

# Hammond Park

## Rehabilitation Management Plan

Prepared for  
Richard Noble  
by Strategen

April 2016



**STRATEGEN**  
environmental consultants



# **Hammond Park**

## **Rehabilitation Management Plan**

Strategen is a trading name of  
Strategen Environmental Consultants Pty Ltd  
Level 2, 322 Hay Street Subiaco WA  
ACN: 056 190 419

April 2016

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### **Client: Richard Noble**

| Report Version       | Revision No. | Purpose            | Strategen author/reviewer                         | Submitted to Client |                     |
|----------------------|--------------|--------------------|---|---------------------|---------------------|
|                      |              |                    |   | Form                | Date                |
| Draft Report         | A            | Client review      | N McAlinden /<br>E Congear / C Ellis /<br>D Walsh | Electronic          | 19 December<br>2013 |
| Final Draft Report   | B            | Client review      | K Britza/E Congear /<br>D Walsh                   | Electronic          | 9 January<br>2014   |
| Final Report         | 0            | Regulator review   | K Britza / E Congear<br>/ D Walsh                 | Electronic          | 15 January<br>2014  |
| Final Report         | 1            | Regulator review   | E Congear /<br>D Walsh                            | Electronic          | 6 June 2014         |
| Final Report         | 2            | Regulator approval | E Congear /<br>L Adams                            | Electronic          | 10 July 2014        |
| Final Report         | 3            | Regulator approval | E Congear /<br>D Walsh                            | Electronic          | 22 July 2014        |
| Revised Final Report | 4            | Regulator approval | E Congear /<br>J Mitchell                         | Electronic          | 8 May 2015          |
| Revised Final Report | 5            | Regulator approval | E Congear /<br>J Mitchell                         | Electronic          | 6 April 2016        |

Filename: RNO13118\_01 R001 Rev 5 - 6 April 2016

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# 1. Introduction

This Rehabilitation Management Plan (RMP) identifies management measures, monitoring actions, contingencies and reporting to be undertaken by Gold Estates Holdings Pty Ltd (GEH) as part of development of Lots 13, 14, 18 Barfield Road and Lots 48-51 Rowley Road, Hammond Park. The RMP details rehabilitation and management actions to be implemented within the proposal site and an off-site rehabilitation area. Richard Noble, on behalf of GEH will be responsible for implementation of the plan.

## 1.1 Purpose and scope

This RMP has been prepared to satisfy proposed revised Condition 2 of EPBC 2012/6524 for Lots 13, 14, 18 Barfield Road and Lots 48-51 Rowley Road, Hammond Park. Table 1 details the requirements of proposed revised Condition 2 of EPBC 2012/6524 and the section of the document the requirement is addressed in.

Table 1 EPBC 2012/6524 Proposed revised Condition 2 and where condition is addressed in RMP

| Condition number          | Requirement  | RMP section  |
|---------------------------|--|--|
| 2                         | To mitigate impacts to black cockatoos, the person taking the action must prepare and submit a Rehabilitation Management Plan (RMP) to the Minister for approval. The RMP must include, but not be limited to:   | This Plan has been prepared for submission to the Minister for approval.   |
| <b>Proposal site</b>      |  |  |
| a)                        | avoidance and mitigation measures to prevent impacts to black cockatoos during construction  | Refer to Table 3.  |
| b)                        | details of tree species, number to be planted and location within the streetscape and the POS  | Tree species to be used in streetscapes and POS are detailed in Appendix 2 (Plate 1 and Plate 2).<br>The number of species and planting densities within POS areas is identified in Table 2. The final number of trees to be planted in the streetscape will be determined during landscaping.<br>The location of revegetation within POS is detailed in Figure 3. |
| c)                        | objectives, targets and completion criteria for seeding and planting programs within the streetscape and POS   | Objectives, targets and indicators are detailed in Table 2.<br>Completion criteria are detailed in Section 3.1.3.  |
| d)                        | management measures to control weeds and erosion within the POS  | Refer to Table 3.  |
| e)                        | details of monitoring, reporting and contingency measures if performance indicators are not met  | Refer to Table 7, Table 8 and Section 8.   |
| f)                        | timeframes for the implementation of the above measures  | Timeframes for revegetation, management, monitoring and reporting actions are detailed in Table 3, Table 4 Table 7 and Table 8.  |
| g)                        | roles and responsibilities of personnel associated with implementing each of the above measures  | Roles and responsibilities are discussed in Section 7.   |
| <b>Bibra Lake Reserve</b> |  |  |
| h)                        | details of revegetation of a 1.78 ha area within Bibra Lake Reserve, at the 'rehabilitation site' shown in the map at Attachment A, including how seeds and topsoil collected from the Proposal site will be utilised, and the species and number of plants that will be planted | Revegetation implementation details are provided in Table 5 and Section 4.   |
| i)                        | objectives, targets and completion criteria for seeding and planting programs  | Refer to Table 4 and Section 3.2.3.  |

| Condition number | Requirement   | RMP section   |
|------------------|---|---|
| j)               | management measures to control site access, weeds and erosion   | Refer to Table 5 and Table 6.   |
| k)               | details of monitoring, reporting and contingency measures if performance indicators are not met   | Refer to Table 7, Table 8 and Section 8.  |
| l)               | timeframes for the implementation of the above measures   | Timeframes for revegetation, management, monitoring and reporting actions are detailed in Table 5, Table 7 and Table 8. |
| m)               | roles and responsibilities of personnel associated with implementing each of the above measures   | Roles and responsibilities are discussed in Section 7.  |
| 2                | The RMP must be submitted to the department at least three months prior to the commencement of construction. If the Minister approves the RMP, the approved RMP must be implemented. Construction must not commence until the RMP is approved by the Minister | N/A.  |

In addition, this RMP has been prepared in accordance with the City of Cockburn Guidelines: *Revegetation of Natural bushland/wetland areas* and the *APD 20 Design Principles for Incorporating Natural Management Areas including wetlands and bushlands in open space and/or drainage*.

The RMP will identify the following:

- rehabilitation species approved by the City of Cockburn
- plant numbers and densities
- timeframe for rehabilitation program
- weed control measures
- watering requirements
- fauna controls
- maintenance measures
- rehabilitation objectives and completion criteria
- monitoring program.

## 1.2 Project overview

### 1.2.1 Approval

GEH received approval to develop Lots 13, 14, 18 Barfield Road and Lots 48-51 Rowley Road, Hammond Park (the project; Figure 1), with a view to undertaking future residential development of the landholdings in accordance with the existing residential zoning of the land and the approved Local Structure Plan (LSP).

The project was referred under the Australian Government *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the then Australian Government Department of Sustainability, Environment, Water, Populations and Community (DSEWPaC) on the 27 August 2012. The development was deemed a 'Controlled Action' under the EPBC Act on 27 September 2012, to be assessed by Preliminary Documentation.

In order to assess the proposed action, DSEWPaC requested additional information from Richard Noble regarding the proposed offsets identified in the EPBC Act referral. Following provision of additional information, DSEWPaC; now the Department of the Environment (DotE), approved the proposal with conditions on 6 November 2013 (EPBC 2012/6524).

