



# REHABILITATING ROE 8

Rehabilitation Management Plan | March 2018

Version 2 - 2021



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It is with great pleasure that I table the Rehabilitation Management Plan for the Roe 8 Corridor.

The Rehabilitating Roe 8 Working Group, formed in May 2017, has worked with environmental and community engagement consultants to prepare the plan to rehabilitate the 18 hectares of land, which stretches from the Kwinana Freeway, past Bibra Lake to Stock Road.

The 'Rehabilitating Roe 8' project arose out of the community capacity stimulated during opposition to the construction of Roe 8 and the newly elected State Labor Government's commitment to rehabilitation of the cleared areas. Essentially, Rehabilitating Roe 8 aims to restore local native vegetation and fauna habitat to the cleared areas along the proposed Roe 8 alignment. However, Rehabilitating Roe 8 is not a typical restoration project. Due to the publicity and controversy surrounding the construction of Roe 8, the restoration of the cleared areas is a uniquely high profile endeavour for Perth and Western Australia, with a correspondingly high level of community and stakeholder engagement.

This will allow it to be implemented by the appropriate land use manager and shared with the hundreds of people who contributed to its formulation.

Importantly, this 10-year plan gives equal weight to the ecological and community needs of the Corridor.

It has been drafted with input from the general community, the scientific community, various levels of government and community groups, making it a unique collaboration for a once-in-Australia opportunity to rehabilitate cleared land.

It is based on the principles and guidance provided in The National Standards for the Practice of Ecological Restoration in Australia (Standards Reference Group SERA 2017), with input from the Perth Urban Restoration Scientific Advisory Committee.

I acknowledge the invaluable input of my colleagues within the Working Group, which has resulted in a comprehensive report that ensures a considered approach to rehabilitation in the Roe 8 corridor.

It was a privilege to chair the Working Group and I am thankful for the opportunity to be involved in such a unique and complex project.

Yours sincerely

**Lisa O'Malley MLA**

State Member for Bicton  
Chair of Rehabilitating Roe 8 Working Group



# Rehabilitation Management Plan

Roe 8 Cleared Areas

Project No: EP17-085

**Prepared for Rehabilitating Roe 8 Steering Committee  
March 2018  
Version 2 – August 2021**

# Rehabilitation Management Plan

## Roe 8 Cleared Areas



## Document Control

<b>Doc name:</b> Rehabilitation Management Plan Roe 8 Cleared Areas					
<b>Doc no.:</b> EP17-085(07)--003G RAW					
Version	Date	Author		Reviewer	
1	December 2017	Tom Atkinson	TAA	Jason Hick	JDH
	Draft to Rehabilitating Roe 8 Steering Committee for review				
A	December 2017	Rachel Omodei	RAO	Tom Atkinson	TAA
	Draft for review updated with minor changes following presentation of Rev 1 to Rehabilitating Roe 8 Steering Committee meeting				
B	February 2018	Rachel Omodei	RAO	Ashley Bird	ALB
		Tom Atkinson	TAA		
	Draft updated following review comments from the Rehabilitating Roe 8 Steering Committee				
C	February 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Draft updated with minor changes following presentation of Rev B to Rehabilitating Roe 8 Steering Committee meeting				
D	February 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Draft updated following review comments from the Rehabilitating Roe 8 Steering Committee				
E	March 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Final issued to the Rehabilitating Roe 8 Working Group				
F	August 2021	Rachel Weber	RAW	Tom Atkinson	TAA
	Annual review updates				
G	December 2021	Rachel Weber	RAW	Tom Atkinson	TAA
	Annual review updates – changes to cover page				

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# Rehabilitation Management Plan

## Roe 8 Cleared Areas

## Preface

*“Social aspects are critical to successful ecological restoration”*

*(Principle 6, Standards Reference Group SERA (2017))*

The ‘Roe 8’ extension of Roe Highway was a controversial and high profile road project for Western Australia. Prior to the suspension of Roe 8 on the 11 March 2017, approximately 18 hectares of native vegetation was cleared in Bibra Lake, North Lake and Coolbellup, Western Australia. The ‘Rehabilitating Roe 8’ project arose out of community capacity that was stimulated during opposition to Roe 8 and the newly elected Labor State Government's commitment to repairing the impacts of the clearing along the proposed alignment of Roe 8. The Rehabilitating Roe 8 project aims to repair both the social and ecological impacts that resulted from Roe 8's construction.

This document, the *Rehabilitation Management Plan Roe 8 Cleared Areas* (the RMP), has been prepared for the Rehabilitating Roe 8 Steering Committee, as part of the Rehabilitating Roe 8 project. It provides guidance on communications, engagement, involvement, restoration and monitoring activities associated with the social rehabilitation and ecological restoration of Roe 8 over a ten year period.

### Acknowledgment of Contributors

Several rounds of community and stakeholder consultation informed the preparation of the RMP. Important contributions were made to the RMP by members of the Rehabilitating Roe 8 Steering Committee, the Perth Urban Restoration Scientific Advisory Committee (PURSAC) and the many community members and stakeholders who participated in the consultation process.

The communications, engagement and involvement components of the RMP are designed using Creating Communities ‘rope model’, which aims to weave various stakeholder objectives, actions and outcomes into a compatible and coherent series of activities.

The restoration component of the RMP is designed with attention to the principles and guidance provided in *The National Standards for the Practice of Ecological Restoration in Australia* (Standards Reference Group SERA 2017).

### Acknowledgement of Country

The Rehabilitating Roe 8 Steering Committee and consultants Emerge Associates and Creating Communities acknowledge the Australian Aboriginal and Torres Strait Islander peoples of this nation. We acknowledge the traditional custodians of the lands on which our organisations are located and where we conduct our business. We pay our respects to ancestors and Elders, past and present.

In particular we would like to acknowledge that the Rehabilitating Roe 8 project area is Wadjuk country and pay respect to Elders and all Nyungar people, past, present and future. The Rehabilitating Roe 8 Steering Committee and consultants Emerge Associates and Creating

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Communities are committed to honouring Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land, waters and seas and their rich contribution to society.

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## Abbreviation Tables

*Table A1: Abbreviations – Organisations*

Organisations	
Main Roads WA	Main Roads Western Australia
DBCA	Department of Biodiversity, Conservation and Attractions
DoH	Department of Health
PURSAC	Perth Urban Restoration Scientific Advisory Committee

*Table A2: Abbreviations – units of measurement*

Units of measurement	
ha	Hectare
km	Kilometre
m	Metre
m <sup>2</sup>	Square metre

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## Roe 8 Cleared Areas

## Definitions

The following definitions are provided to help explain terminology used in this document:

- **Adaptive management** is used to refer to using learnings as the basis for decision making in a process of continuous improvement.
- **Attributes** (of an ecosystem) are used to refer to the biotic (living) and abiotic (inert) properties and functions of an ecosystem.
- **Structure** is used to refer to the physical organisation of biotic and abiotic elements in an ecosystem.
- **Community** is used generally in this plan and is inclusive of a diverse group made up of individuals, organisations and stakeholders. It includes 'communities of interest' made up of residents of adjoining areas, interested non-resident individuals and groups and custodians of the land.
- **Communications** are a range of methods through which the community and other stakeholders are kept informed as the Rehabilitation Management Plan progresses. These include, but are not limited to: project updates, promotion of upcoming community engagement activities, on-site signage, press releases, advertising, etc.
- **Composition** is used to refer to the array and relative proportion of organisms within an ecosystem.
- **Clearing** is used to refer to a substantial level of impact to vegetation as result of physical disturbance.
- **Ecosystem** is used to refer to small or large scale assemblage of biotic and abiotic components in oceans, rivers and on land in which the components interact to form complex food webs, nutrient cycles and energy flows.
- **Engagement** activities are those that seek information, feedback and decision-making from community members and other stakeholders.
- **Involvement** activities involve the participation of community members.
- **Monitoring** is the process of collecting and evaluating observations to measure changes and evaluate progress towards objectives.
- **Native species** (fauna) refers to any vertebrate or invertebrate taxa that naturally occurs within the site.
- **Native species** (flora) refers to vascular flora taxa identified on the 'associated species list' (refer **Section 7.2.3**).
- **Non-native species** refers to any fauna or flora taxa that does not meet the definition for native species.
- **Reference ecosystem** is used to refer to a real or notional community of organisms able to act as a model or benchmark for restoration. Standards Reference Group SERA (2017) define a reference ecosystem as usually representing a non-degraded version of the ecosystem. For the purposes of this document it is acknowledged that ecosystem values within parts of the site were already impacted prior to clearing having occurred for Roe 8.
- **Rehabilitation** is used in this document to refer to the repair of social/community impacts.
- **Restoration** is used in this document to refer to the process of returning an ecosystem that has been degraded, damaged or destroyed to a prior (better) condition.
- **Threat** is used to refer to a factor potentially or already causing degradation, damage or destruction.
- **Trajectory** (ecological) is used to refer to a pathway of development over time, which can be defined and monitored using sequential measurements of ecological attributes.
- **Treatment** (restoration) is used to refer to the interventions, actions or activities undertaken to achieve restoration.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

## 1 Introduction

### 1.1 Project background

The 'Roe 8' extension of Roe Highway was a contentious and high profile road project for Western Australia. Roe 8 was suspended on 11 March 2017 following a State government election, which resulted in the election of a Labor State Government that had committed to stopping the controversial project. Prior to the suspension of Roe 8, approximately 18 hectares (ha) of vegetation was cleared between December 2016 and February 2017 in the localities of Bibra Lake, North Lake and Coolbellup, Western Australia. This clearing was a source of significant concern for members of the community who were opposed to Roe 8 and was accompanied by multiple protests, legal challenges and broad media coverage.

The 'Rehabilitating Roe 8' project arose out of the community capacity that was stimulated during opposition to the construction of Roe 8 and the newly elected State Labor Government's commitment to the restoration of the cleared areas. Essentially, Rehabilitating Roe 8 aims to restore local native vegetation and fauna habitat to the cleared areas along the proposed Roe 8 alignment. However, Rehabilitating Roe 8 is not a typical restoration project. Due to the publicity and controversy surrounding the construction of Roe 8, the restoration of the cleared areas is a uniquely high profile endeavour for Perth and Western Australia, with a correspondingly high level of community and stakeholder engagement. Opposition to Roe 8's construction was circulated widely through activism, politics and media and was strengthened by the longstanding connection of community members to the wetlands and bushland along the proposed Roe 8 alignment. Community and stakeholder interest in Rehabilitating Roe 8 is therefore heightened and extends well beyond the local area.

Representations by community members to the State Government resulted in the formation of the 'Rehabilitating Roe 8 Working Group' to oversee the restoration of the cleared areas. The Rehabilitating Roe 8 Working Group and its sub-committee the 'Rehabilitating Roe 8 Steering Committee' have since coordinated the Rehabilitating Roe 8 project.

#### 1.1.1 Rehabilitating Roe 8 Working Group

The Rehabilitating Roe 8 Working Group was formed by the Minister for Transport; Planning; Lands in April 2017. The formation of this group occurred after the Cockburn Community Wildlife Corridor group met with the Minister and the Minister for Environment, Members for Fremantle, Willagee and Bickton as well as the Mayor of Cockburn, and presented a plan for the 'Kings Park of the South' with restoration requirements for the cleared areas.

The Rehabilitating Roe 8 Working Group oversaw the initial management of cleared areas including the removal of asbestos, mulch piles and some limestone tracks, weed management, installation of conservation fencing with public access gates, ongoing communications and a tender process for the preparation of a 'rehabilitation management plan'.

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## Roe 8 Cleared Areas

The Rehabilitating Roe 8 Working Group includes representatives from the following organisations:

- City of Cockburn
- Cockburn Community Wildlife Corridor
- Cockburn Wetlands Education Centre
- Conservation Council of WA
- Department of Biodiversity, Conservation and Attractions (DBCA)
- Main Roads WA and the Alliance
- Lisa O'Malley (Member for Bicton) (chair)
- Member for Willagee
- Minister for the Environment and Energy
- Minister for Transport; Planning; Lands
- Perth Urban Restoration Scientific Advisory Committee (PURSAC)<sup>1</sup>
- Traditional Custodians of Beeliar Regional Park.

### 1.1.2 Rehabilitating Roe 8 Steering Committee

The Rehabilitating Roe 8 Steering Committee was tasked with overseeing the preparation of a 'rehabilitation management plan' for the Roe 8 cleared areas. The Rehabilitating Roe 8 Steering Committee includes representatives from the following community and stakeholder organisations:

- City of Cockburn
- Cockburn Community Wildlife Corridor
- Cockburn Wetlands Education Centre
- Conservation Council of WA (chair)
- DBCA
- Lisa O'Malley (Member for Bicton)
- Main Roads WA
- Member for Bicton - Lisa O'Malley
- PURSAC.

## 1.2 Document purpose and scope

This document, the *Rehabilitation Management Plan Roe 8 Cleared Areas* (the RMP), has been prepared for the Rehabilitating Roe 8 Steering Committee, as part of the Rehabilitating Roe 8 project.

The twin purposes of the RMP are to provide guidance for coordinating community and stakeholder communications, engagement and involvement in restoration and related activities; and outline methods for conducting the restoration of cleared areas within the Roe 8 alignment, over a ten year period.

The RMP will be an adaptive document that can be altered and improved over time to best meet the goals and objectives of Rehabilitating Roe 8. The RMP therefore aims to provide a framework to achieve the 'social rehabilitation' and 'ecological restoration' desired by the Rehabilitating Roe 8 Working Group and Rehabilitating Roe 8 Steering Committee, following the clearing of areas along the proposed Roe 8 alignment.

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<sup>1</sup> A group facilitated by the Western Australian Biodiversity Science Institute (WABSI).

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

The communications, engagement and involvement components of the RMP have been designed using Creating Communities' 'rope model', which aims to weave various stakeholder objectives, actions and outcomes into a compatible and coherent string of activities.

The restoration component of the RMP has been designed with attention to the principles and guidance provided in *The National Standards for the Practice of Ecological Restoration in Australia* (Standards Reference Group SERA 2017) (hereafter referred to as the *Standards*).

### 1.2.1 Site boundary

A site boundary for the RMP is shown in **Figure 1**.

The site extends over an area of approximately 69.1 hectares (ha). The site boundary was defined to encompass cadastral parcels, or portions of cadastral parcels, within which clearing occurred as part of construction of Roe 8 or whose inclusion was considered beneficial to the restoration of cleared areas as part of an east/west corridor<sup>2</sup>.

Note that the site boundary may be revised in the future to accurately reflect the details of management agreements between Main Roads WA and any future management authority.

The site has historically been open to public access as road reserve or as part of the Beeliar Regional Park.

### 1.2.2 Structure of this document

Consistent with its dual purposes, this document has been prepared with the following structure:

- Section 2 – Goals and objectives
- Section 3 – Implementation
- Section 4 – Communications
- Section 5 – Engagement and involvement
- Section 6 – Restoration
- Section 7 – Monitoring, evaluation and reporting.
  
- **Appendix A** – Community and Stakeholder Feedback Report
- **Appendix B** – External Context Assessment Report
- **Appendix C** – Reference Ecosystem Identification and Baseline Inventory Report
- **Appendix D** – Community Questionnaire
- **Appendix E** – Rehabilitating Roe 8 Governance Structure
- **Appendix F** – Rehabilitating Roe 8 Event/Project Audit
- **Appendix G** – Forward Planning Recommendations
- **Appendix H** – Community Expectations Report
- **Appendix I** – Ecological Monitoring Method

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<sup>2</sup> Establishment of an east/west corridor is a community aspiration identified through consultation.

## 2 Targets, Goals and Objectives

*“Recovery of ecosystem attributes is facilitated by identifying clear targets, goals and objectives”*

*(Principle 3, Standards Reference Group SERA (2017))*

It is important to identify clear targets, goals and objectives for restoration projects to ensure that activities are focused and meaningful; and to facilitate the monitoring and evaluation of outcomes. The *Standards* define ‘targets’ as the ecosystems that restoration activities aspire to re-establish, ‘goals’ as the desired state of the ecosystem after restoration activities have been completed and ‘objectives’ as the immediate outcomes needed to achieve the targets and goals relative to specific spatial zones and timeframes (Standards Reference Group SERA 2017). Although not designed for application to social activities, the ‘target, goals and objectives’ model recommended by the *Standards* has been applied across the communication, engagement and involvement activities, as well as, the restoration activities identified in the RMP.

Specific objectives are, in particular, crucial to the implementation of the RMP, as they guide the scale and timing of activities and translate directly to the criteria used to evaluate project ‘success’ or ‘completion’. Necessarily, objectives are more specific than targets and goals, and must be stated in terms of measurable and quantifiable indicators and timeframes. For example a ‘goal’ may be to re-establish native vegetation within an area, while an ‘objective’ may be to establish a specific number of plants per unit area, of a particular species, within a specific time frame.

The Rehabilitating Roe 8 Steering Committee has endorsed the vision that “over a ten-year period of management, actions will transform the impacted corridor into a young but thriving range of ecological communities. These areas will be home to local biological diversity as well as become community spaces, allowing the public access to enjoy and respect the local environment via a connected pathway network” (Rehabilitating Roe 8 Steering Committee, July 2017).

The Rehabilitating Roe 8 Steering Committee confirmed that this vision corresponds with the primary goal for the ‘full ecological restoration’ of the indigenous ecosystems that were directly impacted by the clearing that occurred along the proposed Roe 8 alignment. However, in the first instance, the minimum goal for Rehabilitating Roe 8 should be to restore the indigenous ecosystems to a condition that is equivalent to that which was present before clearing occurred.

The Rehabilitating Roe 8 Steering Committee has also indicated that that the RMP shall have social outcomes. Substantial personal and community effort was involved in opposing the construction of Roe 8 and the clearing of vegetation along the Roe 8 alignment was a significant cause for concern for many community members and stakeholders. Targets, goals and objectives for social rehabilitation are therefore identified and, being a precursor to the aspiration to restore indigenous ecosystems, are hereafter dealt with first throughout the RMP.

## Rehabilitation Management Plan

### Roe 8 Cleared Areas

## 2.1 Social rehabilitation

### *“Social aspects are critical to successful ecological restoration”*

*(Principle 6, Standards Reference Group SERA (2017))*

Extensive community and stakeholder engagement was conducted between August and November 2017 to gain input into the RMP. Over 210 people provided input via meetings and events. Details of the community consultation activities and feedback obtained are presented in **Appendix A**.

The following engagement actions were completed to provide input into the RMP:

- Community representations to the State Government.
- Formation of the Rehabilitating Roe 8 Working Group, Rehabilitating Roe 8 Steering Committee and sub-committees.
- Contracting Emerge Associates and Creating Communities to develop the RMP.
- Rehabilitating Roe 8 Steering Committee input into the draft RMP.
- Fifteen (15) meetings with key stakeholders to understand background, context, relevance of the RMP and identify communications engagement, involvement, restoration activities.
- Engagement with Aboriginal Custodians to understand areas of cultural and personal significance and identify communications engagement, involvement and restoration activities.
- A ‘community open day’ to gain input into areas/locations of special personal significance, areas/locations that may require special treatment, how the community could receive communications, and identify the types of engagement and activities that community members would like to be involved in.
- A ‘stakeholder workshop’ to review key components of the draft RMP.
- Document revisions based on Rehabilitating Roe 8 Steering Committee and stakeholder feedback.

### 2.1.1 Communications, engagement and involvement goals

The following goals for communications, engagement and involvement are identified from the consultation and engagement on the RMP:

1. Recognise Aboriginal heritage and continued connection to land ensuring Nyungar culture is maintained at each step of the project.
2. Ensure the community has input into decision-making and into the roll-out of the project.
3. Ensure the community has opportunities for hands-on involvement in the implementation of the RMP.
4. Develop trust, alignment and a shared understanding of social rehabilitation aspect of the Rehabilitating Roe 8 project.
5. Honour and acknowledge the long and recent history of community and stakeholder involvement on the Rehabilitating Roe 8 project.
6. Regularly guide updates and adaptations to the RMP informed by engagement with community of interest and stakeholders.
7. Ensure communications are consistent, accessible and transparent from the outset of the implementation of the RMP.
8. Involve community in organisational activities.
9. Strengthen the unique community of interest and sense of place.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

### 2.1.2 Engagement and involvement objectives

Specific engagement and involvement objectives for the RMP are outlined in **Table 1**.

*Table 1: Engagement and involvement objectives*

Goal	Objectives
1. Recognise Aboriginal heritage and continued connection to land ensuring Nyungar culture is maintained at each step in the implementation of the RMP	1.1 The Traditional Owners and other key Aboriginal stakeholders support the Rehabilitating Roe 8 project's approach to Aboriginal heritage
	1.2 The Traditional Owners and other key Aboriginal stakeholders are further consulted and through consultation indicate support for any proposed update to the RMP's approach to Aboriginal heritage
	1.3 A full 'Aboriginal heritage survey' is completed within the first two years of implementation and the outcomes of that survey inform review of the RMP as required <sup>†</sup>
	1.4 A cultural protocol tool is developed through work with the Traditional owners and other Aboriginal stakeholders that outlines how Nyungar culture will be reflected in each step of the project
	1.5 An 'acknowledgement of country' recognises Nyungar culture at each step of the project
2. Ensure the community has input into decision-making and into the implementation of the RMP	2.1 Membership to the Rehabilitating Roe 8 Advisory Committee <sup>†</sup> is open to all interested community groups and individuals
	2.2 Term limits are established for members of the Rehabilitating Roe 8 Advisory Committee
	2.3 Invitation is extended every second year to the local community to join the Rehabilitating Roe 8 Advisory Committee
	2.4 At least 60% of respondents to the 'community questionnaire' <sup>†</sup> support the Rehabilitating Roe 8 project <sup>^</sup>
	2.5 At least 60% of respondents to the 'community questionnaire' <sup>†</sup> feel involved in the Rehabilitating Roe 8 project <sup>^</sup>
3. Ensure the community has opportunities for hands-on involvement in the implementation of the RMP	3.1 A range of different community organisations are given the opportunity to involve their members in implementation of the RMP
	3.2 Key stakeholder organisations identified in this plan are given the opportunity to involve their members in implementation of the RMP
	3.3 At least 60% of respondents to the community questionnaire having had the opportunity to be involved in RMP activities
4. Develop trust, alignment and a shared understanding of the RMP	4.1 At least 60% of respondents to the community questionnaire indicate that they understand the objectives of the Rehabilitating Roe 8 project

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 1: Engagement and involvement objectives (continued)

Goal		Objectives
5.	Honour, involve and acknowledge the long and recent history of community and stakeholder involvement on the Rehabilitating Roe 8 project during the implementation of the RMP	5.1 Community and stakeholder participation to date is acknowledged at the commencement of all engagement and involvement initiatives
6.	Regularly guide updates and adaptations to the RMP informed by engagement	6.1 Complete one review of the plan per year, informed by the community questionnaire and an analysis of other community and stakeholder feedback
		6.2 Using the adaptive management process, update and improve all components of the RMP as required
7.	Ensure communications are consistent, accessible and transparent from the outset of the implementation of the RMP	7.1 At least 60% of respondents to the community questionnaire indicate that communications are consistent, accessible and transparent
8.	Strengthen the unique community and sense of place associated with the site	8.1 Respondents to the community questionnaire give examples of strengthened community and sense of place in open-ended responses
		8.2 Incorporate a cultural/interpretive element into all management areas

†Refer Section 5.2

^refer Section 3.2

## 2.2 Ecological restoration

### 2.2.1 Target ecosystems

*“Ecological restoration practice is based on an appropriate local indigenous reference ecosystem”*

*(Principle 1, Standards Reference Group SERA (2017))*

Biological surveys undertaken prior to clearing occurring along the Roe 8 alignment and baseline monitoring surveys undertaken in 2017 were used to identify and characterise ‘target ecosystems’ for restoration (as detailed in **Appendix B** and **Appendix C**).

Broadly, two types of ecosystem occur within the site:

- ‘wetland’
- ‘banksia/eucalypt woodland’.

The banksia/eucalypt woodland ecosystem was further separated into six categories based on differences in species composition<sup>3</sup>. This resulted in the identification of one wetland and six banksia/eucalypt woodland target ecosystems, as outlined in **Table 2**.

<sup>3</sup> Provisionally based on overt differences in canopy or emergent species.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 2: Target ecosystems category and RMP labels

Ecosystem category	Ecosystem label
Wetland	Wet forest and woodland
Banksia/eucalypt woodland	Banksia woodland
	Banksia/jarrah woodland
	Holly-leaved banksia woodland
	Banksia/coastal blackbutt woodland
	Banksia/woody pear woodland
	Banksia/tuart woodland.

Detailed descriptions of each target ecosystem are provided in **Appendix C**.

### 2.2.2 Restoration goals

*“The goal of ecological restoration is full recovery, insofar as possible, even if outcomes take long timeframes or involve high inputs”*

*(Principle 4, Standards Reference Group SERA (2017))*

‘Primary’ and ‘minimum’ restoration goals are proposed for ‘cleared areas’ and ‘uncleared areas within 20m of cleared areas’<sup>4</sup>, as outlined in **Table 3**. The primary goals aim to optimise restoration outcomes within the site over the ten year implementation period such that the full ecological restoration of the site has the highest potential to be achieved in the long term. The intention of the minimum goals is to enable ‘completion’ of restoration activities to be evaluated within a practicable timeframe. Nevertheless minimum goals are still aligned with aspiration to achieve full ecological restoration over a long term time frame. Having primary and minimum restoration goals provides a reasonable basis for planning and implementation decisions and supports the evaluation of the ‘trajectory’ of restoration outcomes<sup>5</sup>.

<sup>4</sup> The Rehabilitating Roe 8 Steering Committee determined that restoration activities shall be conducted within cleared areas and a 20 m area surrounding cleared areas. Restoration is proposed within the 20 m area around cleared areas to limit threats and assist restoration of cleared areas.

<sup>5</sup> Although ten years is a relatively long time to operate a restoration project, ‘full recovery’ of the target ecosystems is unrealistic within a ten year period. Assessing the trajectory of restored ecosystem is an accepted approach for evaluating restoration performance (Standards Reference Group SERA 2017).

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 3: Restoration goals for cleared areas and uncleared areas within 20m of cleared areas within the site

Goal		Primary goal	Minimum goals
9.	Re-establish native vegetation within cleared areas and manage threats such that:	a) the condition of the restored native vegetation is better than that prior to clearing	b) the condition of the restored native vegetation is equal to or better than that prior to clearing
10.	Re-establish fauna habitat within cleared areas and manage threats such that:	a) the target ecosystems have the highest potential to be fully restored in the long term	b) the target ecosystems can reasonably be expected to be fully restored in the long-term
11.	Re-establish ecosystem function within cleared areas and manage threats such that:	a) the target ecosystems have the highest potential to be fully restored in the long term	b) the target ecosystems can reasonably be expected to be fully restored in the long-term
12.	Manage uncleared areas within 20m of cleared areas and manage threats such that:	a) the condition of the native vegetation is better than that prior to clearing	b) the condition of the native vegetation is equal to or better than that prior to clearing

### 2.2.3 Restoration objectives

Specific restoration objectives for cleared and uncleared areas (within 20m of cleared areas) are outlined in **Table 4**. These objectives are proposed in relation to the aforementioned restoration goals and information used to characterize the target ecosystems is presented in **Appendix C**.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 4: Specific objectives for restoration within the site

Goal	Primary objectives	Minimum objectives
9 Re-establish native <sup>a</sup> vegetation in cleared areas	<b>9.1a</b> Density (stems/unit area) of each important <sup>#</sup> native species $\pm 25\%$ of that recorded in reference sites	<b>9.1b</b> Density (stems/unit area) of each important <sup>#</sup> native species $\pm 50\%$ of that recorded in reference sites
	<b>9.2a</b> Count of native flora $\geq 90\%$ mean species richness identified for target ecosystem <sup>^</sup>	<b>9.2b</b> Count of native flora species richness $\geq 60\%$ mean species richness identified for target ecosystem <sup>^</sup>
	<b>9.3a</b> Cover (%) native understorey flora species $\geq 95\%$ of total understorey cover (%)	<b>9.3b</b> Cover (%) native understorey flora species $\geq 80\%$ of total understorey cover (%)
	<b>9.4a</b> Understorey cover (%) $\pm 25\%$ mean understorey cover (%) recorded in reference sites	<b>9.4b</b> Understorey cover (%) $> 50\%$ mean understorey cover (%) recorded in reference sites
10 Re-establish fauna habitat <sup>†</sup> in cleared areas	<b>10.1a</b> Frequency of records for native fauna species $\geq 100\%$ that recorded in baseline survey and/or reference sites <sup>&amp;n</sup>	<b>10.1b</b> Frequency of records for native fauna species $\geq 50\%$ that recorded in baseline survey and/or reference sites <sup>&amp;n</sup>
11 Re-establish ecosystem function <sup>†*</sup> in cleared areas	<b>11.1a</b> Cover (%) litter $\pm 25\%$ mean cover (%) recorded in reference sites	<b>11.2b</b> Cover (%) litter $\pm 50\%$ mean cover (%) recorded in reference sites
	<b>11.2a</b> Depth (cm) litter $\pm 25\%$ mean depth litter (cm) recorded in reference sites	<b>11.2b</b> Depth (cm) litter $\pm 50\%$ mean depth litter (cm) recorded in reference sites
	<b>11.3a</b> Cover (%) bare ground $\pm 25\%$ mean cover (%) recorded in reference sites	<b>11.3b</b> Cover (%) bare ground $\pm 50\%$ mean cover (%) recorded in reference sites
	<b>11.4a</b> Count of native flora species recorded as naturally recruited juveniles <sup>□</sup> $\pm 50\%$ that recorded in reference sites	<b>11.4b</b> Naturally recruited juveniles <sup>□</sup> of any native flora species recorded.
12 Manage native vegetation in uncleared areas within 20 m of cleared areas	<b>12.1a</b> Cover (%) native understorey flora species $\geq 95\%$ of total understorey cover (%)	<b>12.1b</b> Cover (%) native understorey flora species $\geq 80\%$ of total understorey cover (%)

<sup>a</sup>Native species defined as species identified in 'associated species list' that were identified from Keighery *et al.* (2012) sample plots nearby to the site and/or as naturally recruited species recorded during monitoring.

<sup>#</sup> 'Important' species currently comprise canopy and large shrub taxa only. The important species identified vary for each target ecosystem as outlined in **Table 24** (refer **Section 7.2.3.2**).

<sup>^</sup>Mean species richness derived from the 'associated species list' that were identified from Keighery *et al.* (2012) sample plots nearby to the site and/or as naturally recruited species recorded during monitoring.

<sup>†</sup>In addition to re-establishing native vegetation.

<sup>&</sup>Records of sightings, scats, diggings, tracks and/or foraging evidence by major vertebrate and invertebrate classes, as defined as appropriate by a fauna specialist during the 'level 2' fauna survey. Note at a minimum comparison should include ants.

<sup>^</sup>Where vegetation monitoring sites are not sufficient, additional fauna reference sites may need to be established during proposed 'level 2' fauna survey (see **Section 7.2**).

<sup>\*</sup>In addition to re-establishing fauna habitat.

<sup>□</sup>Juvenile defined as a germinant/seedling/sapling that has not yet flowered.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

## 3 Implementation

### 3.1 Key activities

Key categories of activities proposed to be implemented under the RMP include:

- communications (refer **Section 4**)
- engagement (refer **Section 5**)
- involvement (refer **Section 5**)
- restoration (refer **Section 6**)
- monitoring, evaluation and reporting (refer **Section 6.3.9**).

‘Communications’ comprise a range of activities through which the community and other stakeholders are kept informed as the RMP is implemented. These include, but are not limited to: project updates, promotion of upcoming community engagement activities, on-site signage, press releases and advertising.

‘Engagement’ activities seek information, feedback and input into decision-making from community members and other stakeholders into the RMPs operation, throughout the implementation of the RMP. These include, but are not limited to, surveys, open days, representation of stakeholder groups and in project governance arrangements.

‘Involvement’ activities include the act of participation of community members and stakeholders in the implementation of any or all of the activities identified in the RMP.

‘Restoration’ is the process of returning an ecosystem that has been degraded, damaged or destroyed to a prior (or improved) condition. Restoration includes, but is not limited to, activities such as plant establishment, weed control and fauna habitat creation/enhancement.

‘Monitoring’ is the process of collecting and evaluating observations to measure changes and evaluate progress towards objectives. Monitoring includes, but is not limited to, activities such as sampling and recording information, managing information, analyzing information; and evaluating and reporting information.

### 3.2 Community Engagement Coordinator/Project Manager

The following individual employee role(s) are identified as crucial to the implementation of the RMP:

- community engagement coordinator
- project manager.

The ‘community engagement coordinator’ role is responsible for the implementation of ‘communications’, ‘community engagement’ and ‘involvement’ activities under the RMP. The project manager role is responsible for the implementation of ‘restoration’ and ‘monitoring, evaluation and reporting’, which also comprises ‘involvement’.

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## Roe 8 Cleared Areas

The two roles are hereafter discussed as a combined **Community Engagement Coordinator/Project Manager**, which is identified as requiring 1.0 full-time equivalent (FTE) position for the first five years and provisionally identified as requiring 0.6 FTE position for the second five years of implementation.

The **Community Engagement Coordinator/Project Manager** is crucial to the implementation of the RMP. The **Community Engagement Coordinator/ Project Manager** will work with community and stakeholders, in a collaborative and adaptive manner, to achieve the stated goals and objectives of the RMP (**Section 2**).

### 3.3 Key stakeholders

The key stakeholders identified during community and stakeholder consultation as expecting to have roles in the implementation of the RMP include:

- City of Cockburn
- Cockburn Community Wildlife Corridor
- Cockburn Wetlands Education Centre
- DBCA
- PURSAC
- Main Roads WA
- Murdoch University
- Traditional Owners and Aboriginal Custodians.

Other important stakeholders are listed below, including those who may take on future roles and responsibilities under the RMP:

- Anti-Roe 8 activist groups
- Beeliar Regional Park Community Advisory Committee
- Communities of interest or who have a sense of place connected to the area
- Landcare groups
- Local community associations
- Local environmental groups
- Local Members of State Parliament
- Local residents
- Neighbouring local governments (City of Melville, City of Fremantle, City of Kwinana).
- Non-local environmental interest groups
- Other State Government Departments
- Primary schools
- Pro-Roe 8 activist groups
- Scientific and research community
- Secondary schools
- Tertiary education institutions
- Western Power (landowners immediately below powerlines in the Bibra Drive area)
- Young people and youth organisations.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Protocols for coordinating future involvement in the Rehabilitating Roe 8 project are outlined in **Section 5.2**.

### 3.4 Stakeholder roles and responsibilities

The following roles for stakeholders are identified as being relevant to the implementation of the RMP:

- 'Primary Management Authority'
- 'Secondary Management Authority'
- 'Funding Body'
- 'Project Administrator'
- 'Rehabilitating Roe 8 Advisory Committee' (RR8AC)
- 'Aboriginal Advisory Committee'
- Interested community participants/volunteers
- Scientific advisor(s)
- Specialist restoration contractor(s)
- Specialist monitoring contractor(s)
- Specialist native nurseries.

Note that the Primary Management Authority, Secondary Management Authority, Funding Body, Project Administrator and the **Rehabilitating Roe 8 Advisory Committee** are identified as being singular entities with defined roles with the governance arrangement. The '**Rehabilitating Roe 8 Advisory Committee**' (RR8AC) is identified to represent the community engagement group or forum that will succeed the Rehabilitating Roe 8 Working Group and Rehabilitating Roe 8 Steering Committee<sup>6</sup>.

Proposed roles and responsibilities for project stakeholders are outlined in **Table 5**. As more community members and stakeholders are engaged, a greater range of roles and responsibilities and/or new roles and responsibilities may be assigned.

*Table 5: Proposed stakeholder, individual employee and subcontractor roles and responsibilities*

Role	Stakeholder	Responsibility
Primary Management Authority	City of Cockburn	<ul style="list-style-type: none"> <li>• Management Authority for the road reserve parcels associated with the proposed alignment of Roe 8, provisionally defined by the boundary of the site (as shown in <b>Figure 1</b>)</li> <li>• Management Authority for parts of Beeliar Regional Park south of Hope Road and adjacent to the site</li> </ul>
Secondary Management Authority	DBCA	<ul style="list-style-type: none"> <li>• Management Authority for parts of Beeliar Regional Park north of Hope Road</li> </ul>
Funding Body	Main Roads WA	<ul style="list-style-type: none"> <li>• Administration of the funding agreement to implement the RMP on behalf of the State Government</li> </ul>

<sup>6</sup> The existing governance arrangement which operated in relation to the Rehabilitating Roe 8 Working Group and Rehabilitating Roe 8 Steering Committee will change following approval of the RMP.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 5: Proposed stakeholder, individual employee and subcontractor roles and responsibilities (continued)

Role	Stakeholder	Responsibility
Project Administrator	<ul style="list-style-type: none"> <li>City of Cockburn</li> </ul>	<ul style="list-style-type: none"> <li>Receipt of funding to implement the RMP</li> <li>Administration of funding to implement the RMP</li> <li>Administration and supervision of <b>Community Engagement Coordinator/Project Manager</b> role(s)</li> <li>Facilitation of RR8AC</li> <li>Facilitation of yearly review and revision of the RMP</li> <li>Coordination of project communication</li> <li>Custodian of project data</li> </ul>
Rehabilitating Roe 8 Advisory Committee	<ul style="list-style-type: none"> <li>City of Cockburn</li> <li>Cockburn Community Wildlife Corridor</li> <li>Cockburn Wetlands Education Centre</li> <li>PURSAC</li> <li>DBCA (Regional Parks)</li> </ul>	<ul style="list-style-type: none"> <li>Provision of advice on the implementation of the RMP</li> <li>Support the <b>Community Engagement Coordinator/Project Manager</b> roles(s)</li> <li>Assistance with coordinating inputs into the implementation of the RMP</li> <li>Receive reports on the progress of the RMP</li> <li>Coordination of the yearly review and revision of the RMP</li> </ul>
Aboriginal Advisory Group	<ul style="list-style-type: none"> <li>Traditional Owners</li> </ul>	<ul style="list-style-type: none"> <li>Communication to the broader Aboriginal community (groups such as the Cockburn Aboriginal Reference Group, Traditional Owners and Custodians noted in the community database)</li> <li>Communication with other members of the public when seeking broad representation</li> </ul>
Interested community members / participants / volunteers	<ul style="list-style-type: none"> <li>City of Cockburn</li> <li>Cockburn Community Wildlife Corridor</li> <li>Cockburn Wetlands Education Centre</li> </ul>	<ul style="list-style-type: none"> <li>Leadership/participation in engagement activities</li> <li>Leadership/participation in involvement activities</li> <li>Leadership/participation in restoration activities</li> <li>Leader/participation in monitoring activities</li> </ul>
Scientific advisor(s)	<ul style="list-style-type: none"> <li>PURSAC</li> </ul>	<ul style="list-style-type: none"> <li>Assistance and advice regarding the implementation of the RMP</li> </ul>
Specialist restoration contractor(s)	TBC	<ul style="list-style-type: none"> <li>Weed control</li> <li>Seed collection</li> <li>Tubestock installation</li> <li>Direct seeding</li> </ul>
Specialist monitoring contractor(s)	TBC	<ul style="list-style-type: none"> <li>Biological survey</li> <li>Fauna survey</li> <li>Monitoring survey</li> </ul>
Specialist native nursery	TBC	<ul style="list-style-type: none"> <li>Tubestock propagation</li> </ul>

### 3.5 Governance arrangement

A governance structure will be identified within the funding agreement between the Primary Management Authority and Funding Body that describes a role for interested community members and stakeholders to provide advice and receive reports on progress on the RMP.

### 3.6 Minimum standards

Minimum standards for implementation of the RMP are outlined in **Table 6** (adapted from Standards Reference Group SERA (2017)).

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## Roe 8 Cleared Areas

Table 6: Minimum standards for implementation (adapted from Standards Reference Group SERA (2017)).

### Minimum standards for implementation of the RMP

1. No further and lasting damage shall be caused to land, water or ecosystems within the site, including physical damage, chemical pollution or biological contamination.
2. No further and lasting damage shall be caused to culture, community and community sense of place
3. Communication, engagement, involvement and restoration activities shall be interpreted and carried out responsibly, effectively and efficiently by suitably qualified, skilled and experienced people; or people who are under the supervision of a suitably qualified, skilled and experienced person.
4. All activities shall be undertaken in a manner that is responsive to natural processes and fosters and protects natural recovery. Primary treatments including substrate and hydrological amendments, pest species control, application of recovery triggers and biotic reintroductions shall be adequately followed up by secondary treatments as required.
5. Corrective changes of direction in response to unexpected ecosystem responses shall be facilitated in a timely manner and shall be ecologically informed and documented.
6. All activities shall exercise full compliance with occupational work, health and safety legislation and all other legislation including that relating to soil, air, water, oceans, heritage, species and ecosystem conservation.
7. The project representatives shall communicate regularly with key stakeholders and the general public to keep them informed of progress.

## 3.7 Management areas

To aid communication eight (8) management areas represent portions of the site separated by roads or practical management boundaries. East to west across the site these management areas are labelled<sup>7</sup>:

- Bibra Drive
- Hope Road North
- Turtle Corner
- North Lake Road East
- North Lake Road West
- Forrest Road South
- Forrest Road North
- Stock Road West.

The location of the management areas is shown **Figure 2**.

The management areas are identified to provide boundaries to the consideration of management activities, but do not indicate that management will be conducted across the entire site or that involvement is limited to activities that occur within the site.

## 3.8 Access

The management agreement for the site is expected to propose that the site is managed as public open space. The site is open to the public and no prior authorisation is required in order to enter the site on foot. As outlined in **Section 5.2** prior authorisation shall be obtained from the management

<sup>7</sup> These labels are nominal and in future local names may be applied which better reflect community and stakeholder connection and sense of place.

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## Roe 8 Cleared Areas

authority to bring vehicles, machinery or materials into the site or to perform activities which ordinarily require consent of a landholder or management authority (for example construction works or weed control).

Conservation fencing<sup>8</sup> has been erected around all or parts of each management area, except Turtle Corner, as shown in **Figure 3**. This fencing limits unauthorised access to the site. In the Bibra Drive and Hope Road North management areas rabbit proof fencing mitigates the threat posed by rabbit herbivory to revegetation (refer to discussion of threats provided in **Appendix B**).

Gates have been installed in the conservation fencing at a number of locations, including pedestrian entry points and locked vehicle gates. Additional locations for gates and pedestrian entry points are proposed where fencing interrupts the route of an existing or proposed path. The locations of existing and proposed gates are shown in **Figure 3**.

A network of existing and proposed pathways is identified to provide a route for authorised vehicles and pedestrians across the site. New paths are proposed within management areas based on consideration of:

- historical and pre-existing paths within cleared areas
- the alignment of machine and vehicle tracks, as identified in **Appendix B**.
- existing and proposed firebreaks
- locations of recently installed fencing and gates.

The primary path is proposed to be constructed from compacted limestone to create a formal pathway through the site. Other paths and firebreaks are proposed to be constructed and maintained from *in situ* soils or limestone, as appropriate. The location of existing and proposed paths is shown in **Figure 3**. Along with formalising access, these paths will provide management edges for restoration activities and fire control<sup>9</sup>.

### 3.9 Construction and maintenance

The following activities are identified that require implementation but are not directly related to communications, engagement, involvement, restoration or monitoring:

- path construction
- path maintenance
- fence maintenance
- signage maintenance
- general maintenance.

Where possible, completion of these activities should assist and compliment the implementation of other activities. For example, path construction may include installation of permanent markers that corresponded to restoration area boundaries.

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<sup>8</sup> To Management Authority standard.

<sup>9</sup> Restoration area boundaries should be marked along path alignment to assist in orientation.

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### 3.10 Adaptive management framework

A collaborative and adaptive approach is proposed to the implementation of the RMP. In adaptive management the outcomes of implementation are monitored and learning is incorporated into planning and future management in a process of continuous improvement (Standards Reference Group SERA 2017). An adaptive management framework for the RMP is illustrated in **Plate 1**. The **Community Engagement Coordinator/Project Manager** is identified as having a crucial role in the adaptive management of the Rehabilitating Roe 8 project.



Plate 1: Adaptive management framework showing key stakeholders and roles

As part of annual review and planning, advice shall be sought from subject matter specialists including interested community and stakeholders, PURSAC and/or external specialist contractors. The acceptability of any proposed modification to the RMP should be confirmed with the Primary Management Authority, Secondary Management Authority and Funding Body.

