

Lot 8 Wattle Avenue Nowergup

Clearing and Rehabilitation Management Plan

Prepared for
Oakford Land Company Pty Ltd
by Strategen

December 2014



STRATEGEN
environmental consultants

Lot 8 Wattle Avenue Nowergup

Clearing and Rehabilitation Management Plan

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December 2014

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Table of contents

1. Introduction	1
1.1 Background	1
1.2 Purpose	1
1.3 Proposal area details	1
2. Statutory and policy context	2
2.1 Planning approval	2
2.2 Environmental Protection and Biodiversity Conservation Act 1999	2
3. Carnaby's Cockatoo	5
3.1 Species information	5
3.2 Habitat within the Proposal Area	5
4. Objectives, targets and key performance indicators	6
5. Management measures for clearing and rehabilitation	7
5.1 Habitat management	7
5.2 Native seed collection and storage methodology	7
5.3 Rehabilitation of the eight hectare rehabilitation area	8
6. Monitoring actions	10
6.1 Monitoring actions	10
7. Contingency actions	11
8. Plan implementation timeframe	12
8.1 Reporting and review	12
8.2 Roles and responsibilities	12
9. References	13

List of tables

Table 1: Environmental objectives and performance indicators for clearing and rehabilitation	6
Table 2: Methodology for the collection and storage of native seed	7
Table 3: Rehabilitation management actions	8
Table 4: Monitoring program	10
Table 5: Contingency actions	11

List of figures

Figure 1: Regional location of the proposal area	3
Figure 2: Proposed Rehabilitation Area	4

List of appendices

Appendix 1 Lot 8 Wattle Ave Rehabilitation Plan (Strategen 2012)
Appendix 2 Industry standards

1. Introduction

1.1 Background

Oakford Land Company Pty Ltd (OLC) owns Lot 8 Wattle Avenue, Nowergup (the proposal area) for the purpose of limestone extraction operations. The proposal area is approximately 54 ha in size and is located approximately 40 km north of Perth (Figure 1).

Clearing of 15.54 ha of vegetation for expansion of the existing limestone extraction operation was approved by the delegate for the Minister of the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), reference EPBC 2013/6767, on 14 January 2013. EPBC 2013/6767 includes a requirement to prepare, submit for approval and implement a Clearing and Rehabilitation Management Plan (CRMP).

Clearing was also approved under state legislation (Clearing Permit 4924/2) in January 2013.

It is noted that a Rehabilitation Plan was prepared to address the state requirements for on-site rehabilitation activities (Strategen 2012a). The Rehabilitation Plan was submitted to DotE as part of the EPBC Act assessment, and has been utilised in the preparation of this CRMP. A Limestone Excavation and Rehabilitation Management Plan was also prepared, which provides further details regarding the progressive rehabilitation of excavation areas (Landform Research 2007).

1.2 Purpose

This CRMP has been prepared in accordance with condition 2 of EPBC 2013/6767 (Section 2.2). The purpose of this CRMP is to address the collection and use of native seed from the proposal area and the rehabilitation of eight hectares of degraded vegetation within the proposal area.

1.3 Proposal area details

The proposal area is approximately 54 ha in size and located 40 km north of Perth. The approved clearing area is located in the central portion of the property, between existing limestone extraction activities and a buffer area which surrounds an identified Threatened Ecological Community (TEC; Figure 2).

2. Statutory and policy context

2.1 Planning approval

An extractive industry development application and rehabilitation management plan was lodged with the City of Wanneroo (CoW) and Western Australian Planning Commission (WAPC) in July 2007, for 44.4 ha of limestone extraction at Lot 8 Wattle Avenue (Stage 1 and 2). The application was advertised for public comment after which, CoW gave conditional approval to the application pending the response of WAPC. In June 2008, the plan was approved by WAPC and CoW.