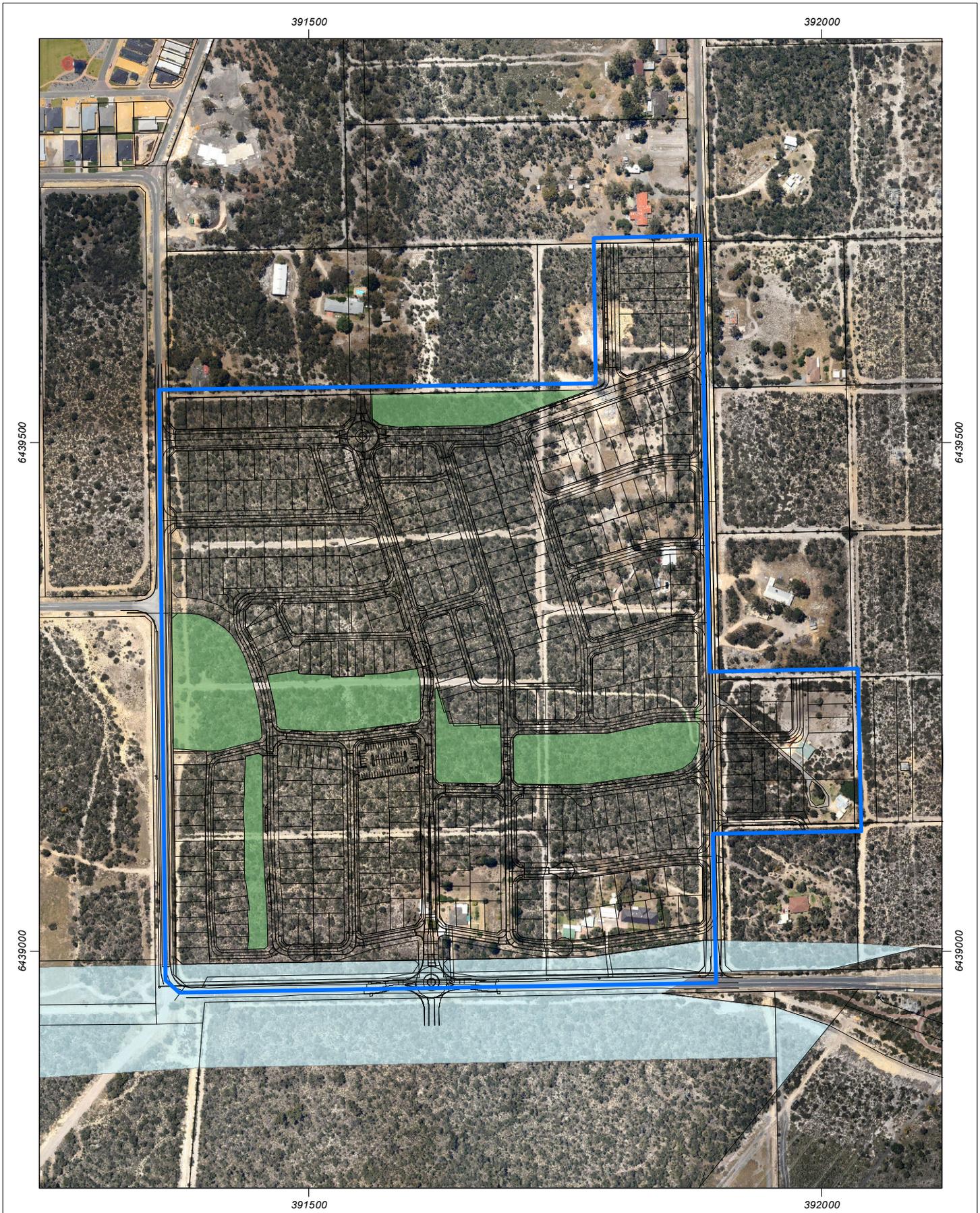
### 1.2.2 Project components

The site covers a total of approximately 33.5 ha, a portion of which has already been cleared for firebreaks, residential lots and other disturbance, a total of 22.92 ha of native vegetation will be cleared for the project (Figure 1).

On-site and off-site rehabilitation will be undertaken to manage and offset the impacts of the development on black cockatoos. Bushland in good condition will be retained in Public Open Space (POS) and rehabilitated. In addition, streetscaping will include proteaceous and eucalypt species that will provide a foraging source for Carnaby's and Forest red-tail (referred to collectively as 'black cockatoo's throughout the document). Trees to be used in streetscapes are identified in Plate 1.

Since the issue of the EPBC Act approval, the City of Cockburn has advised that Frankland Reserve may no longer be available as an off-site offset for rehabilitation. Therefore an alternate off-site rehabilitation site has been identified for rehabilitation of 1.78 ha of degraded vegetation. The site is located at Bibra Lake Reserve, approximately 7 km north of the development area.

The location of Bibra Lake Reserve is depicted in Figure 2.

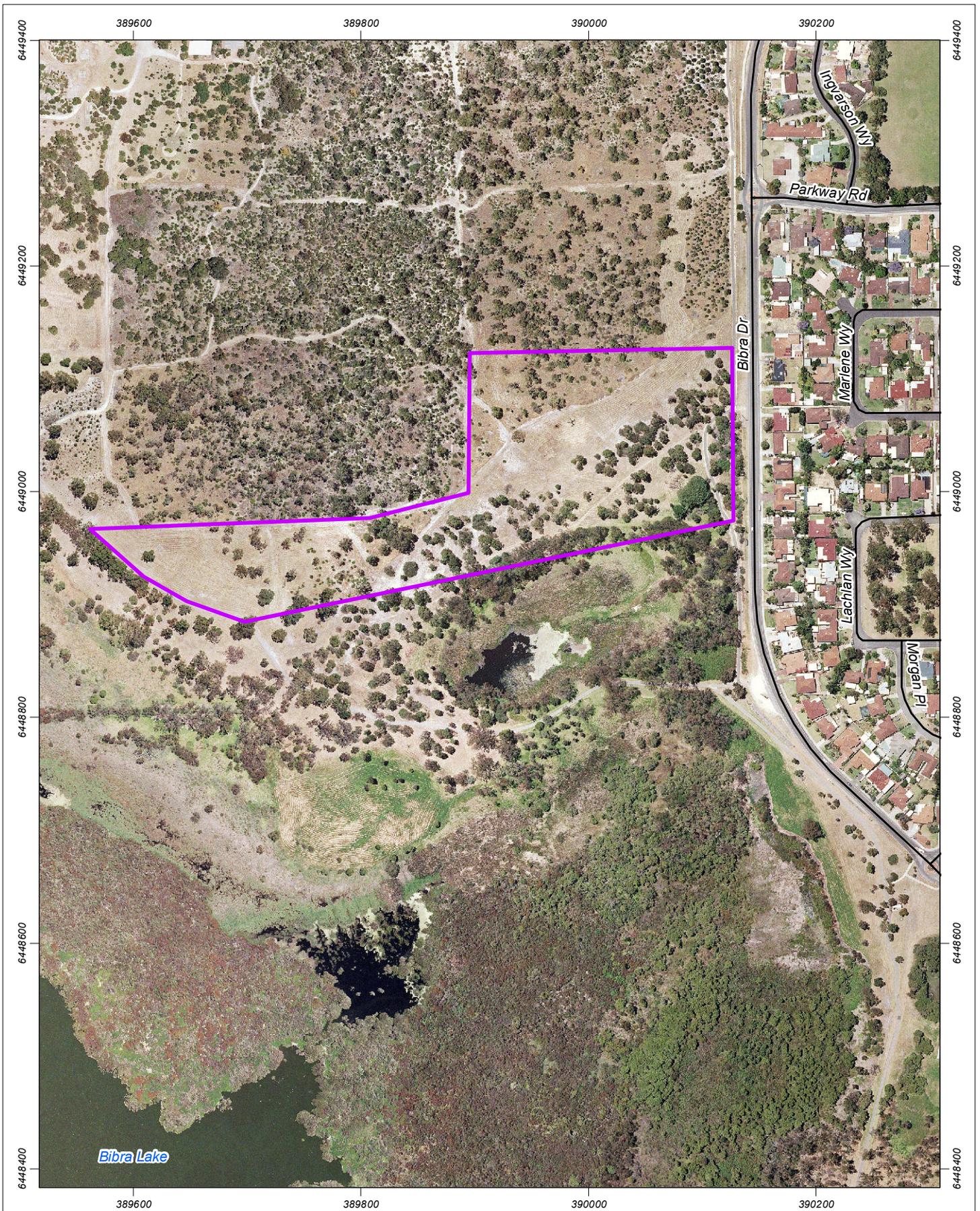


**Figure 1 Hammond Park Local Structure Plan**

Scale 1:5,000 at A4  
 0 20 40 60 80 100 Meters  
 Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 6/04/2016  
 Author: SFinning  
 Source: Aerial image: Nearmap 11/2012. Client 2015

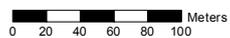
- Legend**
- Cadastre and carriageways
  - Hammond Park development boundary
  - POS area
  - Policy Control Area





**Figure 2 Bibra Lake Off-site Rehabilitation Site**

Scale 1:4,500 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 15/01/2014  
 Author: SFinning  
 Source: Aerial image: SLIP, Landgate 2006.

**Legend**

- Roads
- Rehabilitation site



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 www.strategen.com.au

## 2. Proposal site – Environmental setting

### 2.1 Vegetation and flora

A Level 2 Flora and Vegetation Survey of the project area was undertaken by Ecoscape in 2009 (Ecoscape 2009a).

#### 2.1.1 Vegetation

The survey found that the remnant vegetation located within the project area comprises Vegetation Association 'Banksia low woodland' in the Bassendean System with a semi-open understorey and a thick layer of leaf litter.

The Bassendean System is broadly described as *Banksia* low woodland dominated by *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Eucalyptus tottiana* and *Nuytsia floribunda*, with *Allocasuarina fraseriana* joining the tree layer south of Gingin, and *Eucalyptus marginata* replacing *Eucalyptus tottiana* south of Lake Gnangara. In this case, Beard vegetation association 1001, medium very sparse woodland; jarrah, with low woodland; *Banksia* & *Allocasuarina*, was the only mapped unit within the site.

The vegetation of the site is mostly in excellent bushland condition (Keighery 1994), with few weeds and little sign of human disturbance. Areas of vegetation associated with fencelines, through the centres of Lots 49 and 50 and around houses are weedy, mostly veldt grass (*Ehrharta calycina*) but retain most of their native species. Vegetation in Lot 18 is partly degraded mostly due to grazing by horses, and has little native vegetation. Areas associated with houses, gardens and other areas of high disturbance including the sandpit on Lot 14, are completely degraded.

