Up weed Control																				
Set up Quadrats																				
Monitoring																				
Infill Planting																				
Annual Weed Control																				

8 SUMMARY

This RMP has been prepared to guide the target of achieving the creation of 3.5ha of Tuart Woodland TEC and Black Cockatoo foraging habitat as an offset for clearing Tuart Woodland and Black Cockatoo habitat at Lots 12 and 13 Lodge Drive.

The goals of the RMP are as follows:

- An intact and recovering composition, structure and function of the offset site within five years;
- 3.5ha of revegetated non-contiguous ecological link between the offset site and other Tuart Woodland TEC remnants within 10 years; and
- Foraging evidence of Carnaby's Black Cockatoo within 10 years.

The goals will be achieved through the following objectives:

- Create a Tuart Woodland TEC in very high condition as defined in the Tuart Woodland TEC Conservation Advice (DoEE, 2019) as follows:
 - ≥80 % of all understorey vegetation cover is native; and
 - At least 12 native understorey species per 0.01 ha (10m x 10m plot or equivalent sample unit) that are likely to reach maturity.
- To revegetate using local provenance native species;
- To control and prevent the spread of woody weeds within the revegetation area;
- Protect tubestock from animal predation;
- Define a monitoring program to demonstrate progress towards meeting the target and goals;
- Outline contingency measures if the monitoring program indicates that the trajectory towards maturity is not being achieved; and
- Outline the reporting requirements.

The proponent will meet these goals through the implementation of this RMP which includes the planting of Tuarts at a density of 1.6 trees per 100m² and other understorey species in the first year of planting with infill planting as required in the following three years. Weed and pest control measures will be implemented to increase the likelihood of revegetation success. Contingency measures have been provided to ensure the success of the revegetation.

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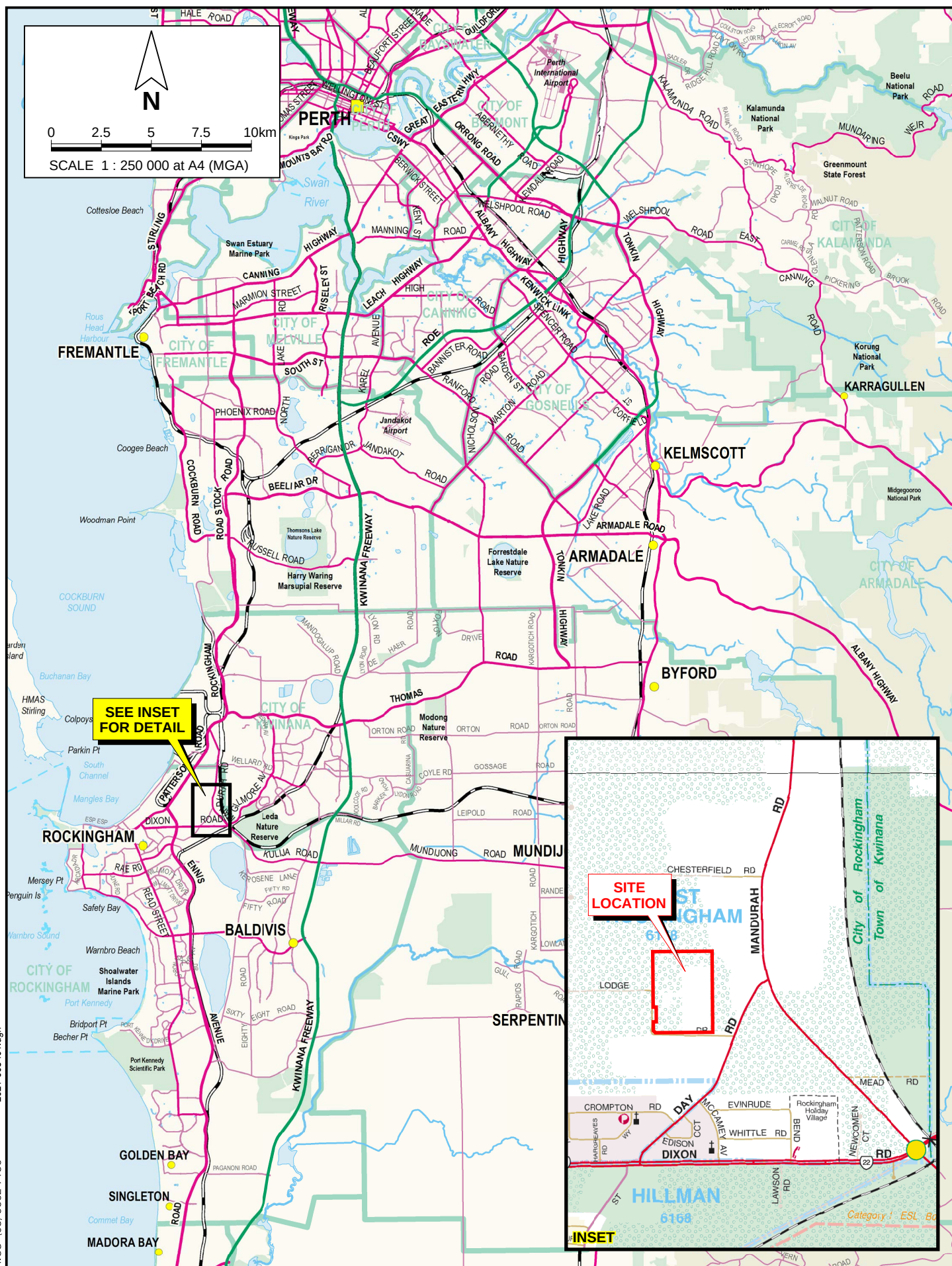
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FIGURES