All parts of the RMP are potentially modifiable. However, changes to the specified goals and objectives should only be considered after extensive consultation with community and stakeholders. Where it is demonstrated that the specified activities have been ineffective, alternative activities should be investigated as part of the annual review and evaluation component of the adaptive management approach. Methods that are considered to better achieve desired outcomes can be routinely adopted during annual planning and implemented during successive annual programs.

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### 3.11 Contingency

Contingency actions should only be required in extraordinary circumstances, where it is demonstrated that the operative adaptive management approach is unable to resolve an issue facing the project. In the event that contingencies are required, advice shall be sought from subject matter specialists including community members and stakeholders, PURSAC and/or external specialist contractors.

### 3.12 Program of works

A proposed yearly schedule of implementation for communication, engagement, involvement restoration and monitoring activities is provided as **Table 7**.

Table 7: Proposed annual schedule of RMP implementation

Category	Activity	Annual timing (approx.)											
		J	F	M	A	M	J	J	A	S	O	N	D
Communications	Update community database	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Update stakeholder database	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Update RR8 website	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Update City of Cockburn website	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Review and update Rehabilitating Roe 8 branding	✓											
	Review and update information				✓						✓		
	Publish promotions and/or articles in local newspapers	As appropriate											
	Create and distribute posters, banners and/or flyers	As appropriate											
	Maintain site signage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Monitor scientific communications pathways for opportunities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engagement and Involvement	Explore opportunities for Aboriginal and local employment and training	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	RR8AC regular meeting <sup>#</sup>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	RR8AC annual meeting <sup>#</sup>		✓										
	Update RMP (where required)		✓	✓	✓								
	Community education (e.g. workshops, training programs)	Items and timing TBC											
	Community science conference	As appropriate											
	Partnerships with City of Cockburn events	As appropriate											
	Partnerships with Cockburn Wetlands Education Centre	As appropriate											
	Maintain partnerships with tertiary education institutions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Community open day(s) and community planting days					✓	✓	✓					

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Table 7: Proposed annual schedule of RMP implementation (continued)

Category	Activity	Annual timing (approx.)											
		J	F	M	A	M	J	J	A	S	O	N	D
Restoration	Collect or source local provenance seed	✓	✓	✓							✓	✓	✓
	Place tubestock order										✓	✓	✓
	Apply direct seeding (TBC)					✓	✓						
	Plant tubestock					✓	✓	✓					
	Weed control - 1 (general - manual or broad spectrum blanket and spot spray)				✓	✓	✓	✓		✓	✓	✓	
	Weed control - 2 (bulb - selective blanket and spot spray)						✓	✓	✓	✓			
	Weed control - 3 (grass - selective blanket or spot spray)						✓	✓	✓				
	Weed control - 4 (general – manual or broad spectrum spot spray)	✓		✓									
	Review and maintain conservation access (fences, gates and paths)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monitoring, Evaluation and Reporting	Produce annual report and community score card								✓				
	Undertake 'community questionnaire'											✓	✓
	Citizen science/community monitoring	Program and timing TBC											
	Monitoring (weed mapping)									✓	✓		
	Monitoring (photopoints)					✓						✓	
	Monitoring (restoration areas)				✓	✓				✓	✓		
	Monitoring (fauna surveys)~				✓	✓				✓	✓		
	Data analysis, QA and entry into databases					✓					✓	✓	✓
	Produce summary report for informal reporting <sup>#</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Produce annual internal monitoring report						✓						✓
	Evaluation of annual progress and forward planning	✓	✓										✓
	Evaluation of RMP outcomes against goals	✓	✓										✓
Update RMP (where required)	✓	✓										✓	

<sup>#</sup>=Frequency of meetings may be reduced after year 1 of the RMP, <sup>~</sup>Programmed for four out of ten years timing TBC.

A proposed yearly schedule of implementation for communication, engagement, involvement, restoration and monitoring activities is provided in **Table 8** to **Table 11**.

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Table 8: Proposed schedule of RMP implementation per year - communication

Category	Activity/tool	Activity	Year										
			1	2	3	4	5	6	7	8	9	10	
Communication	Community database	Update and maintain	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Stakeholder database	Update and maintain	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Rehabilitating Roe 8 brand	Review and update	✓		✓								
	RR8 website	Review and update	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	'Frequently asked questions' and information booklet	Develop	✓										
		Update		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	City of Cockburn website	Update and monitor	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Local newspapers	Publish promotions and articles	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Posters, banners and flyers	Create and distribute	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Site signage	Install	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Maintain		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Annual community report card	Produce	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Scientific communications pathways	Use to inform of opportunities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Table 9: Proposed schedule of RMP implementation per year – engagement and involvement

Category	Activity/tool	Activity	Year											
			1	2	3	4	5	6	7	8	9	10		
Engagement and involvement	Aboriginal heritage survey	Undertake	✓	✓										
	Aboriginal employment and training	Seek opportunities as required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Local employment and training	Seek opportunities as required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Governance structure	Develop	✓											
		Revise		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Rehabilitating Roe 8 Advisory Committee	Determine committee members	✓											
		Hold meeting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Community education		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Citizen science/community monitoring	Develop program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Local community adoption of restoration areas	Develop program	✓	✓	✓									
		Undertake activities			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Community science conference	Planning	✓	✓										
		Hold conference		✓		✓		✓		✓		✓		✓
	City of Cockburn events	Partnerships	Dependent on appropriate events											
Cockburn Wetlands Education Centre	Partnerships	Dependent on appropriate events												
Tertiary education institutions	Partnerships	TBC												
Open days	Hold open day	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

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Table 10: Proposed schedule of RMP implementation per year - restoration

Category	Activity/tool	Activity	Year											
			1	2	3	4	5	6	7	8	9	10		
Restoration	Seed	Seek advice from an experienced restoration contractor in regards to potential future seed collection in the site	✓											
		Seed collection	✓	✓	✓	✓	✓	✓	✓	✓	✓			
		Source local provenance seed	✓	✓	✓	✓	✓	✓	✓	✓	✓			
		Apply direct seeding		✓	✓									
	Tubestock	Place tubestock order	✓	✓	✓	✓	✓	✓	✓	✓	✓			
		Plant tubestock (incl. community planting days)	✓	✓	✓	✓	✓	✓	TBC					
		Plant tubestock (incl. community planting days) – infill planting	✓	✓	✓	✓	✓	✓	TBC					
	Weed control	Manual or herbicide weed control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Site security and access	Construct path ways through management areas	✓	✓	✓	✓	✓							
		Review and maintain conservation fencing , gates and path ways	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

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Table 11: Proposed schedule of RMP implementation per year - monitoring, evaluation and reporting

Category	Tool/category	Activity	Year												
			1	2	3	4	5	6	7	8	9	10			
Monitoring, Evaluation and Reporting	RR8 website	Record feedback	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Community questionnaire	Design community questionnaire	✓												
		Undertake community questionnaire	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Citizen science/community monitoring	Undertake monitoring		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Monitoring	Weed mapping	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Photopoints	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Restoration areas (including permanent plots)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Fauna survey <sup>†</sup>	✓	✓							✓	✓			
		Database management and analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reporting and evaluation	Reporting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Evaluation of annual progress and forward planning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Update RMP (where required)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Evaluation of RMP outcomes against goals													✓

<sup>†</sup>Comprehensive EPA (2016) 'level 2' equivalent.

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## 4 Communications

### 4.1 Key messages

Communications shall reinforce the key messages informed by engagement with community members and other key stakeholders outlined in **Table 12**.

*Table 12: Key messages informed by engagement with community members and other key stakeholders.*

Theme	Message
Aboriginal heritage and continued connection to land	Recognition of Aboriginal heritage and continued connection to land is crucial to the RMP. The following are key messages identified during engagement with Traditional Elders: "Nyungars everywhere gathered here" "The Lakes have been well-preserved but not the culture"
	In regards to the rehabilitation – "we can fix this, but tell the story first." Get important cultural things right, like returning places to their Nyungar names, before starting the rehabilitation.
	There needs to upfront recognition of the significance of the area, including the heritage, culture and stories associated with the site and the wider region
	It is important that any stories told through engagement with Aboriginal people are recognised as the stories of those Aboriginal people and that the rights to peoples' own stories are not impinged.
Project governance and communities of interest	The communities of interest for this project include adjoining residents and communities as well as interested individuals, groups and traditional custodians of the land.
	To date the project has been managed by the Rehabilitating Roe 8 Working Group and the Rehabilitating Roe 8 Steering Committee. This governance structure is likely to change in the future and will be clearly communicated when this happens.
Rehabilitating Roe 8 Project	The Rehabilitating Roe 8 project is embarking on the next phase.
	Extensive stakeholder and community engagement has been conducted to gain input into the RMP.
	The cleared areas which this plan relates to are part of the broader Cockburn Community Wildlife Corridor vision. The <i>Community Wildlife Corridor Briefing Paper 2017</i> is a key document that has informed the RMP.
	The RMP recommends adaptive management; hence, it will be updated as required. Any updates will be informed by a robust review process, community and stakeholder engagement, and increased knowledge and awareness.
Security of tenure	The site is currently zoned as a road reserve. There is a desire from the majority of stakeholder groups to see this land reserved for Parks and Recreation under the <i>Metropolitan Region Scheme</i> to increase certainty of restoration and future conservation.
Communication from and with the scientific community	There is a great opportunity to communicate all upcoming research opportunities with scientific groups and tertiary institutions.
	The research, social rehabilitation and ecological restoration journey of this unique project must be communicated to the scientific and broader communities to inform future restoration projects.

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### 4.2 Communication approach

The following communication tools are proposed to be used to convey the above project messages:

- community database
- stakeholder database
- Rehabilitating Roe 8 brand
- Rehabilitating Roe 8 website
- e-newsletter
- booklet with 'frequently asked questions'
- City of Cockburn website
- local newspapers
- posters, banner and flyers
- site signage
- annual community report card and E-newsletter.

A description of each communication tool, timing and target audience is detailed in **Table 13**.

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Table 13: Communications tools and approaches

Tool / Method	Description	Time / Frequency	Who is targeted	Information promoted through this method?
Community database (refer <b>Appendix A</b> )	<ul style="list-style-type: none"> <li>Use the database to connect directly with community members who have signed up to receive project updates.</li> <li>Primarily used for email updates but potential for mail/phone updates if necessary.</li> <li>Details may be sourced through RSVPs and sign-in sheets at engagement and involvement activities.</li> </ul>	<ul style="list-style-type: none"> <li>Original community database supplied in December 2017.</li> <li>Updates to continue throughout life of project.</li> </ul>	Community members who have signed up to receive project updates. N.B privacy laws prevent including people who have not consented to being on the database.	All upcoming activities and subsequent outcomes to be distributed to the whole community database, with the exception of activities that target proximate residents only.
Stakeholder database (refer <b>Appendix A</b> )	<ul style="list-style-type: none"> <li>Existing stakeholders and stakeholder channels including Facebook pages of environmental and community groups.</li> <li>Details may be sourced through RSVPs and sign-in sheets at engagement and involvement activities, and through direct contact with stakeholders.</li> </ul> <p>NOTE: Traditional Owners and Aboriginal Custodians may be engaged through the City of Cockburn Aboriginal Reference Group, Traditional Owners, City of Kwinana, City of Melville.</p> <p>NOTE: Local businesses may be engaged through the Melville-Cockburn Chamber of Commerce.</p>	<ul style="list-style-type: none"> <li>Original community database supplied in December 2017.</li> <li>Updates to continue throughout life of project.</li> </ul>	Stakeholder organisations	All upcoming activities and subsequent outcomes to be distributed to relevant organisations in the database.
Rehabilitating Roe 8 brand	<p>Review and update the Rehabilitating Roe 8 branding, including:</p> <ul style="list-style-type: none"> <li>logo</li> <li>project name</li> <li>site name</li> <li>names of management areas.</li> </ul>	Following Aboriginal Heritage Study and first 'community questionnaire'.	All community members and other stakeholders.	To be used in all following communication materials.

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Table 13: Communications tools and approaches (continued)

Tool / Method	Description	Time / Frequency	Who is targeted	Information promoted through this method?
RR8 website	<p>Update the rehabilitating Roe 8 website to include the following components</p> <ul style="list-style-type: none"> <li>• Project background</li> <li>• Information downloads (<i>Rehabilitation Management Plan</i>, FAQs and Information)</li> <li>• Project updates</li> <li>• Program of upcoming community engagement and involvement activities</li> <li>• Links to partner organisation website (update existing “links” page)</li> <li>• Registration form to be part of community database may be used as a platform for the online survey if website has the capacity</li> <li>• Project dashboard based on report card (see below) that can include fast and slow moving variables and show information from formal and informal (citizen science) monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• Developed in early 2018</li> <li>• Regular updates and monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• Partner organisations</li> <li>• Key stakeholder groups</li> <li>• Highly interested and invested community members</li> </ul>	<p>Primarily, the website shall be utilised for background information that is relatively static, and as a platform for online engagement where possible.</p> <p>Broad communications cannot be achieved through a website as visitors are unlikely to be frequent or regular. Upcoming activities and subsequent outcomes shall be placed on the website, but the website shall not be considered the primary tool for communicating these important messages.</p>
Frequently Asked Questions and Information	<p>Develop draft ‘frequently asked questions’ and information booklet, include general project information, and questions frequently asked by stakeholders during the both formal and informal engagement (related to rehabilitation, citizen science, engagement and involvement opportunities). This information shall be available in hard copy and online. These key project information and FAQ materials shall be produced as early as possible in the process and can be updated as the project progresses so that additional feedback can inform future questions.</p>	Early 2018, reviewed 6-monthly	Community members with limited background knowledge of the project	Frequently asked questions and background information booklet.
E-newsletter	Produce email newsletter with information on activities and events occurring within the site.	Bi-monthly	<ul style="list-style-type: none"> <li>• Partner organisations</li> <li>• Key stakeholder groups</li> <li>• Community members</li> </ul>	Activities and events (recent and upcoming).

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Table 13: Communications tools and approaches (continued)

Tool / Method	Description	Time / Frequency	Who is targeted	Information promoted through this method?
City of Cockburn website	Liaise with the City of Cockburn to utilise the City's website.	Monthly	City of Cockburn residents	All upcoming activities and subsequent outcomes to be shared on City of Cockburn website, with the exception of activities that target proximate residents only.
Local newspapers	<ul style="list-style-type: none"> <li>Promotions of upcoming activities via advertisement or flyer as an insert.</li> <li>Key outcomes and milestones via articles/press releases.</li> </ul>	<ul style="list-style-type: none"> <li>Upcoming activities approximately monthly</li> <li>Key outcomes and milestones approximately 3 times annually.</li> </ul>	Local residents	Upcoming activities that involve broad community input Key outcomes and milestones of interest to the broader community.
Posters, banners and flyers	Promotions of upcoming activities via advertisement	As required	Local residents and visitors	Upcoming activities that shall involve local community input.
Signage on Site	On-site signage regarding rehabilitation information, access (e.g. dogs required to be on leads) and science communications (e.g. signage regarding local flora and fauna, outcomes of local research). NOTE: There is the potential to use signposts as reference points indicating the corners of monitoring plots Signage within Beeliar Regional Park should be in the appropriate Regional Park format.	Access and rehabilitation signage as required. Science communications signage may be permanent.	Local residents and visitors	<ul style="list-style-type: none"> <li>Rehabilitation information</li> <li>Access (including limitations due to sensitivity and research)</li> <li>Science communications.</li> </ul>

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Table 13: Communications tools and approaches (continued)

Tool / Method	Description	Time / Frequency	Who is targeted	Information promoted through this method?
Annual community report card	Produce a brief (3-4 page) annual community report card to show what is being achieved. Recommend including a one page dashboard summarising key 'community questionnaire' results, and at least one page of visual feedback showing the progress of rehabilitations(e.g. map showing how close each plot is to completion).	Annually	<ul style="list-style-type: none"> <li>Community members who have signed up to receive project updates</li> <li>Stakeholder organisations</li> <li>Local residents</li> </ul>	Summarise rehabilitation milestones, the findings of engagement, key involvement activities and research and scientific outcomes.
Scientific communications pathways	Utilise PURSAC and tertiary institutions to informing the scientific and community of upcoming research opportunities and research/rehabilitation outcomes.	As required for relevant activities	<ul style="list-style-type: none"> <li>Scientists</li> <li>Students</li> </ul>	Research opportunities and research/rehabilitation outcomes.

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#### 4.3 Communication protocols

##### 4.3.1 Authorised spokespeople

It is important that a spokesperson or spokespeople be appointed as a contact for the media and other external sources. This may include the **Community Engagement Coordinator/Project Manager** and/or an individual or individuals identified by the Project Administrator within the agreed governance arrangement (**Section 3.5**).

##### 4.3.2 Responding to media enquiries

All responses to media enquiries shall be directed through the authorised spokesperson/spokespeople identified by the Project Administrator within the agreed governance arrangement. This person will then notify the other Rehabilitating Roe 8 Advisory Committee or analogous group of the enquiry. Generally the member organisation responsible for the particular issue under enquiry will prepare a response and circulate it for comment to the other group members prior to release (where time permits).

##### 4.3.3 Responding to individual public enquiries

All public enquiries may be answered by the **Community Engagement Coordinator/Project Manager**, Rehabilitating Roe 8 Advisory Committee or representatives of the key stakeholder organisation receiving the enquiry. Other key stakeholders or committee members shall be consulted if anything in the enquiry or response is considered potentially controversial. If necessary, the respondent may liaise with the authorised spokesperson/spokespeople identified by the Project Administrator within the agreed governance arrangement.

##### 4.3.4 Content of public comment (including responses to media enquiries)

All public comment, from whichever Rehabilitating Roe 8 Advisory Committee or key stakeholder organisation, must be consistent with the key messages outlined within this document (which may be updated as the RMP is adapted).

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## 5 Engagement and Involvement

### 5.1 Engagement and involvement approach

An extensive community and stakeholder engagement process was conducted between August and November 2017 (detailed in **Appendix A**) to gain input into this RMP. During this community and stakeholder engagement process the primary activities outlined in **Table 14** were recommended.

*Table 14: Summary of community engagement and involvement activities to be undertaken.*

Initiative	Engagement	Involvement
Explore opportunities for local and local Aboriginal employment and training	✓	✓
'Community questionnaire'	✓	
Community science conference	✓	
Develop governance structures that allow input from community and other stakeholders in decision-making, and revise this structure annually	✓	
Open days	✓	
Rehabilitating Roe 8 Advisory Committee meetings	✓	
Review and update RMP	✓	
Community education related to rehabilitation		✓
Community planting, weeding, watering and monitoring		✓
Creation of 'tribes' of locals caring for and monitoring sections near their homes		✓
Partner with schools and tertiary institutions		✓
Partnerships with City of Cockburn events		✓
Partnerships with Cockburn Wetlands Education Centre events/programs		✓

It was identified during engagement that the absence of an Aboriginal heritage study for the site is a significant constraint. An Aboriginal heritage study has been completed and will inform future protection measures within the site.

For other KPI's linked to engagement and involvement the following four key tools are proposed to measure achievement of objectives from the RMP:

- Community survey
- Aboriginal feedback
- Event audits
- Annual reporting.

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## 5.2 Engagement and involvement activities

### 5.2.1 Aboriginal heritage survey

Consultation with Aboriginal stakeholders and other stakeholders has reinforced the need for the Aboriginal heritage of the site to be correctly understood and reflected in the ongoing implementation of the RMP.

It is recommended that an 'Aboriginal heritage survey' be commissioned and that the RMP is reviewed and updated as required to reflect Aboriginal heritage values upon its completion.

The scope of work for an Aboriginal heritage survey will require a consultant experienced in Aboriginal archeology to undertake a sub-surface investigation of areas linked to the registered sites and surrounds. A detailed *Cultural Heritage Management Plan* has been produced and shall be referred to during rehabilitation works near registered sites to ensure any impacts of the rehabilitation works are minimised (Archae-aus 2019).

### 5.2.2 Local employment and training

There is interest in the local community to be involved and to gain employment opportunities on the rehabilitation works. Opportunities shall be further explored to employ interested local people, community groups or businesses on restoration activities.

The Project Manager shall endeavor to engage with local business and providers. Training opportunities can be provided in an informal manner through community capacity building activities both in the field and online such as seed collecting workshops for community members.

### 5.2.3 Aboriginal employment and training

Through consultation, it has been determined that there is significant restoration experience amongst the local Aboriginal community.

Opportunities shall be further explored to employ local Aboriginal custodians and other Aboriginal people on the rehabilitation works, as well as community engagement activities such as cultural events and workshops. Training opportunities can also be considered, but genuine employment shall be prioritized.

Aboriginal business shall be given an opportunity to provide goods and services throughout the course of the project. The role of an Aboriginal Ranger program has been flagged as a potential avenue for long term employment. The Project Manager shall seek to create partnerships with Aboriginal corporations and commerce groups to further engage with Aboriginal suppliers.

### 5.2.4 Community questionnaire

A 'community questionnaire' is required to inform the review and revision of the RMP and provide accountability to interested community members. This questionnaire will serve as a monitoring and evaluation tool for the project as outlined in **Section 7.1.1**.

The questionnaire would ideally be informed by a pre-implementation baseline, which means the first round of survey should be delivered as soon as possible.

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The format of the survey has been determined and is provided in **Appendix D**.

#### 5.2.5 Community science conference

A community science conference that is targeted at informed and interested community members could potentially be the “flagship” community event in the Rehabilitating Roe 8 program calendar.

The conference has been proposed to provide scientists, citizen-scientists and students with the opportunity to present findings and updates to the community. The conference would include presentations on the progress of the Rehabilitating Roe 8 project and relevant and local research projects that are not within the scope of the RMP.

The conference may be modeled on the Brixton St Symposium and Banksia Woodland Symposium and shall include funding to ensure that community can attend.

The Project Manager in conjunction with the Rehabilitating Roe 8 Advisory Committee shall determine conference content and timing biennially.

#### 5.2.6 Input into governance arrangement

Engagement with stakeholders both within and external to the current governance structure of the Rehabilitating Roe 8 Working Group and Rehabilitating Roe 8 Steering Committee, is required to confirm an appropriate ongoing arrangement for the RMP.

Representation of community groups and others in the formal governance structure is an efficient way of communicating with these groups and, when these groups share promotional materials, with their membership and audience. The governance structure of the Rehabilitating Roe 8 Advisory Committee is provided as **Appendix E**.

An inclusive selection process for membership to the Rehabilitating Roe 8 Advisory Committee and other roles will be established. Membership to the Rehabilitating Roe 8 Advisory Committee shall be reassessed biennially and a term limit will be imposed on committee members. This will ensure broad representation within the committee.

Terms of Reference will be developed for the Rehabilitating Roe 8 Advisory Committee.

#### 5.2.7 Open days

A successful open day was conducted as part of consultation on the preparation of the RMP (refer **Appendix A**). Open days provide opportunity for gathering community input, reporting on progress and may link to education or involvement through site visits or aligning to a community planting day.

Annual community open days can be held in a variety of ways, either as an event or through the use of signage and pop-up engagement activities. Community open days should consider specific audiences and stakeholders and can be tailored to these groups.

#### 5.2.8 Rehabilitating Roe 8 Advisory Committee meetings

Meetings of the Rehabilitating Roe 8 Advisory Committee are initially proposed to occur on a monthly basis, and then as required. The Project Manager shall give a monthly report to

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Rehabilitating Roe 8 Advisory Committee at these meetings. Committee meeting agendas and minutes will be available on the Rehabilitating Roe 8 website.

### 5.2.9 Review and revision of RMP

The RMP will be updated adaptively on an annual basis. These updates will be informed by monitored outcomes of activities, ongoing community engagement including the 'community questionnaire', environmental change, new knowledge and other changes, such as changes to project context. The process for the review and revision of the RMP is outlined in **Section 3.10**.

### 5.2.10 Community education

The implementation of the RMP offers excellent opportunity for education. The following community education options related to restoration are identified:

- Restoration and ecology workshops, including understanding local/endemic plants.
- Weed identification and weeding workshops.
- Training for citizen science community monitoring programs.
- Understanding site sensitivity and minimising impact (to ensure large groups do not damage the site).
- Link with Cockburn Wetlands Education Centre, NativeARC, Millennium Kids and City of Cockburn community education opportunities.
- Links with relevant research programs.
- Guided tours of site by community 'champions'.

Note that these are not the only education options and options may be identified over time. The Project Manager, in conjunction with the Rehabilitating Roe 8 Advisory Committee, will seek to offer a range of community engagement activities annually (both formal and informal). Cultural awareness events are considered a high priority.

Community participation levels will be recorded through audits addressing specific community engagement and involvement (refer **Table 1**). The proposed format for the audit is provided in **Appendix F**.

### 5.2.11 Community involvement in restoration

A strong desire was identified for community involvement in planting, weeding and other restoration activities for appropriate areas of the site (according to protocols outlined in **Section 6.3.6**).

Planting areas for 2018 to 2023 are identified in **Appendix G**.

Community planting events are to be scheduled annually. Locations will be determined by the Project Manager. Typically, community planting events will occur within June/July period and cater for a wide range of the community.

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#### 5.2.12 Citizen science / community monitoring

The implementation of the RMP offers an excellent opportunity for citizen science/community monitoring programs and input (according to protocols outlined in **Section 7**).

Photo-monitoring has been undertaken by community volunteers since 2017. Additional community monitoring and citizen science programs will be developed by the Project Manager in conjunction with the Rehabilitating Roe 8 Advisory Committee and other stakeholders. Programs such as banksia and tuart mapping and fauna monitoring have already commenced.

#### 5.2.13 Local community adoption of restoration areas

Community groups such as the Cockburn Community Wildlife Corridor have adopted areas within the project site and have commenced rehabilitation activities such as hand weeding, planting and mapping exercises. Local residents have also adopted specific "patches" and provide feedback to the Project Manger. The Project Manger will continue to explore and facilitate these opportunities where possible.

#### 5.2.14 Partnership with primary / secondary schools

The implementation of the RMP offers excellent opportunity for partnerships with primary/secondary schools including restoration activities such as planting, weeding, monitoring and other citizen science programs, the potential for an "adopt-a-spot" program to include specific area or areas for a particular school to maintain/report on monitoring (refer **Section 5.2.13**). Young people may be able to audit the area, conceptualise and implement their own citizen science projects.

Several primary and high schools have sought to participate in planting and weeding activities. In addition, schools have shown interest in attending the site for information days on topics such as ecological restoration, climate change and land use planning. The Project Manager shall continue to foster opportunities and facilitate engagement with schools wherever possible.

#### 5.2.15 Partnership with tertiary education institutions

The implementation of the RMP offers excellent opportunity for partnerships with tertiary education institutions including engaging and supporting researchers to further understanding of restoration process and outcomes and establishing the Rehabilitating Roe 8 project as a 'centre of learning'.

Tertiary institutions are actively utilising the site for on-ground and theoretical learning. Students are involved with conducting vegetation monitoring through Murdoch University and using the site as an example for restoration ecology units. The Project Manager shall continue to explore opportunities to engage with tertiary institutions including conducting on site studies that complement the RMP objectives<sup>10</sup>.

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<sup>10</sup> For example regarding monitoring and other research projects.

## Rehabilitation Management Plan

### Roe 8 Cleared Areas

#### 5.2.16 Partnerships with City of Cockburn events

The Project Manager shall liaise with the City of Cockburn where appropriate to promote community engagement<sup>11</sup>.

#### 5.2.17 Partnerships with Cockburn Wetlands Education Centre events / programs

The Wetlands Centre Cockburn has been identified as a key stakeholder and has representation on the Rehabilitating Roe 8 Advisory Committee. The Project Manager shall liaise with the Wetlands Centre Cockburn where appropriate to promote community engagement and involvement<sup>12</sup>.

### 5.3 Involvement protocols

Protocols for involvement in the implementation of the RMP are outlined below. These protocols apply to all people, vehicles, equipment or materials entering the site to undertake activities associated with the RMP.

#### 5.3.1 Respect

The site is Wadjuk country. Traditional Owners, Elders and all Nyungar people, past and present shall be acknowledged and respected when referring to, or accessing, the site.

The restoration of cleared areas associated with Roe 8 is important to many people. The restoration areas and remnant native ecosystems within the site, and connection of community members and stakeholders to the site, shall accordingly be treated with respect at all times.

#### 5.3.2 Public liability

Public liability will be held by the Project Administrator and Management Authority.

#### 5.3.3 Safe work practices

Prior to commencing any works, notification shall be given to the **Community Engagement Coordinator/Project Manager** and/or Management Authority.

Where physical works are being carried out (such as planting, hand weeding, herbicide application, installing stakes for monitoring, general maintenance) a 'work plan and job safety assessment' shall be prepared, provided to, and approved by, the **Community Engagement Coordinator/Project Manager** and/or Management Authority prior to entering the site. The work plan and job safety assessment shall identify risk of harm to persons, environment or property and measures taken to reduce risks to an acceptable standard.

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<sup>11</sup> For example the Bibra Lake Fun Run, Aboriginal Reference Group/ Traditional Owners engagement and Bush Tucker Tours.

<sup>12</sup> For example training for on-site rehabilitation, seed collection, site tours, frog-friendly gardens workshops, planting workshops.

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#### 5.3.4 Hygiene

Vehicles, machinery, tools, equipment and clothing shall be free of all mud, soil and plant material (especially weed seed) on arrival at the site. If vehicles, machinery, tools, equipment or clothing are temporarily removed from the site during works they must be free of all mud, soil and plant material on return.

All personnel entering management areas for restoration or monitoring works should ensure that footwear is clean and free of soil and weed seed.

Imported materials shall be certified free of *Phytophthora cinnamomi* (dieback) where possible and free of environmental weeds.

#### 5.3.5 Pedestrian access

Pedestrian access to the site shall be via the gates and entry points only.

Whenever possible pedestrians shall walk on dedicated paths to avoid impacting restoration areas.

#### 5.3.6 Vehicle access

Vehicles shall only be brought into the site by persons authorized by the **Community Engagement Coordinator/Project Manager** and/or Management Authority.

Vehicle access gates shall be used to access the site.

Vehicles shall travel along existing and proposed paths at all times. Any deviation from the paths will require prior authorization.

#### 5.3.7 Pets and livestock

Pets and livestock shall only be allowed within the site as per Management Authority policy. Pets and livestock are otherwise not permitted within the site.

#### 5.3.8 Rubbish and waste

All rubbish and waste brought into the site shall be removed from site and deposited in an appropriate receptacle, or at a suitable licensed facility.

#### 5.3.9 Record keeping

A record of the type and location of any RMP related activities completed shall be provided to the **Community Engagement Coordinator/Project Manager** and/or Project Administrator.

The record shall include spatial reference using location obtained from a GPS enabled device, or at minimum a description of relative location within a management area.

Where monitoring data is collected protocols for data management outlined in **Section 7** shall be adhered to.

## 6 Restoration

*“Restoration inputs will be dictated by level of resilience and degradation”*

*(Principle 2, Standards Reference Group SERA (2017))*

### 6.1 Restoration approach

The Rehabilitating Roe 8 Steering Committee determined that restoration activities shall be conducted within cleared areas and a 20 m area surrounding cleared areas. Restoration is proposed within the 20 m area around cleared areas to limit threats and assist restoration of cleared areas.

The following restoration activities are proposed to be conducted (refer to **Section 6.1.3** for detailed description):

- landform preparation (largely complete)
- habit enhancement
- weed control
- tubestock installation
- maintenance (including litter and selective vegetation management).

To aid communication and planning each management area contains smaller ‘restoration areas’, which have specific target ecosystem and restoration input requirements (refer to **Section 6.1.1**). Restoration is proposed to be completed progressively across the restoration areas (as previously outlined in **Section 3.12**). Restoration input categories are assigned to each restoration area to inform the type and intensity of activities that may be conducted (refer to **Section 6.1.2**). Protocols to guide the implementation of restoration activities are outlined in **Section 6.1.3**. Parts of management areas that are not identified as a restoration area are currently not allocated restoration activities.

#### 6.1.1 Restoration areas

Restoration areas that are currently identified across the site are shown in **Figure 4a** to **Figure 4c**.

Each restoration area has a unique identification number which was assigned east to west across the site. The boundaries of restoration areas were defined based on consideration of relevant target ecosystem, as well as, clearing status, distance from cleared areas, fencing status and regeneration response as identified during site assessment (**Appendix C**). A total of 191 separate restoration areas are currently identified extending over 33.64 ha.

Note that further separation of restoration areas or changes to the boundaries of restoration areas may be required in response to planned or unplanned variations in restoration treatments (see **Section 6.3.9** for further discussion).

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### Roe 8 Cleared Areas

#### 6.1.2 Input categories

The restoration areas were classified into one of the following three restoration input categories dependent on their requirements:

- low intervention
- assisted regeneration
- reconstruction.

The input categories were assigned to restoration areas following consideration clearing status, distance from cleared areas, fencing status and recorded regeneration response as shown in **Figure 5**.

‘Low intervention’ is specified for areas that do not require tubestock planting because they are either:

- uncleared (within 20 m of cleared areas)
- recorded as having a high natural regeneration response during site assessment (as detailed in **Appendix C**) (Bibra Drive wetland area only).

Restoration of low intervention areas will only involve weed control.

‘Assisted regeneration’ is specified for areas where low levels of natural regeneration are present and some planting, seeding, habitat enhancement and weed control will be required in order to meet the restoration objectives. The majority of the restoration areas are assigned this input category.

Full ‘reconstruction’ is specified for areas that have been subject to higher levels of historical disturbance and modification meaning they will require landform preparation, intensive planting, habitat enhancement and weed control in order to meet the minimum restoration objectives.

#### 6.1.3 Prioritisation

Restoration areas were further prioritised to inform the scheduling of the ten-year program works as outlined in **Table 15** (refer to **Section 3.12**). All restoration areas are identified as a medium to high priority for weed control<sup>13</sup>.

A manageable portion of restoration areas with relatively high visibility was identified for planting in 2018 (refer **Appendix D**). Planting in the remainder of restoration areas was allocated progressively, based on consideration of location, restoration input and regeneration response and cumulative scale of respective annual program. The majority of restoration activities are spread over the first 3 to 5 year period of implementation to ensure restoration works are completed as soon as practicable.

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<sup>13</sup> The distribution and cover of weed species varies across restoration areas and across the site.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 15: Scheme for prioritisation of tubestock planting and weed control

Restoration activity	Clearing status	Restoration input category			
		Reconstruction	Assisted regeneration (lower regeneration response)	Assisted regeneration (moderate regeneration response)	Low intervention
Tubestock planting	Cleared	Low	High	Medium	Low
Weed control	Cleared	Medium	High	High	High
	<20m from cleared area	Medium	Medium	Medium	Medium

## 6.2 Restoration activities

Restoration activities and treatment options recommended for each restoration input category are shown in **Table 16**.

Table 16: Summary of restoration activities and options recommended for each input category

Activity	Options	Restoration input category		
		Reconstruction	Assisted regeneration	Low intervention
Landform preparation	Ripping	✓	-	-
	Auguring holes	✓	✓	-
Habitat enhancement	Installation of large wood/tree logs	✓ (suitable areas only)	✓ (limited opportunity)	-
	Turtle breeding habitat creation	✓ (suitable areas only)	-	-
Weed control	Manual (hand weeding)	✓	✓	✓
	Broad spectrum herbicide (spot spray application)	✓	✓	✓
	Selective herbicide (spot spray or blanket application)	✓	✓	-
Revegetation	Tubestock planting	✓	✓	-
	Direct seeding	✓	✓	-
Maintenance	Rubbish removal	✓	✓	✓
	Selective vegetation removal to maintain height restrictions		✓ <sup>†</sup>	-

<sup>†</sup>Hope Road North only

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## Roe 8 Cleared Areas

### 6.3 Restoration protocols

#### 6.3.1 Landform preparation

Areas that are completely devoid of native vegetation and showing signs of compaction may require mechanical soil ripping. This action is only recommended for parts of the site that are easily accessible by vehicles to avoid damage to other areas. Ripping shall be completed to a depth of 0.3 - 0.5m, using appropriate machinery.

#### 6.3.2 Habitat enhancement

After re-establishing vegetation, the installation of large wood is the primary option for habitat enhancement within cleared areas. Large wood was introduced or re-spread following clearing and stockpiling as outlined in **Appendix B**. Management areas such as Turtle Corner, which did not have wood installed, may benefit from the addition of large wood. However, it is unlikely that large wood can be easily installed in other management areas that are surrounded by conservation fencing.

Other identified habitat enhancement options are proposed in **Table 17**.

*Table 17: Fauna enhancement options*

Management area	Activity	Description
Turtle Corner	Large wood installation	<ul style="list-style-type: none"> <li>Installed using machinery ensuring that material is securely bedded down and stable on landform</li> </ul>
Turtle Corner	Turtle breeding habitat installation	<ul style="list-style-type: none"> <li>Female turtles move into terrestrial habitats surrounding wetlands to lay their eggs</li> <li>Sandy areas and enclosures may be installed in suitable locations to provide suitable nesting site and shelter for migrating turtles</li> <li>A habitat feature may be installed as landscape construction works in suitable locations to provide nesting sites and shelter from threats for migrating turtles</li> <li>Details of turtle habitat are to be determined</li> </ul>
All	Feral bee control	<ul style="list-style-type: none"> <li>Undertaken by qualified and experienced person</li> <li>Where pesticides are used these shall only be applied by a Department of Health licensed pesticide management technician in accordance with manufacturer's instructions as provided on product label</li> </ul>
All	Important non-native fauna (pest) control	<ul style="list-style-type: none"> <li>Undertaken by qualified and experienced person</li> <li>In accordance with all relevant legislation, licences and permits</li> <li>Where pesticides are used these shall only be applied by a Department of Health licensed pesticide management technician in accordance with manufacturer's instructions as provided on product label</li> </ul>

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### Roe 8 Cleared Areas

### 6.3.3 Weed control

Three methods of weed control are proposed for use in the site, as outlined in **Table 18**.

*Table 18: Weed control methods*

Method	
Manual i.e. hand weeding	<ul style="list-style-type: none"> <li>Weeds may be removed by hand where appropriate for target species (e.g. based on life stage or species trait)</li> <li>Weed material should be placed into bags and removed from site and disposed in an appropriate waste depository</li> </ul>
Broad spectrum herbicide application (blanket and/or spot spray)	<ul style="list-style-type: none"> <li>Weeds may be treated using a broad spectrum herbicide as a blanket spray or as a targeted spot spray</li> <li>Herbicides should be APVMA permit PER13333 approved</li> <li>Herbicide should only be applied by a licensed pesticide management technician in accordance with manufacturer's instructions as provided on product label</li> <li>Guidance on herbicide treatment for important weeds is available at DBCA (2017)</li> </ul>
Selective herbicide application (blanket and/or spot spray)	<ul style="list-style-type: none"> <li>Weeds may be treated with selective herbicide as appropriate to target species</li> <li>Herbicides should be APVMA permit PER13333 approved</li> <li>Herbicide should only be applied by a licensed pesticide management technician in accordance with manufacturer's instructions as provided on product label</li> <li>Guidance on herbicide treatment for important weeds is available at DBCA (2017)</li> </ul>

All herbicides used must be APVMA permit PER13333 approved and shall only be applied by a Department of Health licensed 'pesticide management technician' in accordance with the requirements of APVMA permit PER13333 and the manufacturer's instructions as provided on product label. Further guidance on herbicide treatment for weed species can be found online via *Florabase* (DBCA 2017).

### 6.3.4 Seed / propagule collection

Seed or propagule material shall be sourced by or with advice from an accredited supplier to ensure that material is obtained sustainably and handled correctly (NIASA 2017, RIAWA 2017).

All material shall be of local provenance (within approximately 50 km of the site) collected from within the site or within bushland that supports similar ecosystems and within a similar regional soil association. As far as practical seed or propagule material for a species shall be obtained from a range of individuals and locations to ensure genetic diversity. A specialist revegetation contractor or accredited seed supplier will be able to advise on appropriate seed collecting distances.

Species targeted for seed collection shall be selected from the appropriate list for a target ecosystem and meet requirements of annual restoration planning.

### 6.3.5 Sourcing tubestock

Tubestock shall be sourced from an accredited nursery (NIASA 2017) and grown from local provenance seed or propagules with genetic diversity.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Tubestock quantities shall be determined to meet requirements of restoration forward planning (refer to **Section 3.10** and **Section 3.12**). As a guide the number of tubestock planted should be approximately twice that required to achieve the objective density to accommodate for plant mortality<sup>14</sup>. Increasing plant density in this way will reduce the requirement for future infill planting.

Detailed floristic information for each target ecosystem from which species lists may be prepared is presented in **Appendix C**. Note a height restriction applies to plant selections for some restoration areas within the Hope Road North management area due to the presence of powerlines.

### 6.3.6 Planting tubestock

Tubestock should be planted once the early winter rains have started and the ground is sufficiently moist. Planting should be initiated as soon as possible following break of winter season to allow plants the maximum time for establishment before the summer dry period.

Tubestock should be installed using a deep planting method whenever possible<sup>15</sup> (WAPC 2003). For example tubestock can be planted with approximately one third stem showing above the soil surface. This positions the roots closer to water supplies and decreases water loss in hot and dry conditions. Deep planting will also help to prevent herbivory from resulting in the death of seedlings, which can easily re-sprout if the top of the plant is removed.

Holes should be pre-dug with a hand auger to a depth of ~300mm. Note this does not mean that the hole that the tubestock is planted into is 300 mm deep. Rather, the soil profile will have been loosened allowing for easier root development. Where compaction is a concern holes shall be at a depth of approximately 600mm.

A tubestock planting density of 3 plants per m<sup>2</sup> is recommended for the first year of planting in a restoration area. Infill planting should be conducted in second year at a density of approximately 1-2 plants per m<sup>2</sup> and for a third year at approximately 0.5 plants per m<sup>2</sup>, depending on seedling survival rates. After that supplementary infill planting should be conducted as required.

Species should be planted in a mixed pattern as appropriate to restoration objectives so that appropriate species diversity and vegetation pattern is established across each restoration area.

### 6.3.7 Direct seeding

Seed of native species can be directly applied to restoration areas to establish native plants. However, this is best done in the first years after landform preparation before soils have settled.

Direct seeding may be applied where appropriate to further increase native plant cover where tubestock planting cannot be used or in combination with it.

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<sup>14</sup> Assuming a 70% or better annual survival rate, approximately half of the tubestock planted in a given year will survive after two years. A 70% survival rate is a reasonable expectation for most native species that are planted without supplementary water, as long as they are installed correctly within the appropriate season and are not subject to predation or other limiting factors.

<sup>15</sup> Common sense should be applied. If tubestock are small or if a species is less suited to deep planting then tubestock should be planted into a hole slightly larger than the root ball, and to a depth just below the surface of the potting mix.

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## Roe 8 Cleared Areas

### 6.3.8 Weed control

The recommended weed control options include manual and herbicide based approaches. The appropriateness of these methods at a given time will depend on an assessment of the types and amount of resources available and the risks to restoration outcomes that might result from a particular treatment. General guidance on selecting weed control options is provided in **Table 19**. The species listed in **Table 19** provide an indication of the most common weeds recorded in the site during the site assessment (refer **Appendix C**). Weed control options shall be reviewed as part of annual planning and specialist advice sought where it is uncertain what method is appropriate.

Table 19: General guidance on the selection of weed control options

Weed category	Species	Manual (hand weeding, cutting)	Broad spectrum herbicide (blanket)	Broad spectrum herbicide (spot spray)	Herbicide targeted (stem injection, basal bark)	Selective herbicide (spot spray or blanket)
Grassy	<i>Avena spp.</i> (wild oats)	J	R	✓		✓
	<i>Ehrharta calycina</i> (perennial veldt grass)	J	R	✓		✓
	<i>Ehrharta longifolia</i> (annual veldt grass)	✓	R	✓		✓
	<i>Eragrostis curvula</i> (African love grass)	J	R	✓		✓
Bulbous	<i>Lachenalia reflexa</i> (yellow soldier)			✓		
	<i>Gladiolus caryophyllaceus</i> (wild gladiolus)			✓		✓
	<i>Freesia alba × leichtlinii</i> (freesia)		✓	✓		✓
	<i>Zantedeschia aethiopica</i> (arum lily)		✓	✓		✓
Woody	<i>Acacia iteaphylla</i> (Finders Range wattle)	J		✓	✓	
	<i>Chamaelucium uncinatum</i> (Geraldton wax)	J		✓	✓	
	<i>Acacia longifolia</i> (Sydney golden wattle)	✓		✓	✓	
	<i>Chamaecytisus palmensis</i> (tagasaste)	J		✓	✓	
	<i>Leptospermum laevigatum</i> (Victorian tea-tree)	J		✓	✓	
Other	<i>Carpobrotus edulis</i> (hottentot fig)	✓		✓		
	<i>Lupinus angustifolius</i> (narrowleaf lupin)	✓		✓		✓
	<i>Pelargonium capitatum</i> (rose pelargonium)	✓		✓		
	<i>Solanum nigrum</i> (black berry nightshade)	✓		J		

J = juveniles only, R = reconstruction areas or bare areas within assisted regeneration areas.