#### 2.1.2 Flora

The Level 2 survey recorded 149 vascular plant species, including 31 weed species (Ecoscape 2009a). At the time of the survey, the Department of Environment and Conservation (DEC, now the Department of Parks and Wildlife (DPaW)) identified two Declared Rare and seven Priority Flora species within 10 km of the project area.

The survey recorded no Declared Rare or Priority flora species within the project area (Ecoscape 2009a).

### 2.2 Fauna

A Level 1 fauna assessment of the project area was undertaken by Ecoscape in 2009 (Ecoscape 2009b).

#### 2.2.1 Fauna habitat

At the time of the fauna assessment, the fauna habitat of the site was considered to be in excellent condition (Ecoscape 2009). The majority of the survey area showed evidence of Cockatoo feeding or was determined to support excellent quality foraging habitat (Ecoscape 2009).

The survey also recorded signs of pest and introduced species, including rabbit diggings, scats and warrens and Western Grey Kangaroo scats (Ecoscape 2009).

#### 2.2.2 Fauna of conservation significance

A fly-over sighting of a Carnaby's Cockatoo was made during the survey however no other observations of Priority or Threatened fauna were made during the survey.

A search of the former DSEWPaC Protected Matters Search Tool was undertaken as part of the assessment. The search found 10 threatened species, including four migratory species. Of these species 8 were considered unlikely to occur including the following:

- *Synemon gratiosa* (Graceful Sun Moth)
- *Dasyurus geoffroyi* (Chuditch)
- *Phascogale calura* (Red-tailed Phascogale)
- *Setonix brachyurus* (Quokka)
- *Andersonia gracilis* (Slender *Andersonia*)
- *Centrolepis caespitose* (Matted *Centrolepis*)
- *Darwinia foetida* (Muchea Bell)
- *Lepidosperma rostratum* (Beaked *Lepidosperma*).

Two species were considered likely to occur within the project area, including Carnaby's Cockatoo (Endangered) and Forest Red-tailed Black Cockatoo (Vulnerable).

## 3. Rehabilitation strategy

### 3.1 Proposal site

Approximately 1.8 ha of remnant native bushland will be retained on-site for incorporation into POS. This bushland is considered to be of good or better condition and comprises predominantly *Banksia* woodland. Approximately 0.6 ha of vegetation within the POS areas is considered to be 'degraded' or 'cleared'. Some of these degraded and cleared areas will not be revegetated as they are proposed to be used in the creation of formal pedestrian pathways, civic facilities and turf areas.

A minimum of 0.3 ha (50 %) of the degraded and cleared vegetation will be revegetated as presented in Figure 3 and Figure 4. Additional streetscape planting and planting in POS areas will be undertaken where possible; using black cockatoo preferred foraging species such as proteaceous and eucalypt species.

#### 3.1.1 Rehabilitation objectives

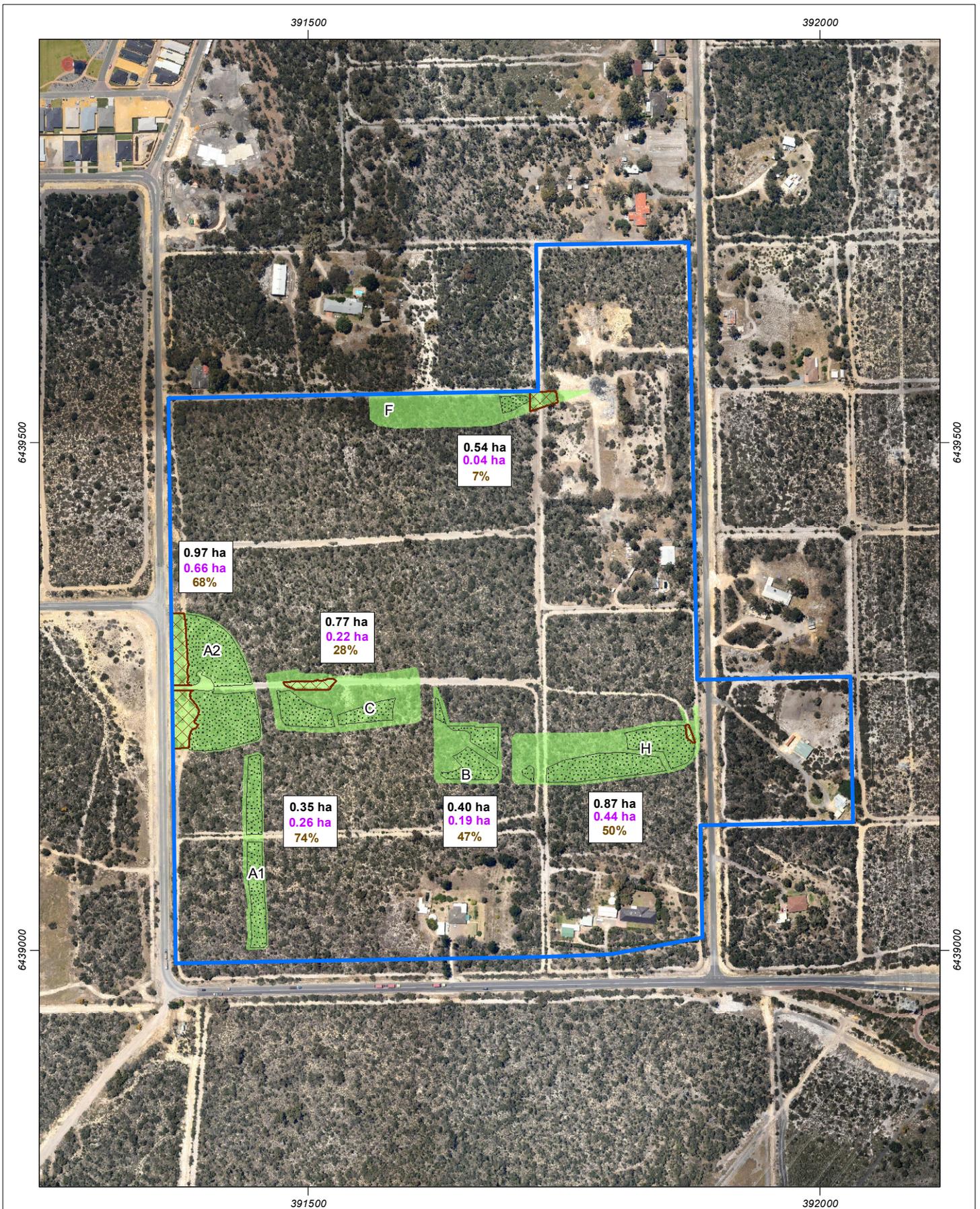
Rehabilitation objectives for the management of POS and streetscapes within the project area are:

- establish an ecologically diverse and stable vegetation community with similar structure and composition to the original native vegetation
- enhance vegetation health within retained areas of vegetation
- establish self-sustaining vegetation community including species known to be primary foraging plants for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo
- establish streetscapes using species known to be foraging plants for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo
- ensure the ongoing protection of and prevent future expansion into bushland protection areas.

#### 3.1.2 Targets and indicators

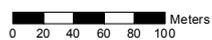
Rehabilitation targets and indicators have been developed for each rehabilitation objective, to enable rehabilitation performance to be measured. Targets have been developed based on baseline environmental information gathered during flora and fauna investigations of the site. A set of performance indicators have been developed for each target to enable the appropriate measurement of rehabilitation performance.

Table 2 provides a summary of targets and indicators for rehabilitation objectives for the Proposal site.



**Figure 3: Proposed POS areas, retained vegetation and revegetation areas**

Scale 1:5,000 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 6/04/2016  
 Author: SFinning  
 Source: Aerial image: Nearmap 11/2012. Client 2013.

**Legend**

- Hammond Park development boundary
- Proposed retained vegetation
- Proposed revegetation degraded
- POS area

**3.91 ha** Total area  
**xx ha** Area of existing native vegetation retained  
**xx%** % of Cockatoo habitat to be retained

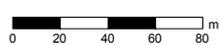


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**Figure 4: Revegetation areas within POS**

Scale 1:3,200 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 6/04/2016  
 Author: SFinning  
 Source: Aerial image: Nearmap 11/2012. Client 2013-2015.