pgv ENVIRONMENTAL

The Trustee for Hamersley Sub Trust
FLORA AND VEGETATION SURVEY
LOTS 12 AND 13 LODGE ROAD, EAST ROCKINGHAM

Drawn: B. Heath

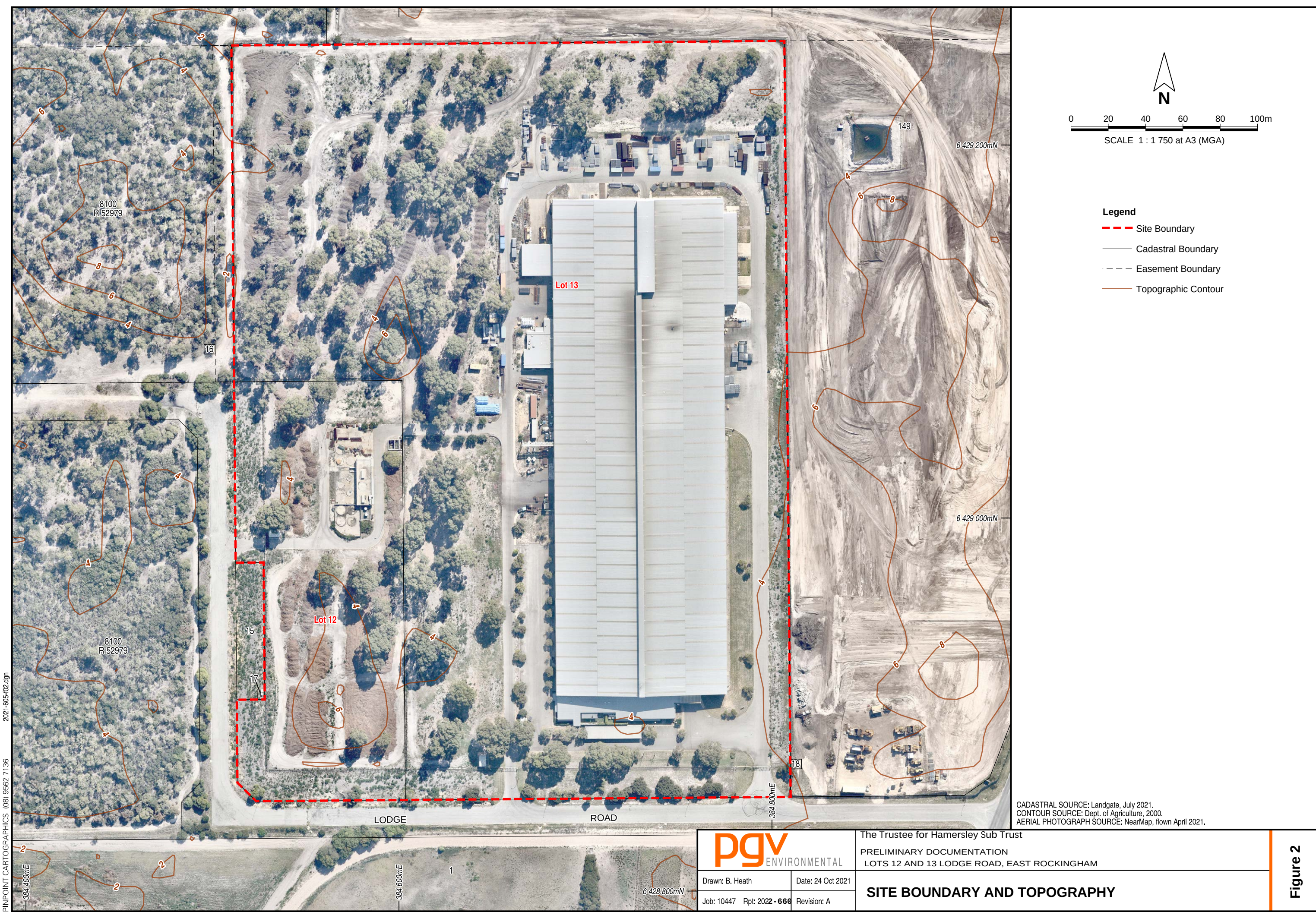
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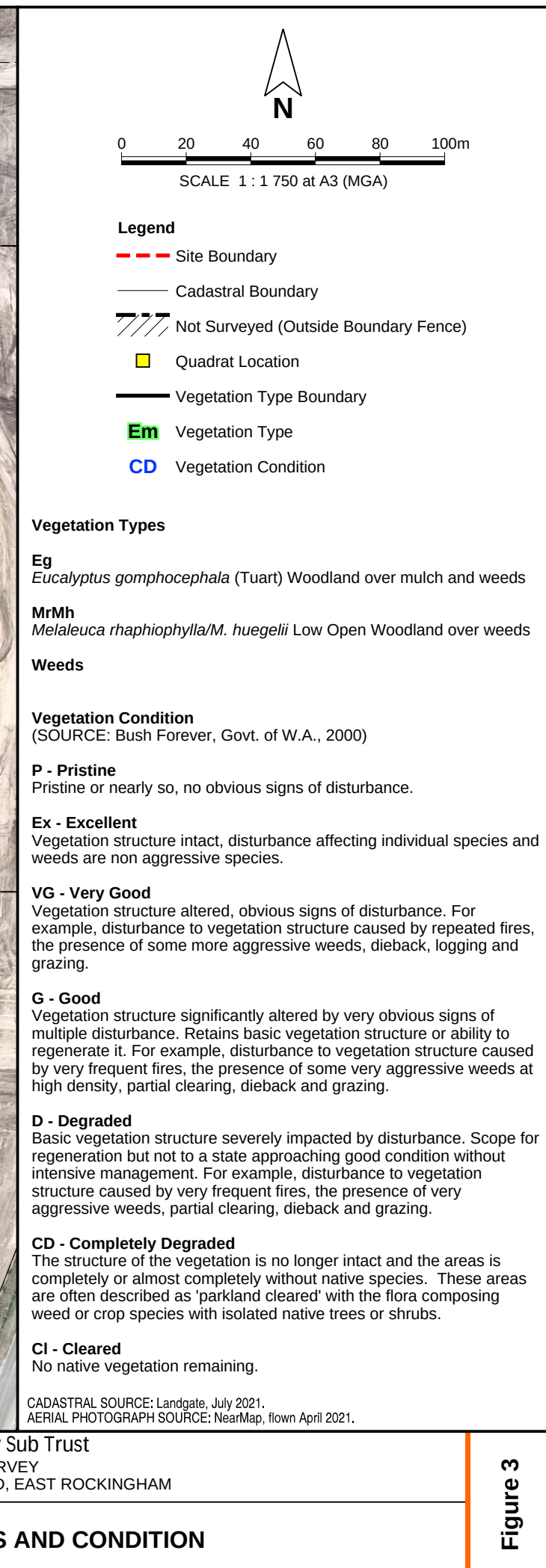
Job: 10447 Rpt: 2021-605

Revision: A

SITE LOCATION

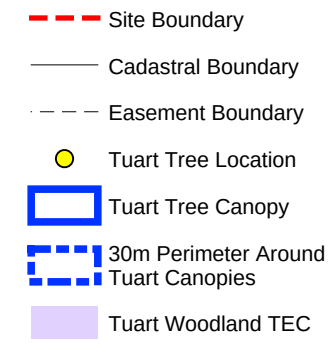
Figure 1







CADASTRAL SOURCE: Landgate, July 2021.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown April 2021.