2.2 Environmental Protection and Biodiversity Conservation Act 1999

Condition 2 of EPBC 2013/6767 states (note additional cross-reference to sections in this document where each sub-condition is addressed):

2. *To mitigate impacts to Carnaby's Black Cockatoo, the person taking the action must prepare and submit a Clearing and Rehabilitation Management Plan (CRMP) for the Minister's approval. The CRMP must include, but not be limited to:*
- a) *The collection of native seed prior to clearing from the proposal area shown at Attachment A, for use in the proposed rehabilitation area shown at Attachment A (Section 5.1);*
 - b) *The methodology for native seed collection from the proposal area:*
 - i. *how will native seed be harvested/ utilised for rehabilitation (Section 5.2); and*
 - ii. *how native seed will be stored and transported (Section 5.2).*
 - c) *Performance targets, monitoring, timeframes and reporting of the above measures (Section 4).*
 - d) *Rehabilitation of 8 ha of degraded vegetation, being the proposed rehabilitation area shown at Attachment A; including:*
 - i. *details of type and amount of native seed collected as specified in 2(a) (Section 5.2);*
 - ii. *details of tree species, number to be planted and location (Section 0);*
 - iii. *objectives, targets and completion criteria for seeding and planting programs (Section 4);*
 - iv. *details of monitoring, reporting and contingency measures if performance indicators are not met (Section 6, Section 7);*
 - v. *timeframes for the implementation of the above measures (Section 8);*
 - vi. *management and mitigation measures to prevent access by unauthorised personnel, dieback, weeds and pests (Section 0); and*
 - vii. *roles and responsibilities of personnel associated with implementing each of the above measures (Section 8.2).*

Condition 2 also clarifies that clearing of Carnaby's Cockatoo habitat must not be undertaken within the proposal area unless the CRMP has been approved by the Minister and if the Minister approves the CRMP it must be implemented.

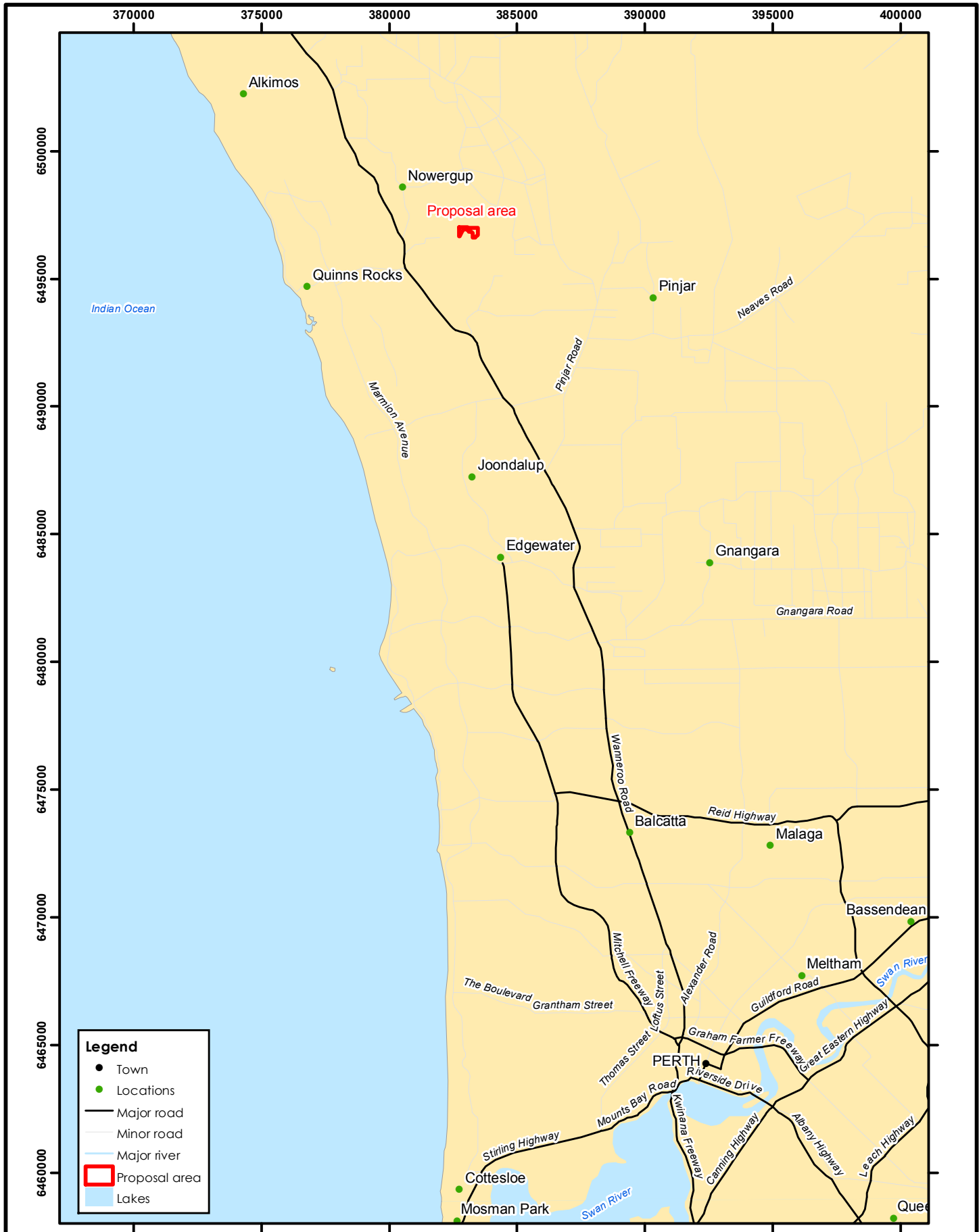
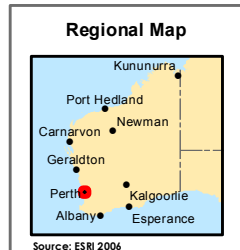