**Legend**

-  Hammond Park development boundary
-  Cleared and degraded areas in which revegetation will occur (0.3 ha)
-  POS area
- xx%** % of Cockatoo habitat to be retained



Table 2 Targets and indicators for rehabilitation objectives for the Proposal site

| Objective  | Target   | Indicators   | Measurement tool  |  |
|--|--|--|---|--|
| <i>Public Open Space</i>   |  |  |   |  |
| <i>Revegetation Areas</i>  |  |  |   |  |
| 1. Establish an ecologically diverse and stable vegetation community with similar structure and composition to the original native vegetation.                         | 2. Establish <i>Banksia</i> low woodland dominated by <i>Banksia attenuata</i> , <i>B. menziesii</i> , <i>B. ilicifolia</i> , <i>Eucalyptus todtiana</i> and <i>Nuytsia floribunda</i> and understorey species to provide suitable foraging habitat for black cockatoos. | 1. Vegetation community types in revegetated areas are representative of those present in the pre-disturbance environment.<br>2. Vegetation communities are consistent with the overstorey species and understorey species identified in Appendix 1.<br>3. Revegetate 0.3 ha of degraded land within POS areas (Figure 3). | 1. Review of plant orders and invoices shows that planting of local provenance species is undertaken at a density of at least 5000 stems/ha (including approximately 75 of each of the 12 species).<br>2. Revegetation monitoring confirms a minimum survival rate of 70 – 80 % over two years has been achieved.<br>3. Revegetation monitoring confirms at least 12 native species present on-site.<br>4. Rehabilitation implementation, monitoring and maintenance will continue over two years or until completion criteria are met. | Revegetation monitoring results confirm 0.3 ha of degraded land within POS areas has been revegetated  |
| <i>Retained Vegetation and Revegetation Areas</i>  |  |  |   |  |
| 1. Enhance vegetation health within retained areas of vegetation.  | 2. Implement hygiene / weed management protocols.  | 1. No introduction of Dieback onto the Site.<br>2. No introduction of new weed species, and existing species are not spread (as compared to baseline weed mapping collected prior to commencement of clearing).  | 1. No evidence of declining vegetation health and death of susceptible species at the Site, which are attributable to Project activities.<br>2. Weeds recorded are at levels that do not threaten the health of native species present within the established vegetation, and occur at a density and diversity similar to or less than baseline levels.   | Site inspections indicate no evidence of dieback infestation.<br><br>Site inspections and monitoring confirms species diversity and density of weeds within established vegetation and revegetation areas are at or below baseline levels. |
| <i>Revegetation Areas</i>  |  |  |   |  |
| 1. Establish a self-sustaining vegetation community including species known to be primary foraging plants for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo. | 2. Establish revegetation including foraging species for black cockatoo species as identified by DPaw (Groom 2011).  | 1. On-site Revegetation area to be planted with 50 per cent of tree and shrub species being primary foraging plants for black cockatoo species.  | 1. Proportion of black cockatoo foraging plants versus other species in planting lists and invoices is at least 50%.<br>2. Site inspection and revegetation monitoring indicates vegetation becoming self-sustaining.   | Revegetation monitoring results and inspection of planting lists and invoices confirm 50 per cent proportion has been attained.  |

| Objective  | Target   | Indicators   | Measurement tool   |  |
|--|--|--|--|--|
| <i>Streetscaping</i>   |  |  |  |  |
| 1. Establish streetscapes using species known to be foraging plants for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo. | 2. Establish streetscapes using foraging species for black cockatoo species as identified by DPaW (Groom 2011) and identified in the Landscape Master Plan (Appendix 2). | 1. Streetscapes to be planted with 50 per cent of tree and shrub species being foraging plants for black cockatoo. | 1. Proportion of black cockatoo foraging plants versus other species in planting lists and invoices is at least 50% (as detailed in Appendix 2). | Site inspections and inspection of planting lists and invoices confirm 50 per cent proportion has been attained. |
| <i>Retained Vegetation</i>   |  |  |  |  |
| 1. Ensure the ongoing protection of and prevent future expansion into bushland protection areas.                                 | 2. Retain 1.8 ha of native bushland on-site within POS areas.  | 1. 1.8 ha of bushland is retained within POS areas.  | 1. No clearing outside of approved boundary.   | Clearing register.<br>Aerial photographs of the Proposal area.   |

### 3.1.3 Completion criteria

Completion criteria have been determined to provide targets to be met before rehabilitation activities can be considered completed.

#### *Completion criteria – POS retained vegetation areas*

Completion criteria presented below are specific to retained vegetation areas of POS only:

1. No evidence of declining vegetation health and death of susceptible species at the Site, which are attributable to Project activities during the duration of the rehabilitation management plan.
2. Weed control is implemented as per the rehabilitation management plan.

#### *Completion criteria – POS revegetation areas*

Completion criteria presented below are specific to revegetation of degraded areas of POS only:

1. Revegetate 0.3 ha of degraded land within POS areas.
2. Enhance the vegetation condition of degraded areas of POS (via direct seeding and/ or planting seedlings) by increasing the species richness of native flora to at least 12 species within two years of establishment.
3. At least 50% of tree and shrub species planted within revegetation areas are to be primary foraging plants for black cockatoo species.
4. Revegetation to be undertaken with local provenance species approved to at least 5000 stems/ha to achieve a minimal survival rate of 70 – 80% over two years.
5. No introduction of new weed species and existing species are not spread (i.e., total weed cover is no more than 10% of baseline weed cover).

#### *Completion criteria – Street trees*

1. At least 50% of tree and shrub species planted to be primary foraging plants for black cockatoo species.
2. Tree planting to be undertaken in accordance with the Landscape Master Plan (Appendix 2).

### 3.1.4 Management actions

Management actions for the rehabilitation of on-site remnant bushland are identified in Table 3 below.

Table 3 On-site rehabilitation management actions

| Item                     | Management action  | Purpose  | Timing  | Responsibility                          |
|--------------------------|--|--|---|---|
| <i>Public Open Space</i> |  |  |   |   |
| 1.                       | <p>Implement site inductions for all contractors prior to their commencement of work on site. The induction will detail the following:</p> <ul style="list-style-type: none"> <li>• fauna management strategies</li> <li>• hygiene management measures</li> <li>• demarcation and areas of no entry</li> <li>• waste management.</li> </ul> <p>Contractors will undertake works in accordance with an approved Construction Environmental Management Plan.</p>   | Inform site personnel of their requirements whilst on-site and promote environmental awareness.        | Prior to rehabilitation and ongoing.  | Rehabilitation contractor / Contractor  |
| 2.                       | Install signage indicating the area is being rehabilitated, including information summarising the purpose of rehabilitation works, key works undertaken, and access restrictions.  | To inform the community about the proposed rehabilitation and to deter people accessing the area.      | Prior to rehabilitation and ongoing.  | Rehabilitation contractor               |
| 3.                       | <p>Cordon off POS areas during clearing activities.</p> <p>All areas of retained vegetation will be identified using GPS coordinates referenced to the Civil Engineers site clearing drawing. Setting out of the works will be carried out by a qualified surveyor. No personnel may enter the area unless authorised by the Construction Manager.</p>   | To prevent unauthorised clearing of areas to be retained.  | During clearing.  | Contractor/Responsible Officer          |
| 4.                       | <p>Follow hygiene protocols to prevent the spread of weeds and dieback during access to the site:</p> <ul style="list-style-type: none"> <li>• vehicles used in clearing and removing topsoil, excavation or transport are to be clean and free from soil or plant material prior to arriving on site from an area known or thought to be dieback infected. Cleaning should be conducted off site on bitumen areas surrounding the project area. In dry weather, this will be achieved by brushdown. Washdown with water and an appropriate reagent will be required during wet weather.</li> <li>• all drivers and plant operators are made aware of the need to have clean trucks and plant when initially arriving on or accessing the site</li> <li>• machinery will work from higher vegetation condition to lower vegetation condition</li> <li>• vehicles to use designated tracks</li> <li>• footwear to be free of mud and soil when entering the Rehabilitation area</li> <li>• all plants, seeds and other materials used in rehabilitation are sourced from dieback free areas.</li> </ul> | To ensure dieback and weeds are not introduced or spread during rehabilitation.                        | During clearing<br>Construction phase.<br>During rehabilitation.  | Contractor<br>Rehabilitation contractor |
| 5.                       | Install temporary fencing or tree guards, and signage around revegetation areas to prevent unauthorised access and fauna entry.  | To maximise potential for rehabilitation success by protecting areas through fencing or tree guarding. | <p>Prior to commencement of revegetation for fencing and signage.</p> <p>At the time of planting for tree guard installation.</p> | Rehabilitation contractor               |