FLORA AND VEGETATION SURVEY
LOTS 12 AND 13 LODGE DRIVE, EAST ROCKINGHAM

TUART WOODLAND TEC

Figure 4

APPENDIX 1

Quadrat Data

QUADRAT LR1

50 384615 E 6428945 N

Vegetation: *Eucalyptus gomphocephala* (Tuart) Woodland over weeds
Condition: Completely Degraded
Landform: Flat
Soil: Mulch
Date: 15.10.21
Recorder: P. van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Eucalyptus gomphocephala</i>	12	25
* <i>Avena fatua</i>	1.2	10
* <i>Rhamnus alaternus</i>	1.2	1
* <i>Gomphocarpus fruticosus</i>	1.1	15
* <i>Schinus terebinthifolius</i>	1	<1
* <i>Ehrharta longiflora</i>	1	25
<i>Acacia rostellifera</i>	0.8	1
* <i>Melilotus indicus</i>	0.6	<1
* <i>Raphanus raphanistrum</i>	0.6	<1
* <i>Lolium rigidum</i>	0.5	2
* <i>Sonchus asper</i>	0.5	1
<i>Acacia saligna</i>	0.5	<1
* <i>Solanum nigrum</i>	0.4	5
* <i>Trachyandra divaricata</i>	0.4	<1
* <i>Sonchus oleraceus</i>	0.4	<1
* <i>Bromus diandrus</i>	0.4	<1
* <i>Briza minor</i>	0.4	<1
* <i>Lysimachia arvensis</i>	0.3	2
* <i>Euphorbia terracina</i>	0.3	1

SPECIES	HEIGHT (m)	COVER (%)
* <i>Asphodelus fistulosus</i>	0.3	<1
* <i>Arctotheca calendula</i>	0.3	<1
* <i>Malva parviflora</i>	0.2	1
* <i>Oxalis pes-caprae</i>	0.2	10
* <i>Fumaria capreolata</i>	0.1	10
* <i>Euphorbia peplus</i>	0.1	<1
* <i>Trifolium sp</i>	<0.1	<1
* <i>Taraxacum officinale</i>	Flat	<1
* <i>Cirsium vulgare</i>	Flat	<1
* <i>Hypochaeris glabra</i>	Flat	<1
* <i>Asparagus asparagoides</i>	Climber	2

* introduced species

QUADRAT LR2

50 384589 E 6428959 N

Vegetation: *Eucalyptus gomphocephala* (Tuart) Woodland over mulch and weeds
Condition: Completely Degraded
Landform: Flat
Soil: Mulch
Date: 15.10.21
Recorder: P. van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Eucalyptus gomphocephala</i>	15	20
* <i>Avena fatua</i>	1	10
* <i>Ehrharta longiflora</i>	0.7	5
* <i>Rhamnus alaternus</i>	0.5	1
* <i>Bromus diandrus</i>	0.4	10
* <i>Sonchus asper</i>	0.4	<1
* <i>Euphorbia terracina</i>	0.3	<1
* <i>Medicago polymorpha</i>	0.3	40
* <i>Fumaria capreolata</i>	0.3	<1
* <i>Oxalis pes-caprae</i>	0.2	20
* <i>Sisylx atropurpurea</i>	0.1	<1
* <i>Lysimachia arvensis</i>	0.1	<1
* <i>Asparagus asparagoides</i>	Climber	<1

* introduced species

QUADRAT LR3

50 384623 E 6429172 N

Vegetation: *Eucalyptus gomphocephala* (Tuart) Woodland over mulch and weeds

Condition: Completely Degraded

Landform: Flat

Soil: Mulch

Date: 15.10.21

Recorder: P. van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Eucalyptus gomphocephala</i>	15	25
* <i>Rhamnus alaternus</i>	2	2
* <i>Avena fatua</i>	1	20
<i>Melaleuca huegelii</i>	1	1
* <i>Gomphocarpus fruticosus</i>	0.8	1
* <i>Ehrharta longiflora</i>	0.7	1
* <i>Bromus diandrus</i>	0.4	5
* <i>Euphorbia terracina</i>	0.3	<1
* <i>Oxalis pes-caprae</i>	0.2	2
* <i>Trifolium campestre</i>	0.2	1
<i>Acacia rostellifera</i>	0.2	<1
* <i>Asphodelus fistulosus</i>	0.2	<1
* <i>Solanum nigrum</i>	0.1	<1
* <i>Lysimachia arvensis</i>	0.1	<1
* <i>Asparagus asparagoides</i>	Climber	1
<i>Clematis linearifolia</i>	Climber	<1