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### Roe 8 Cleared Areas

#### 6.3.9 Updating restoration areas

As the restoration program progresses decisions may be made to include different treatments or vary the treatments that have been applied within all or part of a restoration area (refer to adaptive management **Section 3.10**).

During community and stakeholder consultation, some reasons for varying restoration treatments that were identified included dedicating specific restoration areas or parts of restoration areas to:

- manual or chemical free weed control techniques
- the establishment of scientific trials
- management by specific community groups or community members
- tree bags
- supplementary watering.

Such decisions may affect the creation of a new restoration area or sub-area, out of the initial restoration areas identified. They may also warrant creation of new basic stratifications for the RMP (refer **Section 7.1.1**).

Where new or varied treatments warrant the creation of a new restoration area it is important that:

- the label applied to the new restoration area is consistent with the initial labelling scheme (refer **Section 6.1.1**)
- an additional label (alphabetical suffix) is added to identify restoration areas subject to a new treatment
- records are maintained of changes (refer to data management in **Section 7.3**).

Where a new restoration area is a division, or sub-area, of an existing restoration area, an alphabetical suffix shall be applied to the existing number, east to west. For example, if restoration area '17' was hypothetically split into three sub-areas, these areas would be labelled east to west as restoration areas '17a', '17b' and '17c' respectively.

## 7 Monitoring, Evaluation and Reporting

*“Restoration science and practice are synergistic”*

*(Principle 5, Standards Reference Group SERA (2017))*

### 7.1 Social rehabilitation outcomes

#### 7.1.1 Monitoring design

Annual monitoring of social rehabilitation outcomes is proposed through two approaches:

- ‘community questionnaire’
- collation of information obtained through the adaptive operation of the RMP and analysis of community and stakeholder feedback.

#### 7.1.2 Monitoring protocols

##### 7.1.2.1 Community questionnaire

Through consultation with the Rehabilitating Roe 8 Advisory Committee a community questionnaire has been developed (refer **Appendix D**). The intent of the questionnaire is to provide metrics around community engagement and involvement, understanding of project objectives within the broader community and stakeholders and development of the corridor as a recreation reserve. The results of the initial questionnaire will provide a benchmark that can be re-assessed annually. Management actions shall be informed by the community questionnaire with regards to types and levels of infrastructure, such as reserve signage and paths.

##### 7.1.2.2 Internal information review

All communication, engagement and involvement activities undertaken and feedback received shall be recorded as outlined in **Section 7.3**.

#### 7.1.3 Evaluation

Evaluation of social rehabilitation performance requires that an assessment is made against the community engagement and involvement objectives as outlined in **Table 1**.

A *Community Expectations Report* has been developed and contains a toolkit to assist with some aspect of evaluation of social rehabilitation (refer **Appendix H**). Social rehabilitation has at this stage of the project been focused on engagement and involvement through on ground events and community education. Further understanding and evaluation of the broader aspects of social rehabilitation require more investigation. The Rehabilitating Roe 8 Advisory Committee and Project Manager will continue to further explore developing an appropriate set of metrics and tools around effective evaluation.

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## 7.2 Ecological restoration outcomes

### 7.2.1 Monitoring design

Annual monitoring of restoration outcomes is proposed using an approach that is analogous to a 'before/after-control/ impact' (BACI) design. In addition, 'reference' areas are identified that are used to characterise the 'target ecosystem'. The reference areas may include some 'before' and 'control' locations within the site, as well as other locations outside of the site.

In the proposed design 'before' is represented by uncleared locations within the site that were monitored in 2017 and from information available from biological surveys conducted prior to clearing occurring along the Roe 8 alignment. 'After' is provided by ongoing monitoring. 'Control' applies to, or is provided by, un-cleared parts of the site that are greater than 20 m away from cleared areas that are excluded from restoration activities. 'Impact' applies to restoration areas, inclusive of cleared and un-cleared areas within the site that are subject to restoration activities.

#### 7.2.1.1 Sampling frame

A sample frame based on a grid of 20 m x 20 m primary sample units is proposed to guide monitoring, as illustrated in **Figure 6**. Basic stratifications identified within the sampling frame that provide a basis for the evaluation of performance against the identified objectives are outlined in **Table 20**.

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## Roe 8 Cleared Areas

Table 20: Basic stratifications within sampling frame

Stratification	Strata	Description
Clearing status	Cleared	Areas where vegetation was cleared as part of construction of Roe 8
	Uncleared	Areas of remnant native vegetation within the site that were not cleared as part of construction of Roe 8
Distance from cleared areas	< 20 m from cleared areas	Areas of remnant native vegetation within the site that were not cleared as part of construction of Roe 8 and are located within 20 m of cleared areas
	> 20 m from cleared areas	Areas of remnant native vegetation within the site that were not cleared as part of construction of Roe 8 and are located more than 20 m from cleared areas
Restoration status	Restoration area	Cleared or uncleared locations that are subject to restoration activities under the RMP
	Reference area	Areas of remnant native vegetation that are considered to provide an example of reference ecosystem for use in characterising target ecosystem for restoration <sup>†</sup>
	Control area	Areas of remnant native vegetation within the site that are <u>not</u> subject to restoration activities under the RMP
Management area	Bibra Drive	Labels applied to portions of the site to assist in communication of restoration and management activities
	Hope Road North	
	Turtle Corner	
	North Lake Road East	
	North Lake Road West	
	Forrest Road South	
	Forrest Road North	
	Stock Road West	

<sup>†</sup>These areas may or may not be subject to restoration activities (such as weed control)

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 20: Basic stratifications within sampling frame (continued)

Stratification	Strata	Description
Target ecosystem	Wet forest and woodland	Label applied to a type of wetland ecosystem within the site
	Banksia woodland	Label applied to a type of eucalypt/banksia woodland ecosystem within the site
	Banksia/jarraah woodland	
	Holly-leaved banksia woodland	
	Banksia/coastal blackbutt woodland	
	Banksia/woody pear woodland	
	Banksia/tuart woodland.	
Historical or clearing related factor	Mulch pile storage location	Location used to temporarily store mulch created during clearing occurring along the Roe 8 alignment prior to removal and disposal in April 2017
	Asbestos removal location	Location where asbestos contamination was recorded prior to removal and disposal in April 2017
	Historical path location	Location of path prior to clearing occurring along the Roe 8 alignment
	Construction vehicle track location	Location of primary vehicle tracks created during clearing occurring along the Roe 8 alignment
Regeneration response	Low - resprouter	Resprouters infrequently observed, less than 5 % cover
	Moderate - resprouter	Resprouters commonly observed, 6-33% cover
	High - resprouter	Resprouters frequently observed, greater than 33% cover
	Low - germinant	Germinants infrequently observed, less than 5% cover
	Moderate - germinant	Germinants commonly observed, 6-33% cover
	High - germinant	Germinants frequently observed, greater than 33% cover
Restoration treatment	Low intervention	Areas that do not require or will not receive tubestock planting and will only involve weed control
	Assisted regeneration	Areas where low levels of natural regeneration are present and so some planting, seeding, habitat enhancement and weed control will be required in order to meet the restoration objectives
	Full reconstruction	Areas that have been subject to higher levels of historical disturbance and modification meaning they will require landform preparation, and intensive planting, habitat enhancement and weed control in order to meet the minimum restoration objectives
Restoration area	ID	Unique label applied to a discrete area of restoration based on timing and method of treatment
Restoration treatment date	Planting Date	Year, month, day, time of day etc
	Seeding Date	
	Weed Control Date	

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#### 7.2.1.2 Attributes of interest

Ecosystem 'attributes of interest' that may be assessed during monitoring are outlined in **Table 21**.

*Table 21: Attributes of interest*

Category	Attributes
Abiotic components	<ul style="list-style-type: none"> <li>• Leaf litter</li> <li>• Large wood</li> <li>• Soil</li> <li>• Bare ground</li> <li>• Disturbed ground</li> <li>• Built form</li> <li>• Refuse</li> </ul>
Biotic components	<ul style="list-style-type: none"> <li>• Flora species</li> <li>• Flora species composition</li> <li>• Vegetation cover</li> <li>• Native flora life stage and recruitment (juveniles)</li> <li>• Fauna species</li> </ul>
Threats	<ul style="list-style-type: none"> <li>• Disturbance</li> <li>• Plant pathogens</li> <li>• Non-native flora (weed) species</li> <li>• Non-native fauna (pest) species</li> </ul>

Basic stratifications identified for biotic attributes of interest are outlined in **Table 22**.

*Table 22: Basic stratifications for biotic attributes of interest.*

Attribute	Stratification
Species	<ul style="list-style-type: none"> <li>• Higher order taxonomic rank (flora/fauna)</li> <li>• Origin (native/non-native)</li> <li>• Association (to target ecosystem i.e. previously recorded in reference areas or previous or ongoing biological surveys of the site)</li> <li>• Importance (to target ecosystem)</li> </ul>
Species (flora)	<ul style="list-style-type: none"> <li>• Structural layer (overstorey/understorey/groundstorey)</li> <li>• Regenerative pathway (resprouter/germinant, planted/seeded/self-propagated)</li> <li>• Life stage (mature/juvenile)</li> <li>• Life strategy (perennial, annual, geophyte)</li> </ul>
Species (non-native flora)	<ul style="list-style-type: none"> <li>• Category (grassy/bulbous/woody/other)*</li> </ul>
Species (fauna)	<ul style="list-style-type: none"> <li>• Category (invertebrate, herbivore, carnivore)</li> <li>• Life stage (mature/juvenile)</li> <li>• Habitat use (foraging, roosting/sheltering, breeding)</li> </ul>

\* Non-native species ('grassy' = Poaceae, 'bulbous' = including Araceae, Asparagaceae, Iridaceae, Oxalidaceae, 'woody' = including Apocynaceae, Fabaceae, Moraceae, Myrtaceae, 'other' = including Aizoaceae, Asteraceae, Papaveraceae, Solanaceae).

#### 7.2.1.3 Sample units

Sample units identified to provide a systematic basis for measurements or assessments of attributes of interest across the sample frame are outlined in **Table 23**.

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Table 23: Sample units for monitoring

Unit	Description
Permanently marked plots	<ul style="list-style-type: none"> <li>Permanently marked 20 m x 20 m plots with nested 5 m x 5 m and 0.5 m x 0.5 m subplots.</li> <li>Provide basis for a detailed and statically robust evaluation of change over time for wide range of attributes through comparison of paired impact and reference plots arrayed across sampling frame.</li> </ul>
Unmarked sample plots and mapping	<ul style="list-style-type: none"> <li>20 m x 20 m sample plots or sub plots identified by spatial coordinates.</li> <li>Provide a flexible option for evaluating ecosystem attributes including mapping attributes comprehensively across sample frame.</li> </ul>
Photopoints	<ul style="list-style-type: none"> <li>Oblique photographs from fixed locations and orientation.</li> <li>Provide rapid low intensity option for visually evaluating change in ecosystem attributes across sampling frame over time.</li> </ul>
Fauna monitoring plots, sensors, camera traps and/or traps	<ul style="list-style-type: none"> <li>Reference (control) sites and impact sites identified using spatial coordinates.</li> <li>Transects.</li> <li>Measures of abundance (capture rates and photo events).</li> <li>Censusing (birds)</li> </ul>

### 7.2.1.4 Measures

Measures identified for use in sample units include the following:

- count
- cover (% unit area)
- density (stems/unit area)
- depth/height (cm)
- life stage (juvenile/mature)
- species composition
- species richness
- abundance and distribution (fauna).

Additional measures should be identified as required.

### 7.2.1.5 Key indicators

The combination of a basic stratification, attribute of interest and a measure provides an 'indicator'. Monitoring indicators provides a basis for evaluation of outcomes against the restoration objectives<sup>16</sup>. For example, a measure of the height of canopy and height of understorey provides an indicator of the degree of recovery of woodland structure when compared to the canopy and understorey height in reference sites.

Key indicators that are directly relevant to the evaluation of the restoration objectives include:

- density (stems/ha) important<sup>17</sup> native flora species
- count (species richness) native flora species
- composition native flora species

<sup>16</sup> A restoration objective can be understood as the aspiration that the measurement of a particular indicator has a particular value or is located within a particular range of values.

<sup>17</sup> See **Section 7.2.3.2**

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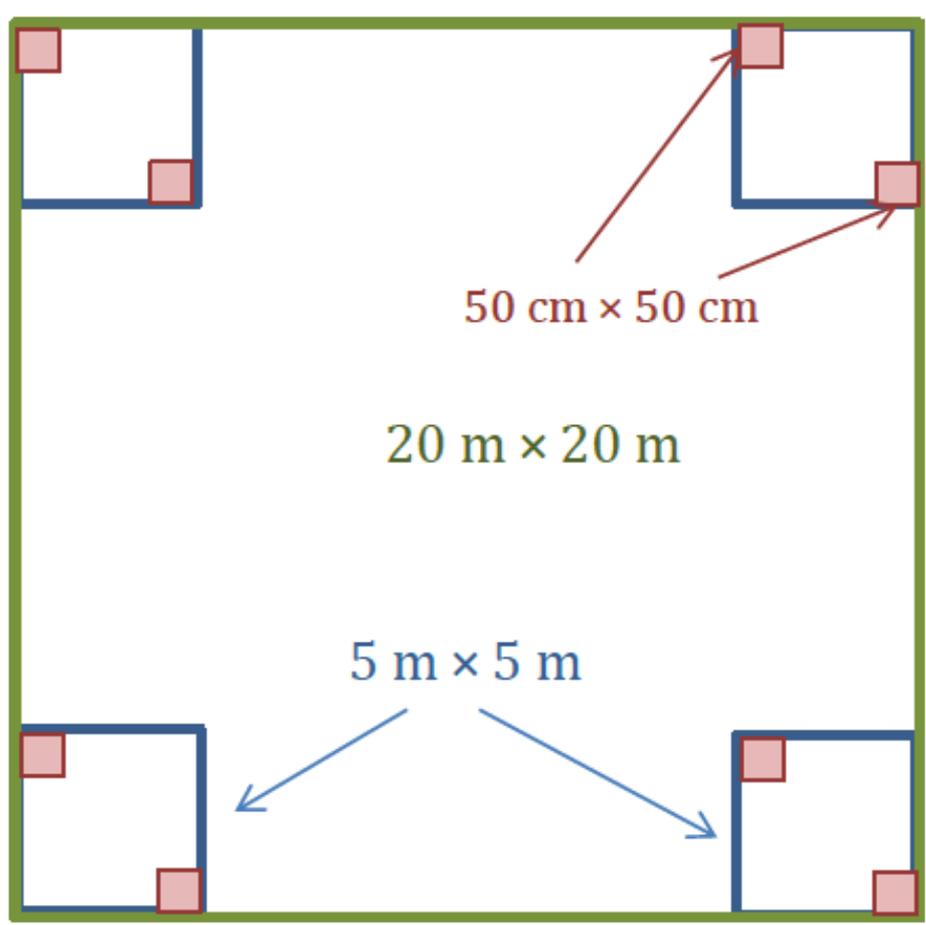
- cover (%) native understorey vegetation
- cover (%) non-native (weed) understorey vegetation
- abundance and distribution of native fauna species (including ants)
- cover (%) litter
- depth (cm) litter
- cover (%) bare ground
- count naturally recruited juvenile native flora species.

Additional indicators should be identified as required.

### 7.2.2 Monitoring protocols

#### 7.2.2.1 Permanently marked plots

A total of 52 permanently marked plots were established in 2017, of which 33 were located in cleared areas and 19 within uncleared areas (Murdoch University 2017). Each permanently marked plot comprises a primary 20 m x 20 m plot nested with 5 m x 5 m and 0.5 m x 0.5 m sub plots as shown in **Plate 2**.



*Plate 2: Murdoch University survey sample unit configuration indicating configuration of primary sample plot in green, secondary sub-plot in blue and tertiary sub plot in red*

Protocols for measurement within permanently marked plots are outlined in **Table 24** and detailed in **Appendix I**.

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Table 24: Monitoring protocol for permanently marked plots

Plot	Indicator	Method
20 m x 20 m	<ul style="list-style-type: none"> <li>• Composition overstorey flora species</li> <li>• Count of overstorey flora individuals</li> <li>• Diameter at breast height (DBH) of overstorey flora individuals</li> </ul>	Assess indicator over sample unit area.
5 m x 5 m	<ul style="list-style-type: none"> <li>• Composition flora species</li> <li>• Cover (%) native flora understorey/groundstorey species</li> <li>• Cover (%) litter</li> <li>• Cover (%) bare ground</li> <li>• Depth (cm) litter</li> </ul>	Assess indicator over sample unit area.
0.5 m x 0.5 m	<ul style="list-style-type: none"> <li>• Composition herb flora species</li> <li>• Cover (%) herb flora species</li> </ul>	Assess indicator over sample unit area.

### 7.2.2.2 Unmarked sampling and mapping

Records of indicators can be collected at any time without the need to pre-determine a sampling method. At the most simple level sampling can include any record of an observation made regarding an attribute of interest or any other feature within the site.

Using the sampling frame to guide the collection of samples and records provides a basis for systematic and unbiased sample collection; from opportunistic records through to comprehensive mapping.

Protocols for unmarked sampling are identified using 20 m x 20 m primary sample units from the grid based sampling frame. The protocol may equally be applied to other sample units if required (for example sub-samples assessed within a 20 m x 20 m cell that provide increased accuracy of, or reduce the time required for, measurement).

Protocols for measurement within unmarked plots are outlined in **Table 25**.

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Table 25: Monitoring protocol for unmarked plots and mapping

Sampling Logic	Method
Systematic/randomised sample 20 m x 20 m primary sample unit	<ul style="list-style-type: none"> <li>Select sample locations using appropriate sample logic</li> <li>Using a GPS receiver locate the centre of given 20 m x 20 m grid cell</li> <li>Scan and traverse the interior of the grid cell as appropriate for attribute of interest and assess and record measures as required<sup>^</sup></li> <li>Progress to next selected grid cell</li> </ul>
Mapping (assessment of contiguous 20 m x 20 m primary units)	<ul style="list-style-type: none"> <li>Using a GPS receiver locate the centre of initial 20 m x 20 m grid cell.</li> <li>Scan and traverse the interior of the grid cell as appropriate for feature of interest and assess and record measures of attributes<sup>^</sup></li> <li>Progress to adjacent cell</li> </ul>
Sub plots (systematic/randomised sub sample)	<ul style="list-style-type: none"> <li>Select sub sample size and locations using appropriate sample logic</li> <li>Using a GPS receiver locate the centre of given 20 m x 20 m grid cell</li> <li>Using a GPS receiver or other appropriate method locate sub sample areas</li> <li>Scan sub sample area as appropriate for feature of interest and assess and record measures of attributes<sup>^</sup></li> </ul>
Point/observation	<ul style="list-style-type: none"> <li>Using a GPS receiver record point location of observation</li> <li>Record photo and notes as appropriate</li> </ul>

<sup>^</sup>Data may be attributed to a waypoint (vector point) which is later related to grid cell. Alternatively using GIS software on laptop or tablet platform data may be attributed directly to grid cell (vector polygon).

### 7.2.2.3 Photopoints

Photopoints have been established at 50 locations across the site, with 25 located in the cleared areas and 25 located in the uncleared areas. At each location an image is captured facing towards and facing away from cleared areas. Multiple sets of images have been captured, commencing prior to clearing (Cockburn Wetland Centre 2018).

### 7.2.2.4 Fauna survey

Both an invertebrate and vertebrate fauna survey (EPA (2016) level 2 equivalent) shall be conducted a minimum of twice within the ten years of the RMP. Both surveys should include multiple visits within a year over two consecutive years, to maximize information collected and to account for seasonal variation. The first survey was conducted in 2019-2020 with the aim of providing initial data that can be used in conjunction with the pre-clearing survey data to establish a baseline for monitoring (as described in **Appendix C**). The second fauna survey should be conducted towards the end of the RMP implementation period to assess the success of fauna habitat re-establishment. However, a survey at the half-way mark of the project may provide useful insight into trends across the site with regards to fauna distribution and abundance. This would allow time then to address any concerns prior to the close out of the project.

The fauna survey may utilise information obtained from existing permanently marked plots (**Section 7.2.2.1**) and also require that new sample units and monitoring locations are employed.

Sampling techniques may include the following methods employed during pre-clearing surveys (as described in **Appendix C**):

- observations (including spotlighting, active searching, bird watching)
- physical traps (such as pit, funnel, box, cage)
- camera traps

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- hair tubes.

#### Invertebrate monitoring

Invertebrate monitoring should occur in early summer. The first invertebrate survey was conducted in 2019. Key attributes for monitoring included:

- documenting the invertebrate fauna in uncleared reference sites
- characterizing the fauna in sites that have been cleared.

Invertebrate sampling comprised a variety of methods such as pitfall traps, visual searches, vegetation sweeping, low tree beating and litter extraction. Sampling was based on the set of twenty 90 m-long transects, one in each of the seven reference ecosystems and thirteen in cleared sites. These transects formed the basis of the pitfall trap sampling, while the other methods were performed in the close vicinity of the transects.

Ultimately, the data collected will be used to monitor progress with restoration.

#### Vertebrate monitoring

The purpose of the survey is to sample vertebrate fauna (frogs, reptiles, birds and mammals) in rehabilitation areas in such a way as to be able to demonstrate that, over time, the rehabilitation creates a functional ecosystem that is comparable in terms of fauna species richness and abundance with reference areas.

Vertebrate sampling will focus on the seven management zones (and their buffers), with an initial set of surveys followed by surveys toward the end of the 10-year rehabilitation monitoring period. While baseline surveys have been conducted, measures of abundance of fauna can vary greatly from year to year, and thus 'same time' comparisons of such measures are preferable to using baseline data collected earlier (BEC 2020). Sampling design varies based on each suite of fauna. A series of transects using a combination of sampling techniques was used including pitfall traps, funnel trap, aural recordings and observations.

#### 7.2.2.5 Material transfers

Records shall be maintained for all abiotic and biotic materials that are brought into the site or removed from the site.

#### 7.2.2.6 Data analysis

Comparison of values and/or mean values will be sufficient to evaluate most indicators<sup>18</sup>. Recommended options for using data for comparisons against restoration objectives are outlined in **Table 26**.

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<sup>18</sup> More sophisticated analysis options should be identified, as required, as monitoring progresses.

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Table 26: Analysis options for comparison to objectives

Sample type	Data type	Analysis options
Permanently marked plot	Repeated measures	<ul style="list-style-type: none"> <li>Comparison of mean values to objective value over time</li> <li>Comparison of mean values to objective value across basic strata</li> </ul>
	Species presence/absence	<ul style="list-style-type: none"> <li>Presence/absence comparison to objective value over time</li> <li>Presence/absence comparison to objective value by basic strata</li> </ul>
Unmarked plot with sampling logic	Single measure	<ul style="list-style-type: none"> <li>Comparison of values to objective value across strata</li> <li>Comparison of mean values to objective value across strata</li> </ul>
Unmarked plot mapping	Repeated measures	<ul style="list-style-type: none"> <li>Change over time by primary sample unit</li> <li>Comparison of values / mean values by primary sample unit across strata</li> <li>Change over time of values / mean values by primary sample unit across strata</li> </ul>
Photopoint	RGB oblique imagery	<ul style="list-style-type: none"> <li>Visual comparison</li> </ul>
Fauna monitoring	Repeated measures	<ul style="list-style-type: none"> <li>Comparison of mean values to objective value over time</li> <li>Comparison of mean values to objective value across basic strata</li> </ul>
	Species richness and abundance	<ul style="list-style-type: none"> <li>Presence/absence comparison to objective value over time</li> <li>Presence/absence comparison to objective value by basic strata</li> </ul>

## 7.2.3 Evaluation

### 7.2.3.1 Associated native flora species

Native flora species associated with each target ecosystem were identified from Keighery *et al.* (2012) sample plots nearby to the site and ongoing during monitoring competed within restoration areas and reference areas. Species on the 'appropriate species lists' represent native flora species for the purposes of the RMP.

Species for 'banksia woodland' and 'holly-leaved banksia woodland' target ecosystems were selected from the closest five Keighery *et al.* (2012) sample plots for FCT 23a, plus limited inclusions from monitoring data recorded to date. Species for 'banksia/coastal blackbutt woodland' target ecosystem were selected from the closest five Keighery *et al.* (2012) sample plots for FCT 21c and FCT 23a plus limited inclusions from monitoring data recorded to date. Species for 'banksia/jarrah woodland', 'banksia/tuart woodland' and 'banksia/woody pear woodland' target ecosystems were selected from the closest five Keighery *et al.* (2012) sample plots for FCT 28 plus limited inclusions from monitoring data recorded to date. Species for 'wet forest and woodland' target ecosystem were selected from all 15 Keighery *et al.* (2012) sample plots for FCT 11 plus limited inclusions from monitoring data recorded to date.

As monitoring data becomes available the lists of appropriate species for each target ecosystem shall be updated. Because native species that naturally occur within the site can be incorporated through monitoring the associated species list should always reflect the indigenous reference ecosystem.

The associated species list for each target ecosystem is provided in **Table 27** to **Table 33**.

Re-establishing native flora species is specifically identified within multiple restoration objectives (refer **Table 4**).

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Table 27: Associated species for wet forest and woodland target ecosystem

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Acacia dentifera</i>	7%	-
<i>Acacia pulchella</i>	20%	-
<i>Acacia saligna</i>	27%	✓
<i>Acacia stenoptera</i>	7%	-
<i>Adenanthos meisneri</i>	7%	-
<i>Adiantum aethiopicum</i>	7%	-
<i>Agrostocrinum scabrum</i>	7%	-
<i>Alternanthera nodiflora</i>	7%	-
<i>Amphipogon laguroides</i>	7%	-
<i>Anigozanthos viridis</i> subsp. <i>viridis</i>	7%	-
<i>Anthotium junciforme</i>	7%	-
<i>Aotus intermedia</i>	20%	-
<i>Aphelia cyperoides</i>	7%	-
<i>Astartea affinis</i>	13%	-
<i>Astartea fascicularis</i>	60%	-
<i>Asteridea pulverulenta</i>	7%	-
<i>Astroloma pallidum</i>	7%	-
<i>Austrostipa compressa</i>	7%	-
<i>Banksia littoralis</i>	13%	-
<i>Baumea articulata</i>	7%	-

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Table 27: Associated species for wet forest and woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Baumea juncea</i>	13%	-
<i>Burchardia multiflora</i>	7%	-
<i>Caesia micrantha</i>	13%	-
<i>Caladenia flava</i> subsp. <i>flava</i>	7%	-
<i>Caladenia latifolia</i>	7%	-
<i>Caladenia longicauda</i>	13%	-
<i>Caladenia paludosa</i>	13%	-
<i>Calothamnus lateralis</i>	7%	-
<i>Carex thecata</i>	7%	-
<i>Cassytha racemosa</i>	27%	-
<i>Centrolepis aristata</i>	33%	-
<i>Centrolepis drummondiana</i>	13%	-
<i>Centrolepis glabra</i>	13%	-
<i>Centrolepis mutica</i>	13%	-
<i>Conostephium preissii</i>	7%	-
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	7%	-
<i>Corymbia calophylla</i>	20%	-
<i>Corynotheca micrantha</i> var. <i>micrantha</i>	7%	-
<i>Cotula coronopifolia</i>	47%	-
<i>Crassula natans</i> var. <i>minus</i>	27%	-
<i>Cycnogeton lineare</i>	20%	-
<i>Dampiera linearis</i>	13%	-
<i>Dasyogon bromeliifolius</i>	13%	-
<i>Daucus glochidiatus</i>	7%	-
<i>Deyeuxia quadriseta</i>	13%	-
<i>Dianella revoluta</i> var. <i>divaricata</i>	7%	-
<i>Dichelachne crinita</i>	7%	-
<i>Dielsia stenostachya</i>	27%	-
<i>Dillwynia dillwynioides</i>	7%	-
<i>Drosera glanduligera</i>	7%	-
<i>Drosera stolonifera</i> subsp. <i>porrecta</i>	7%	-

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Table 27: Associated species for wet forest and woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Epilobium billardioreanum</i>	7%	-
<i>Epilobium hirtigerum</i>	7%	-
<i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>	7%	-
<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	20%	-
<b><i>Eucalyptus rudis</i> subsp. <i>rudis</i></b>	<b>60%</b>	-
<i>Ficinia nodosa</i>	7%	-
<i>Gahnia trifida</i>	7%	-
<i>Gompholobium tomentosum</i>	7%	-
<i>Goodenia pulchella</i>	20%	-
<i>Gratiola pubescens</i>	20%	-
<i>Hemiandra pungens</i>	7%	-
<i>Hibbertia cuneiformis</i>	-	✓
<i>Hibbertia stellaris</i>	13%	-
<i>Homalosciadium homalocarpum</i>	13%	-
<i>Hydrocotyle alata</i>	7%	-
<i>Hydrocotyle scutellifera</i>	7%	-
<i>Hypocalymma angustifolium</i>	13%	-
<i>Hypolaena exsulca</i>	7%	-
<i>Hypolaena pubescens</i>	7%	-
<i>Isolepis cernua</i>	20%	-
<i>Isolepis marginata</i>	47%	-
<i>Isolepis oldfieldiana</i>	13%	-
<i>Isolepis setiformis</i>	7%	-
<i>Isolepis stellata</i>	7%	-
<i>Ixiolaena viscosa</i>	7%	-
<i>Jacksonia furcellata</i>	13%	-
<i>Kennedia prostrata</i>	13%	-
<i>Kunzea glabrescens</i>	27%	-
<i>Lachnagrostis filiformis</i>	27%	-
<i>Lachnagrostis plebeia</i>	7%	-
<i>Lagenophora huegelii</i>	7%	-

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Table 27: Associated species for wet forest and woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Lechenaultia expansa</i>	7%	-
<i>Lepidosperma longitudinale</i>	80%	-
<i>Leptocarpus coangustatus</i>	13%	-
<i>Leptocarpus roycei</i>	7%	-
<i>Leptoceras menziesii</i>	7%	-
<i>Leucopogon propinquus</i>	7%	-
<i>Levenhookia stipitata</i>	7%	-
<i>Liparophyllum capitatum</i>	13%	-
<i>Lobelia alata</i>	27%	-
<i>Macrozamia fraseri</i>	20%	-
<i>Melaleuca incana</i> subsp. <i>incana</i>	7%	-
<i>Melaleuca lateritia</i>	33%	-
<b><i>Melaleuca preissiana</i></b>	<b>47%</b>	-
<b><i>Melaleuca raphiophylla</i></b>	<b>27%</b>	-
<i>Melaleuca teretifolia</i>	7%	-
<i>Melaleuca viminea</i> subsp. <i>viminea</i>	7%	-
<i>Microlaena stipoides</i>	27%	-
<i>Microtis media</i>	40%	-
<i>Monotaxis occidentalis</i>	7%	-
<i>Opercularia hispidula</i>	33%	-
<i>Ornduffia albiflora</i>	27%	-
<i>Patersonia occidentalis</i>	20%	-
<i>Patersonia occidentalis</i> (wetland form)	20%	-
<i>Phyllanthus calycinus</i>	13%	-
<i>Platysace compressa</i>	13%	-
<i>Podolepis gracilis</i>	7%	-
<i>Polypogon tenellus</i>	7%	-
<i>Pseudognaphalium luteoalbum</i>	7%	-
<i>Pteridium esculentum</i>	7%	-
<i>Pterostylis</i> sp. Slender Snail Orchid (G.J. Keighery 14516)	13%	-
<i>Regelia ciliata</i>	7%	-

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Table 27: Associated species for wet forest and woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Schoenus brevisetis</i>	13%	-
<i>Schoenus efoliatus</i>	13%	-
<i>Schoenus elegans</i>	7%	-
<i>Schoenus maschalinus</i>	7%	-
<i>Schoenus rigens</i>	7%	-
<i>Schoenus tenellus</i>	13%	-
<i>Siloxerus filifolius</i>	7%	-
<i>Siloxerus humifusus</i>	7%	-
<i>Sowerbaea laxiflora</i>	13%	-
<i>Sphaerolobium vimineum</i>	7%	-
<i>Stylidium brunonianum</i> subsp. <i>brunonianum</i>	20%	-
<i>Stylidium divaricatum</i>	13%	-
<i>Stylidium junceum</i> subsp. <i>junceum</i>	7%	-
<i>Stylidium longitubum</i>	13%	-
<i>Stylidium roseoalatum</i>	13%	-
<i>Stylidium utricularioides</i>	7%	-
<i>Thelymitra macrophylla</i>	13%	-
<i>Thysanotus manglesianus/patersonii</i> complex	27%	-
<i>Thysanotus multiflorus</i>	7%	-
<i>Thysanotus patersonii</i>	7%	-
<i>Thysanotus thyrsoides</i>	13%	-
<i>Trachymene pilosa</i>	20%	-
<i>Tribonanthes australis</i>	7%	-
<i>Tribonanthes violacea</i>	7%	-
<i>Tricoryne elatior</i>	7%	-
<i>Utricularia violacea</i>	7%	-
<i>Wahlenbergia preissii</i>	7%	-
<i>Waitzia suaveolens</i> var. <i>suaveolens</i>	7%	-
<b><i>Xanthorrhoea preissii</i></b>	<b>20%</b>	-
<i>Xanthosia huegelii</i> subsp. <i>huegelii</i>	7%	-

<sup>†</sup>= Keighery *et al.* (2012) frequency calculated based on all 15 sites representing FCT 11; **Bold** font indicates 'important species' (see **Section 7.2.3.2**).

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Table 28: Associated species for banksia woodland target ecosystem

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Acacia huegelii</i>	20%	-
<i>Acacia pulchella</i>	80%	-
<i>Acacia stenoptera</i>	60%	-
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	20%	-
<b><i>Allocasuarina fraseriana</i></b>	<b>40%</b>	-
<i>Allocasuarina humilis</i>	40%	-
<i>Amphipogon turbinatus</i>	60%	-
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	20%	-
<i>Arnocrinum preissii</i>	20%	-
<i>Austrostipa compressa</i>	80%	-
<b><i>Banksia attenuata</i></b>	<b>80%</b>	-
<i>Banksia ilicifolia</i>	60%	-
<b><i>Banksia menziesii</i></b>	<b>100%</b>	-
<i>Bossiaea eriocarpa</i>	100%	-
<i>Brachyloma preissii</i>	20%	-
<i>Burchardia congesta</i>	80%	-
<i>Caladenia flava</i> subsp. <i>flava</i>	20%	-
<i>Calectasia narragara</i>	20%	-
<i>Calytrix flavescens</i>	80%	-
<i>Calytrix fraseri</i>	40%	-
<i>Carex thecata</i>	20%	-
<i>Cassytha flava</i>	40%	-
<i>Centrolepis drummondiana</i>	60%	-
<i>Centrolepis humillima</i>	20%	-
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	40%	-
<i>Comesperma calymega</i>	20%	-
<i>Conostephium pendulum</i>	80%	-
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	40%	-
<i>Conostylis caricina</i> subsp. <i>caricina</i>	20%	-
<i>Conostylis juncea</i>	20%	-
<i>Conostylis setigera</i> subsp. <i>setigera</i>	40%	-

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Table 28: Associated species for banksia woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Crassula colorata</i> var. <i>colorata</i>	40%	-
<i>Croninia kingiana</i>	20%	-
<i>Dampiera linearis</i>	80%	-
<i>Dasyogon bromeliifolius</i>	100%	-
<i>Daviesia divaricata</i> subsp. <i>divaricata</i>	20%	-
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	20%	-
<i>Daviesia triflora</i>	40%	-
<i>Desmocladius flexuosus</i>	60%	-
<i>Drosera menziesii</i> subsp. <i>penicillaris</i>	20%	-
<i>Drosera paleacea</i> subsp. <i>paleacea</i>	60%	-
<i>Eremaea asterocarpa</i> subsp. <i>asterocarpa</i>	20%	-
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	40%	-
<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	#	-
<i>Gastrolobium capitatum</i>	40%	-
<i>Gompholobium confertum</i>	20%	-
<i>Gompholobium tomentosum</i>	100%	-
<i>Gonocarpus pithyoides</i>	40%	-
<i>Hardenbergia comptoniana</i>	20%	-
<i>Hibbertia aurea</i>	20%	-
<i>Hibbertia huegelii</i>	40%	-
<i>Hibbertia hypericoides</i>	60%	-
<i>Hibbertia racemosa</i>	40%	-
<i>Hibbertia subvaginata</i>	40%	-
<i>Homaloscladium homalocarpum</i>	60%	-
<i>Hovea pungens</i>	20%	-
<i>Hovea trisperma</i> var. <i>trisperma</i>	40%	-
<i>Hypocalymma robustum</i>	60%	-
<i>Hypocalymma xanthopetalum</i>	80%	-
<i>Hypolaena exsulca</i>	60%	-
<i>Isolepis cernua</i>	20%	-
<i>Isolepis marginata</i>	40%	-

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 28: Associated species for banksia woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Jacksonia furcellata</i>	60%	-
<i>Jacksonia sternbergiana</i>	20%	-
<i>Kennedia prostrata</i>	20%	-
<i>Kunzea glabrescens</i>	40%	-
<i>Laxmannia squarrosa</i>	40%	-
<i>Lechenaultia floribunda</i>	60%	-
<i>Lepidosperma squamatum</i>	40%	-
<i>Leucopogon australis</i> subsp. <i>australis</i>	80%	-
<i>Leucopogon gracillimus</i>	20%	-
<i>Leucopogon polymorphus</i>	20%	-
<i>Leucopogon propinquus</i>	20%	-
<i>Levenhookia stipitata</i>	40%	-
<i>Lobelia tenuior</i>	40%	-
<i>Lomandra hermaphrodita</i>	80%	-
<i>Lomandra nigricans</i>	40%	-
<i>Lomandra suaveolens</i>	20%	-
<i>Lyginia barbata</i>	100%	-
<i>Lysinema ciliatum</i>	20%	-
<b><i>Macrozamia fraseri</i></b>	<b>40%</b>	-
<i>Melaleuca preissiana</i>	20%	-
<i>Melaleuca ryeae</i>	40%	-
<i>Melaleuca thymoides</i>	60%	-
<i>Mesomelaena pseudostygia</i>	20%	-
<i>Microtis media</i>	20%	-
<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	20%	-
<i>Nuytsia floribunda</i>	40%	-
<i>Patersonia occidentalis</i>	100%	-
<i>Patersonia occidentalis</i> (wetland form)	20%	-
<i>Persoonia saccata</i>	20%	-
<i>Petrophile linearis</i>	100%	-
<i>Philothea spicata</i>	60%	-

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 28: Associated species for banksia woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Phlebocarya ciliata</i>	60%	-
<i>Phlebocarya filifolia</i>	40%	-
<i>Pimelea sulphurea</i>	40%	-
<i>Platysace compressa</i>	20%	-
<i>Podolepis gracilis</i>	20%	-
<i>Podotheca angustifolia</i>	20%	-
<i>Poranthera microphylla</i>	60%	-
<i>Prasophyllum parvifolium</i>	20%	-
<i>Pyrorchis nigricans</i>	20%	-
<i>Quinetia urvillei</i>	40%	-
<i>Regelia ciliata</i>	20%	-
<i>Regelia inops</i>	20%	-
<i>Rytidosperma occidentale</i>	80%	-
<i>Scaevola repens</i> var. <i>repens</i>	40%	-
<i>Schoenus clandestinus</i>	20%	-
<i>Schoenus curvifolius</i>	100%	-
<i>Schoenus efoliatus</i>	20%	-
<i>Scholtzia involucrata</i>	80%	-
<i>Siloxerus humifusus</i>	20%	-
<i>Stackhousia monogyna</i>	20%	-
<i>Stirlingia latifolia</i>	60%	-
<i>Stylidium brunonianum</i> subsp. <i>brunonianum</i>	80%	-
<i>Stylidium carnosum</i>	20%	-
<i>Stylidium piliferum</i> subsp. <i>piliferum</i>	20%	-
<i>Stylidium repens</i>	60%	-
<i>Tetraria octandra</i>	20%	-
<i>Thysanotus manglesianus/patersonii</i> complex	20%	-
<i>Thysanotus multiflorus</i>	20%	-
<i>Thysanotus patersonii</i>	40%	-
<i>Thysanotus sparteus</i>	20%	-
<i>Thysanotus thyrsoides</i>	20%	-

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## Roe 8 Cleared Areas

Table 28: Associated species for banksia woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Trachymene pilosa</i>	100%	-
<i>Tricoryne tenella</i>	40%	-
<i>Wahlenbergia preissii</i>	20%	-
<i>Waitzia suaveolens</i> var. <i>suaveolens</i>	60%	-
<b><i>Xanthorrhoea preissii</i></b>	<b>80%</b>	-
<i>Xanthosia huegelii</i> subsp. <i>huegelii</i>	60%	-

†= Keighery *et al.* (2012) frequency calculated based on the five closest sites representing FCT 23a (jand04, beel02, jand01, jand02 and bibra01); #=species recorded in Keighery *et al.* (2012) site/s but not included in target ecosystem due to powerline vegetation height restrictions; **Bold** font indicates 'important species' (see Section 7.2.3.2).