| Item                | Management action   | Purpose  | Timing  | Responsibility            |
|---------------------|---|--|---|---------------------------|
| 6.                  | Undertake weed mapping of the rehabilitation sites (revegetation areas and retained vegetation areas).  | To provide data to inform management.  | Prior to commencement of clearing.                      | Botanist                  |
| 7.                  | Undertake ongoing maintenance weed control (as described in section 4.1 through a combination of manual removal / spraying of herbicide within retained vegetation areas and continue weed control measures until handover to the City of Cockburn. | To protect vegetation condition of retained vegetation.  | During rehabilitation.                                  | Rehabilitation contractor |
| 8.                  | Undertake a combination of manual and chemical weed control (as described in section 4.1) of on-site rehabilitation areas for at least one year prior to broad cast seeding.  | To maximise potential for rehabilitation success.  | Construction phase.                                     | Rehabilitation contractor |
| 9.                  | Undertake site preparation such as ripping and mounding of on-site rehabilitation areas as described in Section 4.3 prior to direct seeding.  | To maximise potential for rehabilitation success.  | Prior to direct seeding.                                | Rehabilitation contractor |
| 10.                 | Undertake direct seeding and infill planting as described in Section 4.4.   | To maximise potential for rehabilitation success.  | After the completion of one year of weed control.       | Rehabilitation contractor |
| 11.                 | Undertake ongoing maintenance weed control (as described in section 4.1) through manual removal / spraying of herbicide and continue weed control measures.   | To maximise potential for rehabilitation success.  | Up to two years or until completion criteria are met.   | Rehabilitation contractor |
| 12.                 | Undertake opportunistic visual inspections of the rehabilitated profiles to ensure erosion is not taking place.   | To protect soil profiles and revegetation areas.   | Opportunistically.                                      | Rehabilitation contractor |
| <i>Street trees</i> |   |  |   |                           |
| 13.                 | Determine number of trees required for planting and select black cockatoo preferred foraging species in accordance with planting lists (Appendix 2).  | To ensure adequate street tree density and provision of a future black cockatoo foraging resource. | Construction phase.                                     | Rehabilitation contractor |
| 14.                 | Undertake tree planting within median strips and areas adjoining POS.   | To maximise potential for rehabilitation success.  | Construction phase in spring.                           | Rehabilitation contractor |
| 15.                 | Black cockatoo preferred foraging species will not be planted along roads with speed limits exceeding 50 km/hr.   | To minimise the risk of black cockatoo injury/mortality.   | Construction phase.                                     | Rehabilitation contractor |
| 16.                 | Undertake fortnightly watering of planted street trees (median strips and adjoining POS areas only) from October to March for up to two years, except following rains.  | To maximise potential for tree survival.   | Fortnightly from October to March, for up to two years. | Rehabilitation contractor |

## 3.2 Off-site rehabilitation

Rehabilitation of 1.78 ha at Bibra Lake Reserve will be undertaken primarily through topsoil transfer from cleared areas within the development site. Direct seeding will also be undertaken using seed collected from bushland areas within the development site prior to clearing.

The site is managed by the City of Cockburn and contains areas of degraded *Banksia* woodland. The Bibra Lake site is within a Regional Park and is located within a Bush Forever Site.

### 3.2.1 Rehabilitation objectives

Rehabilitation objectives for the off-site rehabilitation area are:

- promote vegetation growth and enhance vegetation health within degraded areas
- creation and enhancement of Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo habitat.

### 3.2.2 Targets and indicators

Rehabilitation targets and indicators have been developed for each rehabilitation objective, to enable rehabilitation performance to be measured. Targets have been developed based on baseline environmental information gathered during flora and fauna investigations of the site. A set of performance indicators have been developed for each target to enable the appropriate measurement of rehabilitation performance.

Table 4 provides a summary of targets and indicators for rehabilitation objectives for the off-site rehabilitation area.

Table 4 Targets and indicators for rehabilitation objectives for the off-site rehabilitation area

| Objective   | Target   | Indicators  | Measurement tool  |   |
|---|--|---|---|---|
| Promote vegetation growth and enhance vegetation health within degraded areas               | Implement hygiene / weed management protocols.   | No introduction of Dieback onto the site.   | No evidence of declining vegetation health and death of susceptible species at the Site, which are attributable to Project activities.  | Site inspections indicate no evidence of dieback infestation.   |
|   |  | No introduction of new weed species, and existing species are not spread (as compared to baseline weed mapping collected at the offsite area and the on-site topsoil collection area prior to commencement of clearing. | Weeds recorded are at levels that do not threaten the health of native species present within the offsite rehabilitation site and occur at a density and diversity similar to or less than baseline levels. | Site inspections and monitoring confirms species diversity and density of weeds within offsite rehabilitation area are at or below baseline levels. |
|   | Promote vegetation growth within degraded areas.   | Establish a total species richness of at least 12 native species present within the offsite area through topsoil transfer, direct seeding and seedling planting.  | Revegetation monitoring confirms at least 12 native species present.  | Revegetation monitoring results.  |
|   |  | Where percentage cover of native vegetation is less than 50%, infill planting will be undertaken at a density of 5000 stems/ha.   | Revegetation monitoring confirms infill planting density is 5000 stems/ha where native vegetation cover is less than 50%  | Revegetation monitoring results.  |
| Creation and enhancement of Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo habitat | Establish revegetation including foraging species for black cockatoo species as identified by DPaW (Groom C 2011). | Planting within the off-site rehabilitation area to be with 50 per cent of tree and shrub species being primary foraging plants for black cockatoo.   | Proportion of primary black cockatoo feeding plants versus other species in planting lists and invoices.  | Site inspections and inspection of planting lists and invoices confirm 50 percent proportion has been attained.                                     |

### 3.2.3 Completion criteria – Off-site rehabilitation

Completion criteria have been determined to provide targets to be met before rehabilitation can be considered completed. Completion criteria presented below are specific to off-site rehabilitation areas only:

1. Promote vegetation growth (via topsoil transfer, direct seeding and infill planting) with local provenance species to achieve a total species richness of at least 12 native species.
2. Where % cover of remnant vegetation is less than 50%, infill planting will be undertaken at a density of 5000 stems/ha.
3. At least 50% of tree and shrub species planted to be primary foraging plants for black cockatoo species.
4. No introduction of new weed species, and existing species are not spread (as compared to baseline weed mapping collected at the offsite area and the on-site topsoil collection site prior to commencement of clearing).

### 3.2.4 Management actions

Table 5 identifies the management actions to be implemented at the off-site rehabilitation area.

Table 5 Off-site rehabilitation management actions

| Item                                      | Management action   | Purpose  | Timing   | Responsibility                          |
|---|---|--|--|---|
| <i>Site preparation and survey</i>        |   |  |  |   |
| 1.  | Undertake dieback mapping at the rehabilitation site.   | To ensure dieback is not introduced or spread during the topsoil transfer.                                     | To commence following identification of the off-site rehabilitation location.                                  | Dieback consultant                      |
| 2.  | Undertake weed mapping of the rehabilitation site.  | To provide data to inform management.  | To commence following identification of the off-site rehabilitation location.                                  | Botanist                                |
| 3.  | Undertake weed control (as described in section 4.1) at off-site rehabilitation area as required for at least one year prior to commencing rehabilitation activities.   | To maximise potential for rehabilitation success.  | To commence following identification of the off-site rehabilitation location.                                  | Rehabilitation contractor               |
| 4.  | Determine the quantity of Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo foraging species based on specific site requirements (following selection of the offsite area) required for rehabilitation site. Engage contractors to undertake the necessary seed collection from areas at the Hammond Park residential development site designated for clearing. | To maximise potential for rehabilitation success by ensuring appropriate species are used in seeding/planting. | Prior to clearing of proposal site.  | Fauna expert<br>Botanist                |
| 5.  | Install fencing and signage around rehabilitation areas to restrict unauthorised access and fauna entry for the duration of the rehabilitation program.   | To maximise potential for rehabilitation success by protecting areas through fencing.                          | Prior to commencement of rehabilitation.   | Rehabilitation contractor               |
| <i>On-site works and topsoil transfer</i> |   |  |  |   |
| 6.  | Undertake topsoil harvesting of the top 10 cm from on-site cleared areas for transfer to off-site rehabilitation area.  | For transfer to the off-site rehabilitation location.  | Immediately following on-site clearing.  | Contractor                              |
| 7.  | Transfer topsoil to off-site rehabilitation area and respread to a maximum depth of 10 cm.  | To maximise potential for rehabilitation success.  | Prior to seeding and planting.   | Rehabilitation contractor               |
| <i>Rehabilitation</i>                     |   |  |  |   |
| 8.  | Undertake a combination of site preparation techniques as described in Section 4.3 prior to direct seeding.   | To maximise potential for rehabilitation success.  | Prior to direct seeding.   | Rehabilitation contractor               |
| 9.  | Undertake direct seeding and infill planting as described in Section 4.4.   | To maximise potential for rehabilitation success.  | After the completion of one year of weed control (unless scalping used to control weeds, refer to Section 4.1) | Rehabilitation contractor               |
| 10.                                       | Undertake ongoing maintenance weed control (as described in section 4.1) through manual removal / spraying of herbicide and continue weed control measures.   | To maximise potential for rehabilitation success.  | During winter and spring, for up to two years post-planting or until completion criteria are met.              | Rehabilitation contractor               |
| <i>Hygiene measures</i>                   |   |  |  |   |
| 11.                                       | Induct all personnel in relation to weed and dieback risk, potential impacts and management.  | To ensure dieback and weeds are not introduced or spread during rehabilitation.                                | Prior to personnel commencing work on-site.  | Contractor<br>Rehabilitation contractor |

| Item | Management action   | Purpose   | Timing  | Responsibility                          |
|------|---|---|---|---|
| 12.  | Ensure vehicles used in clearing and removing topsoil, excavation or transport are clean and free from soil or plant material prior to arriving on site. Cleaning should be conducted off site on bitumen areas surrounding the project area. In dry weather, this will be achieved by brushdown. Washdown with water and an appropriate reagent will be required during wet weather. | To ensure dieback and weeds are not introduced or spread during rehabilitation. | During clearing, topsoil transfer and rehabilitation. | Contractor<br>Rehabilitation contractor |
| 13.  | Ensure all plants; seeds and other material used in rehabilitation are free of dieback and weeds.   | To ensure dieback and weeds are not introduced or spread during rehabilitation. | During rehabilitation.                                | Rehabilitation contractor               |
| 14.  | Ensure vehicles, machinery, equipment and footwear are free of mud and soil when entering rehabilitation area.  | To ensure dieback and weeds are not introduced or spread during rehabilitation. | During rehabilitation.                                | Rehabilitation contractor               |

## 4. Rehabilitation approach

Rehabilitation activities will include the following:

- weed control
- topsoil transfer
- ripping and mounding where appropriate
- direct seeding
- seedling planting and fertilisation as required.