Figure 1 Regional location



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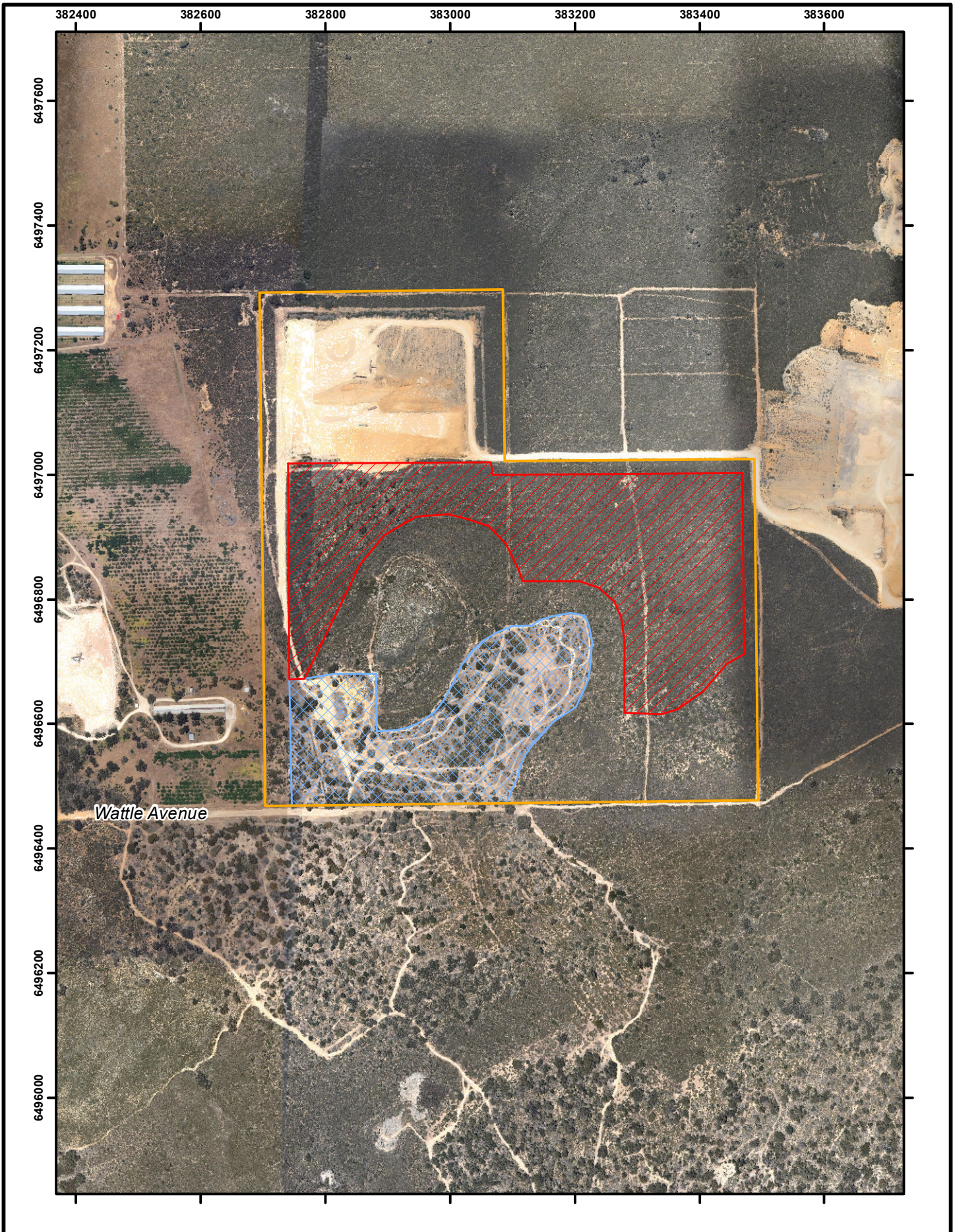