Table 29: Associated species for banksia/jarrah woodland target ecosystem

Species	Keighery <i>et al.</i> (2012) †	Ongoing monitoring
<i>Acacia applanata</i>	20%	-
<i>Acacia huegelii</i>	40%	-
<i>Acacia pulchella</i>	20%	✓
<i>Acacia stenoptera</i>	40%	✓
<i>Acacia willdenowiana</i>	20%	-
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	20%	-
<b><i>Allocasuarina fraseriana</i></b>	<b>20%</b>	-
<i>Allocasuarina humilis</i>	-	✓
<i>Amphipogon turbinatus</i>	40%	-
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	40%	-
<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>	20%	✓
<i>Asteridea pulverulenta</i>	20%	-
<i>Astroloma pallidum</i>	20%	-
<i>Austrostipa compressa</i>	40%	-
<i>Babingtonia camphorosmae</i>	20%	-
<b><i>Banksia attenuata</i></b>	<b>100%</b>	✓
<i>Banksia dallanneyi</i>	20%	-
<i>Banksia ilicifolia</i>	20%	-
<b><i>Banksia menziesii</i></b>	<b>60%</b>	-
<i>Bossiaea eriocarpa</i>	40%	✓
<i>Brachyloma preissii</i>	20%	-

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## Roe 8 Cleared Areas

Table 29: Associated species for banksia/jarrah woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) <sup>†</sup>	Ongoing monitoring
<i>Burchardia congesta</i>	100%	✓
<i>Caesia micrantha</i>	40%	-
<i>Caladenia flava</i> subsp. <i>flava</i>	60%	-
<i>Caladenia georgei</i>	20%	-
<i>Centrolepis drummondiana</i>	40%	-
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	40%	-
<i>Conospermum triplinervium</i>	20%	-
<i>Conostephium pendulum</i>	60%	-
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	80%	✓
<i>Conostylis candicans</i> subsp. <i>candicans</i>	-	✓
<i>Conostylis setigera</i> subsp. <i>setigera</i>	80%	-
<i>Corymbia calophylla</i>	60%	✓
<i>Corynotheca micrantha</i> var. <i>micrantha</i>	20%	-
<i>Dampiera linearis</i>	40%	✓
<i>Dasyogon bromeliifolius</i>	60%	-
<i>Daviesia divaricata</i> subsp. <i>divaricata</i>	40%	-
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	40%	-
<i>Daviesia triflora</i>	20%	-
<i>Desmocladius fasciculatus</i>	40%	-
<i>Desmocladius flexuosus</i>	40%	-
<i>Dianella revoluta</i> var. <i>divaricata</i>	60%	✓
<i>Dichelachne crinita</i>	20%	-
<i>Dichopogon capillipes</i>	-	✓
<i>Diuris longifolia</i>	60%	-
<i>Drosera erythrorhiza</i> subsp. <i>erythrorhiza</i>	-	✓
<i>Drosera macrantha</i> subsp. <i>macrantha</i>	-	✓
<i>Drosera pallida</i>	20%	-
<i>Drosera stolonifera</i>	80%	✓
<i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>	80%	✓
<i>Eucalyptus gomphocephala</i>	20%	-
<b><i>Eucalyptus marginata</i> subsp. <i>marginata</i></b>	<b>60%</b>	<b>✓</b>

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## Roe 8 Cleared Areas

Table 29: Associated species for banksia/jarrah woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) <sup>†</sup>	Ongoing monitoring
<i>Gastrolobium capitatum</i>	100%	-
<i>Gompholobium tomentosum</i>	100%	✓
<i>Hakea prostrata</i>	20%	-
<i>Hardenbergia comptoniana</i>	60%	✓
<i>Hibbertia huegelii</i>	40%	-
<i>Hibbertia hypericoides</i>	80%	✓
<i>Hibbertia racemosa</i>	60%	-
<i>Homalosciadium homalocarpum</i>	40%	-
<i>Hovea pungens</i>	-	✓
<i>Hovea trisperma</i> var. <i>trisperma</i>	60%	✓
<i>Hypocalymma robustum</i>	40%	✓
<i>Hypolaena exsulca</i>	40%	-
<i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i>	60%	-
<i>Jacksonia furcellata</i>	-	✓
<i>Jacksonia sericea</i>	20%	-
<i>Jacksonia sternbergiana</i>	20%	-
<i>Kennedia prostrata</i>	60%	✓
<i>Lagenophora huegelii</i>	60%	-
<i>Lepidobolus preissianus</i>	20%	-
<i>Lepidosperma scabrum</i>	20%	-
<i>Lepidosperma squamatum</i>	60%	-
<i>Leucopogon parviflorus</i>	40%	-
<i>Leucopogon racemosus</i>	20%	-
<i>Lomandra caespitosa</i>	80%	-
<i>Lomandra hermaphrodita</i>	20%	-
<i>Lomandra micrantha</i> subsp. <i>micrantha</i>	20%	-
<i>Lomandra nigricans</i>	20%	-
<i>Lomandra preissii</i>	20%	-
<i>Lomandra suaveolens</i>	20%	-
<i>Lyginia barbata</i>	40%	-
<i>Lyperanthus serratus</i>	20%	-

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## Roe 8 Cleared Areas

Table 29: Associated species for banksia/jarrah woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) <sup>†</sup>	Ongoing monitoring
<i>Macrozamia fraseri</i>	80%	✓
<i>Melaleuca systema</i>	20%	-
<i>Mesomelaena pseudostygia</i>	100%	✓
<i>Microlaena stipoides</i>	40%	-
<i>Monotaxis grandiflora</i>	20%	-
<i>Neurachne alopecuroidea</i>	20%	-
<i>Patersonia occidentalis</i>	40%	-
<i>Patersonia occidentalis</i> (wetland form)	40%	-
<i>Petrophile linearis</i>	100%	-
<i>Petrophile macrostachya</i>	20%	-
<i>Philothea spicata</i>	20%	✓
<i>Pimelea rosea</i> subsp. <i>rosea</i>	20%	-
<i>Pimelea sulphurea</i>	20%	-
<i>Poa drummondiana</i>	20%	-
<i>Podolepis gracilis</i>	20%	-
<i>Poranthera microphylla</i>	20%	-
<i>Scaevola canescens</i>	40%	-
<i>Scaevola repens</i> var. <i>repens</i>	60%	-
<i>Schoenus clandestinus</i>	60%	-
<i>Sowerbaea laxiflora</i>	60%	✓
<i>Stirlingia latifolia</i>	80%	-
<i>Stylidium brunonianum</i> subsp. <i>brunonianum</i>	20%	-
<i>Stylidium schoenoides</i>	20%	-
<i>Tetraria octandra</i>	100%	-
<i>Thelymitra benthamiana</i>	20%	-
<i>Thysanotus arenarius</i>	40%	-
<i>Thysanotus manglesianus/patersonii</i> complex	20%	-
<i>Thysanotus patersonii</i>	40%	-
<i>Thysanotus sparteus</i>	40%	✓
<i>Thysanotus thyrsoides</i>	20%	-
<i>Trachymene pilosa</i>	80%	-

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## Roe 8 Cleared Areas

Table 29: Associated species for banksia/jarrah woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) <sup>†</sup>	Ongoing monitoring
<i>Tricoryne elatior</i>	20%	-
<i>Wahlenbergia preissii</i>	20%	-
<b><i>Xanthorrhoea preissii</i></b>	<b>100%</b>	✓
<i>Xanthosia huegelii</i> subsp. <i>huegelii</i>	60%	-

<sup>†</sup>= Keighery *et al.* (2012) frequency calculated based on the five closest sites representing FCT 28 (beel01, wire01, sand01, wire02, sams01); **Bold** font indicates 'important species' (see Section 7.2.3.2).

Table 30: Associated species for holly-leaved banksia woodland target ecosystem

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Acacia alata</i> var. <i>alata</i>	-	✓
<i>Acacia huegelii</i>	20%	-
<i>Acacia pulchella</i>	80%	-
<i>Acacia stenoptera</i>	60%	-
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	20%	-
<b><i>Allocasuarina fraseriana</i></b>	<b>40%</b>	-
<i>Allocasuarina humilis</i>	40%	-
<i>Amphipogon turbinatus</i>	60%	-
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	20%	-
<i>Arnocrinum preissii</i>	20%	-
<i>Austrostipa compressa</i>	80%	-
<b><i>Banksia attenuata</i></b>	<b>80%</b>	-
<b><i>Banksia ilicifolia</i></b>	<b>60%</b>	-
<b><i>Banksia menziesii</i></b>	<b>100%</b>	-
<i>Bossiaea eriocarpa</i>	100%	-
<i>Brachyloma preissii</i>	20%	-
<i>Burchardia congesta</i>	80%	-
<i>Caladenia flava</i> subsp. <i>flava</i>	20%	-
<i>Calectasia narragara</i>	20%	-
<i>Calytrix flavescens</i>	80%	-
<i>Calytrix fraseri</i>	40%	-
<i>Carex thecata</i>	20%	-
<i>Cassytha flava</i>	40%	-

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## Roe 8 Cleared Areas

Table 30: Associated species for holly-leaved banksia woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Centrolepis drummondiana</i>	60%	-
<i>Centrolepis humillima</i>	20%	-
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	40%	-
<i>Comesperma calymega</i>	20%	-
<i>Conostephium pendulum</i>	80%	-
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	40%	-
<i>Conostylis caricina</i> subsp. <i>caricina</i>	20%	-
<i>Conostylis juncea</i>	20%	-
<i>Conostylis setigera</i> subsp. <i>setigera</i>	40%	-
<i>Crassula colorata</i> var. <i>colorata</i>	40%	-
<i>Croninia kingiana</i>	20%	-
<i>Dampiera linearis</i>	80%	-
<i>Dasyogon bromeliifolius</i>	100%	-
<i>Daviesia divaricata</i> subsp. <i>divaricata</i>	20%	-
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	20%	-
<i>Daviesia triflora</i>	40%	-
<i>Desmocladius flexuosus</i>	60%	-
<i>Drosera menziesii</i> subsp. <i>penicillaris</i>	20%	-
<i>Drosera paleacea</i> subsp. <i>paleacea</i>	60%	-
<i>Eremaea asterocarpa</i> subsp. <i>asterocarpa</i>	20%	-
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	40%	-
<b><i>Eucalyptus marginata</i> subsp. <i>marginata</i></b>	<b>40%</b>	-
<i>Gastrolobium capitatum</i>	40%	-
<i>Gompholobium confertum</i>	20%	-
<i>Gompholobium tomentosum</i>	100%	-
<i>Gonocarpus pithyoides</i>	40%	-
<i>Hardenbergia comptoniana</i>	20%	-
<i>Hibbertia aurea</i>	20%	-
<i>Hibbertia huegelii</i>	40%	-
<i>Hibbertia hypericoides</i>	60%	-
<i>Hibbertia racemosa</i>	40%	-

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## Roe 8 Cleared Areas

Table 30: Associated species for holly-leaved banksia woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Hibbertia subvaginata</i>	40%	-
<i>Homalosciadium homalocarpum</i>	60%	-
<i>Hovea pungens</i>	20%	-
<i>Hovea trisperma</i> var. <i>trisperma</i>	40%	-
<i>Hypocalymma robustum</i>	60%	-
<i>Hypocalymma xanthopetalum</i>	80%	-
<i>Hypolaena exsulca</i>	60%	-
<i>Isolepis cernua</i>	20%	-
<i>Isolepis marginata</i>	40%	-
<i>Jacksonia furcellata</i>	60%	-
<i>Jacksonia sternbergiana</i>	20%	-
<i>Kennedia prostrata</i>	20%	-
<i>Kunzea glabrescens</i>	40%	-
<i>Laxmannia squarrosa</i>	40%	-
<i>Lechenaultia floribunda</i>	60%	-
<i>Lepidosperma squamatum</i>	40%	-
<i>Leucopogon australis</i> subsp. <i>australis</i>	80%	-
<i>Leucopogon gracillimus</i>	20%	-
<i>Leucopogon polymorphus</i>	20%	-
<i>Leucopogon propinquus</i>	20%	-
<i>Levenhookia stipitata</i>	40%	-
<i>Lobelia tenuior</i>	40%	-
<i>Lomandra hermaphrodita</i>	80%	-
<i>Lomandra nigricans</i>	40%	-
<i>Lomandra suaveolens</i>	20%	-
<i>Lyginia barbata</i>	100%	-
<i>Lysinema ciliatum</i>	20%	-
<b><i>Macrozamia fraseri</i></b>	<b>40%</b>	-
<i>Melaleuca preissiana</i>	20%	-
<i>Melaleuca ryeae</i>	40%	-
<i>Melaleuca thymoides</i>	60%	-

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## Roe 8 Cleared Areas

Table 30: Associated species for holly-leaved banksia woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Mesomelaena pseudostygia</i>	20%	-
<i>Microtis media</i>	20%	-
<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	20%	-
<i>Nuytsia floribunda</i>	40%	-
<i>Patersonia occidentalis</i>	100%	-
<i>Patersonia occidentalis</i> (wetland form)	20%	-
<i>Persoonia saccata</i>	20%	-
<i>Petrophile linearis</i>	100%	-
<i>Philothea spicata</i>	60%	-
<i>Phlebocarya ciliata</i>	60%	-
<i>Phlebocarya filifolia</i>	40%	-
<i>Pimelea sulphurea</i>	40%	-
<i>Platysace compressa</i>	20%	-
<i>Podolepis gracilis</i>	20%	-
<i>Podotrochea angustifolia</i>	20%	-
<i>Poranthera microphylla</i>	60%	-
<i>Prasophyllum parvifolium</i>	20%	-
<i>Pyrorchis nigricans</i>	20%	-
<i>Quinetia urvillei</i>	40%	-
<i>Regelia ciliata</i>	20%	-
<i>Regelia inops</i>	20%	-
<i>Rytidosperma occidentale</i>	80%	-
<i>Scaevola repens</i> var. <i>repens</i>	40%	-
<i>Schoenus clandestinus</i>	20%	-
<i>Schoenus curvifolius</i>	100%	-
<i>Schoenus efoliatus</i>	20%	-
<i>Scholtzia involucreta</i>	80%	-
<i>Siloxerus humifusus</i>	20%	-
<i>Stackhousia monogyna</i>	20%	-
<i>Stirlingia latifolia</i>	60%	-
<i>Stylidium brunonianum</i> subsp. <i>brunonianum</i>	80%	-

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 30: Associated species for holly-leaved banksia woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Stylidium carnosum</i>	20%	-
<i>Stylidium piliferum</i> subsp. <i>piliferum</i>	20%	-
<i>Stylidium repens</i>	60%	-
<i>Tetraria octandra</i>	20%	-
<i>Thysanotus manglesianus/patersonii</i> complex	20%	-
<i>Thysanotus multiflorus</i>	20%	-
<i>Thysanotus patersonii</i>	40%	-
<i>Thysanotus sparteus</i>	20%	-
<i>Thysanotus thyrsoideus</i>	20%	-
<i>Trachymene pilosa</i>	100%	-
<i>Tricoryne tenella</i>	40%	-
<i>Wahlenbergia preissii</i>	20%	-
<i>Waitzia suaveolens</i> var. <i>suaveolens</i>	60%	-
<b><i>Xanthorrhoea preissii</i></b>	<b>80%</b>	-
<i>Xanthosia huegelii</i> subsp. <i>huegelii</i>	60%	-

<sup>†</sup>= Keighery *et al.* (2012) frequency calculated based on the five closest sites representing FCT 28 (beel01, wire01, sand01, wire02, sams01); **Bold** font indicates 'important species' (see **Section 7.2.3.2**).

Table 31: Associated species for banksia/coastal blackbutt woodland target ecosystem

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Acacia cyclops</i>	-	✓
<i>Acacia huegelii</i>	60%	-
<i>Acacia pulchella</i>	80%	✓
<i>Acacia saligna</i>	-	✓
<i>Acacia sessilis</i>	20%	-
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	60%	-
<b><i>Allocasuarina fraseriana</i></b>	<b>40%</b>	-
<i>Allocasuarina humilis</i>	40%	-
<i>Amphipogon turbinatus</i>	60%	-
<i>Anarthria gracilis</i>	20%	-
<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>	60%	-
<i>Aotus procumbens</i>	20%	-

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 31: Associated species for banksia/coastal blackbutt woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Arnocrinum preissii</i>	40%	-
<i>Astartea fascicularis</i>	-	✓
<i>Asteridea pulverulenta</i>	20%	-
<i>Astroloma xerophyllum</i>	20%	-
<i>Austrostipa compressa</i>	80%	-
<i>Austrostipa flavescens</i>	20%	-
<b><i>Banksia attenuata</i></b>	<b>80%</b>	-
<i>Banksia dallaneyi</i>	20%	-
<i>Banksia ilicifolia</i>	60%	-
<i>Banksia littoralis</i>	-	✓
<b><i>Banksia menziesii</i></b>	<b>100%</b>	-
<i>Beaufortia elegans</i>	20%	-
<i>Boronia ramosa</i> subsp. <i>ramosa</i>	20%	-
<i>Bossiaea eriocarpa</i>	100%	-
<i>Brachyloma preissii</i>	20%	-
<i>Burchardia congesta</i>	80%	✓
<i>Caladenia flava</i> subsp. <i>flava</i>	-	✓
<i>Caladenia georgei</i>	-	✓
<i>Caladenia latifolia</i>	-	✓
<i>Calandrinia corrigioloides</i>	-	✓
<i>Calectasia narragara</i>	20%	-
<i>Calytrix angulata</i>	20%	-
<i>Calytrix flavescens</i>	80%	-
<i>Calytrix fraseri</i>	40%	-
<i>Cartonema philydroides</i>	40%	✓
<i>Centrolepis drummondiana</i>	60%	✓
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	40%	-
<i>Chordifex sinuosus</i>	20%	-
<i>Conospermum stoechadis</i> subsp. <i>stoechadis</i>	20%	-
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	60%	✓
<i>Conostylis setigera</i> subsp. <i>setigera</i>	40%	-

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 31: Associated species for banksia/coastal blackbutt woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Corynotheca micrantha</i> var. <i>micrantha</i>	20%	-
<i>Crassula colorata</i> var. <i>colorata</i>	40%	✓
<i>Crassula decumbens</i>	-	✓
<i>Crassula exserta</i>	-	✓
<i>Cyathochaeta equitans</i>	20%	-
<i>Dampiera linearis</i>	80%	✓
<i>Dasyogon bromeliifolius</i>	100%	✓
<i>Desmocladius fasciculatus</i>	20%	-
<i>Desmocladius flexuosus</i>	60%	✓
<i>Dianella revoluta</i> var. <i>divaricata</i>	20%	✓
<i>Drosera erythrorhiza</i> subsp. <i>erythrorhiza</i>	20%	-
<i>Drosera menziesii</i> subsp. <i>menziesii</i>	-	✓
<i>Drosera menziesii</i> subsp. <i>penicillaris</i>	40%	-
<i>Drosera stolonifera</i>	-	✓
<i>Drosera stolonifera</i> subsp. <i>porrecta</i>	20%	-
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	40%	-
<b><i>Eucalyptus marginata</i> subsp. <i>marginata</i></b>	<b>40%</b>	-
<i>Eucalyptus rudis</i> subsp. <i>rudis</i>	-	✓
<b><i>Eucalyptus tottiana</i></b>	-	✓
<i>Gastrolobium ebracteolatum</i>	-	✓
<i>Gompholobium tomentosum</i>	100%	✓
<i>Haemodorum laxum</i>	20%	-
<i>Hakea candolleana</i>	20%	-
<i>Hardenbergia comptoniana</i>	-	✓
<i>Hensmania turbinata</i>	20%	-
<i>Hibbertia cuneiformis</i>	-	✓
<i>Hibbertia huegelii</i>	40%	-
<i>Hibbertia hypericoides</i>	-	✓
<i>Hibbertia racemosa</i>	60%	-
<i>Hibbertia subvaginata</i>	40%	-
<i>Homalosciadium homalocarpum</i>	60%	-

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 31: Associated species for banksia/coastal blackbutt woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Hovea pungens</i>	-	✓
<i>Hypocalymma robustum</i>	-	✓
<i>Jacksonia floribunda</i>	20%	-
<i>Jacksonia furcellata</i>	60%	✓
<i>Kennedia prostrata</i>	-	✓
<i>Kunzea glabrescens</i>	-	✓
<i>Laxmannia sessiliflora</i> subsp. <i>australis</i>	20%	-
<i>Lechenaultia expansa</i>	20%	-
<i>Lechenaultia floribunda</i>	60%	-
<i>Lepidosperma leptostachyum</i>	-	✓
<i>Lepidosperma longitudinale</i>	-	✓
<i>Lepidosperma squamatum</i>	40%	✓
<i>Leporella fimbriata</i>	20%	-
<i>Leucopogon australis</i> subsp. <i>australis</i>	-	✓
<i>Leucopogon conostephioides</i>	80%	-
<i>Leucopogon polymorphus</i>	20%	-
<i>Levenhookia stipitata</i>	40%	-
<i>Lomandra caespitosa</i>	80%	-
<i>Lomandra hermaphrodita</i>	80%	-
<i>Lomandra micrantha</i> subsp. <i>micrantha</i>	20%	✓
<i>Lomandra preissii</i>	-	✓
<i>Lyginia barbata</i>	100%	-
<i>Macarthuria apetala</i>	20%	-
<i>Macarthuria australis</i>	20%	-
<b><i>Macrozamia fraseri</i></b>	<b>40%</b>	<b>✓</b>
<i>Melaleuca preissiana</i>	-	✓
<i>Melaleuca raphiophylla</i>	-	✓
<i>Melaleuca ryeae</i>	40%	-
<i>Melaleuca thymoides</i>	60%	-
<i>Mesomelaena pseudostygia</i>	20%	-
<i>Mesomelaena tetragona</i>	20%	-
<i>Microtis media</i>	20%	✓

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## Roe 8 Cleared Areas

Table 31: Associated species for banksia/coastal blackbutt woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	20%	-
<i>Neurachne alopecuroidea</i>	60%	-
<i>Nuytsia floribunda</i>	40%	-
<i>Patersonia occidentalis</i>	100%	✓
<i>Pelargonium littorale</i>	20%	-
<i>Persoonia angustiflora</i>	20%	-
<i>Petrophile juncifolia</i>	20%	-
<i>Petrophile linearis</i>	100%	-
<i>Philothea spicata</i>	60%	-
<i>Phlebocarya ciliata</i>	60%	-
<i>Phyllangium paradoxum</i>	20%	-
<i>Pithocarpa pulchella</i> var. <i>pulchella</i>	20%	-
<i>Podotheca angustifolia</i>	20%	-
<i>Podotheca chrysantha</i>	20%	-
<i>Poranthera microphylla</i>	-	✓
<i>Pteridium esculentum</i>	-	✓
<i>Pterochaeta paniculata</i>	20%	-
<i>Pterostylis vittata</i>	20%	-
<i>Quinetia urvillei</i>	40%	-
<i>Regelia inops</i>	20%	-
<i>Rytidosperma caespitosum</i>	20%	-
<i>Rytidosperma occidentale</i>	80%	-
<i>Schoenus curvifolius</i>	100%	-
<i>Schoenus discifer</i>	20%	-
<i>Schoenus grandiflorus</i>	20%	-
<i>Schoenus pedicellatus</i>	20%	-
<i>Scholtzia involucrata</i>	80%	✓
<i>Siloxerus humifusus</i>	20%	-
<i>Sowerbaea laxiflora</i>	20%	-
<i>Stirlingia latifolia</i>	60%	✓
<i>Stylidium brunonianum</i> subsp. <i>brunonianum</i>	80%	-

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## Roe 8 Cleared Areas

Table 31: Associated species for banksia/coastal blackbutt woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Stylidium calcaratum</i>	20%	-
<i>Stylidium repens</i>	80%	-
<i>Taxandria linearifolia</i>	-	✓
<i>Thysanotus arbuscula</i>	20%	-
<i>Thysanotus manglesianus/patersonii</i> complex	60%	-
<i>Thysanotus multiflorus</i>	20%	-
<i>Thysanotus patersonii</i>	-	✓
<i>Thysanotus thyrsoides</i>	20%	-
<i>Trachymene pilosa</i>	100%	✓
<i>Tricoryne elatior</i>	20%	-
<i>Wahlenbergia preissii</i>	20%	-
<b><i>Xanthorrhoea preissii</i></b>	<b>80%</b>	✓

†= Keighery *et al.* (2012) frequency calculated based on the highest percentage of the five closest sites representing FCT 21c (YULE-3, DEJONG02, FL-5, FL-6 and jand05) and FCT 23a (jand04, beel02, jand01, jand02 and bibra01); **Bold** font indicates 'important species' (see **Section 7.2.3.2**).

Table 32: Associated species for banksia/woody pear woodland target ecosystem

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Acacia applanata</i>	20%	-
<i>Acacia huegelii</i>	40%	✓
<i>Acacia pulchella</i>	20%	✓
<i>Acacia saligna</i>	-	✓
<i>Acacia stenoptera</i>	40%	-
<i>Acacia willdenowiana</i>	20%	-
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	20%	-
<b><i>Allocasuarina fraseriana</i></b>	<b>20%</b>	-
<i>Amphipogon turbinatus</i>	40%	-
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	40%	-
<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>	20%	-
<i>Asteridea pulverulenta</i>	20%	-
<i>Astroloma pallidum</i>	20%	-
<i>Austrostipa compressa</i>	40%	-
<i>Babingtonia camphorosmae</i>	20%	-

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## Roe 8 Cleared Areas

Table 32: Associated species for banksia/woody pear woodland target ecosystem (continued)

Species	Keighery et al. (2012) frequency <sup>†</sup>	Ongoing monitoring
<b><i>Banksia attenuata</i></b>	<b>100%</b>	✓
<i>Banksia dallaneyi</i>	20%	-
<i>Banksia ilicifolia</i>	20%	-
<b><i>Banksia menziesii</i></b>	<b>60%</b>	-
<i>Boronia ramosa</i> subsp. <i>ramosa</i>	-	✓
<i>Bossiaea eriocarpa</i>	40%	✓
<i>Brachyloma preissii</i>	20%	-
<i>Burchardia congesta</i>	100%	✓
<i>Caesia micrantha</i>	40%	✓
<i>Caladenia flava</i> subsp. <i>flava</i>	60%	✓
<i>Caladenia georgei</i>	20%	-
<i>Centrolepis drummondiana</i>	40%	-
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	40%	-
<i>Conospermum triplinervium</i>	20%	-
<i>Conostephium pendulum</i>	60%	✓
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	80%	✓
<i>Conostylis candicans</i> subsp. <i>candicans</i>	-	✓
<i>Conostylis setigera</i> subsp. <i>setigera</i>	80%	-
<i>Corymbia calophylla</i>	60%	✓
<i>Corynotheca micrantha</i> var. <i>micrantha</i>	20%	-
<i>Dampiera linearis</i>	40%	-
<i>Dasypogon bromeliifolius</i>	60%	-
<i>Daviesia divaricata</i> subsp. <i>divaricata</i>	40%	✓
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	40%	-
<i>Daviesia triflora</i>	20%	-
<i>Desmocladius fasciculatus</i>	40%	-
<i>Desmocladius flexuosus</i>	40%	✓
<i>Dianella revoluta</i> var. <i>divaricata</i>	60%	✓
<i>Dichelachne crinita</i>	20%	-
<i>Dichopogon capillipes</i>	-	✓
<i>Diuris longifolia</i>	60%	-

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## Roe 8 Cleared Areas

Table 32: Associated species for banksia/woody pear woodland target ecosystem (continued)

Species	Keighery et al. (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Drosera erythrorhiza</i> subsp. <i>erythrorhiza</i>	-	✓
<i>Drosera menziesii</i> subsp. <i>menziesii</i>	-	✓
<i>Drosera pallida</i>	20%	-
<i>Drosera stolonifera</i>	80%	✓
<i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>	80%	✓
<i>Eucalyptus gomphocephala</i>	20%	-
<b><i>Eucalyptus marginata</i> subsp. <i>marginata</i></b>	<b>60%</b>	<b>✓</b>
<i>Gastrolobium capitatum</i>	100%	-
<i>Gastrolobium ebracteolatum</i>	-	✓
<i>Gompholobium tomentosum</i>	100%	✓
<i>Hakea prostrata</i>	20%	-
<i>Hardenbergia comptoniana</i>	60%	✓
<i>Hibbertia huegelii</i>	40%	-
<i>Hibbertia hypericoides</i>	80%	✓
<i>Hibbertia racemosa</i>	60%	-
<i>Homalosciadium homalocarpum</i>	40%	-
<i>Hovea trisperma</i> var. <i>trisperma</i>	60%	-
<i>Hypocalymma robustum</i>	40%	✓
<i>Hypolaena exsulca</i>	40%	-
<i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i>	60%	-
<i>Jacksonia furcellata</i>	-	✓
<i>Jacksonia sericea</i>	20%	-
<i>Jacksonia sternbergiana</i>	20%	-
<i>Kennedia prostrata</i>	60%	✓
<i>Lagenophora huegelii</i>	60%	-
<i>Lepidobolus preissianus</i>	20%	-
<i>Lepidosperma scabrum</i>	20%	-
<i>Lepidosperma squamatum</i>	60%	-
<i>Leucopogon conostephoideis</i>	-	✓
<i>Leucopogon parviflorus</i>	40%	-
<i>Leucopogon propinquus</i>	-	✓

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## Roe 8 Cleared Areas

Table 32: Associated species for banksia/woody pear woodland target ecosystem (continued)

Species	Keighery et al. (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Leucopogon racemosus</i>	20%	-
<i>Lomandra caespitosa</i>	80%	-
<i>Lomandra hermaphrodita</i>	20%	-
<i>Lomandra maritima</i>	-	✓
<i>Lomandra micrantha</i> subsp. <i>micrantha</i>	20%	-
<i>Lomandra nigricans</i>	20%	-
<i>Lomandra preissii</i>	20%	-
<i>Lomandra suaveolens</i>	20%	✓
<i>Lyginia barbata</i>	40%	-
<i>Lyperanthus serratus</i>	20%	-
<i>Macarthuria australis</i>	-	✓
<b><i>Macrozamia fraseri</i></b>	<b>80%</b>	<b>✓</b>
<i>Melaleuca systema</i>	20%	-
<i>Mesomelaena pseudostygia</i>	100%	✓
<i>Microlaena stipoides</i>	40%	-
<i>Monotaxis grandiflora</i>	20%	-
<i>Neurachne alopecuroidea</i>	20%	-
<i>Patersonia occidentalis</i>	40%	-
<i>Patersonia occidentalis</i> (wetland form)	40%	-
<i>Petrophile linearis</i>	100%	✓
<i>Petrophile macrostachya</i>	20%	-
<i>Philothea spicata</i>	20%	✓
<i>Pimelea rosea</i> subsp. <i>rosea</i>	20%	✓
<i>Pimelea sulphurea</i>	20%	-
<i>Poa drummondiana</i>	20%	-
<i>Podolepis gracilis</i>	20%	✓
<i>Poranthera microphylla</i>	20%	-
<i>Scaevola canescens</i>	40%	✓
<i>Scaevola repens</i> var. <i>repens</i>	60%	-
<i>Schoenus clandestinus</i>	60%	-
<i>Senecio condylus</i>	-	✓

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## Roe 8 Cleared Areas

Table 32: Associated species for banksia/woody pear woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency <sup>†</sup>	Ongoing monitoring
<i>Sowerbaea laxiflora</i>	60%	✓
<i>Stirlingia latifolia</i>	80%	-
<i>Stylidium brunonianum</i> subsp. <i>brunonianum</i>	20%	-
<i>Stylidium schoenoides</i>	20%	-
<i>Tetraria octandra</i>	100%	-
<i>Thelymitra benthamiana</i>	20%	-
<i>Thysanotus arenarius</i>	40%	-
<i>Thysanotus manglesianus/patersonii</i> complex	20%	-
<i>Thysanotus patersonii</i>	40%	-
<i>Thysanotus sparteus</i>	40%	-
<i>Thysanotus thyrsoides</i>	20%	-
<i>Trachymene pilosa</i>	80%	-
<i>Tricoryne elatior</i>	20%	-
<i>Tricoryne tenella</i>	-	✓
<i>Wahlenbergia preissii</i>	20%	-
<b><i>Xanthorrhoea preissii</i></b>	<b>100%</b>	✓
<i>Xanthosia huegelii</i> subsp. <i>huegelii</i>	60%	-
<b><i>Xylomelum occidentale</i></b>	-	✓

†= Keighery *et al.* (2012) frequency calculated based on the five closest sites representing FCT 28 (beel01, wire01, sand01, wire02, sams01); **Bold** font indicates 'important species' (see **Section 7.2.3.2**).

Table 33: Associated species for banksia/tuart woodland target ecosystem

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Acacia applanata</i>	20%	-
<i>Acacia huegelii</i>	40%	-
<i>Acacia pulchella</i>	20%	✓
<i>Acacia stenoptera</i>	40%	-
<i>Acacia willdenowiana</i>	20%	-
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	20%	-
<b><i>Allocasuarina fraseriana</i></b>	<b>20%</b>	-
<i>Amphipogon turbinatus</i>	40%	-
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	40%	✓

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 33: Associated species for banksia/tuart woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>	20%	-
<i>Asteridea pulverulenta</i>	20%	-
<i>Astroloma pallidum</i>	20%	-
<i>Austrostipa compressa</i>	40%	-
<i>Babingtonia camphorosmae</i>	20%	-
<b><i>Banksia attenuata</i></b>	100%	✓
<i>Banksia dallaneyi</i>	20%	✓
<i>Banksia ilicifolia</i>	20%	-
<b><i>Banksia menziesii</i></b>	60%	-
<i>Bossiaea eriocarpa</i>	40%	✓
<i>Brachyloma preissii</i>	20%	-
<i>Burchardia congesta</i>	100%	✓
<i>Caesia micrantha</i>	40%	✓
<i>Caladenia flava</i> subsp. <i>flava</i>	60%	✓
<i>Caladenia georgei</i>	20%	✓
<i>Centrolepis drummondiana</i>	40%	-
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	40%	-
<i>Conospermum triplinervium</i>	20%	-
<i>Conostephium pendulum</i>	60%	-
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	80%	✓
<i>Conostylis setigera</i> subsp. <i>setigera</i>	80%	-
<i>Corymbia calophylla</i>	60%	-
<i>Corynotheca micrantha</i> var. <i>micrantha</i>	20%	-
<i>Dampiera linearis</i>	40%	-
<i>Dasypogon bromeliifolius</i>	60%	-
<i>Daviesia divaricata</i> subsp. <i>divaricata</i>	40%	-
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	40%	-
<i>Daviesia triflora</i>	20%	-
<i>Desmocladius fasciculatus</i>	40%	-
<i>Desmocladius flexuosus</i>	40%	✓
<i>Dianella revoluta</i> var. <i>divaricata</i>	60%	✓

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 33: Associated species for banksia/tuart woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Dichelachne crinita</i>	20%	-
<i>Diuris longifolia</i>	60%	-
<i>Drosera pallida</i>	20%	-
<i>Drosera stolonifera</i>	80%	✓
<i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>	80%	✓
<b><i>Eucalyptus gomphocephala</i></b>	<b>20%</b>	✓
<b><i>Eucalyptus marginata</i> subsp. <i>marginata</i></b>	<b>60%</b>	✓
<i>Gastrolobium capitatum</i>	100%	-
<i>Gompholobium tomentosum</i>	100%	✓
<i>Hakea prostrata</i>	20%	✓
<i>Hardenbergia comptoniana</i>	60%	✓
<i>Hibbertia huegelii</i>	40%	-
<i>Hibbertia hypericoides</i>	80%	-
<i>Hibbertia racemosa</i>	60%	-
<i>Homalosciadium homalocarpum</i>	40%	-
<i>Hovea trisperma</i> var. <i>trisperma</i>	60%	-
<i>Hypocalymma robustum</i>	40%	-
<i>Hypolaena exsulca</i>	40%	-
<i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i>	60%	-
<i>Jacksonia sericea</i>	20%	-
<i>Jacksonia sternbergiana</i>	20%	-
<i>Kennedia prostrata</i>	60%	✓
<i>Lagenophora huegelii</i>	60%	-
<i>Lepidobolus preissianus</i>	20%	-
<i>Lepidosperma scabrum</i>	20%	-
<i>Lepidosperma squamatum</i>	60%	✓
<i>Leucopogon parviflorus</i>	40%	-
<i>Leucopogon racemosus</i>	20%	-
<i>Lomandra caespitosa</i>	80%	✓
<i>Lomandra hermaphrodita</i>	20%	-
<i>Lomandra micrantha</i> subsp. <i>micrantha</i>	20%	✓

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 33: Associated species for banksia/tuart woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Lomandra nigricans</i>	20%	-
<i>Lomandra preissii</i>	20%	-
<i>Lomandra suaveolens</i>	20%	-
<i>Lyginia barbata</i>	40%	-
<i>Lyperanthus serratus</i>	20%	-
<b><i>Macrozamia fraseri</i></b>	<b>80%</b>	✓
<i>Melaleuca systema</i>	20%	-
<i>Mesomelaena pseudostygia</i>	100%	-
<i>Microlaena stipoides</i>	40%	-
<i>Monotaxis grandiflora</i>	20%	-
<i>Neurachne alopecuroidea</i>	20%	-
<i>Patersonia occidentalis</i>	40%	-
<i>Patersonia occidentalis</i> (wetland form)	40%	-
<i>Petrophile linearis</i>	100%	-
<i>Petrophile macrostachya</i>	20%	-
<i>Philothea spicata</i>	20%	-
<i>Pimelea rosea</i> subsp. <i>rosea</i>	20%	✓
<i>Pimelea sulphurea</i>	20%	-
<i>Poa drummondiana</i>	20%	-
<i>Podolepis gracilis</i>	20%	✓
<i>Poranthera microphylla</i>	20%	-
<i>Scaevola canescens</i>	40%	-
<i>Scaevola repens</i> var. <i>repens</i>	60%	-
<i>Schoenus clandestinus</i>	60%	✓
<i>Sowerbaea laxiflora</i>	60%	✓
<i>Stirlingia latifolia</i>	80%	-
<i>Stylidium brunonianum</i> subsp. <i>brunonianum</i>	20%	-
<i>Stylidium schoenoides</i>	20%	-
<i>Tetraria octandra</i>	100%	✓
<i>Thelymitra benthamiana</i>	20%	-
<i>Thysanotus arenarius</i>	40%	-

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 33: Associated species for banksia/tuart woodland target ecosystem (continued)

Species	Keighery <i>et al.</i> (2012) frequency	Ongoing monitoring
<i>Thysanotus manglesianus/patersonii</i> complex	20%	-
<i>Thysanotus patersonii</i>	40%	✓
<i>Thysanotus sparteus</i>	40%	✓
<i>Thysanotus thyrsoides</i>	20%	-
<i>Trachymene pilosa</i>	80%	-
<i>Tricoryne elatior</i>	20%	-
<i>Wahlenbergia preissii</i>	20%	-
<b><i>Xanthorrhoea preissii</i></b>	<b>100%</b>	✓
<i>Xanthosia huegelii</i> subsp. <i>huegelii</i>	60%	-

†= Keighery *et al.* (2012) frequency calculated based on the five closest sites representing FCT 28 (beel01, wire01, sand01, wire02, sams01); **Bold** font indicates 'important species' (see **Section 7.2.3.2**).

### 7.2.3.2 Important species

Important species are identified to guide the focus of restoration based on criteria outlined in **Appendix B**. Note that labelling the important species is not intended to convey that they are the only native species that have a significant, valuable or otherwise meaningful role within the identified target ecosystems. Rather, they are identified as important because they are diagnostic, structural components (canopy species), are conservation significant or represent potentially significant threats to the restoration of target ecosystems (weeds and pest fauna species). The species identified as important may change over time as new information is obtained.

Native flora species identified as important to the target ecosystems are outlined in **Table 34**. Re-establishing specific density of these species within restoration areas is identified as a restoration objective (refer **Table 4**).

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 34: Important native flora species by target ecosystem

Species	Target Ecosystem						
	Banksia woodland	Banksia/coastal blackbutt woodland	Banksia/jarrah woodland	Banksia/tuart woodland	Banksia/woody pear woodland	Holly-leaved banksia woodland	Wet forest and woodland
<i>Allocasuarina fraseriana</i>	✓	✓	✓	✓	✓	✓	
<i>Banksia attenuata</i>	✓	✓	✓	✓	✓	✓	
<i>Banksia ilicifolia</i>						✓	
<i>Banksia menziesii</i>	✓	✓	✓	✓	✓	✓	
<i>Eucalyptus gomphocephala</i>				✓			
<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	X <sup>†</sup>	✓	✓	✓	✓	✓	
<i>Eucalyptus rudis</i> subsp. <i>rudis</i>							✓
<i>Eucalyptus todtiana</i>		✓					
<i>Macrozamia fraseri</i>	✓	✓	✓	✓	✓	✓	
<i>Melaleuca preissiana</i>							✓
<i>Melaleuca raphiophylla</i>							✓
<i>Xanthorrhoea preissii</i>	✓	✓	✓	✓	✓	✓	
<i>Xylomelum occidentale</i>					✓		

<sup>†</sup>jarrah omitted due to height restriction relevant to this target ecosystem in Hope Road North.

A range of non-native flora (weed) species are identified as important to the restoration areas as outlined in **Table 35**. These species were recorded during 2017 site assessment (as outlined in **Appendix C**) and are considered potentially high threat. Note that other weed species may also be present in the site and of particular note are species listed in the *Environmental weed census and prioritisation* (Keighery and Bettink 2008). The important weed species may change over time as informed by monitoring and will form part of the adaptive management process.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 35: Non-native flora taxa recorded in the site that are considered important for restoration and management within the site

Weed category	Species	Status	
		BAM Act	Environmental Weed <sup>†</sup>
Grassy	<i>Avena</i> spp. (wild oats)	-	✓
	<i>Ehrharta calycina</i> (perennial veldt grass)	-	✓
	<i>Ehrharta longifolia</i> (annual veldt grass)	-	✓
	<i>Eragrostis curvula</i> (African love grass)	-	✓
Bulbous	<i>Freesia alba</i> × <i>leichtlinii</i> (freesia)	-	✓
	<i>Gladiolus caryophyllaceus</i> (wild gladiolus)	-	✓
	<i>Lachenalia reflexa</i> (yellow soldier)	-	✓
	<i>Zantedeschia aethiopica</i> (arum lily)	✓	✓
Woody	<i>Acacia longifolia</i> (Sydney golden wattle)	-	✓
	<i>Acacia iteaphylla</i> (Finders Range wattle)	-	✓
	<i>Chamaecytisus palmensis</i> (tagasaste)	-	✓
	<i>Chamelaucium uncinatum</i> (Geraldton wax)	-	✓
	<i>Leptospermum laevigatum</i> (Victorian tea-tree)	-	✓

<sup>†</sup>Swan Weeds (DBCA 2017)

Due to the threat posed by these important weed species, limiting their presence and/or cover within restoration areas shall be a priority of weed control activities. Designing the annual weed control program around important weed species categories will ensure that weed control actions are generally appropriately timed and effective. Limiting the cover of all weed species is identified as a specific restoration objective (refer **Table 4**).

Important native and non-native fauna species shall be identified in the forthcoming fauna surveys (as detailed in **Section 7.2.2.4**). Objectives are identified in relation to native fauna species (refer **Table 4**) but currently no restoration objectives are identified in relation to important non-native fauna species.

While no specific restoration objectives for non-native fauna species have been identified, control of species such as rabbits and foxes is considered part of good natural resource management and should be undertaken with consideration to existing native fauna populations and impacts on vegetation.

### Invertebrates

The high diversity and sensitivity of invertebrates to site conditions make them especially suited for monitoring the changes that are taking place in these managed areas (Biomonitoring International 2019). Ants have been used as bio-indicators in the invertebrate survey but consideration should also be given to other groups that are associated with particular ecosystem functions, such as herbivory (sucking bugs), predation (spiders) and nutrient cycling/decomposition (springtails).

## Rehabilitation Management Plan

### Roe 8 Cleared Areas

The invertebrate survey identified the invasive ant *Pheidole megacephala* at two of the cleared sites. Presence of this species in the site is a matter of particular concern since, if it were to increase in density, it has the capacity to severely reduce the biodiversity of other ant species and no doubt other invertebrate taxa. On-going monitoring, control and possible eradication of this species should be considered.

#### 7.2.3.3 Assessment against goals and objectives

The evaluation of restoration performance requires that an assessment is made against the restoration goals and specifically against the restoration objectives previously outlined in **Table 4**. Currently, the indicators identified in **Section 7.2.1.5** must be assessed in order to evaluate performance against the objectives. The assessment of any combination of additional indicators provides a basis for further evaluation of restoration outcomes.

Ideally, the evaluation against objectives is spatially comprehensive so that reported outcomes reflect the performance across the whole of a restoration area. However, as the assessment of certain indicators can be time consuming, especially where assessment is required over relatively large areas, a combination of permanently marked plots, unmarked plots and mapping based approaches is likely to provide sufficient information.

A banksia woodland restoration project may take many decades to complete (attributed to Drs. Hans Lambers and Kingsley Dixon, ABC News report 30 March 2017). While ten years is a relatively long period of time to operate a restoration project, it is unrealistic to expect that restoration could be completed within a ten year period. Therefore, to provide practicable boundaries for evaluation, 'completion' is defined as the point when a restoration area has been demonstrated to have met the minimum restoration goals and associated objectives after at least 4 years of management (refer **Table 4**).

Note that the minimum goals and objectives are expected to be met over the entire ten year period for which the project is currently forecast to operate. Attainment of minimum restoration goals is intended to indicate that the restoration areas can be maintained on a trajectory for continued improvement towards the primary goals (refer **Section 2**).