* introduced species

QUADRAT LR4

50 384722 E 6429230 N

Vegetation: *Eucalyptus gomphocephala* (Tuart) Woodland over weeds
Condition: Completely Degraded
Landform: Flat
Soil: Mulch
Date: 15.10.21
Recorder: P. van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Eucalyptus gomphocephala</i>	14	20
<i>Spyridium globulosum</i>	1	2
* <i>Rhamnus alaternus</i>	1	1
* <i>Solanum nigrum</i>	1	1
* <i>Gomphocarpus fruticosus</i>	0.8	10
* <i>Ehrharta longiflora</i>	0.8	50
* <i>Sonchus oleraceus</i>	0.8	20
<i>Acacia rostellifera</i>	0.7	10
* <i>Bromus diandrus</i>	0.5	5
* <i>Euphorbia terracina</i>	0.5	<1
* <i>Euphorbia peplus</i>	0.2	4
* <i>Lysimachia arvensis</i>	0.2	1
* <i>Trifolium campestre</i>	0.2	<1
* <i>Fumaria capreolata</i>	0.1	1
* <i>Hypochaeris glabra</i>	Flat	<1
* <i>Taraxacum officinale</i>	Flat	<1
* <i>Asparagus asparagoides</i>	Climber	1
<i>Clematis linearifolia</i>	Climber	<1

* introduced species

QUADRAT LR5

50 384574 E 6428903 N

Vegetation: Weeds
Condition: Completely Degraded
Landform: Flat
Soil: Mulch
Date: 15.10.21
Recorder: P. van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
* <i>Avena fatua</i>	1	10
* <i>Bromus diandrus</i>	0.5	10
* <i>Rhamnus alaternus</i>	0.4	<1
* <i>Solanum nigrum</i>	0.4	<1
* <i>Lolium rigidum</i>	0.3	<1
* <i>Ehrharta longiflora</i>	0.3	<1
* <i>Trifolium campestre</i>	0.2	15
* <i>Fumaria capreolata</i>	0.2	2
* <i>Euphorbia terracina</i>	0.2	1
* <i>Medicago polymorpha</i>	0.1	5
* <i>Oxalis pes-caprae</i>	0.1	1

* introduced species

QUADRAT LR6

50 384549 E 6429225 N

Vegetation: *Melaleuca raphiophylla*/M. *huegelii* Low Open Woodland over weeds

Condition: Completely Degraded

Landform: Flat

Soil: Mulch

Date: 15.10.21

Recorder: P. van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Melaleuca raphiophylla</i>	5	10
<i>Melaleuca huegelii</i>	4	2
<i>Spyridium globulosum</i>	1.4	5
* <i>Gompholobium fruticosus</i>	1.4	1
* <i>Avena fatua</i>	1.2	2
<i>Acacia rostellifera</i>	0.6	2
* <i>Urospermum picroides</i>	0.6	1
* <i>Ehrharta longiflora</i>	0.5	25
* <i>Euphorbia terracina</i>	0.5	1
* <i>Lolium perenne</i>	0.4	5
* <i>Sonchus oleraceus</i>	0.4	1
* <i>Petrorhagia dubia</i>	0.4	<1
* <i>Asphodelus fistulosus</i>	0.4	<1
* <i>Erigeron bonariensis</i>	0.3	<1
* <i>Lagurus ovatus</i>	0.3	<1
* <i>Briza minor</i>	0.2	<1

SPECIES	HEIGHT (m)	COVER (%)
<i>*Lysimachia arvensis</i>	0.1	4
<i>*Trifolium campestre</i>	0.1	2
<i>*Crassula glomerata</i>	0.1	1
<i>*Euphorbia peplus</i>	0.1	1
<i>*Galium murale</i>	<0.1	<1
<i>*Taraxacum officinale</i>	Flat	<1
<i>*Asparagus asparagoides</i>	Climber	<1