### 4.1 Weed control

Weed control techniques utilised on-site in POS areas and the offsite revegetation site will include a combination of chemical and manual control methods (Table 6). Subject to further detailed planning, weed control is likely to be undertaken four times per year; however this is dependent on the weed species present within the revegetation site, as different weed species may require different weed control measures to be implemented. Weed control will commence in winter, prior to revegetation activities commencing.

Scalping has also been recommended by the City of Cockburn for utilisation at the offsite area, to optimise revegetation success and reduce weed growth. If scalping is used for initial weed control then it must be undertaken within two months of the commencement of topsoil resspreading at the offsite revegetation site to minimise any potential requirement to use herbicide spraying due to weed regrowth on the bare soil (i.e. the requirement for one year of weed control as described in Table 5 will not apply if scalping is chosen). It is noted that the City of Cockburn would allow scalped material to be distributed and spread close to the rehabilitation site.

Table 6 Summary of weed control methods

| Weed control method |  | Indicative target weed type  |
|---------------------|--|--|
| Manual control      | Hand weeding, digging, pulling   | For control of small infestations of non-bulbous weeds prior to seed set.  |
|                     | Power tools (chainsaws and pole saws)  | For control of woody weed species (trees and large shrubs).  |
|                     | Scalping   | For blanket control of all weeds prior to revegetation activities  |
| Chemical control    | Blanket spray herbicide application (using towed boom spray rigs)  | For blanket control of most weed species including grass weeds prior to revegetation germination/ seedling planting. |
|                     | Spot spray herbicide application (using plant such as large tanks with long hoses, or backpack sprayers) | For targeted control of most weed species including grass weeds after revegetation germination/ seedling planting.   |
|                     | Stem injection, cut and paint  | To control large woody weeds.  |

### 4.2 Topsoil transfer

Topsoil as it is referred to within the Rehabilitation Management Plan includes approximately the top 10 cm of undisturbed soil present in areas which contained native bushland up until the point of clearing of vegetation for the purposes of the Proposal. The intention is to salvage the seed bank present within this part of the soil profile, and to transfer the contained biodiversity to the chosen offsite area for use in the rehabilitation project.

Topsoil from the Proposal site will be salvaged during clearing activities to use in rehabilitation of the off-site rehabilitation area. Topsoil removal and stockpiling will be undertaken during clearing activities. Topsoil removal will involve scraping of the material prior to loading into trucks for haulage to Bibra Lake site.

Where possible the topsoil will be transferred directly to the off-site rehabilitation area for re-spreading to promote growth from the existing topsoil seed bank.

### 4.3 Site preparation

Site preparation will include a combination of techniques, aiming to reduce the presence of weed material at the site prior to topsoil placement and revegetation activities commencing.

Disturbed areas within the offsite area will be ripped to address soil compaction, promote soil aeration and plant growth. It is anticipated that ripping is undertaken over late summer or early autumn (March – April) to allow soil to be broken up during the warmer months, to facilitate soil aeration, rainfall infiltration and remove compaction which will aid new plant growth in spring following planting. It is noted that ripping will stimulate weed growth also, and timing of ripping, topsoil placement and preparatory weed control will be refined once project parameters (including location of offsite area and the timing of topsoil collection) are finalised.

In addition to ripping, soil should be scarified immediately prior to direct seeding. Scarifying prior to seeding allows small niches to be formed, allowing seed and organic matter to settle and allow rainfall to concentrate on germinating seed.

Further refinement of site preparation methods required will be finalised on selection of the offsite project area.

### 4.4 Seeding and planting

Key species listed in Appendix 1 do not represent all species found within these vegetation communities, therefore other species appropriate to *Banksia* woodland may be included in seedling/seed mixes.

Direct seeding will be undertaken using local provenance seed where practical, with the seed mix based on the species list provided in Appendix 1. Seeding will be undertaken in autumn, prior to the main winter rainfall and following the required soil preparation and weed treatment.

In the event quantities of seed required for rehabilitation are not available, DPaW will be consulted regarding the appropriateness of species to be used in seed/tubestock mixes. Seed broadcast rates will be determined in consultation with experienced seed collectors contracted to undertake the collection.

All seeds should be mixed with a suitable bulking and spreading agent (e.g. yellow sand or vermiculite), and manually spread ensuring even coverage over the whole area.

If monitoring determines that rehabilitation requires supplementary seedling planting, this will be undertaken in early winter, within one month of the first rains. Seed to be used in tubestock will be propagated by a NIASA (Nursery Industry Accreditation Scheme) accredited nursery, with remaining seed to be retained for direct seeding. Seed not required to supplement rehabilitation will be stored in a cool dry place for potential future needs.

Tubestock used for planting should be suitably mature, between 6 to 12 months to enable optimal establishment and growth. Tubestock should also not be root bound. Tubestock planting should be undertaken as follows:

- location of tubestock should be chosen at the time of planting
- seedling should be planted so that the stem is vertical and the base of the plant is slightly below the original soil surface
- soil surrounding the seedling root ball should be pressed in firmly to avoid air pockets
- a minimum of three stakes and a protective guard manufactured for such purpose should be placed around the seedling to protect the vegetation from potential rabbit foraging and wind damage.

## 5. Monitoring

This section details monitoring requirements for both the Proposal site and off-site rehabilitation site.

### 5.1 Monitoring methodology

Monitoring quadrats will be established to enable monitoring data to be collected. 10 m by 10 m monitoring plots will be set up at each revegetation site, with installation occurring progressively, in line with on-ground activities. Each 10 m by 10 m plot will comprise five 1 m<sup>2</sup> monitoring quadrats for measuring completion criteria, which will be averaged across each site.

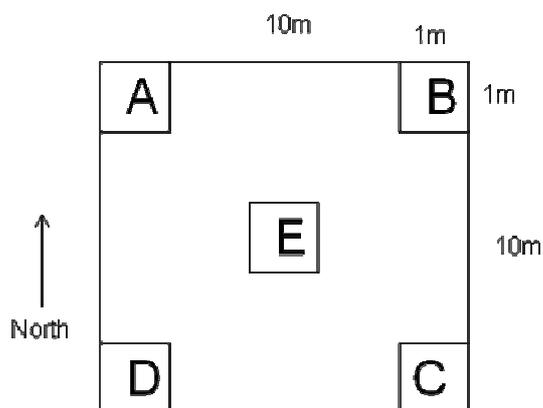


Figure 5 Rehabilitation monitoring quadrat setup

### 5.2 Monitoring actions

Table 7 details the monitoring program for revegetation to achieve the success criteria mentioned above.

Table 7 Monitoring program for on-site and offsite rehabilitation sites

| Item                 | Parameters  | Frequency                                   | Method              | Purpose   |
|----------------------|---|---|---------------------|---|
| <i>Proposal site</i> |   |   |                     |   |
| 1.                   | a. Plant density<br>b. Species richness<br>c. Number of suitable black cockatoo foraging species<br>d. Percentage cover (revegetation and weeds). | Annually until completion criteria are met. | Monitoring quadrats | <ul style="list-style-type: none"> <li>To monitor the emergence of seedlings, species richness, rehabilitation species diversity, and number of seedlings/plants</li> <li>To monitor establishment of vegetation and compare progress to success criteria</li> <li>To monitor the abundance of species suitable for future foraging use by Carnaby's Cockatoos and Forest Red-tailed Black Cockatoo.</li> </ul> |
| 2.                   | a. Weed species density<br>b. Weed species richness.  | Annually until completion criteria are met. | Monitoring quadrats | <ul style="list-style-type: none"> <li>To monitor weed richness and density/percentage cover</li> <li>To monitor weed growth in rehabilitation areas and compare to performance targets.</li> </ul>   |
| 3.                   | a. Erosion.   | Opportunistically.                          | Visual inspection   | <ul style="list-style-type: none"> <li>To monitor occurrence and extent of erosion.</li> </ul>  |