### 7.3 Data management

All data collected for the RMP shall at minimum include information fields described in **Table 36**. Recorders and the **Community Engagement Coordinator/Project Manager** shall undertake quality assurance and quality control (QAQC) to ensure quality and consistency of information.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

*Table 36: Minimum information required for project data and records*

Data type	Fields
Communication	<ul style="list-style-type: none"> <li>• Date</li> <li>• Author name</li> <li>• Medium/forum</li> <li>• Description of message</li> <li>• Indicator fields</li> </ul>
Engagement	<ul style="list-style-type: none"> <li>• Date</li> <li>• Recorder name</li> <li>• Description of activity</li> <li>• Indicator fields</li> </ul>
Involvement	<ul style="list-style-type: none"> <li>• Date</li> <li>• Recorder name</li> <li>• Spatial location (GDA 94, MGA 50)</li> <li>• Description of activity</li> <li>• Indicator fields</li> </ul>

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

Table 36: Minimum information required for project data and records (continued)

Data type	Fields
Observation/record (any)	<ul style="list-style-type: none"> <li>• Date</li> <li>• Recorder name</li> <li>• Description</li> <li>• Spatial location (GDA 94, MGA 50)</li> <li>• Waypoint ID               <ul style="list-style-type: none"> <li>○ Indicator fields</li> </ul> </li> </ul>
Permanently marked plot data	<ul style="list-style-type: none"> <li>• Date</li> <li>• Recorder name</li> <li>• Spatial location (GDA 94, MGA 50)</li> <li>• Plot ID               <ul style="list-style-type: none"> <li>○ Indicator fields</li> </ul> </li> <li>• 5m subplot ID               <ul style="list-style-type: none"> <li>○ Indicator fields</li> </ul> </li> <li>• 0.5m subplot ID               <ul style="list-style-type: none"> <li>○ Indicator fields</li> </ul> </li> </ul>
Unmarked sample plot	<ul style="list-style-type: none"> <li>• Date</li> <li>• Recorder name</li> <li>• Spatial location (GDA 94, MGA 50)</li> <li>• Waypoint ID               <ul style="list-style-type: none"> <li>○ Indicator fields</li> </ul> </li> </ul>
Photopoint	<ul style="list-style-type: none"> <li>• Date</li> <li>• Recorder name</li> <li>• Spatial location (GDA 94, MGA 50)</li> <li>• Photopoint ID</li> <li>• Aspect</li> <li>• Image ID</li> </ul>
Material samples (including basic materials, abiotic/biotic samples, seed / propagule collection, tubestock)	<ul style="list-style-type: none"> <li>• Date collected</li> <li>• Date of acquisition</li> <li>• Date applied/installed</li> <li>• Collector/applicator/installer name</li> <li>• Spatial location (for example GDA94, MGA50)</li> <li>• Description of donor and receiving sites</li> <li>• Collection and identification methods</li> <li>• Collector/propagators name</li> </ul>

All information recorded must be stored in secure and dedicated databases. Separation of information based on its type and use is recommended as follows:

- community database (information related to individual community participants)
- stakeholder database (information related to government/organisation participants)
- restoration database (information related to restoration including general records for site management).

The Project Administrator shall be the custodian of the databases. The databases may be stored concurrently on a local platform, such as Microsoft Access and shared platform, such as the *Atlas of Living Australia*. The Project Administrator may therefore host a server on which the databases are stored and liaise with and provide access to data via other server administrators subject to future data licencing agreements.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

All data must be submitted to the dedicated database via the **Community Engagement Coordinator/Project Manager** or approved delegate<sup>19</sup>. Data will be made available to interested community and stakeholders, as appropriate<sup>20</sup>.

The Rehabilitating Roe 8 project has data available to view via E-mapper. This is a subscription-based platform that allows vegetation and fauna data to be spatially displayed along with infrared imagery to allow for increased analytics on progress against the restoration objectives. Several scientific reports are available to view online via the Rehabilitating Roe 8 website. Data management protocols are in development with regards to expanding access to the wider community.

## 7.4 Reporting

### 7.4.1 Internal

#### 7.4.1.1 Regular reporting

At each meeting of the Rehabilitating Roe 8 Advisory Committee a brief summary shall be prepared and delivered by the Project Manager. The summary shall outline the recent activities completed as part of the RMP as well as works proposed for the upcoming month/s.

The summary report is not required to be more than one page and shall cover activities undertaken and proposed for topics including the following:

- Communication
- Engagement and involvement
- Restoration:
  - weed control
  - tubestock planting
  - monitoring
- Other.

#### 7.4.1.2 Annual project reporting

At the end of each restoration season an annual internal monitoring report shall be prepared by the Project Manager submitted to the Rehabilitating Roe 8 Advisory Committee for review and comment.

The report shall outline the scope of activities completed and demonstrate current performance of communications, engagement, involvement and restoration activities against the objectives as outlined in **Section 2**.

The report shall include all relevant information, maps, figures and charts as required and at minimum have a structure that includes the following headings:

- Executive Summary
- Land Management

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<sup>19</sup>With assistance provided by PURSAC

<sup>20</sup> Pending consideration of privacy and intellectual property.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

- Rehabilitating Roe 8 Program of Works
- Works to Date
- Works Program Forecast
- Advisory Committee
- Community Engagement
- Annual Report and Community Score Card
- Cultural Heritage
- Volunteers
- Media Coverage
- Opportunities and Challenges
- Risks
- Occupational Health and Safety
- Rehabilitation Management Plan Key Performance Indicators
- Financial Report

The report shall also forecast a program of works for the forward year(s) as input into planning and preparation. A template for forward planning is provided in **Appendix G**.

### 7.4.2 External

#### 7.4.2.1 Communicating performance and progress to community and stakeholders

Refer to **Section 4.2** for communication tools.

The *Standards* recommend a 'recovery wheel' tool, wherein progress against attribute categories can be displayed together to provide an overview of performance (Standards Reference Group SERA 2017). An annual community report card is proposed that may include a recovery wheel or similar device.

The annual report and score card summarises the annual and cumulative outcomes of engagement, involvement and restoration. The report may also include visual tools such as a map showing how close restoration area is to reaching minimum or aspirational objectives.

# Rehabilitation Management Plan

## Roe 8 Cleared Areas

## 8 References

### 8.1 General references

- Archae-aus 2019, *Cultural Heritage Management Plan – Rehabilitating Roe 8*.
- Bamford Consulting Ecologists (BEC) 2020, *Terrestrial Vertebrate Fauna Survey: Rehabilitating Roe*.
- Biomonitoring International 2019, *Rehabilitating Roe 8 – Terrestrial Invertebrate Survey, with Special Attention to Ants*.
- Environmental Protection Authority (EPA) 2016, *Technical Guidance - Terrestrial Fauna Surveys*, EPA.
- Western Australian Planning Commission (WAPC) 2003, *Coastal Planning and Management Manual*, Western Australian Planning Commission, Perth, Perth.

### 8.2 Online references

- ABC News 2017, *Roe 8 environmental damage could take decades to restore according to experts*, viewed 29 November 2017 <<http://www.abc.net.au/news/2017-03-30/roe-8-environmental-damage-could-take-decades-to-restore/8402126>>
- Bureau of Meteorology (BOM) 2017, *Climate Averages*, viewed 14 June 2017, <<http://www.bom.gov.au/climate/data/>>.
- Department of Parks and Wildlife (DBCA) 2017, *Florabase*, viewed 29th November 2017 <<https://florabase.dpaw.wa.gov.au/>>.
- Nursery Industry Accreditation Scheme (NIASA) 2017, *NIASA Best Practice Management Guidelines*, viewed 29 November 2017 <[https://www.ngia.com.au/Category?Action=View&Category\\_id=125/](https://www.ngia.com.au/Category?Action=View&Category_id=125/)>
- Rehabilitating Roe 8 Steering Committee 2017, *Rehabilitating Roe 8*, viewed 3 December 2017 <<https://rehabilitatingroe8.org/>>
- Revegetation Industry Association of Western Australia (RIAWA) 2017, *Accreditation*, viewed 29 November 2017 <[http://riawa.com.au/wordpress/?page\\_id=1059/](http://riawa.com.au/wordpress/?page_id=1059/)>



# Figures



*Figure 1: Site Location*

*Figure 2: Management Areas*

*Figure 3: Existing and Proposed Gates and Paths*

*Figure 4: Restoration Areas*

*Figure 5: Restoration Area Input Categories*

*Figure 6: Monitoring Design*





**Figure 1: Site Location**

**Project:** Rehabilitation Management Plan  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

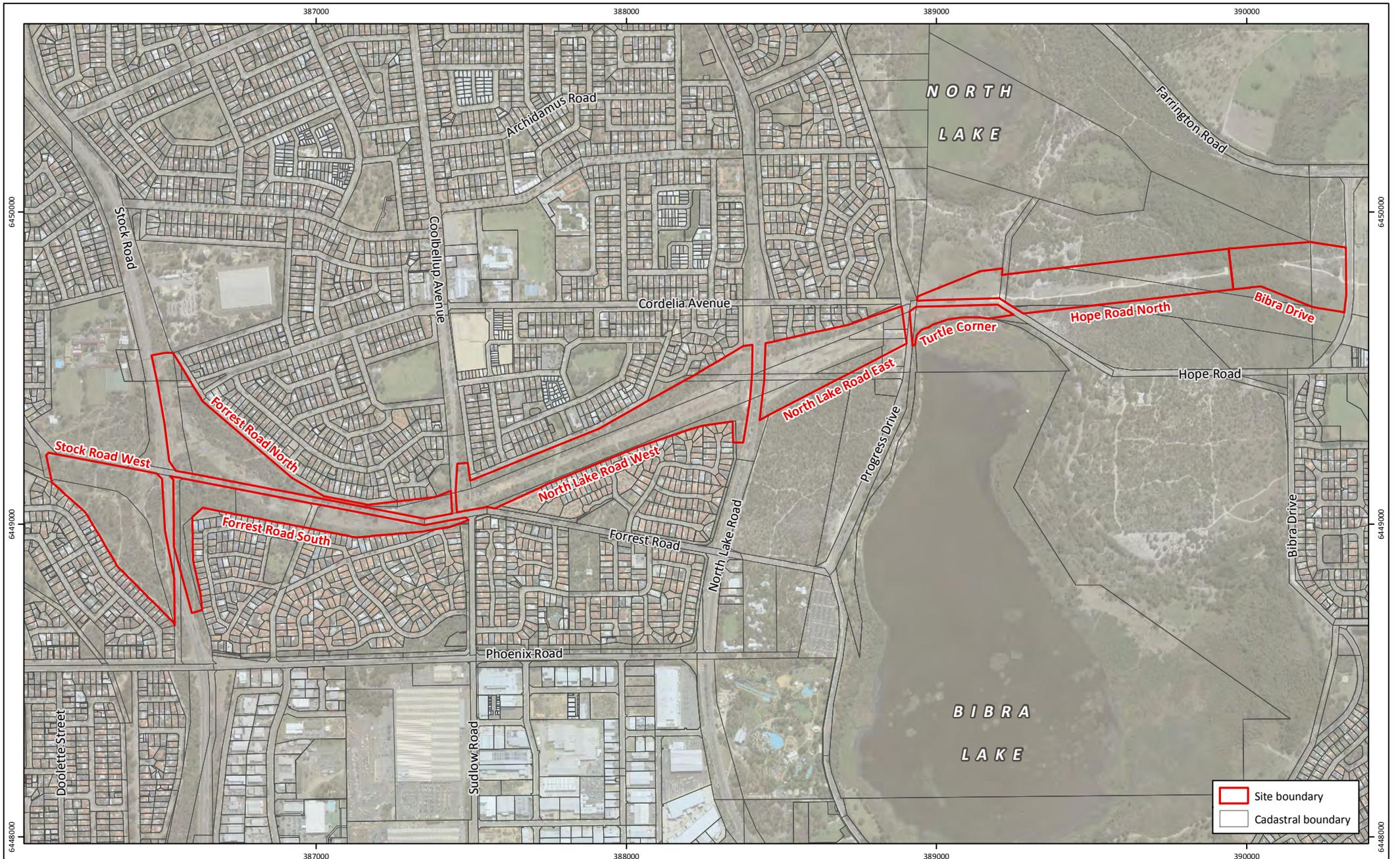
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EP17-085(07)--F28a  
**Drawn:** KNM  
**Date:** 31/01/2018  
**Checked:** RAO  
**Approved:** TAA  
**Date:** 31/01/2018



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GDA 1994 MGA Zone 50



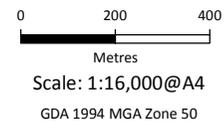




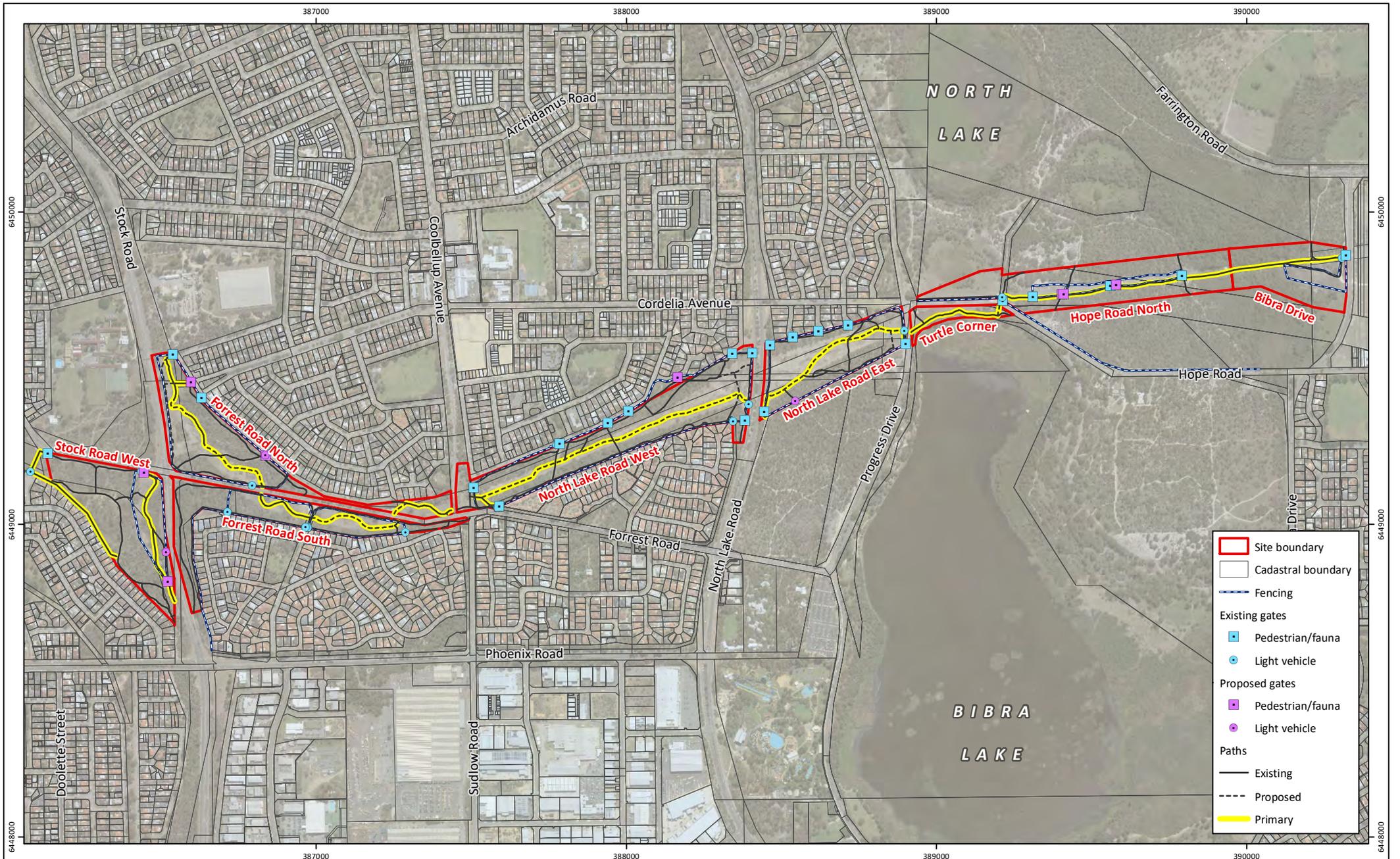
**Figure 2: Management Areas**

**Project:** Rehabilitation Management Plan  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)--F29a  
**Drawn:** KNM  
**Date:** 31/01/2018  
**Checked:** RAO  
**Approved:** TAA  
**Date:** 31/01/2018



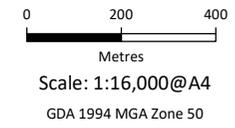




**Figure 3: Existing and Proposed Gates and Paths**

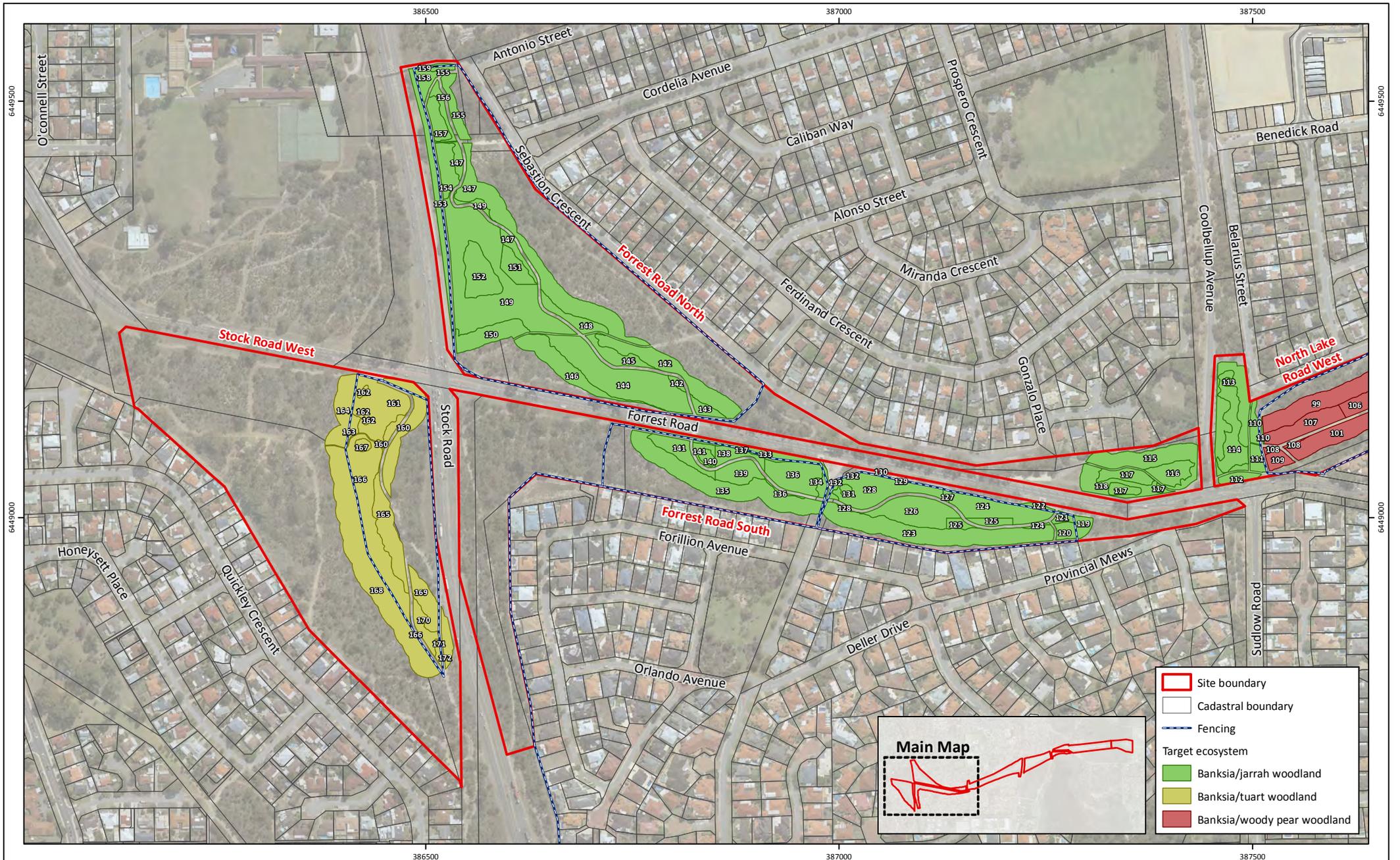
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Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

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While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

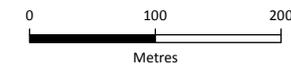




**Figure 4a: Restoration Areas (1 of 3)**

**Project:** Rehabilitation Management Plan  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)--F52  
**Drawn:** KNM  
**Date:** 31/01/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 31/01/2018

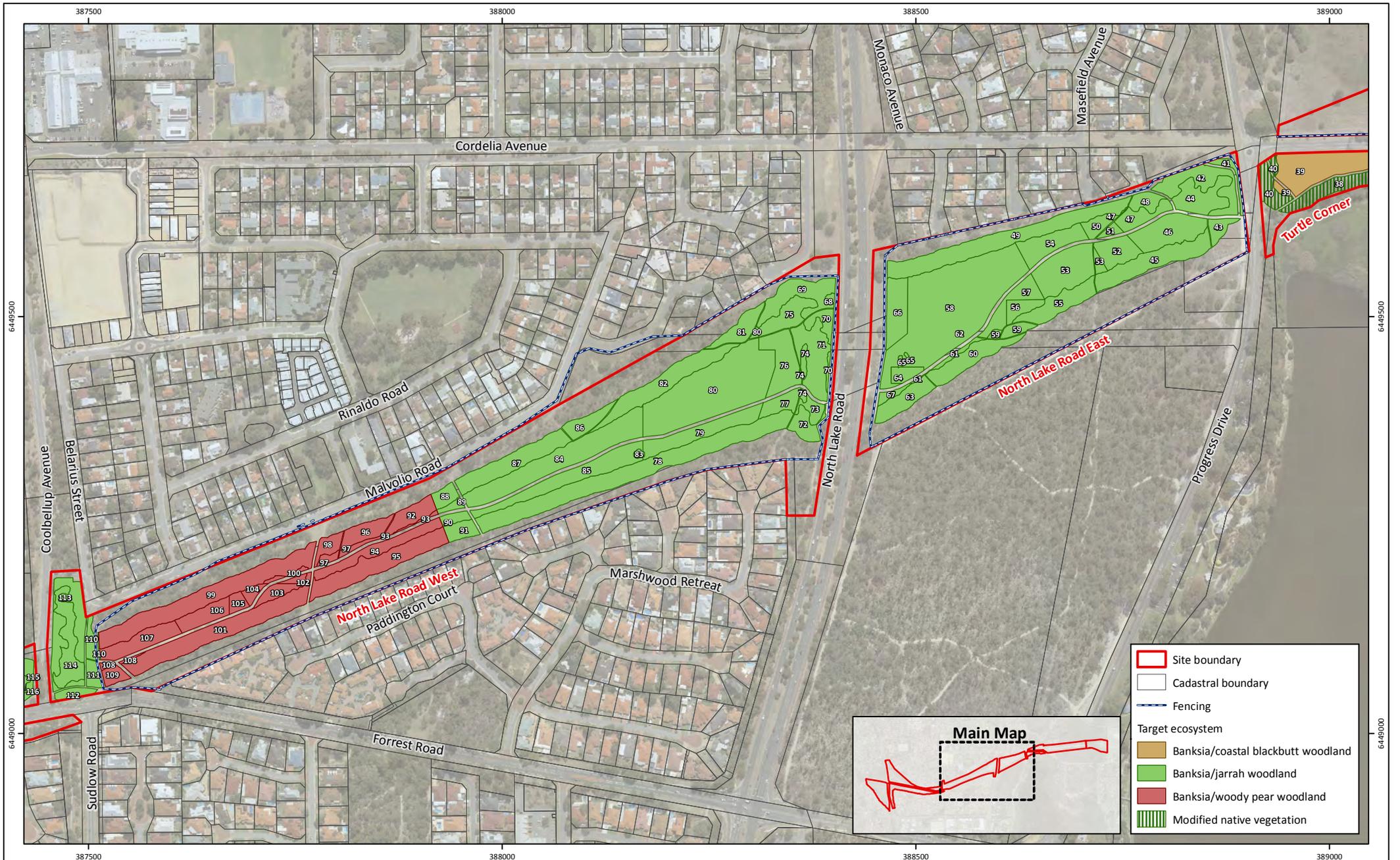


Scale: 1:6,000@A4  
GDA 1994 MGA Zone 50



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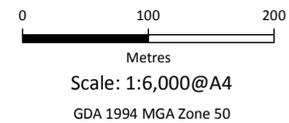




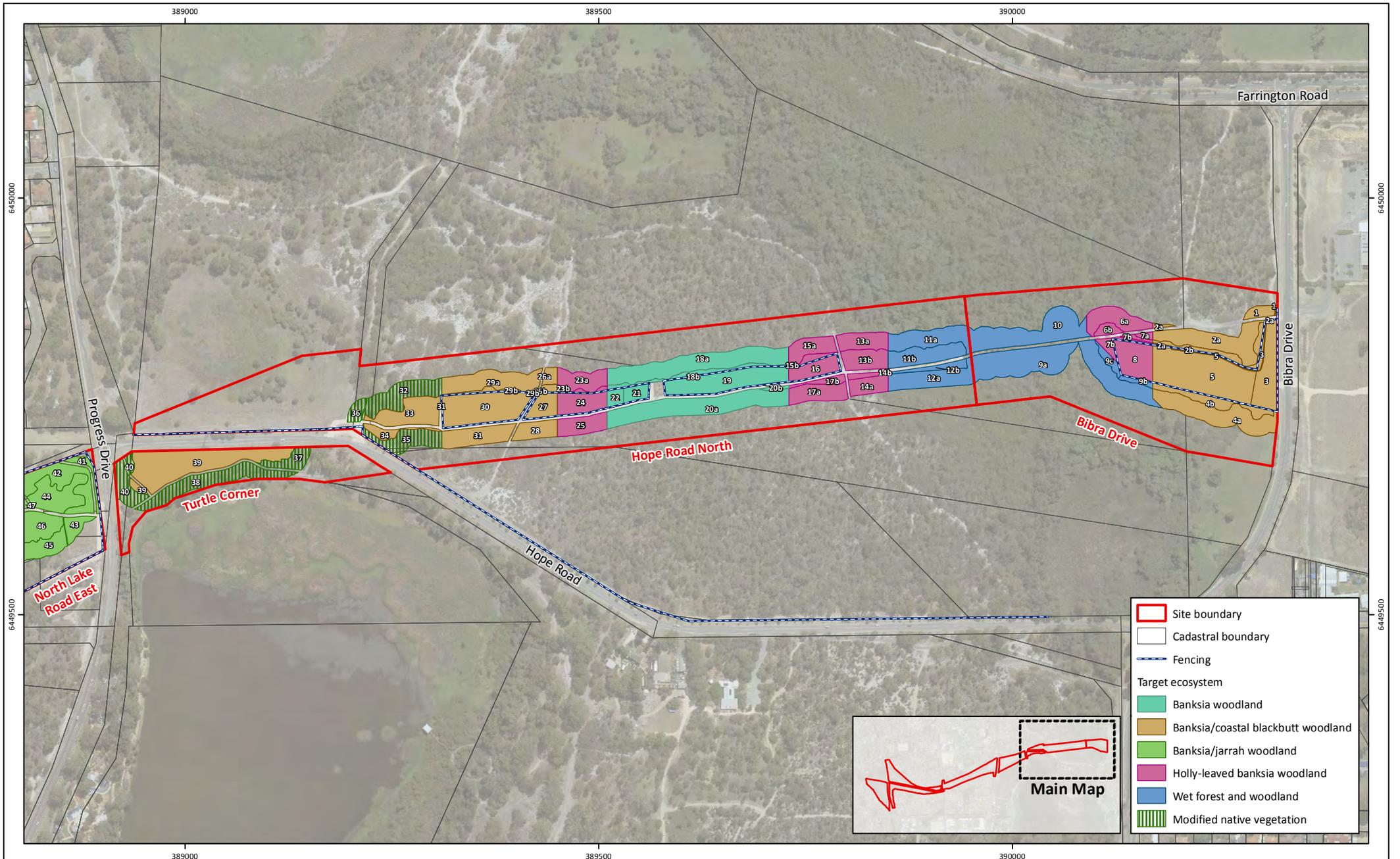
**Figure 4b: Restoration Areas (2 of 3)**

**Project:** Rehabilitation Management Plan  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)--F57  
**Drawn:** KNM  
**Date:** 31/01/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 31/01/2018



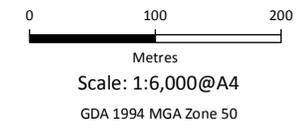




**Figure 4c: Restoration Areas (3 of 3)**

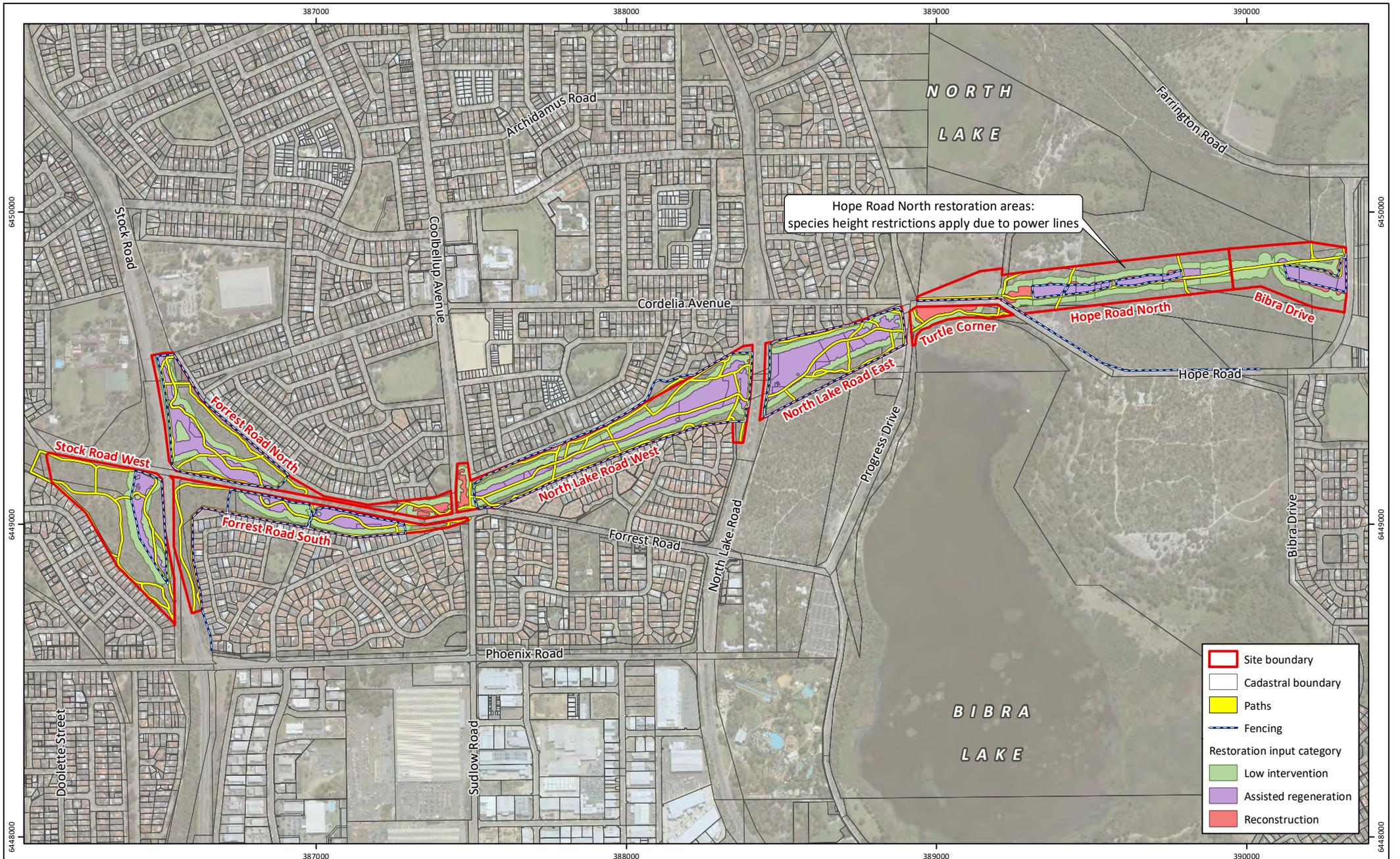
**Project:** Rehabilitation Management Plan  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F58a  
**Drawn:** RAO  
**Date:** 23/02/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 23/02/2018



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**Figure 5: Restoration Inputs**

**Project:** Rehabilitation Management Plan  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

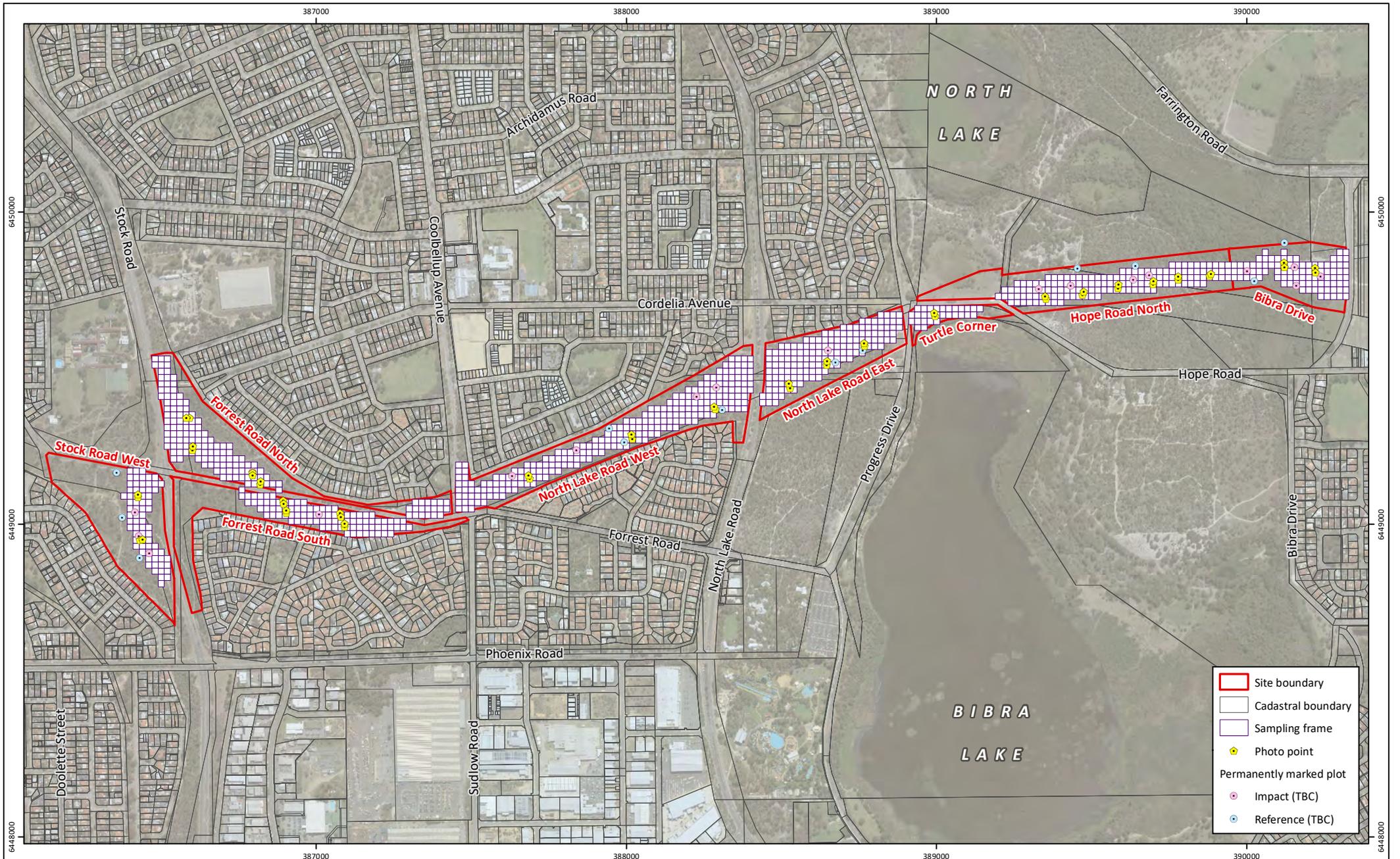
**Plan Number:**  
EP17-085(07)-F53b  
**Drawn:** GAR  
**Date:** 06/08/2021  
**Checked:** RAW  
**Approved:** RAW  
**Date:** 06/08/2021



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Metres  
Scale: 1:16,000@A4  
GDA 1994 MGA Zone 50



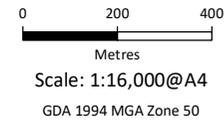




**Figure 6: Monitoring Design**

**Project:** Rehabilitation Management Plan  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F31c  
**Drawn:** GAR  
**Date:** 06/08/2021  
**Checked:** RAW  
**Approved:** RAW  
**Date:** 06/08/2021



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# Appendix A

Community and Stakeholder Feedback Report







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## Rehabilitating Roe 8

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# Community and Stakeholder Feedback Report

JANUARY 2018

**Creating  
Communities**

## Project Details

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January 2018

## EXECUTIVE SUMMARY

In August 2017 the Rehabilitating Roe 8 Steering Committee appointed Emerge Associated and Creating Communities to design and prepare a 10 year Rehabilitation Management Plan for the areas disturbed by the Roe 8 road project from Bibra Drive to west of Stock Road.

Extensive community and stakeholder engagement was conducted between August and November 2017 to gain input into this plan. This report details the input received during the engagements which included meetings with key stakeholders, engagement with Aboriginal Custodians, a Community Open Day and a Stakeholder Workshop. There was a high level of input into this plan with over 210 people providing input via meetings and events.

The themes coming through the engagement included the following.

- The importance of Traditional Owners input, leadership and engagement in all aspects of the plan and related activities.
- A desire for certainty that the rehabilitation project will be implemented for the full 10 years and protection of the land into the future.
- Willingness and eagerness amongst community members to get involved in the rehabilitation.
- The need for meaningful feedback into the *Rehabilitation Management Plan* during its 10 year lifespan and for the plans to be adaptive documents.
- The importance of public access to the site with minimal impact to the rehabilitation itself.
- The need for transparency around any changes to the plans.

The community and stakeholders have strong interest in being involved in the Rehabilitating Roe 8 Project and proposed a range of involvement and ongoing communications activities including:

- Community involvement in planting
- Community involvement in weeding and weed control
- Citizen science opportunities, including community involvement in monitoring
- Community engagement to inform, discuss and create updates to the plan
- Community education related to rehabilitation
- Community science conference.

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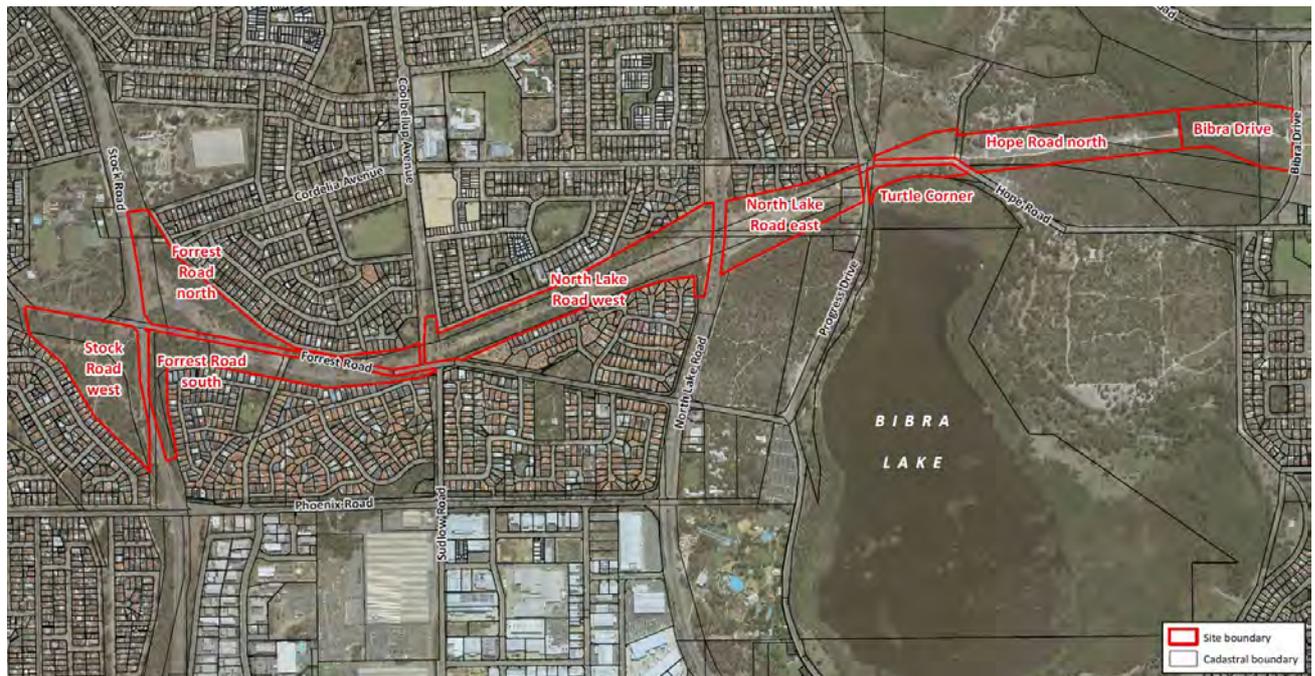
# 1. ACKNOWLEDGEMENT OF COUNTRY

The Rehabilitating Roe 8 Steering Committee and consultants Emerge Associates and Creating Communities acknowledge the Australian Aboriginal and Torres Strait Islander peoples of this nation. We acknowledge the traditional custodians of the lands on which our organisations are located and where we conduct our business. We pay our respects to ancestors and Elders, past and present. In particular we would like to acknowledge that the Rehabilitating Roe 8 project area is Whadjuk country and pay respect to Elders and all Nyungar people, past, present and future. The Roe 8 Steering Committee and consultants Emerge Associates and Creating Communities are committed to honouring Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land, waters and seas and their rich contribution to society.

## 2. INTRODUCTION

In August 2017 the Rehabilitating Roe 8 Steering Committee appointed Emerge Associated and Creating Communities to design and prepare a 10 year Rehabilitation Management Plan for the areas disturbed by the Roe 8 road project from Bibra Drive to west of Stock Road (see Figure 1).

Figure 1. Site Map with area labels.



Extensive community and stakeholder engagement was conducted between August and November 2017 to gain input into this plan. This report details the input received during the engagements which included meetings with key stakeholders, engagement with Aboriginal Custodians, a Community Open Day and a Stakeholder Workshop. There was a high level of input into this plan with over 210 people providing input via meetings and events.

## 3. BACKGROUND

The 'Roe 8' portion of Roe Highway was a controversial and high profile road project for Western Australia. The construction of Roe 8 was suspended on 11 March 2017 following a State government election and a preceding period of protests, legal challenges and broad media coverage. Before construction was halted, clearing was undertaken along the proposed alignment of Roe 8 in the localities of Bibra Lake, North Lake and Coolbellup, Western Australia. This clearing was a source of significant concern for members of the community opposed to Roe 8's construction.

The 'Rehabilitating Roe 8' project arose out of the community capacity stimulated during opposition to the construction of Roe 8. Essentially, Rehabilitating Roe 8 aims to restore local native vegetation and fauna habitat to the cleared areas along the proposed Roe 8 alignment. However, Rehabilitating Roe 8 is not a typical restoration project, and also seeks to restore community vitality, build local capacity and rebuild trust.

### 3.1 Document Structure

- Section 4 summarises the engagement methodology that took place during the development of this plan in August to November 2017
- Section 5 details the results of the 2017 engagement
- Section 6 outlines the engagement, involvement and communications principles, tools and plans for the next 10 years
- Section 7 appendices include the communications and engagement material used during the 2017 engagement period

### 3.2 Definitions

Community engagement, involvement and communications have specific functions. For the purposes of the Rehabilitating Roe 8 project community engagement, community involvement and communications are defined as follows:

**Community engagement** initiatives are those that seek information, feedback and decision-making from community members and other stakeholders into the Plans and throughout the implementation of the rehabilitation. These include, but are not limited to: surveys, open days, representation of stakeholder groups in the governance structure of the project

**Community involvement** initiatives are the participation of community members in the rehabilitation of the land itself (through planting, weeding, watering, monitoring) as well as a range of other initiatives that build the capacity of the community (including citizen science opportunities).

**Communications** are a range of methods through which the community and other stakeholders are kept informed as the Plans progresses. These include, but are not limited to: project updates, promotion of upcoming community engagement initiatives, on-site signage, press releases, advertising, social media etc.

## 4. ENGAGEMENT METHODOLOGY

This section summarises the community and stakeholder engagement methodology from August to November 2017.

An extensive community and stakeholder engagement process was conducted between August and November 2017 to gain input into the *Rehabilitation Management Plan* and to seek input into the Community Engagement, Involvement and Communication Plan.

A range of engagement activities were implemented to gain input into the *Rehabilitation Management Plan*. The activities included:

- **Formation of Working Group, Steering Committee and Sub-Committees**
- **Contracting Emerge Associates and Creating Communities** to develop the *Rehabilitation Management Plan*
- **Gaining input into the draft engagement plan**
- **15 meetings with key stakeholders** to understand background, context, relevance of the Plan to these groups, and recommendations for future rehabilitation, engagement, involvement and communications
- **Engagement with Aboriginal Custodians** to understand areas of special cultural and personal significance, and recommendations for future rehabilitation, engagement, involvement and communications
- **A Community Open Day** to gain input into areas/locations of special personal significance, areas/locations that may require special treatment, how the community could receive communications site the types of engagement and initiatives that individuals would like to be involved in
- **A Stakeholder Workshop** to review key components of the draft Plan

The *Rehabilitation Management Plan* has been informed by these engagement initiatives.