* introduced species

APPENDIX 2

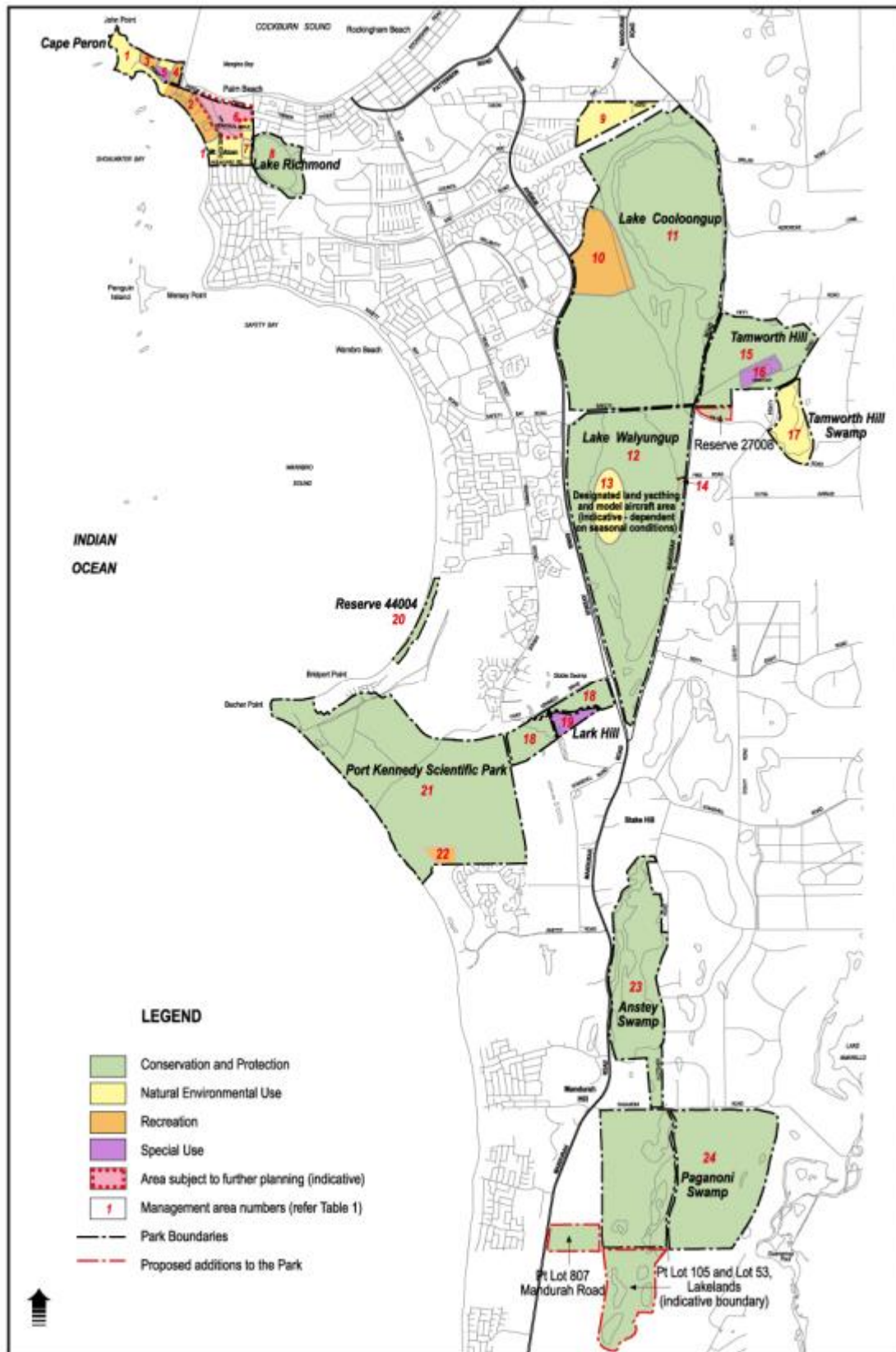
SIGNIFICANT TREE LOCATIONS

Lots 12 and 13 Lodge Road

Tree No.	Species	Easting	Northing	DBH	2nd branch	3rd branch	Comments
108	Tuart	384754	6429221	95			
51	Tuart	384620	6429138	94			
94	Tuart	384690	6429232	94			
95	Tuart	384697	6429217	94			
107	Tuart	384769	6429227	93			
98	Tuart	384718	6429236	91			
53	Tuart	384605	6429120	88			
61	Tuart	384527	6429093	86			
76	Tuart	384604	6429184	82			
119	Tuart	384567	6428974	81			
66	Tuart	384536	6429118	79			
73	Tuart	384591	6429155	79			
78	Tuart	384604	6429186	77			
44	Tuart	384621	6429112	74			
89	Tuart	384634	6429227	73			
72	Tuart	384586	6429147	72			
54	Tuart	384605	6429119	70			
64	Tuart	384527	6429112	70			
88	Tuart	384644	6429226	70			
2	Tuart	384655	6428884	69			
129	Tuart	384685	6428872	69			tree in carpark S of big shed
1	Tuart	384654	6428879	68			no hollows or spouts
42	Tuart	384625	6429071	68			
93	Tuart	384681	6429232	68	44		
75	Tuart	384602	6429156	67			
134	Tuart	384768	6428873	67			tree in carpark S of big shed
4	Tuart	384628	6428888	66			
130	Tuart	384704	6428873	66			tree in carpark S of big shed
113	Tuart	384544	6429057	65			
131	Tuart	384721	6428869	65			tree in carpark S of big shed
106	Tuart	384776	6429233	64	24		
110	Tuart	384740	6429221	63			
111	Tuart	384570	6429068	63			
92	Tuart	384651	6429241	62			
43	Tuart	384631	6429095	60			
77	Tuart	384588	6429185	60			
121	Tuart	384585	6428969	60			
70	Tuart	384575	6429142	59			
81	Tuart	384618	6429204	59			
9	Tuart	384650	6428949	58			
80	Tuart	384615	6429197	58			
114	Tuart	384530	6429073	58			
8	Tuart	384636	6428908	57	20		
59	Tuart	384549	6429092	57			
71	Tuart	384582	6429142	57			
60	Tuart	384535	6429103	56			
112	Tuart	384561	6429072	56			
33	Tuart	384627	6429020	55			
36	Tuart	384628	6429028	55			
3	Tuart	384648	6428887	54			
15	Tuart	384611	6428967	54	53		
17	Tuart	384635	6428978	54			
100	Tuart	384745	6429247	54	30		
14	Tuart	384612	6428935	53			
21	Tuart	384609	6428993	51			
31	Tuart	384633	6429014	51			
57	Tuart	384598	6429090	51	38		32
96	Tuart	384704	6429235	50			
105	Tuart	384779	6429234	50	42		
7	Tuart	384622	6428878	49			
22	Tuart	384610	6428995	49			
116	Tuart	384535	6429033	49	42	29	
128	Tuart	384676	6428873	49			tree in carpark S of big shed
6	Tuart	384630	6428883	48			
46	Tuart	384655	6429120	48	41		
56	Tuart	384596	6429088	48	27		
97	Tuart	384683	6429249	48			
102	Tuart	384765	6429246	48			