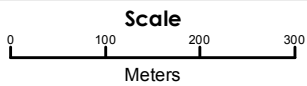


Figure 2 Proposed Rehabilitation Area

- Legend**
-  Proposal area
 -  Proposed Rehabilitation Area



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1:8,000
 at A4

Coordinate System: GDA 1994 MGA Zone 50
 Date: 17/02/2014
 Author: jcrule
 Path: G:\GIS\Consult\2012\MNO\MNO12291.01\ArcMap_documents\R002\RevA\MNO12291_01_R002_RevA_F002.mxd

Source: Aerial image: Nearmap 10/2012, downloaded 12/2012.
 Note that positional errors may occur in some areas

3. Carnaby's Cockatoo

3.1 Species information

Carnaby's Cockatoos (*Calyptorhynchus latirostris*) are endemic to the south-west of Western Australia. They mainly occur in uncleared remnant native eucalypt woodlands, especially those that contain Salmon gum, wandoo, and in shrubland or Kwongan heathland dominated by *Hakea*, *Dryandra*, *Banksia* and *Grevillea* species (DSEWPaC 2012). Current data on distribution of this species shows that there are numerous records along the Northern Swan Coastal Plain, including records in and around the proposal area.

3.2 Habitat within the Proposal Area

An assessment of the likelihood of occurrence of each of the fauna species identified by the EPBC Act Protected Matters database search was included in the EPBC Act referral (Strategen 2012b). It was noted in the referral that potential foraging habitat for Carnaby's Cockatoo can be found within the proposal area. This includes remnant native eucalypt woodlands and in shrubland or Kwongan heathland dominated by *Hakea*, *Banksia* and *Grevillea* species. There are no known or potential breeding areas within the proposal area.

The development will result in the removal of approximately 15.54 ha of potential foraging habitat for Carnaby's Cockatoo. Management actions to control clearing and rehabilitation activities will be implemented to minimise the impact on Carnaby's Cockatoo.

4. Environmental objectives, targets and completion criteria

A number of environmental objectives, targets and completion criterion have been developed for the management of clearing and rehabilitation of Carnaby's Cockatoo habitat, as per condition 2 of approval EPBC 2013/6767 (Table 1). Rehabilitation activities will be progressively implemented from commencement of clearing, determined by timing of approval of the CRMP.

Table 1: Environmental objectives and performance indicators for clearing and rehabilitation

Environmental objectives	Target	Completion criteria
Utilise seed collected from the proposal area within the on-site rehabilitation area (Figure 2).	Collect native seed from the proposal area prior to clearing and utilise within the 8 ha on-site rehabilitation area.	1. 8 ha of land rehabilitated (Figure 2). 2. Species richness and/or density are within 65% of the native species richness and/or density recorded in reference quadrats.
To establish 8 ha of foraging habitat for Carnaby's Cockatoo within the rehabilitation area (Figure 2).	Revegetate 8 ha of degraded land (Figure 2).	3. Less than 10% increase in weed density and cover.

5. Management measures for clearing and rehabilitation

5.1 Habitat management

A management program for vegetation clearing and rehabilitation has been developed to minimise the impact to retained Carnaby's Cockatoo habitat during implementation of the limestone expansion operations in the proposal area. OLC has incorporated the following environment management commitments into the development to achieve these outcomes:

1. Collection of native seed from the proposal area prior to clearing of vegetation
2. Use of collected suitable native seed within the eight hectare on-site rehabilitation area in the southern portion of the Proposal area.