124 people attended the 3 larger scale events (Engagement with Aboriginal Custodians, Open Day and Stakeholder Workshop). 15 stakeholder organisations attended meetings. Over 70 people contributed via meetings of existing groups such as the Working Group, Steering Committee and PURSAC. In addition, Creating Communities staff attended initiatives of other stakeholder groups to further understand the context for stakeholders, including a meeting of the Cockburn Aboriginal Reference Group, a smoking ceremony at Turtle Corner and Millennium Kids Un-Conference.

The promotional and information material used is provided in **Appendix 1**.

## 5. ENGAGEMENT FEEDBACK

This section summarises the community and stakeholder feedback that have informed the development of the Rehabilitation Roe 8 Plan. The feedback shown in this section was collected at:

- Engagement with Aboriginal Custodians
- A Community One Day
- One-on-one stakeholder meetings

### 5.1 Engagement with Aboriginal Custodians

Maps of the site and preliminary plans were discussed with Traditional Owners at Bibra Lake. Project team members recorded anecdotal feedback relevant to:

- Key messages for the project
- Cultural Significance and how to celebrate this through the project
- Involvement in the project
- Communications channels

The feedback recorded during these discussions is listed below:

#### 5.1.1 Key messages

- Look at how to maintain Nyungar culture first
- “Nyungars everywhere gathered here”
- “The Lakes have been well-preserved but not the culture”
- In regards to Roe 8 Corridor rehabilitation – “we can help fix this but tell the story first.” Get the these things right, like returning to Nyungar names, before starting on the rehabilitation
- There needs to upfront recognition of the significance of the area, including the heritage, culture and stories associated with the site and the wider region
- Strong concern that these stories are recognised as the stories of Aboriginal people and that the rights to peoples’ own stories are not impinged
- Nyungar people see themselves as protectors of the place – the people we met with are the next generation of caretakers and have the role to pass on knowledge
- There will need to be some symbolic gestures to demonstrate the seriousness of the intent to understand and recognise Aboriginal heritage and that this then informs the planning and the roll-out of the plan
- Address uncertainty around land tenure (this is a key concern for all stakeholders)

#### 5.1.2 Cultural significance and how to celebrate this through the Project

- Re-establish the heritage of the area
- Native title has been extinguished (give us back our last significant site south of the river)
- Sacred sites at Roe 8 may have been destroyed
- The area is an important place for Nyungars. Many people have stories that date back a long time
- There are some stories from the place and throughout the Whadjuk trails archived in Canberra
- Significant examples/findings that demonstrate the length of time and history in the area:
  - Corner of the Hope and Progress – a finding of charcoal carbon-dated at 55 thousand years old

- At the lake near Murdoch University – found a curved Whitegum stick used as a firestick lighter 180 years old.
- At the black water at the end of North Lake Road – Boomerangs found
- Trees around the lake with scarring on them need to be identified and protected
- Where are these artefacts that were found during construction? (These need to come back to a keeping place and not go to another Aboriginal Corporation)
- There are probably more artefacts
- There hasn't been a study done of the whole area – there needs to be an Aboriginal Heritage Study for at least the immediate site, if not the broader area. The Heritage Study should include a focus on further Aboriginal Engagement
- No surveying of the ground has happened
- Maps of de-listed heritage areas need to be provided
- People used to travel by horse and cart from Cottesloe to Jandakot and used Coolbellup oval as a burial ground
- All wetlands are sites of special cultural significance – resting places for the Waugal
- Desire for Keeping Places
- Multipurpose Nyungar Centre at the corner of Progress Dr and Hope Rd
  - Those we met with have a share of \$45 million in Native Title money – could be used on Nyungar Rangers program with State Departments
  - Interpretive heritage (e.g. QR codes on signage – also around the site more broadly)
  - Funding for this centre may include Ranger Programs
  - Running of Cert I and II management programs
  - Training in land management, not only of the immediate site but of surrounding areas
- Aboriginal connection to land and scientific outcomes are not necessarily compatible
- Much of the area was cleared in the 60s
- Very important that sites of significance are name properly to reflect ancestors
  - Rename North Lake and Bibra Lake with their Nyungar names – “von Bibra has no significance to us”
  - Some sites here are named e.g. Coolbellup. Other are not e.g. Willagee should be Wilgi – water holes and rock holes
  - Elders know the names of the people who used to camp here – the Inditch family had camps all round this lake, meeting places and walk trails
- Nyungar interpretation and Nyungar signage
- Extend the Whadjuk walking trails to the site and lake
- Nyungar people have the right to carry out ceremonies in parks and wildlife areas – there need to be protocols and communication around this, including communication to government who may not understand the right to ceremony
- Re-list all the sites for protection under the Aboriginal Heritage Act – state and federally
- Site vested in the Nyungar Trust
- Balga trees were taken out – where did they go? These should be given back to the local people to be re-planted
- During the process of fighting for Country there were also a group of Elders who ticked the box to allow Roe 8 to go ahead. There is a view that this group were not representative of the local community and that there was a lack of transparency around this decision

### 5.1.3 Involvement in the project

- Not tokenistic work (i.e. work for the dole) – but meaningful rehabilitation and research contracts
- Due to the significant rehabilitation experience of the local Aboriginal population (e.g. in mine site and farm rehabilitation) there is potential for the whole project to Indigenous
- Also partnership opportunities e.g. with local universities
- Project Manager position could be two positions – i.e. a partnership between an Aboriginal and non-Aboriginal Project Manager
- Work may include:
  - Planting
  - Seed collection and identification
  - Weed control
  - Work in / establishment of nurseries
  - Animal monitoring and identification
- Consider a KEEDAC / PEEDAC model for sourcing Aboriginal employment (e.g. providing connections with business and industry promoting Aboriginal people as an integral part of a skilled workforce)

### 5.1.4 Communications channels

- Always hold meetings on site to get the local mob to come
- Word of mouth – through Elders
- Libraries and community centres

## 5.2 Community Open Day – Feedback Boards

Five different feedback boards were used at the Community Open Day to gather feedback from participants. These boards asked the following questions:

- What areas are of special personal significance?
- What areas need special treatment and how?
- How do you want to be involved in the rehabilitation project?
- How do we best keep in contact with you?
- How do you want to contribute to the project?

Where the feedback related to a specific location, participants placed a sticker on a map of the project area in order to indicate where this feedback applies. This location-specific feedback is shown on the maps on the following pages and corresponds to the text in bold.

## 5.2.1 What areas are of special personal significance?

The responses to this question are listed below.

The responses in **bold** correspond to a specific location (as indicated by the participant). In these cases, the number at the beginning of each line corresponds to a dot on the map.

The number in brackets indicates how many different participants gave the same or a similar response.



1. The entire area is special and precious (5)
2. **Silence, sacred beauty (2)**
3. **Christmas tree – significant tree (2)**
4. **Paperbark (rare to extinct) (2)**
5. **Woody Pear Grove: community has a connection with this area (2)**
6. **Only tuart area left (2)**
7. **Large reedy bird feeding area at edge of lake (2)**
8. **Walk nature trail – limestone/cement along Malvolio Road and with park benches to rest and enjoy the nature (2)**
9. **We want jobs here (I protested here) (1)**
10. Environmental carers needed (1)
11. **Sacred birthing area – heritage listing (1)**
12. **Replanting (1)**
13. **Malvolio Road – rehabilitation (1)**
14. **Theatre and creative groups (1)**
15. Wetlands (1)
16. Weed control and site assessments (all areas) (1)
17. Barnett paid to destroy – shouldn't rely on community volunteering (1)
18. Jobs for local conservation workers/students (1)
19. **Traditional dance – Elders' respect (1)**
20. **Replant the ancient melaleucas/banksias (1)**
21. **Beautiful bush on my doorstep. Places for nesting and feeding for local wildlife (1)**
22. **Special area for walking with my children, has special significance for times in any family's life (whole area) (1)**
23. **Turtles, Camp 2 (1)**
24. **Sacred area (1)**
25. **Traditional mens' ground – needs monitoring (1)**
26. **One to three year internships/scholarships from Council/Wetlands Centre for students or unemployed to learn conservation skills and help rehabilitation (1)**
27. **Turtle corner – special enclosed park for memorial and contemplation garden (keep the two pine stumps) (1)**
28. **Artefacts found – special spiritual place overlooking wetland (1)**
29. **Turtles, heritage Norfolk Island Pines – can they be carved or something? Special place (1)**

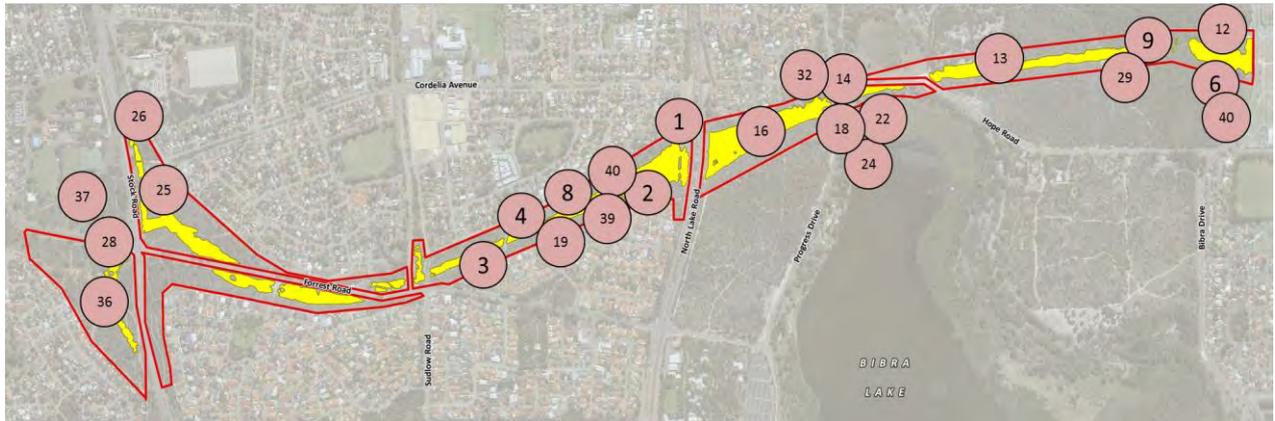
30. **Roe Swamp floodplain: rare vegetation and fauna, and adjacent rainbow bee-eater nesting sites**
31. **Rainbow bee-eater wetland sites (1)**
32. **Rare flora and fauna – this year rainbow bee-eater nesting sites (1)**
33. **Pines Corner: turtle nesting (1)**
34. **Rainbow bee-eater nesting (1)**
35. **Rainbow bee-eater nesting (1)**
36. **Only marri-dominant community in the whole corridor (1)**
37. **Only untouched section from Roe 8 site – should be left as is (1)**
38. **I drive past every day and I like looking at the trees, not the destruction (1)**
39. **Great place for walking (3)**
40. **TEC – all banksia woodland / mound spring (1)**
41. **Woody pears: rare trees in urban areas – some are sprouting. On Cockburn heritage register (1)**
42. **Kate’s[?] tuart: old tree sentinel over the bushland (1)**
43. **South-west corner of Forrest and Stock Roads: I walk here almost every day. It is full of bandicoots, birds and natives despite having some areas that are degraded. Black cockatoos feed here every afternoon on their way East. (1)**
44. **Tree sitter’s area (1)**
45. **Tait Place Protectors’ Camp: this is where the campaign began (1)**
46. **Malvolio Road (1)**
47. **I have experienced shock and hope here! (watched trees come down, gathered to protest) (1)**
48. **Aboriginal Heritage Centre Building – near Fox tree (1)**
49. **Save Me Tree (1)**
50. **Great winter walking track (1)**
51. **Site of mass sit-in: a significant moment in the campaign (1)**
52. **Quenda population still in existence (1)**
53. **Banksias, quendas, tuarts, wildflowers, woody pear. A lovely place to walk (1)**
54. **Banksias – great pace to walk with children. Close to seasonal lake (1)**
55. **“Malvolio” block bushland walk (1)**
56. **Quenda corner (1)**
57. **Dixon pines: don’t cut down or carve into artwork (1)**
58. **Fence remaining bush (1)**
59. **First fences and arrests (1)**
60. **350 year old tree (1)**
61. **Trees where red-tailed black cockatoos roost every night (1)**
62. **All sacred sites over the whole site (1)**
63. **This area has some plant diversity – large grass trees and tuarts, marri, banksia etc. it needs to be protected from dumping and four wheel drive damage (1)**
64. **Heart of wetland area (1)**
65. **Pedestrian crossing area to rest of North Lake park walk (1)**
66. **This area was so densely vegetated prior to clearing (1)**

## 5.2.2 What areas need special treatment and how?

The responses to this question are listed below.

The responses in **bold** correspond to a specific location (as indicated by the participant). In these cases, the number at the beginning of each line corresponds to a dot on the map.

The number in brackets indicates how many different participants gave the same or a similar response.



1. **Tait Place: Protectors’ Camp art piece (6)**
2. **East end of Malvolio Road: weeding, rehabilitation and nesting boxes for cockatoos (5)**
3. **Woody pear grove: very important to community. A lot of people have a connection (5)**
4. **Malvolio Road: another memorial, where the struggle started this time (4)**
5. Foxes tree: memorial (alternative comment: “building site here, no access from park”) (4)
6. **Roe Swamp: high cultural significance (4)**
7. Make sure new fire regulations don’t adversely affect plan (4)
8. Malvolio – protect regrowth (3)
9. **Ancient banksia and melaleuca grove: old, magic, dense, low-light fairy land (3)**
10. Womens’ Site: heritage listed – mark traditional boundaries (3)
11. Traditional Mens’ Area – seek Elder permission for rehabilitation (3)
12. **Roe swamp floodplain: severely damaged by post-clearing fencing works and spraying – rare flora and fauna killed since initial clearing. Urgent remediation required (3)**
13. **Banksia woodlands between wetlands severely damaged by spray and fencing work since June. Urgent remediation required if any of original seed bank is to survive. Summer watering and hard weeding (3)**
14. **Turtle Corner: make a memorial / Roe 8 victory gazebo with native bush/trees, paths and fences between the memorial and the road. Shade and contemplation (3)**
15. No vehicles on site at all (3)
16. **Need to replace large trees as soon as possible, add roosting and nesting boxes, place habitat in upland areas. Species surveys and monitoring (3)**
17. More engagement with of Traditional Owners (2)
18. **Pines Corner: no to idea of pine trees being used for sculpture (2)**
19. **Walk trail / cycle path / park benches (non-intrusive) (2)**
20. Bike path to support safe community and bringing users in who will keep an eye on things – more use and a feeling of safety for the walkers. Location made to be independent to sensitive areas (2)
21. All areas: include as many Phytophthora Dieback-resistant plants (endemic) as possible in plant selection to decrease the spread (2)
22. **Pines Corner: rehab of nesting sites, nesting mounds (1)**
23. Don’t get bogged down in red tape – needs action (1)
24. **Pines Corner: wood sculpture sentinel trees – man and woman (1)**
25. **Known quenda sightings (pre-clearing). Possible colony at Water Corporation for recolonisation to cleared site – pesticide spraying will impact this species (1)**
26. **Rainbow bee-eater site – pesticide spraying will impact this species (1)**

27. Nyungar place names are really, really important (1)
- 28. Replace ecosystem and continue monitoring and management (1)**
- 29. Wetland area needs special care, especially from Turtle Corner to Roe Swamp. Let community help (tell them what they can do – e.g. pulling arum lilies) (1)**
30. Weed control to reduce reliance on pesticides/herbicides. Refer to “the bush is a garden” (1)
31. No herbicides – steam weeding (weed design) (1)
- 32. Turtle corner, Malvolio Road and Bibra Drive area – repair and restore, create a barrier (1)**
33. Weed control of the unaffected areas on each side of the scar! Especially adjacent to Coolbellup (1)
34. Right plants for the right spot (1)
35. Land use plan to ensure ongoing community use to ensure protection of the corridor into the future (1)
- 36. As a result of vehicle access this area has some degraded parts with large feeds and rubbish, however there are some excellent quality woodlands that can support rehab in the degraded areas (1)**
- 37. This area should be included in the management plan (1)**
38. Need for trees as soon as possible to provide shade and support for regrowth (1)
- 39. Cleared area to be fully rehabilitated, I don’t want parkland or bike paths, I want to see bush regrown (1)**
- 40. Need to mark out paths – but just keep dirt paths (through the middle?) (1)**
41. Habitat for turtles and other fauna at turtle corner (1)
42. Priority around lakes and wetlands (1)
43. Access and walking are important (1)
44. *Banksia littoralis* deaths need checking (1)

### 5.2.3 How do you want to be involved in the rehabilitation project?

The responses to this question are listed below.

The number in brackets indicates how many different participants gave the same or a similar response.

- Planting/re-planting (56)
- Weeding / weed control (42)
- Citizen science (23)
- Monitoring (21)
- Community engagement to inform, discuss and create updates to the Plan (21)
- Community education related to rehabilitation (20)
- Community science conference (20)
- Face-to-face meetings (19)
- Seed collection (18)
- Links with existing Wetlands Centre events (16)
- Membership to environmental/landcare groups (15)
- Site visit (14)
- Links with existing City of Cockburn events (13)
- Community surveys (13)
- Art and photography (12)
- Visiting Wetlands Centre or NativeARC (12)
- Weed identification workshops (11)
- Membership to local community associations (10)
- Leading/joining wildflower walks (10)
- Education of young people through the curriculum (5)
- Scientific research (5)
- Helping wildlife / NativeARC (2)
- Community strength groups (theatre/arts) (2)

- “Tribes” of locals caring for sections near their homes, weeding, planting etc. (2)
- Creating the Rehabilitation Management Plan (1)
- Give people seedlings to look after and grow ready for planting next winter (1)
- Nameplates for the plants – “own” [adopt?] a tree/plant (1)

## 5.2.4 How do we best keep in contact with you?

The responses to this question are listed below.

The number in brackets indicates how many different participants gave the same or a similar response.

- Email (42)
- Facebook (35)
- E-newsletter (21)
- Rehabilitating Roe 8 website (19)
- Local newspaper (Herald or Gazette) (13)
- CCWC Website (12)
- CCWC Facebook (11)
- Through City of Cockburn (website and other means) (9)
- Newsletters (6)
- Save Beeliar Wetlands Facebook (5)
- Hamilton Hill Community Group Facebook (5)
- Other social media (besides Facebook) (5)
- Through City of Fremantle (website and other means) (4)
- Through City of Melville (website and other means) (3)
- Multi-model ("it's 2017") (3)
- Flyers (2)
- Freo Massive Facebook (1)
- Letters (1)
- Information phone line (1)

## 5.2.5 How do you want to contribute to the project?

The responses to this question are listed below.

The number in brackets indicates how many different participants gave the same or a similar response.

This feedback board also allowed participants to list their contact details. These details have been stored in a community database (Provided in **Appendix 2**) and will be used to contact community members regarding future engagement and involvement opportunities.

- Planting/re-planting (31)
- Weeding (28)
- Monitoring (including monitoring of revegetation and fauna, photo monitoring, turtle monitoring) (8)
- Seed collection (6)
- Rehabilitation (5)
- Citizen science (5)
- Meetings / Workshops / Committees (4)
- Clean-up (3)
- Communications / passing on information (3)
- Ongoing community engagement (3)
- Assessment (of current site and of revegetation) (3)
- Design and build walking tracks (2)
- Weed mapping (1)
- Employment options (1)
- Watering (1)
- Protect the bush (1)
- Grow the bush back (1)
- Encourage involvement by children (1)
- Art work (1)
- Culture (1)
- Grass (1)
- Lead wildflower walks (1)
- Revegetation (1)
- Growing plants (1)
- Landscaping (1)
- Civic education representative for environmental curriculums (1)
- Turtle science (1)
- Learning (1)
- Teaching (1)
- Maintenance (1)
- Research and advice to support Environmental Management Plan (1)
- Landscape architect – interpretation (1)
- Blocking 4WD access (1)
- Community decision-making (1)
- Governance (1)

- Share models and experiences of NRM groups in WA practicing non-chemical regrowth and weed control (1)
- Be a section/area leader for restoration (1)

## 5.3 Community Open Day – Anecdotal Feedback Sheets

During discussions with Open Day participants, project team members recorded anecdotal feedback. This feedback is recorded below according to three themes:

- Questions
- Recommendations/suggestions
- Other comments

The number in brackets indicates how many different participants gave the same or a similar response.

### 5.3.1 Questions

- What will the cost be over 10 years? (1)
- What will the governance structure be for the 10 years? (1)
- Are there areas being eroded or susceptible to erosion? (1)
- What will the timing be for the Plans? (1)
- Could prison labour be used for grass weeding? (1)
- How will weeds be managed, including in the most sensitive wetland areas and near residential area? (1)
- How will community members and groups be included in decision-making? (1)
- Will the plan use herbicides/pesticides or non-chemical bushland regeneration practices? (1)
- Impacts of Murdoch Drive / Roe 7 Connection: what recompense will Hope Road residents receive what will presumably happen? Road spurs? To Bibra Drive – where is the rationale for these? Has there been genuine modelling done regarding the impact of Bibra Drive traffic? There needs to be a complete review of the need for this infrastructure (1)

### 5.3.2 Recommendations/suggestions

- Seek further advice from and engage Traditional Owners to be leaders and actively engaged in all aspects of the Plan and related activities (e.g. a “Friends of” group should engage Traditional Owners) (5)
- Steam-weeding / non-chemical NRM /no herbicides (East Metropolitan Regional Council and several Friends of Groups are commencing and having success with this) – notice that many people have volunteered to help with weeding so there are resources available (5)
- Re-zone the site under the Metropolitan Region Scheme (5)
- Should be returned to how it was (as close as possible or better) (3)
- Engage with wetland and bushland groups using non-chemical NRM (2)
- Blackwell Road east could also be a good site for volunteer restoration (1)
- Broad and ongoing consultation needs to happen first (1)
- Cut from the project all contractors who are deliberately vandalising the site (2)
- Offer an alternative to Roe 8 (1)

- Contractors spraying around the Christmas tree and sitting tree need to get an Aboriginal Elder to make sure that important areas aren't being disturbed (1)
- Plants are sensitive to chemicals - community want to do their own burning and pulling of weeds (1)
- There are two roads to close: Farrington and Hope – opportunity to take down the powerlines that cross the lake. Instead build an elevated road on the bases of the powerline following this route (1)
- Womens' area – heritage (1)
- Weed control (1)
- Bike track (1)
- Something needs to happen as people are becoming cynical of the process. Weeding and cleaning up if planting is not possible (1)
- Number one priority is that it never happens again (1)
- Return the banksia woodlands (1)
- Improve the area for the next generation (1)
- More public transport through the area will help with the City of Melville's issue with trucks (1)
- Teams of people to pull grasses (veldt and similar) by hand (1)
- Ensuring transparent and regular reviews of the Plans (1)
- Community arts project that marks and makes places all along the route – especially those around which there is a strong sense of ownership and sense of place from community members (oral histories, legacy items in places "lily pads," stories from before the protests about walking in the bush: e.g. as the bush was cleared a lot of walkers could see each other, this formed communities but was a loss of sense of solitude) (1)
- Localise rubbish-picking ("adopt-a-spot") (1)
- Local community groups may be able to receive grants to manage small areas (1)
- Noise modelling (test the legitimacy of current noise modelling) (1)
- Better oversight of the dumping happening in both areas (1)
- Need community involvement in monitoring (1)
- Signage to warn against dumping and a program to prevent this happening (including on Blackwood Avenue land) (1)
- Don't treat this as a large top-down scientific project (1)
- Limit public accessibility to firebreaks only (1)
- Allow tours but do not have formal tracks (more like South Lake than Bibra Lake) – there is tourism potential despite lack of formal pathways (1)
- No carparks or rubbish bins (1)
- I would like the rehabilitation to include public access to increase the overall value of the site in terms of walkways and tracks (similar to Bibra Lake) and increase the natural experiences for people. This may lead to an increased appreciation of the wetland system, including education points for significant parts – culturally and ecologically etc. Provides education as well as experience (1)
- Greater community involvement in decision-making processes (1)
- Broader and deeper community involvement in weeding and watering (1)
- Hiring of contractors and employees based upon rehabilitation and bushland knowledge and experience (1)
- Need a wide diversity of input (1)
- Use existing crushed limestone to create walkways (1)

- Create a Rehabilitating Roe 8 Facebook page (1)
- Engage the South West Biodiversity Group (1)
- Engage Friends of Blackwood Ave (1)
- Engage WA Alliance for a Clean Environment (ACE) (1)
- Engage Friends of Coolbellup Bushland (1)
- Engage Pesticide Action Group (1)

### 5.3.3 Other comments

- Sounds like a lot of work, budget will be important (1)
- Keen to be involved in restoration (1)
- Never before felt a sense of grieving for a place, the plants and animals (1)
- Asbestos and noise were big issues (1)
- Approximately 30 people meeting at parks and rec centre (Cooby Concerned Residents) (1)
- Cooby is a high-functioning, well-connected community (1)
- Concerned by current pesticide use practices on site, including observed non-compliance with regulations and unsuitable products for wildlife, soil and humans (1)
- Warning that large control plots will attract guerrilla planting (1)
- Murdoch interchange reference group was shut down (“disgraceful”) (1)
- Contractors deliberately vandalising the area and abusing community members (1)
- Poor weed-spraying practices, including dragging of hoses across seedlings (1)
- The less that has been done, the more likely it is that the road may end up going through (1)
- Community anger over being excluded from decision-making processes is at a flashpoint (1)
- It would be sad to see this project fail and a government fall because of failure to accept ongoing community participation and consultation (1)
- Currently too many small groups working independently (“clique-y”) (1)

## 5.4 One-on-one Stakeholder Meetings

15 one-on-one meetings with the following key stakeholder organisations were conducted:

- Millennium Kids
- City of Cockburn
- Cockburn Aboriginal Reference Group
- Main Roads WA
- PURSAC
- Cockburn Community Wildlife Corridor
- Lisa O'Malley
- Cockburn Wetlands Education Centre
- Conservation Council of WA
- Melville-Cockburn Chamber of Commerce
- Steering Committee
- Department of Biodiversity, Conservation and Attractions (phone meeting)
- Coolbellup Community Association
- Native ARC
- Hamilton Hill Community Group.

Feedback recorded during these discussions is listed below.

### 5.4.1 Structure/format of the plan

- The CECP must be a **public** document which is **adaptable** and is **reviewed regularly**.
- The CECP must outline a phased approach that reflects the phases of Rehabilitation Management Plan.
- The CECP must be responsive to:
  - Changes in land tenure
  - Changes in the rehabilitation requirements and environmental changes (e.g. where timeframes are affected by unexpectedly hot/cold/dry/wet seasons).

### 5.4.2 Key messages

- Recognition of Indigenous Heritage and continued connection to land.
- Honour and acknowledge the long and recent history of community and stakeholder involvement that have led to today.
- The current phase marks embarking on a new process.
- Ensure transparency and inclusion from the outset.
- Describe how the plan relates to the Rehabilitation Management Plan.
- Describe how the plan relates to the broader Community Wildlife Corridor.
- Celebrate the creation of a new community of interest and sense of place.
- Acknowledge and communicate the complexity of the community (some communities are those of proximate residents, many are spread far beyond the local area, a mix of views).
- Communicate the likely/proposed governance structure for the ongoing project and uncertainty.
- Communicate the complexity and uncertainty around land tenure (if not confirmed prior to finalisation of this plan).

### 5.4.3 Objectives

- Build ownership and buy-in for the project.
- Harness the energy, passion and resources of stakeholders into the project.
- Identify key stakeholders, resources and communications channels for the project.
- Providing mechanisms through which people of all communities will continue to be engaged.
- Provide opportunities for communities to continue working together, but also to involve new groups and individuals.
- Find out what the community want to see from the rehabilitation process at regular intervals.
- Identify the appropriate level of engagement and communication for different community and stakeholder groups.
- Outline a calendar and action plan for engagement and communications.
- Identify specific locations and timeframes for each type of engagement initiative.
- Clearly identify the engagement, capacity-building and communications initiatives that are to be conducted during the implementation of this plan, and the involvement and capacity-building initiatives that will be briefly noted in this plan but would be further detailed in a Community Development Plan.

### 5.4.4 Governance

- Governance needs to be transparent and broadly communicated from the outset.
- Representation from a broad range of community groups and other stakeholders.
- Regular community input into project governance.
- Consider Advisory Committees in preference to Steering Committees.
- Cockburn Aboriginal Reference Group indicated that this group is not representative of the broader Aboriginal community and that further engagement should be conducted [this led to the decision to hold the engagement event with Aboriginal Custodians].

### 5.4.5 Potential engagement and capacity-building initiatives

- Relevant engagement for each step of the Rehabilitation Management Plan (e.g. sessions/programs prior to key rehabilitation initiatives to educate community members on proper practice and allow for input into the rehabilitation).
- Engagement to inform the governance structure and how the community will aid in decision-making through this governance structure.
- Representation from a wider range of community groups and other stakeholders on committees and sub-committees.
- Annual Community Expectations and Satisfaction survey to review and update the CECP.
- Regular opportunities for face-to-face meeting and project updates
  - For key stakeholders; and
  - For broader community.
- Links with existing City of Cockburn events in the area.
- Links with existing Cockburn Wetlands Education Centre (CWEC) events (e.g. World Wetlands Day, Get Wild about Wetlands).
- Links with science (PURSAC) and citizen science initiatives.
- Community science conference.
- Youth engagement through school, Native ARC, Millennium Kids, CWEC etc.
- Engagement through art and photography.
- Planting days that link to the Rehabilitation Management Plan.
- Training for community members to be involved in rehabilitation and land care – run through CWEC.

- Training for community members to be involved in citizen science.
- Formation of a “Friends of” group.
- New citizen science opportunities.
- Partnerships with Millennium Kids projects in the area.
- Skills-sharing with an environmental / land care focus

*Note that the engagement plan would identify potential community development initiatives and who to connect with, but will not have the scope to confirm or build these into the action plan.*

#### **5.4.6 Potential communications initiatives and channels**

- **Ensure clear and consistent messaging**
- **Utilise and describe existing stakeholder network**
- Promote all engagement and rehabilitation initiatives to community members and stakeholders across a wide area
- Communicate all changes and updates to the Rehabilitation Management Plan, CCEP and Community Development Plan
- Communicate the project timeline
- Review and potentially update the Rehabilitating Roe 8 brand
- Revise and upgrade the Rehabilitating Roe 8 website to build this into an engagement platform
- Develop PURSAC’s proposed online toolbox (may be part of the RR\* website or require a separate platform)
- Communicate the project governance and land tenure
- Develop and regularly update an Information and FAQ document
- Communicate rehabilitation progress and outcomes at key milestones
- Communicate progress and outcomes of scientific projects at key milestones
- Develop signage
- Communicate why the public will be allowed into and, conversely, kept out of specific areas. Also that some areas may be open to public access at certain stages or if community members have received training/education for a specific rehabilitation initiative
- Communicate what the rehabilitation and science projects are focusing on and why (e.g. why the rehabilitation project is monitoring plants but not animals, why there are sites where no rehabilitation is happening (control quadrats))
- Outline strategy for responding to negative feedback regarding management of the site i.e. a strong and defensible position based upon science and based upon advice from WA’s leading biodiversity scientists. Broad stakeholder and community group representation on committees/sub-committees provides an efficient and direct communication channel.

## 6. FINDINGS FOR REHABILITATION MANAGEMENT PLAN

This section outlines the findings of community engagement and research that are relevant to the Rehabilitation Management Plan.

### 6.1 Ongoing Acknowledgment and Involvement of Traditional Owners

Throughout the engagement process stakeholders and the community reinforced the importance of acknowledging, respecting and actively involving Traditional Owners and Aboriginal Custodians during the roll-out of the Rehabilitating Roe 8 project.

Traditional Owners and Aboriginal Custodians have had input and proposed strategies have been incorporated into this plan. Planning for engagement has been constrained by the absence of an Aboriginal Heritage Study. It is proposed that an Aboriginal Heritage Study be commissioned and that this plan be reviewed and amended with Traditional Owners and Aboriginal Custodians upon its completion.

### 6.2 Engagement, Involvement and Communications Objectives

The engagement, involvement and communications objectives identified by stakeholders and the community for the next phase of the project are to:

- Recognise Aboriginal heritage and continued connection to land ensuring Nyungar culture is maintained at each step of the project.
- Ensure the community has input into decision-making and into the roll-out of the project.
- Develop trust, alignment and a shared understanding of rehabilitation project.
- Honour and acknowledge the long and recent history of community and stakeholder involvement on the project.
- Regularly guide update and adapt the plan, informed by engagement (the Expectations and Satisfaction will be a major tool for these updates).
- Ensure communications are consistent, accessible and transparent from the outset of the project.
- Strengthen the unique community of interest and sense of place.

### 6.3 Engagement Context

Due to the publicity of and controversy around the suspended Roe 8 highway extension, Rehabilitating Roe 8 is a high profile project, with a correspondingly high level of community and stakeholder interest.

There is generally very high awareness of the suspension of Roe 8, but considerably lower awareness of the upcoming Rehabilitating Roe 8 project. Communicating the distinction between the two projects is crucial. The difference between the desired outcomes of the Roe 8 Freight Link and Rehabilitating Roe 8 is

clear, but emphasising the distinction between the governance structures and methods of community engagement and involvement are just as important in order to begin re-building trust.

The formation of the Rehabilitating Roe 8 Working Group, Steering Committee and the appointment of consultants to develop the *Rehabilitation Management Plan* marked the commencement of new phase of the project and the associated commencement of a phase of formal community engagement.

For many community members and stakeholder groups, the primary concern related to Rehabilitating Roe 8 is uncertainty that the 10 year rehabilitation project will be delivered and the long term land tenure of the project area.

This uncertainty is the major barrier to building trust between the project team and stakeholder groups.

The project team must therefore aim to achieve certainty around governance, tenure and zoning as soon as practical, but continue to acknowledge and communicate aspects of the project around which there is uncertainty.

## 6.4 Communications Context

The digital and social media landscape relevant to the project is active, with a range of environmental and community groups having a high number of followers and frequent posts. These groups include the Cockburn Community Wildlife Corridor, Save Beeliar Wetlands, Rethink the Link, the Cockburn Wetlands Education Centre, Hamilton Hill Community Group, Coolbellup Community Association and Bibra Lake Residents Association. A high number of posts relate to the suspension of Roe 8, regrowth, rehabilitation, related or nearby environmental concerns, community events and the nearby Murdoch Drive Connection road development.

The Steering Committee has developed a Rehabilitating Roe 8 website as the central hub and point of contact on the project. Currently the Rehabilitating Roe 8 website receives low visitation, and appears low on online search results. As websites tend to be more static than social media and are not visited frequently except by those with very high interest in the subject, the Rehabilitating Roe 8 website will need to be heavily supplemented by social media.

The City of Cockburn actively utilises a number of digital channels, including their Comment on Cockburn engagement platform. The City's "What's On" page also shares a range of both the City's internal events and event organised by local groups. Figure 2 below shows a screen-grab from the "What's On" page. The first event is organised by Native ARC and the remaining three by Cockburn Wetlands Education Centre. The high proportion of "What's On" initiatives related to the environment, and specifically the wetlands area, reflects the high activity of key groups (in particular the Wetlands Centre) and the existing strength of communication channels between these groups and the City of Cockburn. These events are all exemplars of existing stakeholder initiatives that could be leveraged for potential partnership opportunities with the Rehabilitating Roe 8 project.

Figure 2. Screen-grab from City of Cockburn "What's On" page. Source: <https://www.cockburn.wa.gov.au/Recreation-and-Attractions/Whats-On>

			
<p><b>Native ARC Holiday Fun</b></p> <p>26 September &amp; 2 October</p> <p>Does your family love nature and caring for wildlife? Join Native ARC this school holidays for two exciting wildlife and nature based activities!</p>	<p><b>Get Wild About Wetlands</b></p> <p>School holiday program</p> <p>Join us for some exciting environment events with a series of eco-walks, talks and night stalks held for families during these September/ October school holidays.</p>	<p><b>Painting the plants and animals of Bibra Lake</b></p> <p>21 October, 2017</p> <p>A workshop for nature lovers. Join artist and environmental educator Angela Rossen and discover the animals and plant life of the Bibra Lake wetlands through paint medium.</p>	<p><b>Build Your Own Frog Habitat Workshop</b></p> <p>11 November, 2017</p> <p>We invite you to learn about our local frogs and how you can create your own frog habitat in your garden. Experts from SERCUL will introduce you to the frogs of the south-west and show you the secrets of building...</p>

## 7. CONCLUSIONS

Based on the community engagement taken from August to November 2017, the following themes were identified.

- The importance of Traditional Owners input, leadership and engagement in all aspects of the plan and related activities.
- A desire for certainty that the rehabilitation project will be implemented for the full 10 years and protection of the land into the future.
- Willingness and eagerness amongst community members to get involved in the rehabilitation.
- The need for meaningful feedback into the *Rehabilitation Management Plan* during its 10 year lifespan and for the plans to be adaptive documents.
- The importance of public access to the site with minimal impact to the rehabilitation itself.
- The need for transparency around any changes to the plans.

The community and stakeholders have strong interest in being involved in the Rehabilitating Roe 8 Project and proposed a range of involvement and ongoing communications activities including:

- Community involvement in planting
- Community involvement in weeding and weed control
- Citizen science opportunities, including community involvement in monitoring
- Community engagement to inform, discuss and create updates to the plan
- Community education related to rehabilitation
- Community science conference.

## 8. APPENDICES

### 8.1 Appendix 1: Promotional and Information Materials (2017 Engagement Period)

This Appendix shows promotional and information materials used during the 2017 phase of engagement.

### 8.1.1 Flyer for engagement with Aboriginal Custodians



## Rehabilitating Roe 8 Your Say

The consultants working on the rehabilitation of Roe 8 are keen to hear the views of the traditional custodians of the land. To do this we are holding a BBQ at Bibra Lake.

You are invited to attend the BBQ to express your view on:

- the history and cultural significance of the area
- what the rehabilitation project means to you
- how the project can reflect and celebrate local history and culture
- how you and others might like to be involved in the rehabilitation, revegetation and other aspects of the project

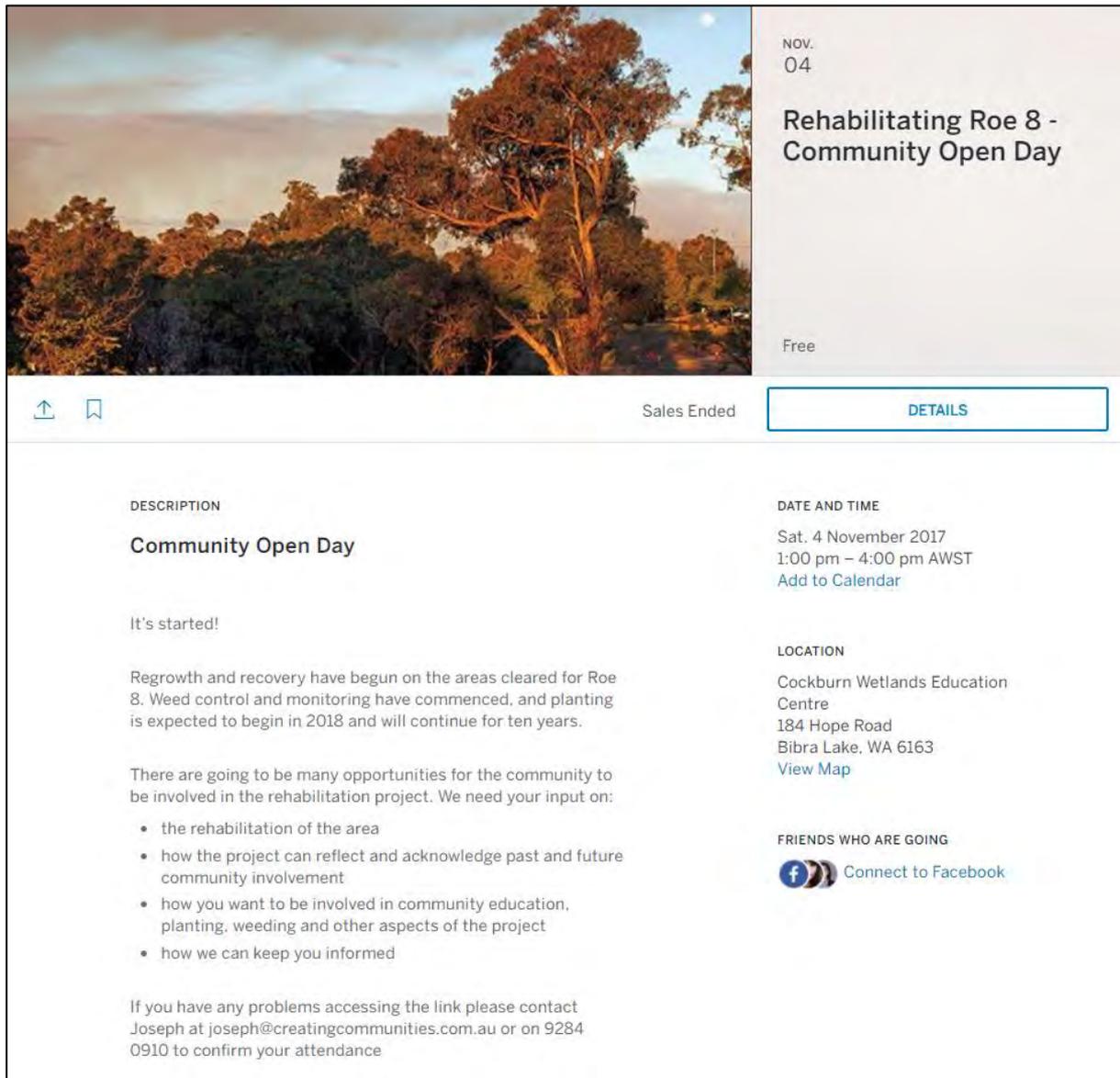
**Date: Wednesday 25 October**

**Time: 6pm – 7.30pm**

**Location: Bibra Lake – BBQs South of Nature Playground. Follow signage on the day**

**RSVP: Please contact Joseph at [joseph@creatingcommunities.com.au](mailto:joseph@creatingcommunities.com.au) or on 9284 0910 to confirm your attendance and for catering purposes**

## 8.1.2 Online invitation for Community Open Day (Eventbrite)



The image shows a screenshot of an Eventbrite event page. At the top left is a photograph of trees at sunset. To the right of the photo, the date 'NOV. 04' is displayed, followed by the event title 'Rehabilitating Roe 8 - Community Open Day' and the price 'Free'. Below the photo are icons for sharing and bookmarking, and a 'Sales Ended' status. A 'DETAILS' button is visible. The main content area is divided into two columns. The left column is titled 'DESCRIPTION' and contains the event title 'Community Open Day', the text 'It's started!', a paragraph about regrowth and recovery, another paragraph about community involvement opportunities, a bulleted list of topics, and contact information for Joseph. The right column is titled 'DATE AND TIME' and lists the date 'Sat. 4 November 2017', time '1:00 pm - 4:00 pm AWST', and a link to 'Add to Calendar'. Below that is the 'LOCATION' section with the address 'Cockburn Wetlands Education Centre, 184 Hope Road, Bibra Lake, WA 6163' and a 'View Map' link. At the bottom of the right column is the 'FRIENDS WHO ARE GOING' section with a Facebook icon and the text 'Connect to Facebook'.

NOV.  
04

### Rehabilitating Roe 8 - Community Open Day

Free

↑    📌

Sales Ended

[DETAILS](#)

**DESCRIPTION**

#### Community Open Day

It's started!

Regrowth and recovery have begun on the areas cleared for Roe 8. Weed control and monitoring have commenced, and planting is expected to begin in 2018 and will continue for ten years.