| Item                           | Parameters   | Frequency                                   | Method                                   | Purpose   |
|--------------------------------|--|---|--|---|
| 4.                             | a. Presence of dieback in susceptible species within rehabilitation area.  | Opportunistically.                          | Visual inspection                        | <ul style="list-style-type: none"> <li>To monitor presence and distribution of dieback in rehabilitation areas.</li> </ul>  |
| 5.                             | a. Integrity of perimeter fencing.   | Annually.                                   | Inspect perimeter of rehabilitation area | <ul style="list-style-type: none"> <li>To ensure fencing is sufficiently intact to prevent unauthorised access and fauna entry.</li> </ul>  |
| <i>Off-site rehabilitation</i> |  |   |  |   |
| 6.                             | a. Plant density<br>b. Species richness<br>c. Percentage cover of remnant vegetation and infill planting density<br>d. Number of suitable black cockatoo foraging species. | Annually until completion criteria are met. | Monitoring quadrats                      | <ul style="list-style-type: none"> <li>To monitor the emergence of seedlings, species richness, rehabilitation species diversity, and number of seedlings /plants</li> <li>To monitor establishment of vegetation and compare progress to success criteria</li> <li>To monitor success of infill planting</li> <li>To monitor the abundance of species suitable for future foraging use by Carnaby's Cockatoos and Forest Red-tailed Black Cockatoo.</li> </ul> |
| 7.                             | a. Weed species density<br>b. Weed species richness.   | Annually until completion criteria are met. | Monitoring quadrats                      | <ul style="list-style-type: none"> <li>To monitor weed richness and density/percentage cover</li> <li>To monitor weed growth in rehabilitation areas and compare to performance targets.</li> </ul>   |
| 8.                             | a. Erosion.  | Opportunistically.                          | Visual inspection                        | <ul style="list-style-type: none"> <li>To monitor occurrence and extent of erosion.</li> </ul>  |
| 9.                             | a. Presence of dieback in susceptible species within rehabilitation area.  | Opportunistically.                          | Visual inspection                        | <ul style="list-style-type: none"> <li>To monitor presence and distribution of dieback in rehabilitation areas.</li> </ul>  |
| 10.                            | a. Integrity of perimeter fencing.   | Annually.                                   | Inspect perimeter of rehabilitation area | <ul style="list-style-type: none"> <li>To ensure fencing is sufficiently intact to prevent unauthorised access and fauna entry.</li> </ul>  |

## 6. Contingency measures

Contingency actions will be initiated if monitoring indicates that management actions detailed for the Proposal site (Table 3) and the Off-site Rehabilitation site (Table 5) have not been successful or effective and/or success criteria are not being achieved (Table 8). Where contingency actions are required to be implemented, they will be reported on against as part of the EPBC Act annual environmental reporting requirements, as detailed in Section 8.

Table 8 Contingency actions for on-site and off-site rehabilitation sites

| Item | Trigger   | Action  |
|------|---|---|
| 1.   | Revegetation completion criteria detailed in Section 3.1.3 for the Proposal site and Section 3.2.3 for the offset site are not met. | <ol style="list-style-type: none"> <li>1. Identify cause.</li> <li>2. Implement approach to remedy cause, which could include: <ul style="list-style-type: none"> <li>• collecting additional provenance seed for direct seeding or plant propagation to compensate for the insufficient native plant species richness and/or cover</li> <li>• undertaking infill seedling planting and direct seeding</li> <li>• applying fertilisers or wetting agents</li> <li>• provide alternate species suitable to the site and provenance requirements.</li> </ul> </li> <li>3. Monitor success of remedy.</li> </ol> |
| 2.   | Weed cover increases in comparison to baseline weed mapping.  | <ol style="list-style-type: none"> <li>1. Investigate cause (e.g. adjacent sources of weed seed).</li> <li>2. Implement measures to prevent further weed infestations (e.g. screening fencing, weed control in adjacent land), as practicable.</li> <li>3. Undertake weed control activities as required.</li> </ol>  |
| 3.   | Erosion occurring.  | <ol style="list-style-type: none"> <li>1. Identify cause.</li> <li>2. Determine remedy in consultation with DPaW. Remedy may include application of a surface binding agent, such as 'hydromulch'.</li> <li>3. Fixing screening to surrounding fence.</li> </ol>  |
| 4.   | Dieback introduced to rehabilitation areas.   | <ol style="list-style-type: none"> <li>1. Confirm presence.</li> <li>2. Identify source.</li> <li>3. Undertake sampling to determine extent.</li> <li>4. Isolate area and prevent soil movement between infested and un-infested areas.</li> <li>5. Consult and expert on appropriate treatment and management.</li> <li>6. Undertake treatment if required.</li> <li>7. Install clean-down facilities if vehicle or personnel movement between areas is required.</li> <li>8. Review dieback management procedures on-site.</li> <li>9. Monitor success of control.</li> </ol>                               |
| 5.   | Unauthorised access (people and vehicles).  | <ol style="list-style-type: none"> <li>1. Ensure good maintenance of perimeter fence.</li> </ol>  |

## 7. Responsibilities

This section provides a summary of the key personnel involved in implementation of the Rehabilitation Management Plan and their roles and responsibilities.

### 7.1 Proponent responsibilities

Richard Noble, on behalf of GEH will be responsible for engagement of contractors to undertake the required rehabilitation activities. Richard Noble will be responsible for ensuring rehabilitation activities are implemented in accordance with the Rehabilitation Management Plan.

### 7.2 Contractor responsibilities

Contractors will be determined by Richard Noble and are required to undertake rehabilitation works in accordance with agreed scopes of works. Responsibilities of contractors are presented in the following sections.

#### 7.2.1 Botanist / rehabilitation expert

A botanist will be nominated by Richard Noble, on behalf of GEH. The botanist will be responsible for the following:

- surveying reference sites pre-clearing (Table 3)
- determining achievement against success criteria
- weed mapping of on-site and offsite areas.

#### 7.2.2 Dieback consultant

A dieback consultant will be nominated by Richard Noble, on behalf of GEH. This consultant will be responsible for dieback mapping of areas targeted for topsoil harvesting and receipt, prior to clearing.

#### 7.2.3 Rehabilitation contractor

A rehabilitation contractor will be nominated by Richard Noble, on behalf of GEH. The rehabilitation contractor will be responsible for:

- weed control on rehabilitation sites
- preparation of rehabilitation sites, including fencing
- seeding and infill planting
- street tree selection, planting and management.

## 8. Audit, review and reporting

Richard Noble will maintain accurate records of all rehabilitation activities taken on-site and at the off-site rehabilitation location for the duration of the rehabilitation program. These records will be made available to the DotE and City of Cockburn upon request.

Richard Noble will publish a report annually on their website, within three months of every 12 month anniversary of the commencement of construction, on the implementation of the RMP. This report will include management actions taken, the outcomes of annual monitoring and any contingency measures implemented. Richard Noble will advise the DotE of the publication of the report.

## 9. References

Ecoscope (Australia) Pty Ltd. 2009a, *Level 2 Vegetation Survey for Lots 13, 14, 18 Barfield Road and 48-51 Rowley Road, Hammond Park.*

Ecoscope (Australia) Pty Ltd. 2009b, *Fauna Survey for Lots 13, 14, 18 Barfield Road and 48-51 Rowley Road, Hammond Park.*

Groom C 2011, *Plants Used by Carnaby's Black Cockatoo*, [Online] Department of Environment and Conservation, available from: < <http://www.dec.wa.gov.au/management-andprotection/threatened-species/5983-plants-for-carnabys-search-tool.html>> [1 July 2013].

Keighery BJ 1994, *Bushland Plant Survey - A Guide to Plant Community Survey for the Community* Nedlands, Western Australia, Wildflower Society of WA (Inc.).



**Appendix 1**  
**Project area species list**



| Family         | Species                         |
|----------------|---------------------------------|
| ANTHERICACEAE  | <i>Caesia micrantha</i>         |
|                | <i>Chamaescilla corymbosa</i>   |
|                | <i>Corynotheca micrantha</i>    |
|                | <i>Laxmannia grandiflora</i>    |
|                | <i>Sowerbaea laxiflora</i>      |
|                | <i>Thysanotus patersonii</i>    |
| APIACEAE       | <i>Trachymene pilosa</i>        |
| ASPHODELACEAE  | <i>Podolepis gracilis</i>       |
|                | <i>Podotheca gnaphalioides</i>  |
|                | <i>Rhodanthe corymbosa</i>      |
|                | <i>Siloxerus humifusus</i>      |
| BORYACEAE      | <i>Borya sphaerocephala</i>     |
| CAMPANULACEAE  | <i>Wahlenbergia preissii</i>    |
| CASUARINACEAE  | <i>Allocasuarina fraseriana</i> |
|                | <i>Allocasuarina humilis</i>    |
| COLCHICACEAE   | <i>Burchardia congesta</i>      |
| CYPERACEAE     | <i>Caustis dioica</i>           |
|                | <i>Cyathochaeta avenacea</i>    |
|                | <i>Lepidosperma pubisquamum</i> |
|                | <i>Mesomelaena</i>              |
|                | <i>pseudostygia</i>             |
|                | <i>Schoenus clandestinus</i>    |
|                | <i>Schoenus curvifolius</i>     |
| DASYPOGONACEAE | <i>Calectasia narragara</i>     |
|                | <i>Dasyogon bromeliifolius</i>  |
|                | <i>Lomandra preissii</i>        |
| DILLENACEAE    | <i>Hibbertia huegelii</i>       |
|                | <i>Hibbertia hypericoides</i>   |
|                | <i>Hibbertia racemosa</i>       |
| DROSERACEAE    | <i>Drosera erythrorhiza</i>     |
|                | <i>Drosera macrantha</i>        |
|                | <i>Drosera menziesii</i>        |
|                | <i>Drosera zonaria</i>          |
| EPACRIDACEAE   | <i>Astroloma pallidum</i>       |
|                | <i>Conostephium pendulum</i>    |
|                | <i>Conostephium preissii</i>    |
|                | <i>Leucopogon</i>               |
|                | <i>conostephioides</i>          |
|                | <i>Leucopogon parviflorus</i>   |
| EUPHORBIACEAE  | <i>Phyllanthus calycinus</i>    |
| GOODENIACEAE   | <i>Dampiera linearis</i>        |
|                | <i>Goodenia caerulea</i>        |
|                | <i>Scaevola canescens</i>       |
| HAEMODORACEAE  | <i>Anigozanthos humilis</i>     |
|                | <i>Anigozanthos manglesii</i>   |
|                | <i>Conostylis aculeata</i>      |