Detailed protocols, management actions and timing for these commitments are provided in the following sections.

5.2 Native seed collection and storage methodology

Conditions 2(a), (b) and (c) of EPBC 2013/6767 require the collection of native seed prior to clearing, for use in the rehabilitation area, including storage, transport, monitoring and reporting of these measures.

A methodology for collection and use of native seed has been developed consistent with conditions 2(a) and (b) (Table 2).

Table 2: Methodology for the collection and storage of native seed

Actions	Timing	Responsibility
Seek quotations and engage contractor licensed by the Department of Parks and Wildlife (DPaW) to collect seed from areas of Carnaby's Cockatoo habitat to be cleared.	Pre-clearing	Oakford Land Company Project Manager
Undertake seed collection in designated areas (15.54 ha) of Carnaby's Cockatoo habitat proposed to be cleared (Figure 2), in accordance with Revegetation Industry of Western Australia (RIAWA) standards to ensure seed viability (RIAWA 2014a, 2014b).	Pre-clearing	Rehabilitation contractor
Store and transport seed for on-site rehabilitation in accordance with Revegetation Industry of Western Australia (RIAWA) standards to ensure seed viability (RIAWA 2014a, 2014b).	Pre & during clearing, until required for on-site rehabilitation activities	Rehabilitation contractor
Maintain a register of volumes, species collected, locations and quantities to ensure that the commitments of the CRMP can be met.	During seed collection prior to clearing	Rehabilitation contractor

5.3 Rehabilitation of the eight hectare rehabilitation area

Conditions 2 (b)(i) and 2 (d) require details of the methodology for rehabilitation activities, including the utilisation of native seed, in the on-site rehabilitation areas.

The rehabilitation objective is proposed to be achieved through a combination of direct seeding and seedling planting techniques and in accordance with the management actions described in Table 3.

Plants used in revegetation will consist of plants utilised by Carnaby's Black-Cockatoo and, where possible, are representative of the structure and composition of the surrounding remnant vegetation. Suggested species to be used in revegetation are provided in Appendix 1 or as otherwise listed within:

- *Plants used by Carnaby's Cockatoo* (Groom 2011)
- *Plants for Carnaby's Search Tool* (DEC 2012)
- resources from Birdlife Australia (Birdlife Australia 2012).

Table 3: Rehabilitation management actions

Item #	Actions	Timing	Responsibility
Site preparation, access control and maintenance			
1	Select on-site reference sites containing landforms and vegetation comparable (or likely to have been comparable) to the proposed rehabilitation area.	Prior to rehabilitation	Rehabilitation contractor
2	Survey the reference sites (identified in Item 1) to determine indicator species, density of native species, % cover of native species, native species richness and % weed cover.	Prior to rehabilitation	Rehabilitation contractor
3	Determine success criteria for revegetation area based on the survey of the reference sites.	During construction	Rehabilitation contractor
4	Install temporary fencing and signage around the rehabilitation area to control access.	Prior to rehabilitation	Oakford Land Company
5	Undertake initial weed control in response to results of weed monitoring (Table 4) at the rehabilitation area.	Prior to rehabilitation commencing	Rehabilitation contractor
6	Continue ongoing weed control in response to results of weed monitoring (Table 4) employing either manual removal or spraying of herbicide or a combination of both as appropriate.	During rehabilitation and continue weed control measures for three years from first year of revegetation works (direct seeding or seedling planting)	Rehabilitation contractor
Broadcast seeding			
7	Determine the quantity of seed of various native flora species to be used for broadcasting within on-site rehabilitation area.	During rehabilitation	Rehabilitation contractor
8	Prior to direct seeding, seed should undergo the appropriate treatments required to break dormancy and improve germination rates. The treatments could include smoking, freezing, boiling or scarifying. as per Table 2	Prior to rehabilitation – prior to direct seeding	Rehabilitation contractor
9	Undertake seed viability and germination testing as advised by a suitably qualified seed collection or revegetation specialist.	Prior to rehabilitation	Rehabilitation contractor
10	Rake (scarify) the rehabilitation area in preparation for direct seeding.	During rehabilitation - after achieving required weed control	Rehabilitation contractor
11	Combine the treated seed with an appropriate medium (e.g. yellow sand or vermiculite) and distribute manually (i.e. broadcast by hand) by an experienced operator, ensuring an even coverage over the whole area.	During rehabilitation	Rehabilitation contractor