There are going to be many opportunities for the community to be involved in the rehabilitation project. We need your input on:

- the rehabilitation of the area
- how the project can reflect and acknowledge past and future community involvement
- how you want to be involved in community education, planting, weeding and other aspects of the project
- how we can keep you informed

If you have any problems accessing the link please contact Joseph at [joseph@creatingcommunities.com.au](mailto:joseph@creatingcommunities.com.au) or on 9284 0910 to confirm your attendance

**DATE AND TIME**

Sat. 4 November 2017  
1:00 pm - 4:00 pm AWST  
[Add to Calendar](#)

**LOCATION**

Cockburn Wetlands Education Centre  
184 Hope Road  
Bibra Lake, WA 6163  
[View Map](#)

**FRIENDS WHO ARE GOING**

 [Connect to Facebook](#)

### 8.1.3 Open day feedback boards

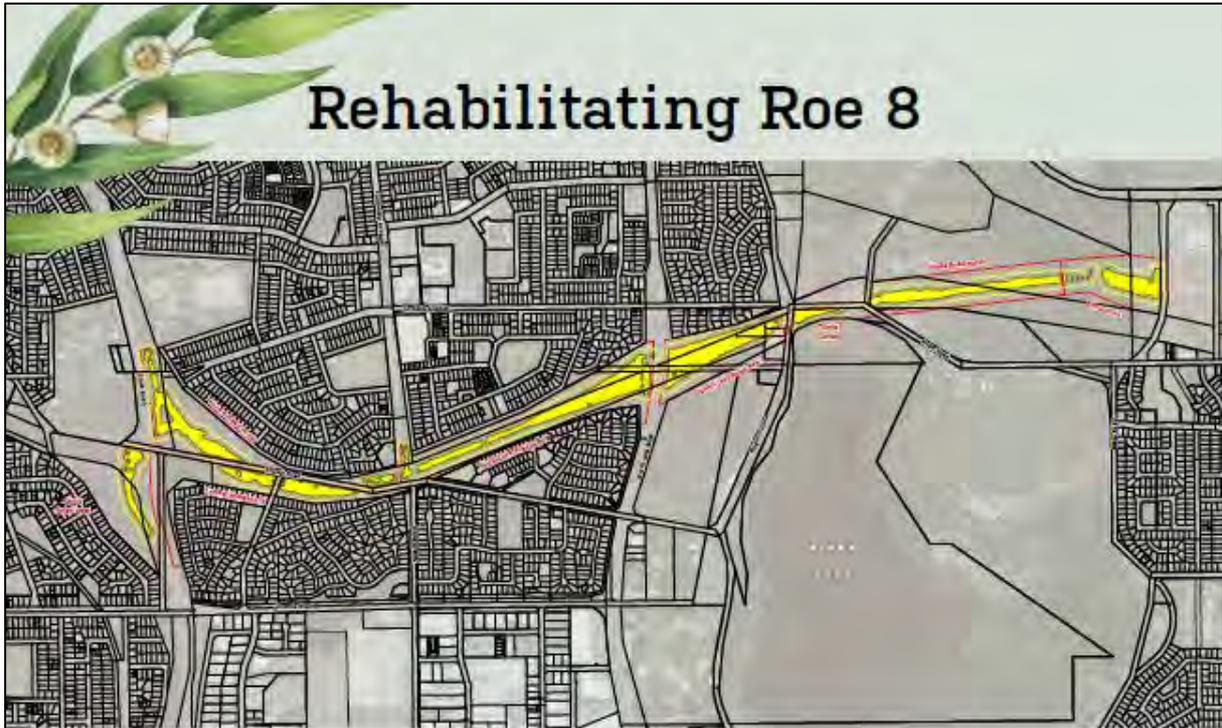
## Rehabilitating Roe 8



**What areas are of special personal significance?**  
Put a sticker on the areas of special significance number it with the next free number below and provide a description of what makes it special.

1 _____	13 _____
2 _____	14 _____
3 _____	15 _____
4 _____	16 _____
5 _____	17 _____
6 _____	18 _____
7 _____	19 _____
8 _____	20 _____
9 _____	21 _____
10 _____	22 _____
11 _____	23 _____
12 _____	24 _____

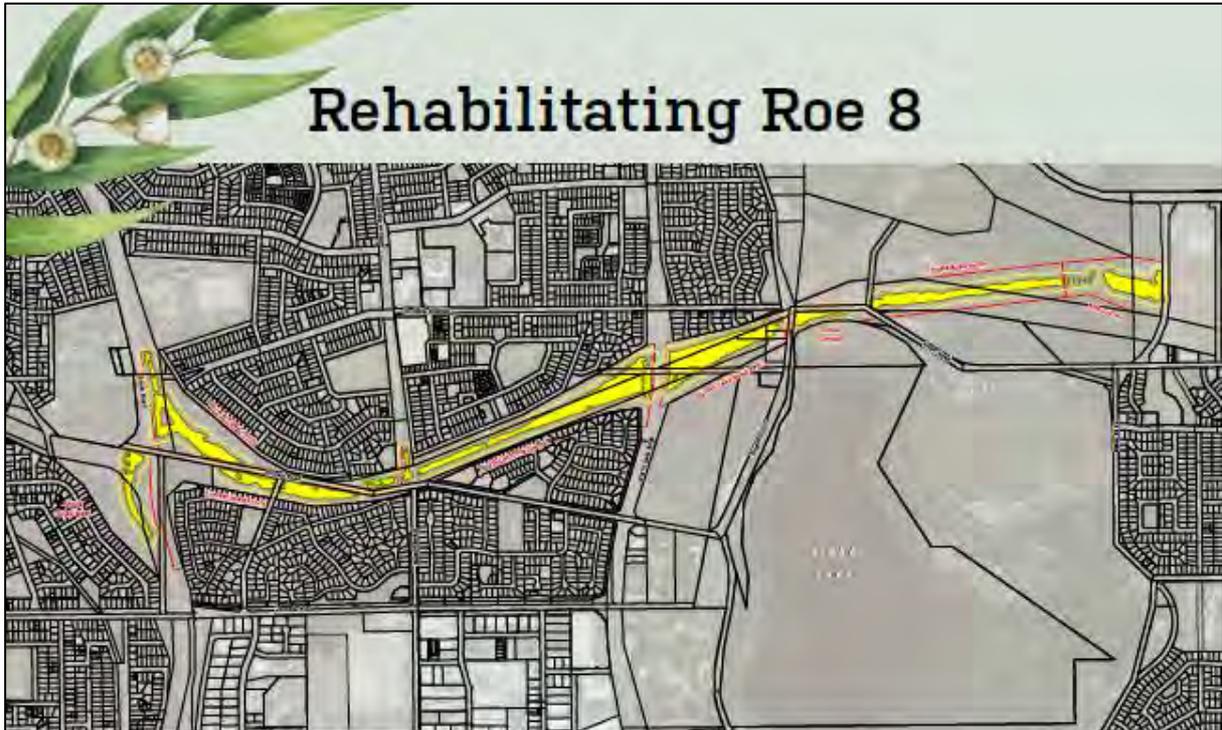




### How do you want to be involved in the rehabilitation project?

Place a tick next to the engagement option below which suits you best or suggest another option.  
 If your feedback relates to a specific location, place a sticker on the map number  
 it with a spare number below and provide a description.

1 _____	13 _____
2 _____	14 _____
3 _____	15 _____
4 _____	16 _____
5 _____	17 _____
6 _____	18 _____
7 _____	19 _____
8 _____	20 _____
9 _____	21 _____
10 _____	22 _____
11 _____	23 _____
12 _____	24 _____



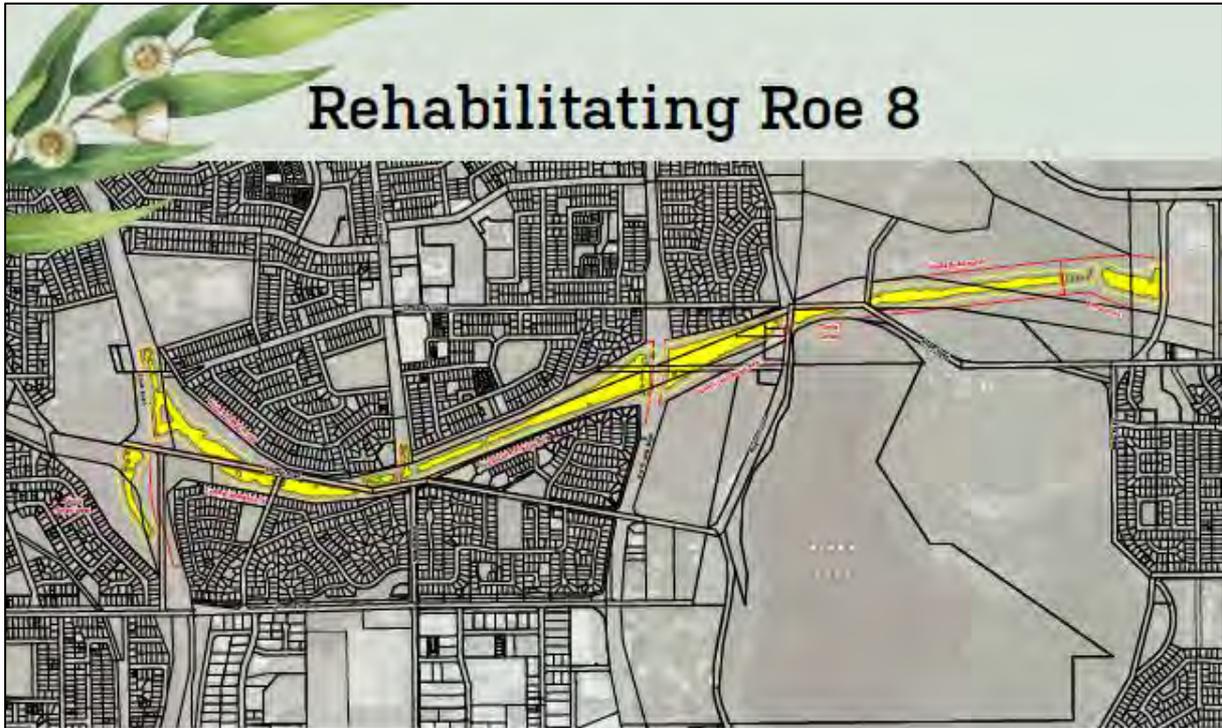
# Rehabilitating Roe 8

## What areas need special treatment and how?

Put a sticker on the areas you believe require special treatment, number it with the next free number below and provide a description of the treatment required.

1 _____	13 _____
2 _____	14 _____
3 _____	15 _____
4 _____	16 _____
5 _____	17 _____
6 _____	18 _____
7 _____	19 _____
8 _____	20 _____
9 _____	21 _____
10 _____	22 _____
11 _____	23 _____
12 _____	24 _____





**How do we best keep in contact with you?**  
 Which communication channel suits you best, or suggest another option.

1 _____	13 _____
2 _____	14 _____
3 _____	15 _____
4 _____	16 _____
5 _____	17 _____
6 _____	18 _____
7 _____	19 _____
8 _____	20 _____
9 _____	21 _____
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# Appendix B

External Context Assessment Report





# External Context Assessment Report

Roe 8 Cleared Areas

Project No: EP17-085(07)

**Prepared for Rehabilitating Roe 8 Steering Committee  
August 2021**

# External Context Assessment Report

## Roe 8 Cleared Areas

## Document Control

<b>Doc name:</b>	External Context Assessment Report Roe 8 Cleared Areas				
<b>Doc no.:</b>	EP17-0485(07)--004C RAW				
Version	Date	Author		Reviewer	
1	December 2017	Rachel Omodei	RAO	Tom Atkinson	TAA
	Draft to client for review				
A	December 2017	Rachel Omodei	RAO	Tom Atkinson	TAA
	Draft to client for review				
B	February 2018	Rachel Omodei	RAO	Sarah Paul	SKP
	Updates to address client comments and incorporate social context				
C	February 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Minor updates for resubmission				
D	August 2021	Rachel Weber	RAW	Tom Atkinson	TAA
	Annual review updates				

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# External Context Assessment Report

## Roe 8 Cleared Areas

## Executive Summary

The 'Roe 8' portion of Roe Highway was a controversial and high profile road project for Western Australia. The construction of Roe 8 was suspended on 11 March 2017 following a State government election and a preceding period of protests, legal challenges and broad media coverage. Before construction was halted, clearing was undertaken along the proposed alignment of Roe 8 in the localities of Bibra Lake, North Lake and Coolbellup, Western Australia.

The 'Rehabilitating Roe 8' project arose out of the community capacity stimulated during opposition to the construction of Roe 8. Rehabilitating Roe 8 aims to restore local native vegetation and fauna to the cleared areas along the proposed Roe 8 alignment, and also seeks to restore community vitality, build local capacity and rebuild trust.

This *External Context Assessment Report* provides background information on the restoration areas that was considered in the preparation of the *Part 1- Rehabilitation Management Plan (RMP)* (Emerge Associates 2018) for the Rehabilitating Roe 8 project. The scope of this assessment was guided by the *National Restoration Standards* (Standards Reference Group SERA 2017), which recommend background information is assembled regarding external context and security of site tenure as part of planning for a restoration project.

Specifically, the site background information covered in this report includes:

- social context
  - community leadership
  - Whadjuk country
  - community engagement
  - communications
- environmental context
  - climate
  - landforms and soils
  - State recognised protected lands
  - flora and vegetation
  - historic land use
- planning context
- threats
- site tenure security.

# External Context Assessment Report

## Roe 8 Cleared Areas



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# External Context Assessment Report

## Roe 8 Cleared Areas

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## Abbreviation Tables

*Table A1: Abbreviations – General terms*

General terms	
CCW	Conservation category wetland
ESA	Environmentally sensitive area
FCT	Floristic community type
MUW	Multiple use wetland
P1	Priority 1
P2	Priority 2
P3	Priority 3
P4	Priority 4
PEC	Priority ecological community
REW	Resource enhancement wetland
T	Threatened
TEC	Threatened ecological community
UFI	Unique feature identifier

*Table A2: Abbreviations – units of measurement*

Units of measurement	
ha	Hectare
km	Kilometre
m	Metre
m AHD	Metres in relation to the Australian Height Datum
mm	Millimetre

*Table A3: Abbreviations – Organisations*

Organisations	
DBCA	Department of Biodiversity, Conservation and Attractions
CoC	City of Cockburn
EPA	Environmental Protection Authority
WALGA	Western Australia Local Government Association

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## Roe 8 Cleared Areas

*Table A4: Abbreviations –Legislation*

Legislation	
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i>
EP Act	<i>Environmental Protection Act 1986</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
WC Act	<i>Wildlife Conservation Act 1950</i>

*Table A5: Abbreviations – Planning terms*

Planning terms	
TPS	Town planning scheme
MRS	Metropolitan region scheme

# External Context Assessment Report

## Roe 8 Cleared Areas

## 1 Introduction

### 1.1 Project background

The 'Roe 8' portion of the Roe Highway extension, in the localities of Bibra Lake, North Lake and Coolbellup, Western Australia, was a controversial and high profile road project for Western Australia. Approximately 18 hectares (ha) of vegetation was cleared for Roe 8 between December 2016 and February 2017. The construction of Roe 8 was suspended on 11 March 2017 following a State government election which resulted in the election of a Labor state government that had committed to stopping the controversial project. This clearing was a source of significant concern for members of the community opposed to Roe 8's construction and was accompanied with multiple protests, legal challenges and broad media coverage.

The 'Rehabilitating Roe 8' project arose out of the community capacity stimulated during opposition to the construction of Roe 8 as well as the newly elected state Labor government's commitment to rehabilitation of the cleared areas. Essentially, Rehabilitating Roe 8 aims to restore local native vegetation and fauna habitat to the cleared areas along Roe 8. However, Rehabilitating Roe 8 is not a typical restoration project. Due to the publicity and controversy surrounding the construction of Roe 8, the restoration of these cleared areas is a uniquely high profile endeavour for Perth and Western Australia, with a correspondingly high level of community and stakeholder engagement.

As part of the Rehabilitating Roe 8 project the 'Rehabilitating Roe 8 Steering Committee' sought the preparation of the *Rehabilitation Management Plan Roe 8 Cleared Areas* (RMP) (Emerge Associates 2018). The RMP defines management areas and outlines communication, involvement, engagement, restoration and monitoring actions based on feedback obtained during community and stakeholder consultation and guidance from *National standards for the Practice of Ecological Restoration in Australia* (hereafter referred to as 'the Standards') (Standards Reference Group SERA 2017).

#### 1.1.1 Site boundary

The site encompasses cadastral parcels, or portions of cadastral parcels, within which clearing occurred as part of construction of Roe 8 or whose inclusion enhanced the appearance of the site as an east/west corridor<sup>1</sup>, as shown in **Figure 1**.

The site spans approximately 2 kilometres (km) in length and totals approximately 69 hectares (ha) in area.

#### 1.1.2 Management areas

To assist in communication eight (8) management areas are identified within the RMP representing portions of the site separated by roads or practical management boundaries (Emerge Associates 2018).

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<sup>1</sup> Establishment of a corridor is a community aspiration identified through consultation undertaken for preparation of the RMP (Emerge Associates 2018).

# External Context Assessment Report

## Roe 8 Cleared Areas

East to west across the site these management areas are labelled:

- Bibra Drive
- Hope Road North
- Turtle Corner
- North Lake Road East
- North Lake Road West
- Forrest Road South
- Forrest Road North
- Stock Road West.

The locations of these management areas are shown **Figure 2**.

### 1.2 Document purpose and scope

The *Standards* recommend that a detailed review of the social and environmental context of a site is input into planning and design of restoration projects.

This document outlines background information relevant the management areas that was considered in the preparation of the RMP (Emerge Associates 2018). Creating Communities have provided input into the preparation of the RMP as well as to the social context section of this document (**Section 2.1**).

The scope of this assessment was guided by the *Standards* (Standards Reference Group SERA 2017), which recommend background information is assembled regarding:

- external context (social and environmental)
- security of site tenure.

# External Context Assessment Report

## Roe 8 Cleared Areas

## 2 External context

### 2.1 Social context

The clearing that occurred in the site along the proposed alignment of Roe 8 was controversial and the subject of protests, legal challenges and broad media coverage. Consequentially, the Rehabilitating Roe 8 project has a high level of community and stakeholder awareness and engagement.

#### 2.1.1 Community leadership

The Rehabilitating Roe 8 project is a collaboration between the government and community organisations.

#### 2.1.2 Rehabilitating Roe 8 Working Group

The Rehabilitating Roe 8 Working Group was formed by the Minister for Transport; Planning; Lands in April 2015. The formation of this group occurred after the Cockburn Community Wildlife Corridor met with the Minister and the Minister for Environment, Members for Fremantle, Willagee and Bicton as well as the Mayor of Cockburn, and presented a plan for the 'Kings Park of the South' with restoration requirements for the cleared areas.

The Rehabilitating Roe 8 Working Group oversaw the initial management of cleared areas including the removal of asbestos, mulch piles and some limestone tracks, weed management, installation of conservation fencing with public access gates, ongoing communications and a tender process for the preparation of a 'rehabilitation management plan'.

The Rehabilitating Roe 8 Working Group includes representatives from the following organisations:

- Member for Bicton - Lisa O'Malley (chair)
- City of Cockburn
- Cockburn Community Wildlife Corridor Group
- Cockburn Wetlands Education Centre
- Conservation Council of WA
- Department of Biodiversity Conservation and Attractions
- Main Roads WA and the Alliance
- Member for Willagee
- Minister for the Environment and Energy
- Minister for Transport; Planning; Lands
- Perth Urban Restoration Scientific Advisory Committee
- Traditional Custodians of Beeliar Regional Park.

#### 2.1.3 Rehabilitating Roe 8 Steering Committee

The Rehabilitating Roe 8 Steering Committee is tasked with overseeing the preparation of the RMP. The Rehabilitating Roe 8 Steering Committee includes representatives from the following community and stakeholder organisations:

## External Context Assessment Report

### Roe 8 Cleared Areas

- City of Cockburn
- Cockburn Community Wildlife Corridor Group
- Cockburn Wetlands Education Centre
- Conservation Council of WA
- Department of Biodiversity Conservation and Attractions
- Lisa O'Malley (Member of Parliament)
- Main Roads WA
- Perth Urban Restoration Scientific Advisory Committee.

#### 2.1.4 Whadjuk country

The site is within Whadjuk country and the RMP authors and Rehabilitating Roe 8 Steering Committee pay respect to Elders and all Nyungar people, past and present. The RMP was prepared on the basis that ecological restoration and recognition of cultural connection to country are compatible goals. Nonetheless it is recognized that until Nyungar cultural values are properly addressed there can be no true restoration.

Consultation with local Nyungar people undertaken during the preparation of the RMP indicated the heritage information available for the site (and the wider local area) is incomplete and insufficient to properly identify cultural heritage values. Some of this information is presented in documents associated with the Roe 8 construction project (South Metro Connect 2011). However, cultural information has not been specifically identified in this assessment or the RMP. To address the lack of accurate heritage information available for the site, a detailed *Cultural Heritage Management Plan* has been produced for the site (Archae-aus 2019). Findings of the *Cultural Heritage Management Plan* are shown in **Figure 3**.

#### 2.1.5 Community engagement

There is generally a very high awareness of the suspension of the construction of Roe 8, but considerably lower awareness of the upcoming Rehabilitating Roe 8 project. Communicating the distinction between the two projects is crucial. The difference between the desired outcomes of the Roe 8 Freight Link and Rehabilitating Roe 8 is clear, but emphasising the distinction between the governance structures and methods of community engagement and involvement are just as important in order to begin re-building trust.

The formation of the Rehabilitating Roe 8 Working Group, Steering Committee and the appointment of consultants to develop the Rehabilitating Roe 8 Plan marked the commencement of new phase of the project and the associated commencement of a phase of formal community engagement.

For many community members and stakeholder groups, the primary concern related to Rehabilitating Roe 8 is uncertainty that the 10 year rehabilitation project will be delivered and the long term land tenure of the project area. This uncertainty is the major barrier to building trust between the project team and stakeholder groups. The project team must therefore aim to achieve certainty around governance, tenure and zoning as soon as practical, but continue to acknowledge and communicate aspects of the project around which there is uncertainty.

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### Roe 8 Cleared Areas

#### 2.1.6 Communications

The digital and social media landscape relevant to the project is active, with a range of environmental and community groups having a high number of followers and frequent posts. These groups include the Cockburn Community Wildlife Corridor, Save Beelias Wetlands, Rethink the Link, the Cockburn Wetlands Education Centre, Hamilton Hill Community Group, Coolbellup Community Association and Bibra Lake Residents Association. A high number of posts relate to the suspension of Roe 8, regrowth, rehabilitation, related or nearby environmental concerns, community events and the nearby Murdoch Drive Connection road development.

The Steering Committee has developed a Rehabilitating Roe 8 website as the central hub and point of contact on the project. Currently the Rehabilitating Roe 8 website receives low visitation, and appears low on online search results. As websites tend to be more static than social media and are not visited frequently except by those with very high interest in the subject, the Rehabilitating Roe 8 website will need to be heavily supplemented by social media.

The City of Cockburn actively utilises a number of digital channels, including their Comment on Cockburn engagement platform. The City's "What's On" page also shares a range of both the City's internal events and event organised by local groups. **Plate 1** below shows a screen-grab from the "What's On" page. The first event is organised by Native ARC and the remaining three by Cockburn Wetlands Education Centre. The high proportion of "What's On" initiatives related to the environment, and specifically the wetlands area, reflects the high activity of key groups (in particular the Wetlands Centre) and the existing strength of communication channels between these groups and the City of Cockburn. These events are all exemplars of existing stakeholder initiatives that could be leveraged for potential partnership opportunities with the Rehabilitating Roe 8 project.

			
<p><b>Native ARC Holiday Fun</b></p> <p>26 September &amp; 2 October</p> <p>Does your family love nature and caring for wildlife? Join Native ARC this school holidays for two exciting wildlife and nature based activities!</p>	<p><b>Get Wild About Wetlands</b></p> <p>School holiday program</p> <p>Join us for some exciting environment events with a series of eco-walks, talks and night stalks held for families during these September/ October school holidays.</p>	<p><b>Painting the plants and animals of Bibra Lake</b></p> <p>21 October, 2017</p> <p>A workshop for nature lovers. Join artist and environmental educator Angela Rossen and discover the animals and plant life of the Bibra Lake wetlands through paint medium.</p>	<p><b>Build Your Own Frog Habitat Workshop</b></p> <p>11 November, 2017</p> <p>We invite you to learn about our local frogs and how you can create your own frog habitat in your garden. Experts from SERCUL will introduce you to the frogs of the south-west and show you the secrets of building...</p>

Plate 1: Screen-grab from City of Cockburn "What's On" page.

Source: <https://www.cockburn.wa.gov.au/Recreation-and-Attractions/Whats-On>

## External Context Assessment Report

### Roe 8 Cleared Areas

## 2.2 Environmental context

### 2.2.1 Climate

Climate has a strong influence on ecosystems and correspondingly understanding climatic conditions is crucial to ecological restoration.

An average of 702.7 millimetres (mm) of rainfall is recorded annually from the Murdoch weather station, which is the closest weather station, located approximately 1.17 km from the eastern boundary of the site. The majority of this rainfall is received between the months of May and September. Mean maximum temperatures at the Jandakot Aero station, which is the nearest temperature recording station approximately 4.4 km south east of the site, range from 17.9°C in July to 31.6°C in February. Mean minimum temperatures range from 6.8°C in July and August to 17.1°C in February (BoM 2017).

### 2.2.2 Landform and soils

Landform and soils influence are important influences and attributes of ecosystems. The site occurs on the Swan Coastal Plain, which is the geomorphic unit that characterises much of the Perth metropolitan region. Broadly, the Swan Coastal Plain comprises three dune systems on the western side, referred to as the Quindalup, Spearwood and Bassendean associations, and an alluvial plain on the eastern side.

The western and central portions of the site are located within the Spearwood dune system which consists of a core of limestone overlain with yellow sand (Churchward and McArthur 1980). Variation in wind erosion has produced two units within the Spearwood system: the Cottesloe unit and Karrakatta unit. The western end of the site is located within the Cottesloe association which consists of yellow brown sands and exposed limestone. The central and western portion is within the Karrakatta association which consists of deep yellow brown sands.

The eastern portion of the site is in the Bassendean association which comprises the oldest dune system on the Swan Coastal Plain and subsequently the most leached and infertile.

Within the Bassendean and Spearwood associations large swamps have been separately mapped as the Herdsman association, which contain black organic sands, peaty loams, black clays and true peats (Churchward and McArthur 1980). A small portion of the eastern end of the site, associated with lower-lying wetlands, is within the Herdsman association.

The landforms and soils in the site are shown in **Figure 3**.

### 2.2.3 Topography

The elevation of the site is highest on the western end, ranging from 42-59 m in relation to the Australian height datum (mAHD). The eastern end of the site is lower lying and ranges from 15-20 mAHD (DoW 2008) and being lowest in the portion of the site between Bibra Lake and North Lake.

The topography of the site is shown in **Figure 3**.

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#### 2.2.4 Wetlands

Wetlands include “areas of seasonally, intermittently or permanently waterlogged soils or inundated land, whether natural or otherwise, fresh and saline, e.g. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries” (Wetlands Advisory Committee 1977). Wetlands can further be recognised by the presence of vegetation associated with waterlogging or the presence of hydric soils such as peat, peaty sand or carbonate mud (Hill *et al.* 1996).

Wetlands of national or international significance may be afforded special protection under Commonwealth or international agreements. The following lists of important wetlands were checked as part of this assessment:

- *Ramsar List of Wetlands of International Importance* (DSEWPaC 2013)
- *A Directory of Important Wetlands in Australia* (Environment Australia 2001).

No Ramsar or listed ‘important’ wetlands are located within the site. The closest RAMSAR site is located 5.7 km south of the site and the closest ‘important’ wetland is located 3.8 km north-east of the site.

On the Swan Coastal Plain the geomorphic wetland classification system of Semeniuk (1987) is used to classify wetlands based on the landform shape and water permanence (hydro-period). The Department of Biodiversity, Conservation and Attractions (DBCA) maintains the *Geomorphic Wetlands of the Swan Coastal Plain* dataset, which further categorises geomorphic wetland features into specific management categories (Hill *et al.* 1996) to guide landuse and conservation as shown in **Table 1**. Each wetland feature in the dataset is given a ‘unique feature identifier’ (UFI). As this dataset was drafted at a regional scale the boundaries of mapped wetland features are often inconsistent with physical wetland boundaries.

Table 1: *Geomorphic Wetlands of the Swan Coastal Plain management categories* (Hill *et al.* 1996).

Management category	Description of wetland	Management objectives
Conservation (CCW)	Support high levels of attributes	Preserve wetland attributes and functions through reservation in national parks, crown reserves and state owned land. Protection provided under environmental protection policies.
Resource enhancement (REW)	Partly modified but still supporting substantial functions and attributes	Restore wetland through maintenance and enhancement of wetland functions and attributes. Protection via crown reserves, state or local government owned land, environmental protection policies and sustainable management on private properties.
Multiple use (MUW)	Few wetland attributes but still provide important hydrological functions	Use, development and management considered in the context of water, town and environmental planning through land care.

A review of DBCA’s *Geomorphic Wetlands of the Swan Coastal Plain* dataset indicated that four conservation category wetland features (UFIs 6600, 14645 and 14425) and one multiple use category wetland feature (UFI 6601 (Bibra Lake)) occur within the eastern portion of the site. No wetlands occur within the central and western portions of the site. UFIs 6601 and 6600 are classified as lakes and UFIs 14645 and 14425 are classified as sumplands. The wetlands in the site are part of a chain of

## External Context Assessment Report

### Roe 8 Cleared Areas

wetlands that occur to the north and south of the western portion of the site, as detailed in the (South Metro Connect 2011).

The wetlands within and adjacent to the site are shown in **Figure 4**.

#### 2.2.5 Bush Forever

The Government of Western Australia's *Bush Forever* policy is a strategic plan for conserving regionally significant bushland within the Swan Coastal Plain portion of the Perth Metropolitan Region. The objective of *Bush Forever* is to protect comprehensive representations of all original ecological communities by targeting a minimum of 10% of each vegetation complex for protection (Government of WA 2000). *Bush Forever* sites are representative of regional ecosystems and habitat and have a key role in the conservation of Perth's biodiversity.

Bush Forever Site 244 (North Lake and Bibra Lake) occurs in the eastern portion of the site. This *Bush Forever* site extends beyond the site, comprising 128.2 ha of vegetation and as well as areas of open water. Other *Bush Forever* sites occur outside of the site to the south and north-west.

The location of Bush Forever Site 244 is shown in **Figure 5**.

#### 2.2.6 Environmentally sensitive areas (ESAs)

'Environmentally sensitive areas' (ESAs) are prescribed under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and have been identified to protect native vegetation values of areas surrounding significant, threatened or scheduled flora, vegetation communities or ecosystems. Within an ESA none of the exemptions under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* apply. However, exemptions under Schedule 6 of the EP Act still apply, including any clearing in accordance with a subdivision approval under the *Planning and Development Act 2005* (a recognised exemption under the Schedule 6 of the EP Act).

ESA No. 3686 occurs in the eastern portion of the site and extends beyond to the north and south. ESA 3686 is associated with multiple wetlands and *Bush Forever* sites.

The ESA associated with the site is shown in **Figure 5**.

#### 2.2.7 Ecological linkages

Ecological linkages are linear landscape elements that allow the movement of fauna, flora and genetic material between areas of remnant habitat. The movement of fauna and the exchange of genetic material between vegetation remnants improve the viability of those remnants by allowing greater access to breeding partners and food sources, refuge from disturbances such as fire and maintenance of genetic diversity of plant communities and populations. Ecological linkages are ideally continuous or near-continuous as the more fractured a linkage is, the less ease flora and fauna have in moving within the corridor (Alan Tingay and Associates 1998).

The Perth Biodiversity Project, supported by the Western Australia Local Government Association (WALGA), have identified and mapped regional ecological linkages within the Perth Metropolitan Region (WALGA and PBP 2004).

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Three mapped ecological linkages occur within the site. Linkage No. 51 commences near the coast and passes through the western and central portions of the site and then diverges in a south-easterly direction. This linkage joins up with Linkage No. 50 which is situated in a north-south direction and passes through the eastern portion of the site. Linkage No. 48 connects with Linkage No. 50 in the eastern portion of the site and travels in a south-easterly direction.

The ecological linkages associated with the site are shown in **Figure 5**.

### 2.2.8 Regional vegetation

Native vegetation in Western Australia is described and mapped at different scales in order to illustrate patterns in its distribution. Regional vegetation association mapping by Beard *et al.* (2013) shows that the site supports four vegetation associations. Finer scale vegetation complex mapping by Heddle *et al.* (1980) also indicates that the site occurs within four vegetation complexes. As described in **Section 2.2.2**, the western and central portions of the site are within the Spearwood dune system (Cottesloe and Karrakatta units) and are mapped as supporting medium eucalypt woodland. The low lying central portion of the site, associated with Bibra Lake and surrounds, has been mapped as supporting lakes and associated wetland vegetation. The Bassendean sands in the eastern portion of the site are mapped as supporting medium woodland with eucalypts and banksias.

These associations and complexes are described in **Table 2** and the vegetation complexes mapped in the site (Heddle *et al.* 1980) are shown in **Figure 6**.

Table 2: Regional vegetation mapping within the site

Portion of site	Vegetation association (Beard <i>et al.</i> 2013)	Vegetation complex (Heddle <i>et al.</i> 1980)
Western	'Spearwood 998': medium woodland with <i>Eucalyptus gomphocephala</i> (tuart)	'Cottesloe complex – central and south': mosaic of woodland of tuart and open forest of tuart - jarrah - <i>Corymbia calophylla</i> (marri); closed heath on the limestone outcrops.
Central	Spearwood 6': medium woodland with tuart and <i>Eucalyptus marginata</i> (jarrah)	'Karrakatta complex – central and south': Open forest of tuart - jarrah - marri
Central-eastern (wetlands and Bibra Lake)	'Bassendean 126': bare areas and freshwater lakes'	'Herdsman complex': Sedgelands and fringing woodland of <i>Eucalyptus rudis</i> (flooded gum) - <i>Melaleuca</i> spp.
Eastern	'Bassendean 1001': medium to very sparse woodland with jarrah and low woodland with <i>Banksia</i> spp. and <i>Allocasuarina</i> spp.	'Bassendean complex – central and south': Vegetation ranges from woodland of jarrah - <i>Allocasuarina fraseriana</i> - <i>Banksia</i> spp. to low woodland of <i>Melaleuca</i> spp. and sedgelands on the moister sites

### 2.2.9 Site vegetation

A total of 38 vegetation communities were previously recorded in the site (AECOM 2011), predominantly comprising woodlands, shrublands and herb/sedgelands. The condition of vegetation in the site was assessed as ranging from 'very good' to 'completely degraded' using a combination of

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the descriptive Keighery (1994) vegetation condition scale and the Braun-Blanquet scale of cover abundance (Ellenberg and Mueller-Dombois 1974) for non-native species.

AECOM (2011) undertook comparison of vegetation data with the regional 'floristic community type' (FCT) dataset (Gibson *et al.* 1994) and indicated the presence of five FCTs in the site:

- Central *Banksia attenuata* – *Banksia menziesii* woodlands (FCT 23a)
- Central *Banksia attenuata* – *Eucalyptus marginata* woodlands (FCT 21a)
- Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus* woodlands (FCT 28)
- Wet forests and woodlands (FCT 11)
- *Melaleuca preissiana* damplands (FCT 4).

These FCTs are all listed as 'well reserved' and at 'low risk' of extinction by Gibson *et al.* (1994).

Detailed information regarding vegetation previously recorded in the site is provided in the AECOM (2011) report.

#### 2.2.10 Threatened and priority flora

Certain flora species that are considered to be rare or under threat warrant special protection under Commonwealth and/or State legislation. At a Commonwealth level, flora species may be listed as 'threatened' pursuant to Schedule 1 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Any action likely to have a significant impact on a species listed under the EPBC Act requires approval from the Commonwealth Minister for the Environment and Energy.

In Western Australia flora species may also be classed as 'threatened' species under the *Wildlife Conservation Act 1950* (WC Act). Threatened flora species are gazetted under subsection 2 of section 23F of the WC Act and it is an offence to "take" or damage rare ('threatened') flora without Ministerial approval.

Threatened flora species listed under the EPBC Act and/or WC Act are assigned a conservation status ranking of 'critically endangered', 'endangered' or 'vulnerable', according to their national extent.

Flora species that may be threatened or near threatened but lack sufficient information to be listed under the WC Act may be added to the DBCA's *Priority Flora List*. These species are ranked from 'Priority 1 (P1)', being species in urgent need of survey to provide information, down to 'Priority 4 (P4)', being species that are not in urgent need of information.

A previous search of DBCA's threatened and priority flora database recorded five threatened ('declared rare') and 14 priority flora species in the vicinity of the study area AECOM (2011). A search of the *Protected Matters Search Tool* (DoEE 2017) in November 2017 indicates that 12 flora species listed as threatened under the EPBC Act have potential to occur in the site.

No threatened flora species were recorded in the site during the previous flora and vegetation assessment (AECOM 2011). Six priority flora species were previously recorded in the site (AECOM 2011):

- *Tetraria* sp. Chandala (G.J.Keighery 17055) (P2)
- *Cyathochaeta teretifolia* (P3)

## External Context Assessment Report

### Roe 8 Cleared Areas

- *Dampiera triloba* (P3)
- *Eryngium pinnatifidum* subsp. *Palustre* (G.J. Keighery 13459) (P3)
- *Jacksonia gracillima* (P3)
- *Dodonaea hackettiana* (P4).

One occurrence of *Eucalyptus caesia* (P4) was also previously recorded within the site. However, this taxon was planted in a road reserve in the site and does not naturally occur in the vicinity of the site (AECOM 2011).

#### 2.2.11 Threatened and priority ecological communities

An ecological community is a naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat. An ecological community's structure, composition and distribution are determined by environmental factors such as soil type, position in the landscape, altitude, climate and water availability (DoEE 2017b). 'Threatened ecological communities' (TECs) are ecological communities that are recognised as rare or under threat and therefore warrant special protection.

Selected TECs are afforded statutory protection at a Commonwealth level under section 181 of the EPBC Act. Any action likely to have a significant impact on a community listed under the EPBC Act requires approval from the Commonwealth Minister for the Environment and Energy. TECs are also listed within Western Australia but are currently are not afforded direct statutory protection at a State level. Nonetheless their significance is acknowledged through other State environmental approval processes such as 'environmental impact assessment' pursuant to Part IV of the *Environmental Protection Act 1986* (EP Act) and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. A plant community that is under consideration for listing as a TEC in Western Australia, but does not yet meet survey criteria or has not been adequately defined, may be listed as a 'priority ecological community' (PEC). Listing as a PEC is similarly considered during State approval processes.

AECOM (2011) previously conducted a search of DBCA's threatened and priority ecological communities' database which recorded occurrences of two priority ecological communities (PECs) in the vicinity of the site. One PEC (Priority 3), 'low lying *Banksia attenuata* woodland or shrubland' (SCP21c), was identified as occurring within a portion of the study area. The other PEC (Priority 2), '*Banksia illicifolia* woodlands' (SCP 22), was identified as occurring approximately 1.7 km south east of the site.

A search of the *Protected Matters Search Tool* (DoEE 2017) in November 2017 indicates that two threatened ecological communities (TECs) are likely to occur within 10 km of the site:

- 'banksia woodlands of the Swan Coastal Plain' (listed as endangered under the EPBC Act)
- 'subtropical and temperate coastal saltmarsh' (listed as vulnerable under the EPBC Act).

The 'banksia woodlands of the Swan Coastal Plain' TEC was not listed at the time of the previous survey (AECOM 2011) and applies to a range of FCTs including FCT 21c (which corresponds to PEC SCP21c present in the AECOM (2011) study area).

## External Context Assessment Report

### Roe 8 Cleared Areas

A large portion of the site contains banksia woodland vegetation previously mapped as being in 'good' or better condition. Therefore, the 'banksia woodlands of the Swan Coastal Plain' TEC is likely to be present within a large portion of the site, subject to meeting specific thresholds.

The site is unlikely to contain the TEC 'subtropical and temperate coastal saltmarsh' as this community requires tidal influence.

#### 2.2.12 Plant disease

*Phytophthora cinnamomi* (commonly known as dieback) is a soil borne fungal pathogen which spreads through surface and sub-surface water flows and soil movement, and is a serious threat to much of the flora of the south west Western Australia.

A dieback survey of the site in 2011 (Glevan Consulting 2010) recorded the following:

- 15.9% of the site was deemed to be 'uninfested' by dieback, indicating there was no evidence of dieback disease.
- 54% of the site was categorised as 'uninterpretable' due to the location on the Spearwood dune system and/or the presence of wetlands. The soil pH of the Spearwood dune system is unfavourable to dieback, meaning dieback may be present but has no capacity to negatively impact the vegetation. Wetlands are naturally devoid of reliable dieback indicator species.
- 30.1% of the site was categorised as unmappable [sic] due to significant levels of disturbance (and subsequent lack of dieback indicator species).

More recently, DBCA have indicated that dieback has been recorded in at least one location within the site (personal communication, Mark Brundrett DBCA). The current status of dieback throughout the site is unconfirmed but dieback is likely to be within at least a portion of the site.

#### 2.2.13 Weeds

The term 'weed' can refer to any plant that requires some form of action to reduce its effect on the economy, the environment, human health and amenity. Many non-native flora species and some native species are considered to be weeds. A particularly invasive or detrimental weed species may be listed as a 'declared pest' pursuant to the Western Australia's Biosecurity and Agriculture Management Act 2007 (BAM Act), indicating that it warrants special management to limit its spread.

The previous survey recorded a total of 129 non-native (weed) flora species in the site (AECOM 2011). Of these, three are listed as a declared pest pursuant to the BAM Act: *\*Asparagus asparagoides* (bridal creeper), *\*Moraea flaccida* (one-leaf cape tulip) and *\*Zantedeschia aethiopica* (arum lily).

#### 2.2.14 Historic land use

The site and surrounding area was historically used for stock grazing, market gardens and cropping (South Metro Connect 2011), during which vegetation was cleared to various intensities. Rubbish, including fragments of asbestos, were previously recorded in the site (South Metro Connect 2011). Presently, the site is surrounded by residential housing and reserved vegetated land.

## External Context Assessment Report

### Roe 8 Cleared Areas

### 2.3 Planning context

The site is zoned 'primary regional roads' under the *Metropolitan Region Scheme (MRS)* and 'primary regional roads' under the *City of Cockburn Town Planning Scheme (TPS) 3*. This zoning was applied for the now suspended construction of the Roe 8.

It is understood that preparations are currently being made to re-zone the site under the MRS (ABC News report 4 December 2017).

### 2.4 Summary of threats

Key threats to restoration outcomes that may require management are identified in **Table 3**.

Table 3: Summary of key threats to restoration outcomes.

Threat	Description
Plant pathogens (dieback)	<p>The soil borne water mould <i>Phytophthora cinnamomi</i> (dieback) occurs in the surrounding area and is known to have been recorded within the site (pers. comms. Mark Brundrett DBCA). Dieback kills susceptible plants by attacking their root system which inhibits uptake of water and nutrients (DPaW 2015). A large range of native species are susceptible to dieback which is spread through movement of soil and mud, especially by vehicles and footwear.</p> <p>There is no practical large-scale cure for dieback and therefore containment is the primary option available for management.</p> <p>Dieback is not expected to be a critical issue for restoration within the site, nor is exclusion of dieback from the site realistic given its' historically disturbed, urban context. Nonetheless monitoring for dieback symptoms and appropriate soil hygiene practices are recommended to limit the potential that dieback or other pathogens are introduced as part of restoration activities.</p>
Unmanaged access	<p>The movement of people, domesticated animals and/or vehicles over the restoration areas may result in erosion, damage to plants, and introduction of weeds and/or pathogens and directly limit restoration outcomes. Therefore management of access to the restoration areas is required over the duration of restoration works and will moreover be important to long term sustainability of the site. However, as the site is accessible to the public, complete elimination of access threats is impossible and management should aim to minimise related threats.</p>
Erosion	<p>Within the exception of wetland areas, surface water is likely to drain freely across the site due to the permeable nature of in situ sands present. Therefore erosion from surface water runoff would occur infrequently, if at all, and only in response to intense events.</p> <p>Wind erosion has the potential to impact on restoration due to the ground disturbance and removal of vegetation cover within the development footprint. The restoration area may therefore be prone to wind erosion and so may require management until stabilising vegetation can be restored.</p>
Non-native flora species (weeds)	<p>Invasive non-native plants, or weeds, may degrade native vegetation through competition for space and resources. Relatively high or increasing weed cover will limit restoration outcomes.</p> <p>Some weed species are already well established within the site including grassy weeds, bulbous weeds and woody weeds.</p> <p>The cover and/or diversity of weeds may also be increased during restoration through the effects of ground disturbance and by the introduction of new weeds on clothing, vehicles or equipment.</p> <p>Management is therefore required to limit the introduction of weeds and to control weeds within restoration areas.</p>

## External Context Assessment Report

### Roe 8 Cleared Areas

Table 3: Summary of key threats to restoration outcomes.(continued)

Threat	Description
Non-native fauna (pest) species	<p>Herbivory can directly limit the outcomes of restoration by destroying small plants and damaging mature plants.</p> <p>Herbivores such as non-native (pest) species rabbits could pose a risk to restoration areas. To a lesser degree native herbivores such as kangaroos (unlikely) and birds may predate vegetation impacting restoration outcomes.</p> <p>Management may be required to manage rabbits particularly in initial periods when plants within the revegetated areas are small.</p> <p>Carnivores like foxes and cats are predators of native fauna such as turtles, quenda and birds. Management of these predators may be considered to limit the impact of these pests.</p>
Climate change	<p>The increasingly dry climate predicted with advancing global warming can increase drought stress in immature plants and can lead to high seedling mortality.</p>
Frequent unplanned fires	<p>Too frequent fires can destroy and exhaust the seed bank as well as kill or damage mature and juvenile plants.</p> <p>Fire management is required to ensure that the site is monitored for unplanned fires and actions taken to reduce their occurrence.</p>

## External Context Assessment Report

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## 3 Security of site tenure

The *Standards* recommends that a long term restoration commitment that allows for appropriate ongoing access and management is established for restoration projects (Standards Reference Group SERA 2017).