52	Tuart	384617	6429135	47			

APPENDIX 3

**ROCKINGHAM LAKES REGIONAL
PARK LAND USE ZONES**



From Rockingham Lakes Regional Park Management Plan (DEC, 2010)

APPENDIX 4

**DESCRIPTION OF THE VEGETATION
AND FLORA LIST FOR BUSH
FOREVER SITE NO. 356**

LAKE COOLOONGUP, LAKE WALYUNGUP AND ADJACENT BUSHLAND, HILLMAN TO PORT KENNEDY

Boundary Definition: protected area/bushland (part taken to cadastre) boundary (Areas of bushland within the boundaries of the Site are not accurately mapped.)

SECTION 1: LOCATION INFORMATION

Bush Forever Site no. 356

Area (ha): bushland 1617.5 (Site also includes open water.)

Map no. 69, 70, 74, 75
SW

Map sheet series ref. no. 2033–II NW, 2033–II

Other Names: White Lake, Salt Lake, Lark Hill, Tamworth Hill, part of Rockingham Lakes Regional Park

Local Authorities (Suburb): Shire of Rockingham (Hillman, Cooloongup, Waikiki, Warnbro, Port Kennedy, Baldivis)

System 6 (1983): M103 area of bushland goes beyond System area boundaries, all bushland described

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S13, LS4)

Wetlands (within the Quindalup/Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps, Cs1)

Lagoon and Estuarine Deposits (at or near interface of Quindalup/Spearwood Dunes)

Lagoon and Estuarine Deposits (Vasse) (Qhg: M5)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands

*19a Sedgeland in Holocene dune swales (DEP 1996, equivalent to 19 in Gibson *et al.* 1994, English and Blyth 1997)

19b Woodlands over sedgeland in Holocene dune swales (DEP 1996, equivalent to 19 in Gibson *et al.* 1994, English and Blyth 1997)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands (most southern occurrence)

*29b *Acacia* shrublands on taller dunes

WETLANDS

Wetland Types: lake, sumpland, dampland, artificial lake

Natural Wetland Groups

Spearwood Dunes

Stakehill (S.4)

Quindalup

Cooloongup (Qu.1)

Becher (Qu.2)

Wetland Management Objectives: Conservation (1462.3ha)

Swan Coastal Plain Lakes EPP: 312.8ha + 24.2ha + 438.6ha + 48.8ha = 824.4ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 19 as defined by Gibson *et al.* 1994)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetlands, vegetated uplands

Vegetation and Flora: detailed survey (part Site — Keighery, BJ, *et al.* 1997c, Tingay and Tingay 1977); limited survey (DEP 1999, EPA and WAWA 1990, Gibson *et al.* 1994 (Tam 01, Cool 01–04, 08–09, 11, Kero 01–02), Keighery, GJ, 1996 D (Cool 14–15))