Item #	Actions	Timing	Responsibility
Plant propagation and installation			
12	Determine the quantity of various native flora species required to be propagated for on-site rehabilitation.	Prior to rehabilitation	Project manager
13	Engage a nursery to propagate seedlings. Plants will be in a healthy, non-root bound condition upon pick-up or delivery.	Prior to rehabilitation	Project manager
14	Determine appropriateness of additives, which could include Seasol, water granules, soil breaker, water retainer, wetting agent or fertiliser tablets.	During rehabilitation - at the relevant time (i.e. in the hole prior to planting or on watering-in of plants).	Rehabilitation contractor
15	Place plants in a hole that is twice the size of the plant pot, ensuring the base of the plant is slightly below the original soil surface.	During rehabilitation	Rehabilitation contractor
16	Fill soil around the plant ensuring it sits in a basin that is approximately 200-300 mm in diameter and 50 mm deep to provide adequate water capture. The base of the plant will be flush with the soil surface within the basin to prevent collar rot.	During rehabilitation	Rehabilitation contractor
17	Water seedlings when planted as required.	During rehabilitation	Rehabilitation contractor
18	Install stakes (10-12 mm diameter) and a protective guard (plastic) around the seedlings to protect the seedlings from rabbits (Note: protective guards are only required in areas outside rabbit-proof fencing).	During rehabilitation – immediately after planting	Rehabilitation contractor
Site hygiene measures for dieback, weed and pest management			
19	Vehicles used in the rehabilitation area are to be clean and free from soil or plant material. Cleaning is to be conducted offsite.	During rehabilitation - prior to arriving on-site	Rehabilitation contractor
20	Footwear is to be free of soil when entering the rehabilitation area.	During rehabilitation - when entering the rehabilitation area	Rehabilitation contractor
21	All materials (including seedlings and materials such as mulch) are to be sourced from dieback and weed free supplies.	During rehabilitation	Rehabilitation contractor

6. Monitoring actions

6.1 Monitoring actions

A monitoring program has been developed to assess the achievement of CRMP objectives and targets (Table 4).

Table 4: Monitoring program

Parameter	Frequency	Location	Purpose	Responsibility
Seed collection and use				
Details of native species recorded in the seed collection program.	Throughout and on completion of the pre-clearing native seed collection program.	Seed register	To ensure that all seed collection records are kept, and that adequate amounts of local provenance species are being collected.	Rehabilitation contractor
On-site rehabilitation				
Integrity of temporary fencing.	Monthly as part of rehabilitation area inspections.	On-site rehabilitation area	To ensure access is controlled for the on-site rehabilitation area.	Oakford Land Company
Weed presence and composition.	Prior to direct seeding and seedling installation.	On-site rehabilitation area	To ensure adequate control of weed species prior to commencement of direct seeding and seedling installation.	Rehabilitation contractor
Plant density and species richness. Weed species density and weed species richness.	Annually in spring for a period of five years.	Monitoring quadrats in on-site rehabilitation area.	To determine success of rehabilitation.	Rehabilitation contractor
Presence of feral animals.	Annually after planting/direct seeding for a period of five years.	Monitoring quadrats in on-site rehabilitation area.	To ensure no feral animals are present within the on-site revegetated areas.	Rehabilitation contractor

7. Contingency actions

Contingency actions will be initiated if monitoring indicates that management measures have not been successful or effective and/or environmental targets are not being achieved (Table 5).