| Family        | Species                           |
|---------------|-----------------------------------|
|               | <i>Conostylis juncea</i>          |
|               | <i>Conostylis setigera</i>        |
|               | <i>Conostylis</i> sp.             |
|               | <i>Phlebocarya ciliata</i>        |
| IRIDACEAE     | <i>Patersonia occidentalis</i>    |
| LAMIACEAE     | <i>Hemiandra pungens</i>          |
| LAURACEAE     | <i>Cassytha racemosa</i>          |
| LORANTHACEAE  | <i>Nuytsia floribunda</i>         |
| MIMOSACEAE    | <i>Acacia pulchella</i>           |
|               | <i>Acacia stenoptera</i>          |
| MOLLUGINACEAE | <i>Macarthuria australi</i>       |
| MYRTACEAE     | <i>Calytrix fraseri</i>           |
|               | <i>Eremaea asterocarpa</i>        |
|               | <i>Eremaea pauciflora</i>         |
|               | <i>Eucalyptus marginata</i>       |
|               | <i>Hypocalymma robustum</i>       |
|               | Indet.                            |
|               | <i>Kunzea glabrescens</i>         |
| ORCHIDACEAE   | <i>Caladenia arenicola</i>        |
|               | <i>Caladenia discoidea</i>        |
|               | <i>Caladenia flava</i>            |
|               | <i>Caladenia</i> sp.              |
|               | <i>Diuris brumalis</i>            |
|               | <i>Diuris magnifica</i>           |
|               | <i>Microtis</i> sp.               |
|               | <i>Pterostylis recurva</i>        |
|               | <i>Pterostylis vittata</i>        |
|               | <i>Thelymitra crinita</i>         |
|               | <i>Thelymitra macrophylla</i>     |
| PAPILIONACEAE | <i>Bossiaea eriocarpa</i>         |
|               | <i>Daviesia nudiflora</i>         |
|               | <i>Daviesia triflora</i>          |
|               | <i>Gastrolobium linearifolium</i> |
|               | <i>Gompholobium confertum</i>     |
|               | <i>Gompholobium</i>               |
|               | <i>tomentosum</i>                 |
|               | <i>Hovea pungens</i>              |
|               | <i>Hovea trisperma</i>            |
|               | <i>Jacksonia furcellata</i>       |
| POACEAE       | <i>Amphipogon turbinatus</i>      |
|               | <i>Austrodanthonia</i> sp.        |
|               | <i>Austrostipa compressa</i>      |
| PORTULACACEAE | <i>Calandrinia granulifera</i>    |
| PROTEACEAE    | <i>Adenanthos cygnorum</i>        |
|               | <i>Banksia attenuata</i>          |
|               | <i>Banksia dallanneyi</i>         |

| Family           | Species                          |
|------------------|----------------------------------|
|                  | <i>Banksia illicifolia</i>       |
|                  | <i>Banksia menziesii</i>         |
|                  | <i>Grevillea paniculata</i>      |
|                  | <i>Persoonia saccata</i>         |
|                  | <i>Petrophile linearis</i>       |
|                  | <i>Stirlingia latifolia</i>      |
|                  | <i>Synaphea spinulosa</i>        |
| RESTIONACEAE     | <i>Desmocladius fasciculatus</i> |
|                  | <i>Desmocladius flexuosus</i>    |
|                  | <i>Hypolaena exsulca</i>         |
|                  | <i>Lyginia barbata</i>           |
|                  | <i>Lyginia imberbis</i>          |
| RUBIACEAE        | <i>Opercularia vaginata</i>      |
| RUTACEAE         | <i>Philotheca spicata</i>        |
| SANTALACEAE      | <i>Leptomeria empetriformis</i>  |
| STACKHOUSIACEAE  | <i>Stackhousia monogyna</i>      |
| STYLIDIACEAE     | <i>Levenhookia stipitata</i>     |
|                  | <i>Stylidium brunonianum</i>     |
|                  | <i>Stylidium piliferum</i>       |
|                  | <i>Stylidium repens</i>          |
|                  | <i>Stylidium schoenoides</i>     |
| THYMELAEACEAE    | <i>Pimelea lehmanniana</i>       |
| XANTHORRHOEACEAE | <i>Xanthorrhoea preissii</i>     |
| ZAMIACEAE        | <i>Macrozamia riedlei</i>        |

Source: Ecoscape (2009)



**Appendix 2**  
**Streetscaping and POS planting**  
**palettes**



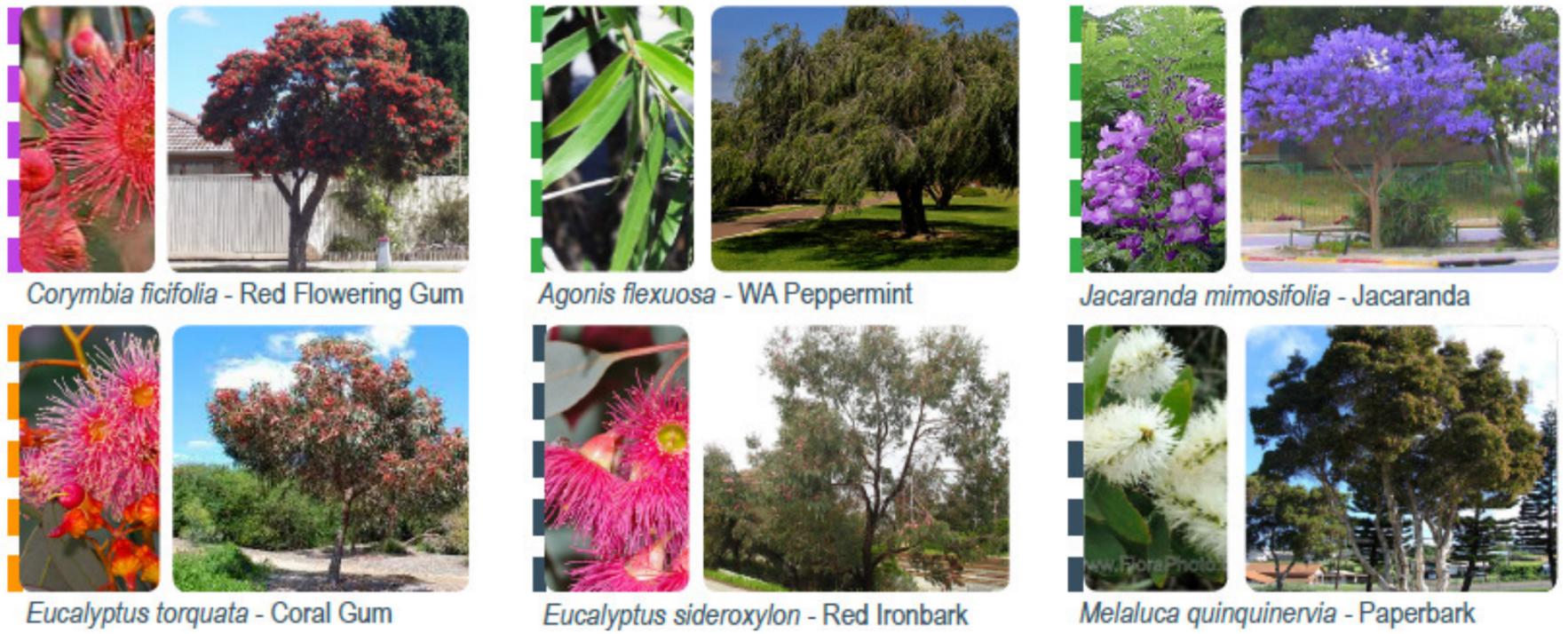


Plate 1 Streetscape planting palette



Plate 2 POS planting palette