Structural Units: mapping (part Site — EPA and WAWA 1990, Keighery, BJ, *et al.* 1997c, Tingay and Tingay 1977)

Spearwood Dunes

Uplands — Sands derived from Tamala Limestone: *Banksia attenuata* and *B. menziesii* Low Woodland; *Eucalyptus gomphocephala*, *E. marginata* and *Banksia attenuata* Open Forest; *Grevillea vestita* Closed Heath; *Hibbertia hypericoides* Open Low Heath

Quindalup Dunes

Uplands — Beach ridge plain: *Eucalyptus gomphocephala* Woodland to Forest; *Acacia rostellifera* Tall Open Scrub; *Jacksonia furcellata* and *Acacia rostellifera* Shrubland; *Acacia saligna* Low Open Woodland to Low Woodland; *Xanthorrhoea preissii* Open Heath

Wetlands (at or near the interface of the Quindalup and Spearwood Dunes): Open to Closed Sedgelands dominated by *Baumea juncea*, *Gahnia trifida*, *Lepidosperma longitudinale*, *Juncus kraussii* or *Baumea vaginalis* or combinations of these; *Banksia littoralis* Low Woodland; *Melaleuca raphiophylla* Low Woodland to Forest; *Eucalyptus gomphocephala* Woodland to Forest

Wetlands — Beach ridge plain: *Isolepis nodosa* and *Baumea juncea* Closed to Open Sedgeland, generally with an overstorey of *Xanthorrhoea preissii*

Scattered Native Plants: *Eucalyptus gomphocephala* Woodland; *Acacia saligna* Low Woodland; *Xanthorrhoea preissii* Open Heath

Vegetation Condition: >60% Very Good to Pristine, <40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 174 native taxa, 82 weed taxa (part Site — Keighery, BJ, *et al.* 1997c) (>85% of expected flora)

Significant Flora: Keighery, BJ, *et al.* 1997c — *Trachymene coerulea*, *T. pilosa* (distinct form found also at Rottnest Island), *Sonchus hydrophilus* (at risk), *Atriplex suberecta* (not previously recorded on the Swan Coastal Plain), *Linum marginale* (rarely recorded on Quindalup dunes), *Acacia pulchella* var. *goadbyi* (only known occurrence on the Swan Coastal Plain), *Eremophila glabra* subsp. *albicans*, *Jacksonia furcellata* (floriferous shrub form), *Kennedia coccinea* (becoming increasingly uncommon on the western margins of the Plain)

Fauna: multiple surveys for birds (73 species) (Tingay and Tingay 1977; RAOU 1996 D, 3 visits), limited survey for native mammals (2 species), reptiles (1 species), amphibians (3 species) and fish (1 species) (Tingay and Tingay 1977). Significant bird species: category 2 (6), category 3 (10), category 4 (5). Significant population of Black Swan. Significant mammal species: Western Brush Wallaby and Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (Site 349, across road), south, east and west (Site 377, across road); part of Greenways 83, 85, 86, 89, 122 (Tingay, Alan & Associates 1998a); part of a regionally significant contiguous bushland/wetland linkage (Part A, Map 7)

Other Special Attributes

Meets five of the six specific criteria for coastal reserves—

- (i) Quindalup Dune types: beach ridge plain and older dunes
- (ii) Continuing natural processes: 1079.4ha (837.4 bushland) of Quindalup Dunes extending to 8.8km inland (through Site 377 to coast)
- (iv) Linkage: Quindalup/Spearwood Dunes (Tamala Limestone) interface
- (v) Vegetation: five regional floristic groups, one of which is a threatened community
- (vi) Habitats: see Fauna section above;

Part Site (Lake Cooloongup and Lake Walyungup) — wetland of ‘national significance’; part Site (Tamworth Lakes) — wetland of ‘regional significance’ (Semeniuk, V&C Research Group 1991b); contains examples of microbialites, organo-sedimentary structures formed by microorganisms, the oldest life-form on earth (Tingay, Alan & Associates 1997); majority of Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Entered in the Register of the National Estate; location for JAMBA/CAMBA species; subject to protection under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, Scientific or evolutionary importance, General criteria for the protection of wetland, streamline and estuarine fringing vegetation and coastal vegetation

Recommendation: Part A: Site with Some Existing Protection; the care, control and management of this Site for conservation purposes within Rockingham Lakes Regional Park is endorsed. Part B: Other Government Land Mechanism. Part C: Proposed Parks and Recreation Reservation (see Table 3, Volume 1).

APPENDIX 5

DBCA Letter of Support for RMP