Table 5 Contingency actions

Trigger	Action
On-site rehabilitation area	
Species used in on-site rehabilitation area are not listed in Appendix 1 or within. <ul style="list-style-type: none"> • <i>Plants used by Carnaby's Cockatoo</i> (Groom 2011) • <i>Plants for Carnaby's Search Tool</i> (DEC 2012) • resources from Birdlife Australia (Birdlife Australia 2012). 	<ol style="list-style-type: none"> 1. Identify cause. 2. Remove inappropriate species and replace (if required) with appropriate species. 3. Ensure only appropriate species are used in future.
Insufficient seed available to fulfil rehabilitation requirements to meet targets in Table 1.	<ol style="list-style-type: none"> 1. Identify cause. 2. Implement approach to remedy cause, which could include: <ul style="list-style-type: none"> • collecting or purchase additional seed of suitable provenance for direct seeding or plant propagation 3. Monitor success of remedy.
Inadequate native flora species richness and/or cover to achieve targets determined in Table 1.	<ol style="list-style-type: none"> 1. Identify cause. 2. Implement approach to remedy cause, which could include: <ul style="list-style-type: none"> • collecting additional provenance seed for direct seeding or plant propagation to compensate for the insufficient native plant species richness and/or cover • undertaking infill seedling planting and direct seeding • applying fertilisers or wetting agents. 3. Monitor success of remedy.
A 10% increase in weed density and cover or the addition of new weed species compared to the on-site reference site.	<ol style="list-style-type: none"> 1. Investigate cause (e.g. adjacent sources of weed seed). 2. Implement measures to prevent further weed infestations (e.g. screening fencing, weed control in adjacent land), as practicable. 3. Undertake weed control activities as required.

8. Plan implementation timeframe

This CRMP will be implemented by the Oakford Land Company with monitoring to continue for a five year timeframe, or until completion criteria are met¹. This timeframe will be reviewed annually in accordance with the plan review process described in Section 8.1 of this CRMP.

8.1 Reporting and review

As required by condition 3, this plan will be reviewed within six months of every one year anniversary of the date the Minister for the Environment first approved the CRMP, and revise as required to account for progress, monitoring results, or changes necessary to achieve the designated performance targets. The revised CRMP will be submitted to the Minister for the Environment for approval.

8.2 Roles and responsibilities

Oakford Land Company has overall responsibility for achievement of the objectives of the CRMP.

All contractors and staff will be required to operate in accordance with this CRMP. The key position with responsibility for implementing the plan as required is the Rehabilitation Contractor.

The primary responsibilities of the Rehabilitation Contractor include:

- ensure all staff and sub-contractors are aware of, inducted in, and understand the requirements of, this CRMP
- ensure native seed is collected, stored and transported as per the procedures outlined in this plan
- ensure all management, monitoring and contingency actions are carried out as described in this CRMP
- provide support to OLC as required during the clearing and rehabilitation phases.

¹ Revegetate 8 ha of degraded land so that native species richness and/or density are within 65% of the native species richness and/or density recorded in reference quadrats

9. References

- Landform Research 2007, *Limestone Excavation and Rehabilitation Management Plan Lot 8, Wattle Avenue, Nowergup*, unpublished report prepared for Oakford Land Company, Western Australia.
- Department of Sustainability, Environment, Water, Population & Communities (DSEWPaC) 2012, *Calyptorhynchus latirostris—Carnaby's Black-Cockatoo, short billed black-cockatoo*, (SPRAT), [Online], Available at http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59523 [6 August 2013].
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- Florabank 2000, *Florabank Guideline 1, Basic methods for drying, extraction and cleaning of native plant seed*, [online], Florabank, available from www.florabank.org.au (21 February 2014).
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- Revegetation Industry Association of Western Australia (RIAWA) 2014b, *RIAWA Standards Review Paper – April 2006*, [Online], RIAWA, Available from <http://riawa.com.au/wordpress/wp-content/uploads/2009/08/RIAWA-Accr-Stds-SC-Rev-Ppr-0604-PJG-Refmt.pdf> [1 July 2014].
- Strategen 2012a, *Lot 8 Wattle Avenue Rehabilitation Plan*, report prepared for Oakford Land Company, Western Australia.
- Strategen 2012b, *Environment Protection and Biodiversity Conservation Act, 1999 Referral: Lot 8 Wattle Avenue, Nowergup*, report prepared for Oakford Land Company, Western Australia.

Appendix 1
Preliminary flora species list

Shrubs

- *Acacia lasiocarpa*
- *Banksia sessilis*
- *Grevillea Preissii*
- *Melaleuca systema*
- *Melaleuca huegelii*
- *Spyridium globulosum*

Herbs

- *Daucus glochidiatus*
- *Eriochilus dilatatus*
- *Desmocladius flexuosus*
- *Millotia tenuifolia*
- *Phyllangium paradoxum*
- *Austrostipa flavescens*
- *Thysanotus manglesianus/patersonii complex*
- *Trachymene pilosa*

*based on Floristic Community Type 26a adapted from Gibson et al. 1994.