Main Roads is the current management authority for the site. Negotiations are currently underway to transfer management authority to the City of Cockburn. These negotiations include an agreement for the management of the broader road reserve and the site, in the context of restoration under the RMP (Emerge Associates 2018).

The option to re-zone the land associated with the site, removing its status as a road reserve under the MRS, is currently being reviewed by the State Government.

Until the site is rezoned security of tenure cannot be warranted. Nonetheless it is expected that the agreement with the City of Cockburn will at least ensure that the site is transferred into a management framework where restoration and management can be sustained.

## External Context Assessment Report

### Roe 8 Cleared Areas

## 4 References

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### 4.2 Online references

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Bureau of Meteorology (BOM) 2017, *Climate Averages*, viewed 22nd November 2017, <<http://www.bom.gov.au/climate/data/>>.



# Figures



*Figure 1: Site Location*

*Figure 2: Site Management Areas*

*Figure 3: Indigenous Cultural Values*

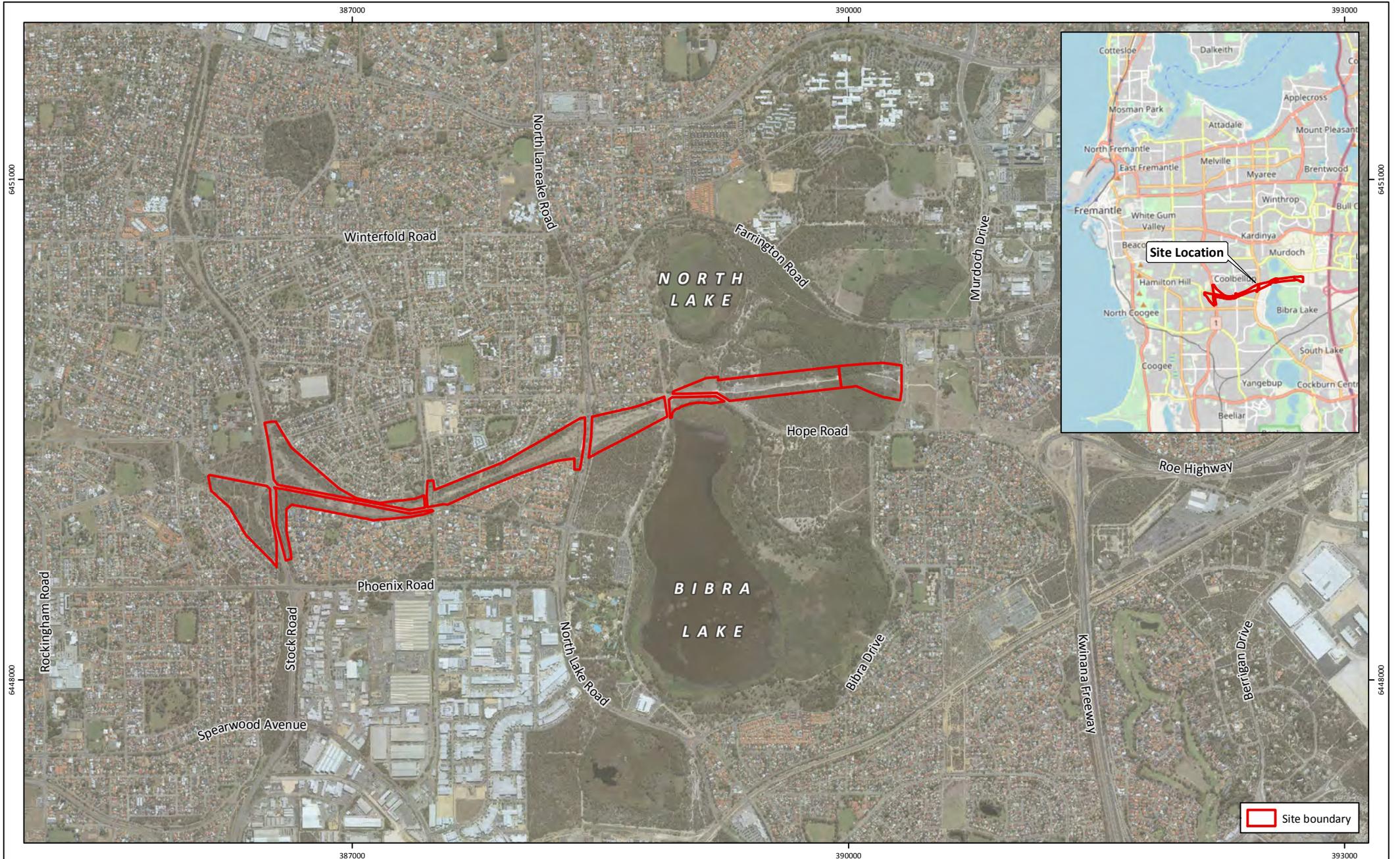
*Figure 4: Landforms, soils and topography*

*Figure 5: Wetlands*

*Figure 6: Bush Forever, ESAs and Ecological Linkages*

*Figure 7: Regional Vegetation*





**Figure 1: Site Location**

**Project:** External Context Assessment Report  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

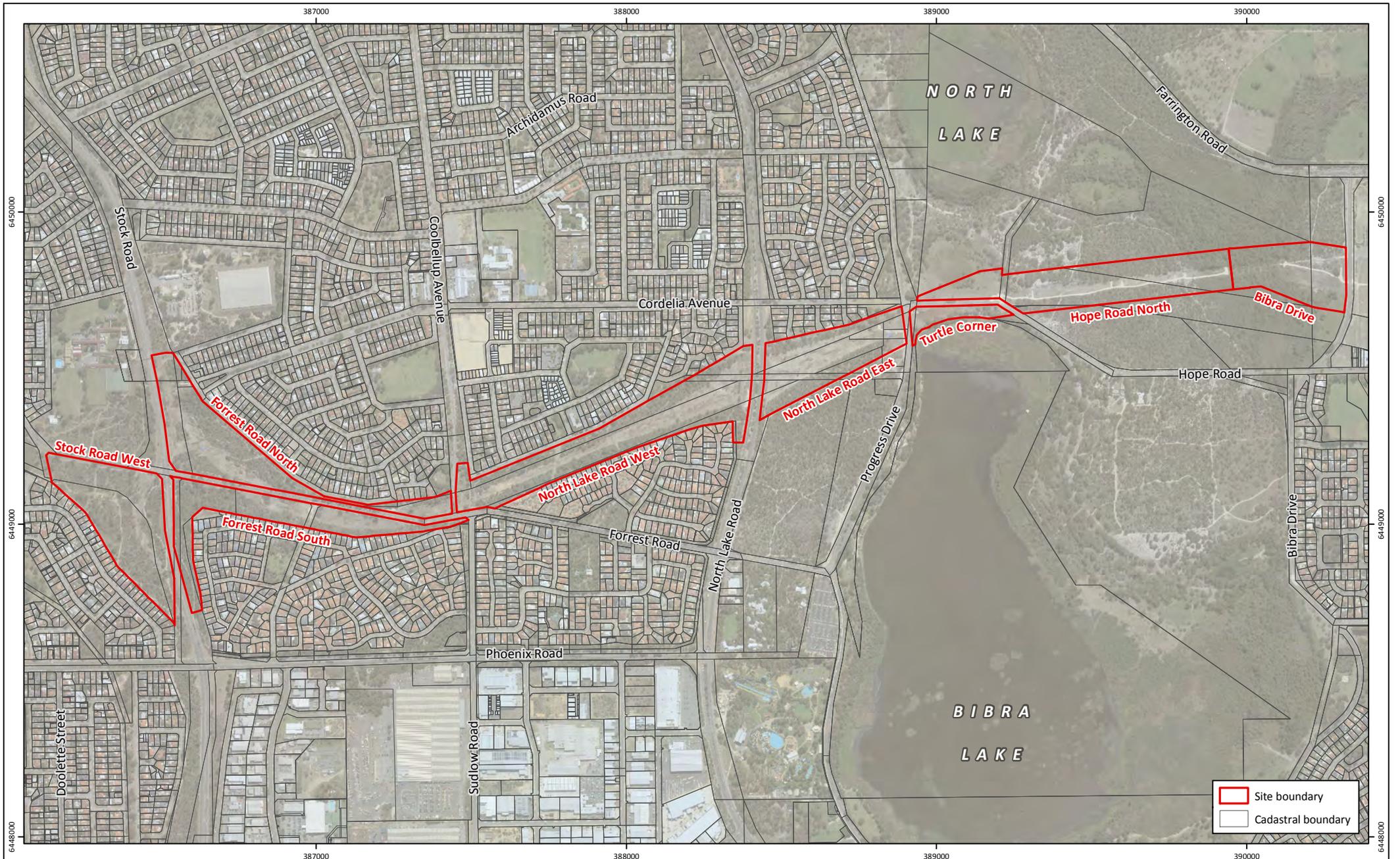
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EP17-085(07)--F32a  
**Drawn:** KNM  
**Date:** 31/01/2018  
**Checked:** RAO  
**Approved:** TAA  
**Date:** 31/01/2018



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GDA 1994 MGA Zone 50



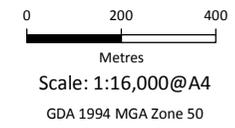




**Figure 2: Management Areas**

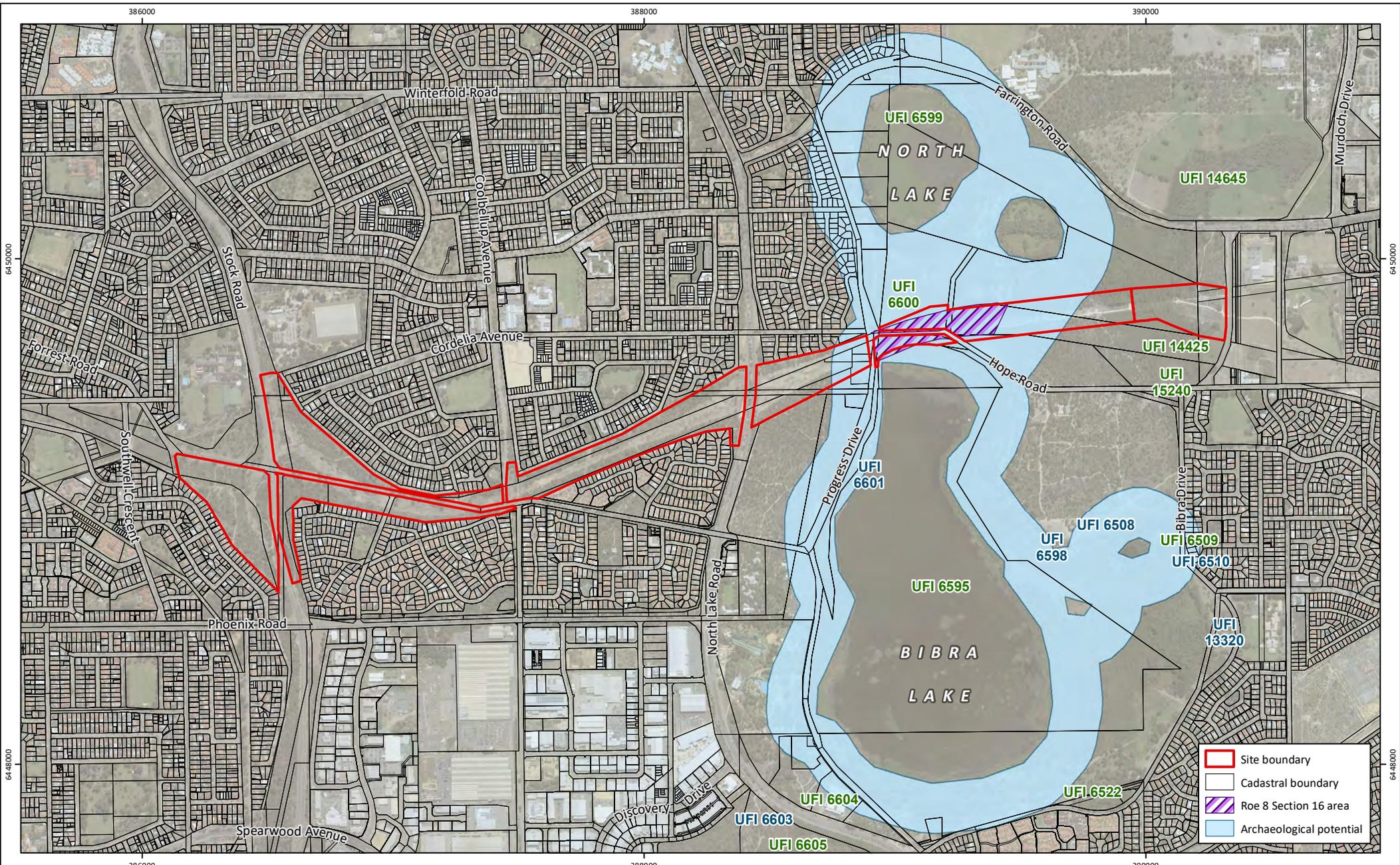
**Project:** External Context Assessment Report  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
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**Drawn:** KNM  
**Date:** 31/01/2018  
**Checked:** RAO  
**Approved:** TAA  
**Date:** 31/01/2018



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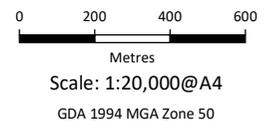




**Figure 3: Indigenous Cultural Values**

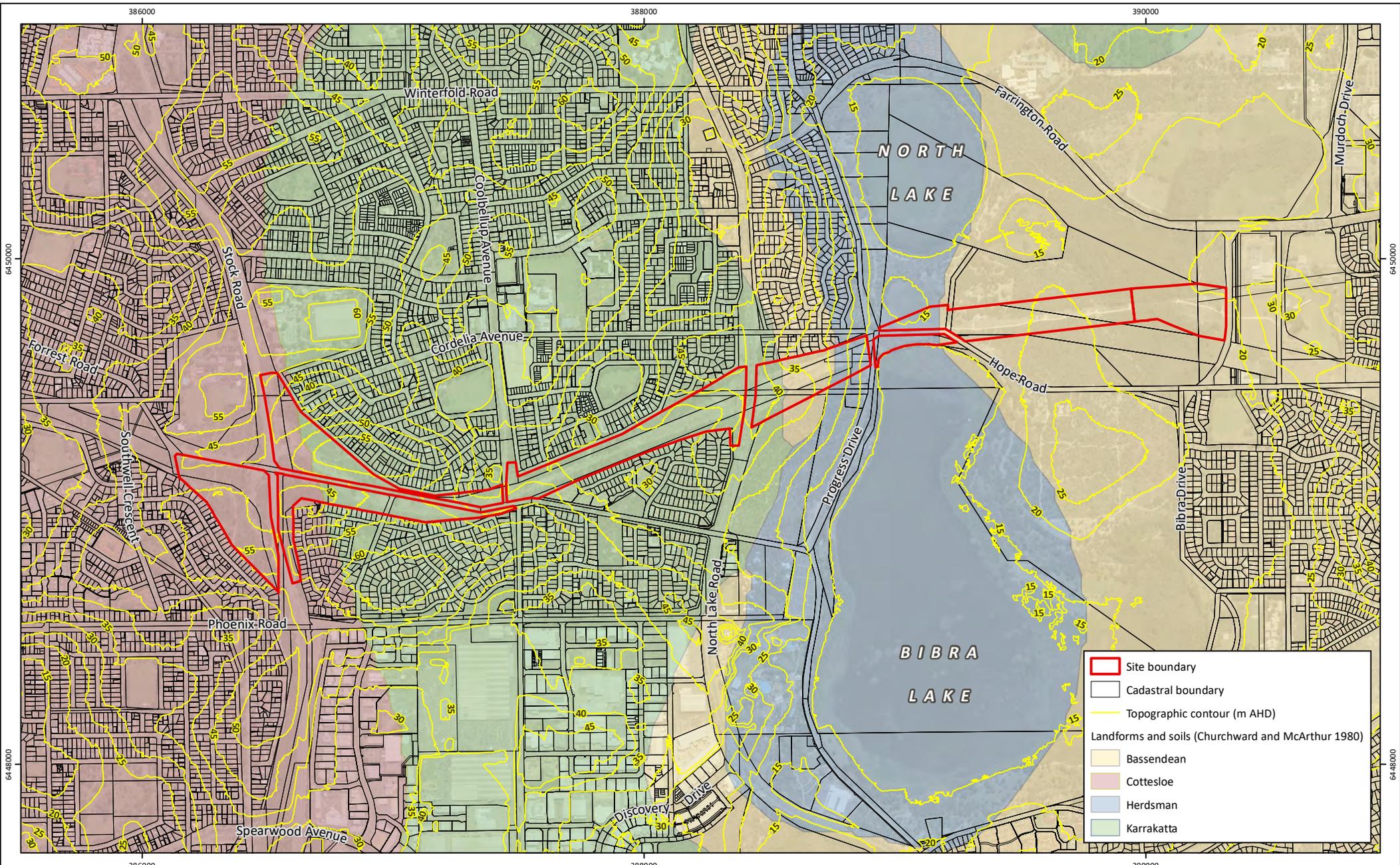
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Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
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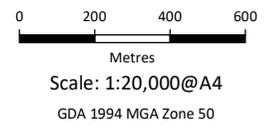




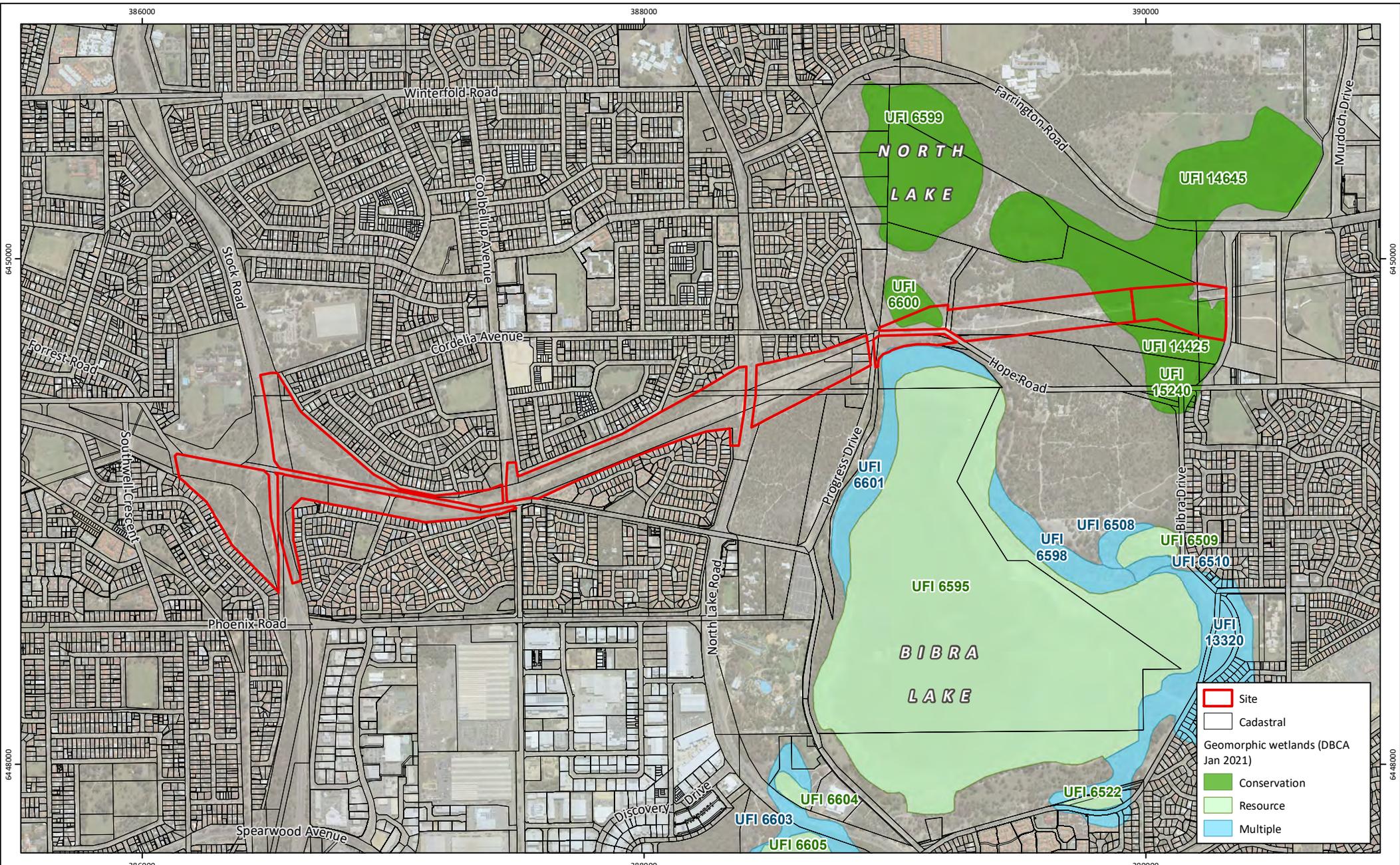
**Figure 4: Landforms, Soils and Topography**

**Project:** External Context Assessment Report  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F34b  
**Drawn:** GAR  
**Date:** 06/08/2021  
**Checked:** RAW  
**Approved:** RAW  
**Date:** 06/08/2021







**Figure 4: Wetlands**

**Project:** External Context Assessment Report  
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**Plan Number:**  
EP17-085(07)-F35b  
**Drawn:** GAR  
**Date:** 06/08/2021  
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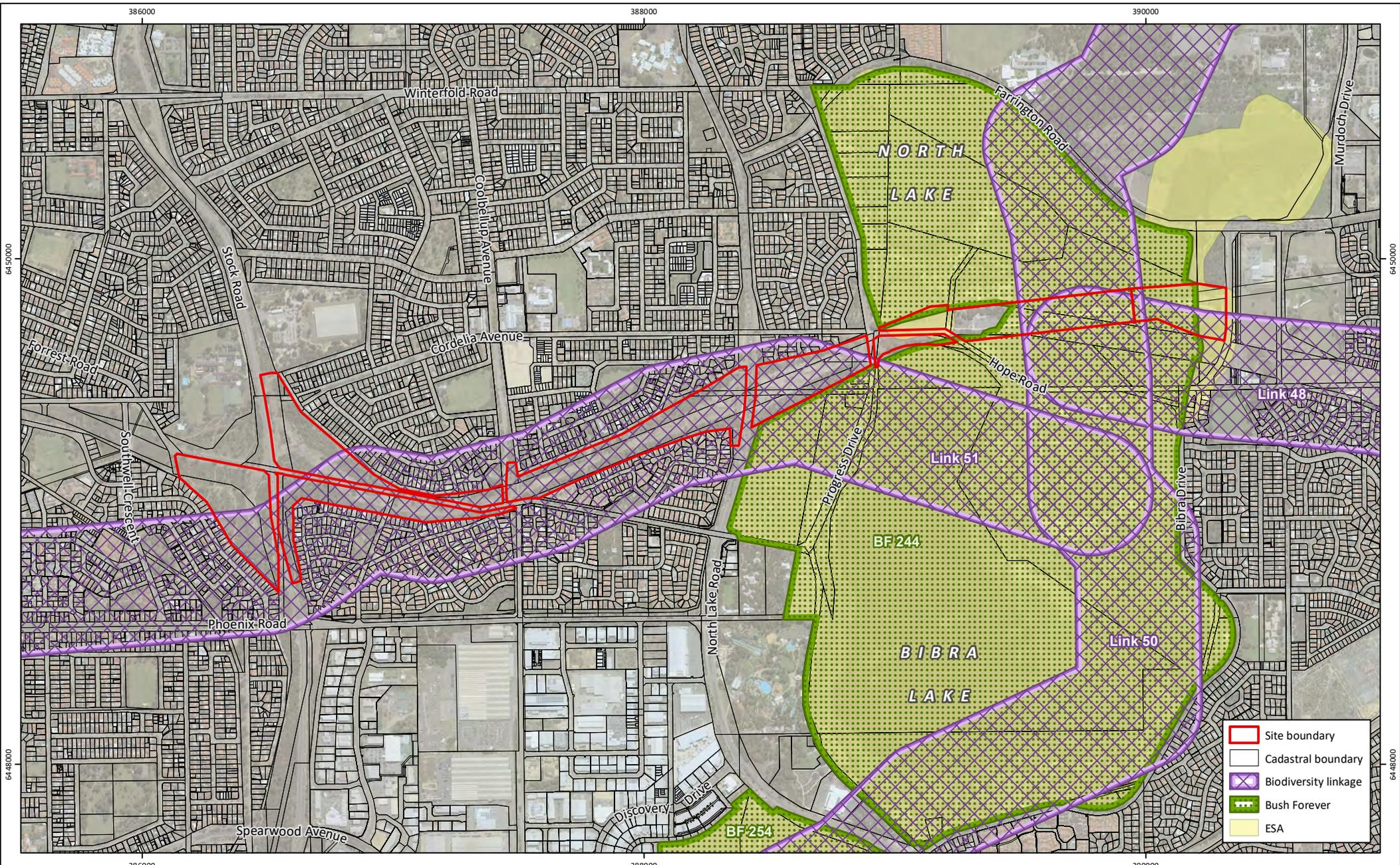


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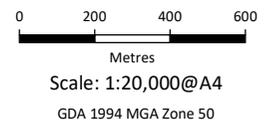




**Figure 6: Bush Forever Sites, Environmentally Sensitive Areas (ESAs) and Ecological Linkages**

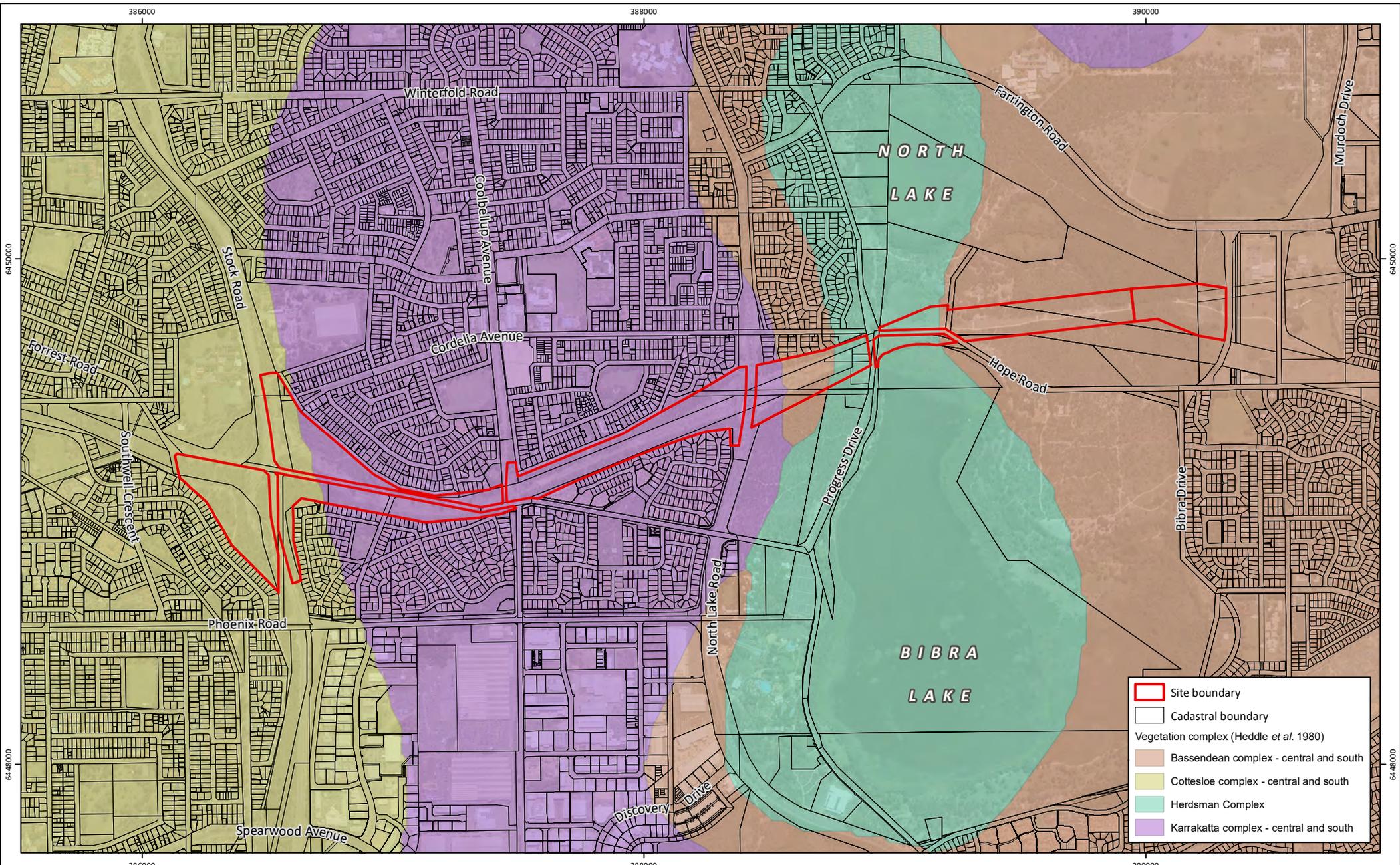
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<b>Client:</b>	Rehabilitating Roe 8 Steering Committee

<b>Plan Number:</b>	EP17-085(07)-F36b
<b>Drawn:</b>	GAR
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<b>Date:</b>	06/08/2021



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**Site boundary**

**Cadastral boundary**

**Vegetation complex (Hedde *et al.* 1980)**

- Bassendean complex - central and south
- Cottesloe complex - central and south
- Herdsman Complex
- Karrakatta complex - central and south

**Figure 7: Regional Vegetation**

**Project:** External Context Assessment Report  
Roe 8 Cleared Areas

**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F37b

**Drawn:** GAR

**Date:** 06/08/2021

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# Appendix C

Reference Ecosystem Identification and Baseline Inventory Report





# Target Ecosystem Identification and Baseline Inventory Report

Roe 8 Cleared Areas

Project No: EP17-085(07)

**Prepared for Rehabilitating Roe 8 Steering Committee  
August 2021**

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



## Document Control

<b>Doc name:</b>	Target Ecosystem Identification and Baseline Inventory Report Roe 8 Cleared Areas				
<b>Doc no.:</b>	EP17-085(07)--005C RAW				
Version	Date	Author		Reviewer	
1	December 2017	Rachel Omodei	RAO	Tom Atkinson	TAA
	Draft to client for review				
A	January 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Updates to address following comments from Rehabilitating Roe 8 Steering Committee				
B	February 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Final issued to the Rehabilitating Roe 8 Working Group				
C	August 2021	Rachel Weber	RAW	Tom Atkinson	TAA
	Annual review updates				

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# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



## Executive Summary

This document outlines target ecosystem identification and ecosystem baseline information relevant to the restoration areas identified in the *Rehabilitation Management Plan* (RMP)(Emerge Associates 2018).

Seven target ecosystems were identified within the site:

- Wet forest and woodland
- Banksia/coastal blackbutt woodland
- Banksia woodland
- Banksia/jarraah woodland
- Holly-leaved banksia woodland
- Banksia/woody pear woodland
- Banksia/tuart woodland.

Site assessments identified the following information:

- Records of recent relevant management actions.
- Mapping of key site features such as the extent of cleared areas, historical mulch piles and existing and proposed paths.
- Mapping of regeneration response within cleared areas according to two categories (resprouter and germinant).
- Mapping of weed cover across the site according to four categories (grassy, bulbous, woody and other).
- Data obtained from establishment of permanently marked plots within the cleared (impact) and remnant (reference) areas.

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



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# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



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# Target Ecosystem Identification and Baseline Inventory Report

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## Abbreviation Tables

*Table A1: Abbreviations – General terms*

General terms	
DBH	Diameter at breast height
FCT	Floristic community type
GPS	Global positioning system
P3	Priority 3
P4	Priority 4
RMP	Rehabilitation management plan
SRE	Short range endemic
T	Threatened
TEC	Threatened ecological community

*Table A2: Abbreviations – units of measurement*

Units of measurement	
ha	Hectare
m	Metre
mm	Millimetre

*Table A3: Abbreviations – Organisations*

Organisations	
DBCA	Department of Biodiversity, Conservation and Attractions

*Table A4: Abbreviations – Legislation*

Legislation	
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
WC Act	<i>Wildlife Conservation Act 1950</i>

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



Table A5: Abbreviations – restoration ecology terms from Standards Reference Group SERA (2017).

General terms	
Attributes (of an ecosystem)	The biotic and abiotic properties and functions of an ecosystem (In this document referred to as including absence of threats, physical conditions, species composition, community structure, ecosystem function and external exchanges).
Community structure	The physical organisation of biotic and abiotic elements in a community. This refers to the degree of layering and spatial patchiness in an ecosystem; whether of substrates (e.g. rocks, coral or shell reefs, woody debris) or organisms (e.g. trees, shrubs, ground layer vegetation). This enables the development of complexity of habitats and functions.
Ecological restoration	The process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. (Note: Single species restoration can be considered complementary and an important component of ecological restoration.)
Ecosystem	Small or large scale assemblage of biotic and abiotic components in oceans, rivers and on land in which the components interact to form complex food webs, nutrient cycles and energy flows. The term 'ecosystem'; is used in the Standards to describe an ecological community of any size or scale.
Reference ecosystem	A real or notional community of organisms able to act as a model or benchmark for restoration. A reference ecosystem usually represents a non- degraded version of the ecosystem complete with its flora, fauna (and other biota), functions, processes and successional states that would have existed on the restoration site had degradation, damage or destruction not occurred—but should be adjusted to accommodate changed or predicted environmental conditions.

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



## 1 Introduction

### 1.1 Project background

The 'Roe 8' portion of the Roe Highway extension, in the localities of Bibra Lake, North Lake and Coolbellup, Western Australia, was a controversial and high profile road project for Western Australia. Approximately 18 hectares (ha) of vegetation was cleared for Roe 8 between December 2016 and February 2017. The construction of Roe 8 was suspended on 11 March 2017 following a State government election which resulted in the election of a Labor state government that had committed to stopping the controversial project. This clearing was a source of significant concern for members of the community opposed to Roe 8's construction and was accompanied with multiple protests, legal challenges and broad media coverage.

The 'Rehabilitating Roe 8' project arose out of the community capacity stimulated during opposition to the construction of Roe 8 and the newly elected State Labor government's commitment to rehabilitation of the cleared areas. Essentially, Rehabilitating Roe 8 aims to restore local native vegetation and fauna habitat to the cleared areas along Roe 8. However, Rehabilitating Roe 8 is not a typical restoration project. Due to the publicity and controversy surrounding the construction of Roe 8, the restoration of the cleared areas is a uniquely high profile endeavour for Perth and Western Australia, with a correspondingly high level of community and stakeholder engagement.

As part of the Rehabilitating Roe 8 Project, Emerge Associates and Creating Communities prepared the Rehabilitation Management Plan Roe 8 Cleared Areas (RMP) (Emerge Associates 2018). The RMP defines management areas and outlines communication, involvement, engagement, restoration and monitoring actions over a ten year period based on feedback obtained during community and stakeholder consultation and guidance from the *National Standards for the Practice of Ecological Restoration in Australia* (hereafter referred to as 'the Standards') (Standards Reference Group SERA 2017).

#### 1.1.1 Site boundary

A site boundary for the RMP is shown in **Figure 1**. This site boundary has been defined to encompass cadastral parcels, or portions of cadastral parcels, within which clearing occurred as part of construction of Roe 8 or whose inclusion was considered beneficial to the restoration of cleared areas as part of an east/west corridor<sup>1</sup>. Note that this boundary is nominal and may be revised in the future (for example to accurately reflect the boundary associated with the management agreement between Main Roads WA and a future management authority).

The site spans approximately 2 kilometres (km) in length and totals approximately 69 hectares (ha) in area. Within the site boundary are 'cleared areas' which were directly cleared during construction for the proposed Roe 8 alignment, and 'uncleared areas' which comprise a mixture of native and non-native vegetation but were not directly impacted by the Roe 8 works.

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<sup>1</sup> Establishment of an east/west corridor is a community aspiration identified through consultation.

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### 1.1.2 Management areas

To assist in communication eight (8) management areas are identified within the RMP representing portions of the site separated by roads or practical management boundaries (Emerge Associates 2018). East to west across the site these management areas are labelled:

- Bibra Drive
- Hope Road North
- Turtle Corner
- North Lake Road East
- North Lake Road West
- Forrest Road South
- Forrest Road North
- Stock Road West.

The locations of these management areas are shown **Figure 2**.

### 1.2 Document purpose and scope

The *Standards* state that “ecological restoration practice should be based on an appropriate local indigenous reference ecosystem” (Standards Reference Group SERA 2017).

This document details the identification of reference ecosystems for restoration areas within the site and subsequent target ecosystem definitions. The target ecosystems are used to guide targets, goals and objectives outlined in the RMP (Emerge Associates 2018).

Specifically this document details:

- vegetation assessment methods
- the site’s current ecosystem and its features and condition
- the identification and description of local native reference ecosystem(s)
- the identification of target ecosystems for restoration works.

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## 2 Methods

### 2.1 Review of pre-existing information

#### 2.1.1 Flora and vegetation surveys

A flora and vegetation survey of a larger area including the current site was undertaken in 2011, prior to vegetation clearing (AECOM 2011). The purpose of this survey was to determine potential environmental impacts of the then proposed clearing footprint associated with the construction of the proposed Roe 8 extension. Although the study area for the AECOM (2011) survey was larger than the current site it did not include 0.42 hectares (ha) of land within the current site. This additional area is spread across multiple narrow pieces of land near the site boundary and is not considered to be an important limitation to the use of AECOM (2011) results as part of reference ecosystem identification.

AECOM (2011) recorded 20 vegetation communities within the current site. The majority of these communities are woodlands and the others comprise non-native herbland/sedgeland and vegetation dominated by planted shrubs and/or trees.

To assess vegetation condition a combination of the descriptive Keighery (1994) vegetation condition scale and the Braun-Blanquet scale of cover abundance (Ellenberg and Mueller-Dombois 1974) for non-native species. The condition of vegetation in the AECOM (2011) survey area ranged from 'completely degraded' to 'very good'. Over half of the site was determined to be in 'degraded' to 'completely degraded' condition.

AECOM (2011) completed a comparison of site vegetation data with the regional 'floristic community type' (FCT) dataset (Gibson *et al.* 1994) and indicated the presence of five FCTs in the site:

- Central *Banksia attenuata* – *Banksia menziesii* woodlands (FCT 23a)
- Central *Banksia attenuata* – *Eucalyptus marginata* woodlands (FCT 21a)
- Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus* woodlands (FCT 28)
- Wet forests and woodlands (FCT 11)
- *Melaleuca preissiana* damplands (FCT 4).

These FCTs are all listed as 'well reserved' and at 'low risk' of extinction by Gibson *et al.* (1994).

Since the completion of the AECOM (2011) assessment the 'banksia woodlands of the Swan Coastal Plain' threatened ecological community (TEC) was listed as 'endangered' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). FCTs '23a', '21a' and '28' are all associated with the 'banksia woodlands of the Swan Coastal Plain' TEC (DoEE 2016). Specific patch size and vegetation condition thresholds apply to the identification of the 'banksia woodlands of the Swan Coastal Plain' TEC. In addition to other factors, the conservation advice states that banksia woodland vegetation must be in 'good' or better condition, using the scale provided.

The vegetation condition scale used in the AECOM (2011) assessment differs from that provided in the conservation advice for the 'banksia woodlands of the Swan Coastal Plain' TEC (DoEE 2016). The condition scale used by AECOM (2011) is likely to have classified vegetation into lower condition

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categories than if the DoEE (2016) scale had been used, in part due to the use of the Braun-Blanquet scale for weed cover. If the DoEE (2016) had been applied up to 137.22 ha of vegetation previously mapped as being in 'degraded' to 'very good' condition (55% of the site) would have been considered to represent the 'banksia woodlands of the Swan Coastal Plain' TEC.

#### 2.1.2 Fauna surveys

Multiple fauna surveys of a larger area including the current site were undertaken between 2009 and 2011, prior to vegetation clearing. The following surveys were undertaken:

- Level 1 fauna survey (habitat assessment and reconnaissance) (Phoenix Environmental Sciences 2011c).
- Level 2 vertebrate fauna survey (Phoenix Environmental Sciences 2011c) comprising six systematic bushland trapping sites.
- *Isoodon obesulus* (quenda) (Priority 4) monitoring program (Phoenix Environmental Sciences 2011b).
- Targeted *Chelodina oblonga* (oblong turtle) survey (Phoenix Environmental Sciences 2011a).
- Wetland bird and shorebird surveys at 13 of the Beelihar Wetlands (of which four are located within the project area) (Western Wildlife 2010).
- Short-range endemic (SRE) invertebrate survey (Phoenix Environmental Sciences 2010b).
- Targeted invertebrate assessment for conservation significant species (Phoenix Environmental Sciences 2010b).
- An aquatic macroinvertebrate survey of five wetlands in the area (of which three are located within the project area) (Phoenix Environmental Sciences 2010a).

In regards to threatened species of black cockatoos, the following actions were undertaken during the level 1 and level 2 surveys:

- Identification and assessment of suitability of potential breeding habitat trees (diameter at breast height (DBH) greater than 500mm).
- Assessment of potential nest hollows for evidence of nesting by black cockatoos.
- Searches for evidence of black cockatoo feeding activity for foraging habitat mapping.
- Searches for potential black cockatoo roost sites.

A total of nine fauna habitat types were identified within study area larger than the current site, comprising five upland *Eucalyptus marginata* – *Corymbia calophylla* – *Banksia* spp. woodlands, two lowland riparian types and two man-made habitats (e.g. roadsides, parkland).

The following fauna were recorded within the previous larger survey area:

- The vertebrate surveys recorded 120 native vertebrate species comprising up to eight amphibians, 83 birds, eight mammals and 21 reptiles.
- Five introduced mammal species and five naturalised exotic bird species.
- Approximately 125 invertebrate species
- Seven SRE invertebrate species (distribution limited to the Perth metropolitan region) of which one could not be accurately identified to species level and is rarely found in the Perth metropolitan area.

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Bird and macroinvertebrate surveys of the wetlands in the project area recorded the following:

- North and Bibra lakes consistently rank high in species richness and highest total count of wetlands and shorebirds, while Horse Paddock and Lower swamps rank relatively low.
- Bibra Lake is recognised for its high waterbird diversity and North Lake is an important breeding area for ducks.
- Bibra Lake recorded the highest number of threatened migratory shorebirds while North Lake, Horse Paddock Swamp and Lower Swamp recorded two or less records each.
- None of the wetlands of the project area were considered to support significant levels of macroinvertebrate species diversity.

In terms of conservation significant fauna, the following species were recorded within the project area:

- *Calyptorhynchus latirostris* (Carnaby's black cockatoo) and *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) (T) with the following recorded:
  - Confirmed sightings
  - Evidence of foraging
  - Approximately 177 ha of potential foraging habitat for Carnaby's black cockatoo
  - Approximately 166 ha of potential foraging habitat for forest red-tailed black cockatoo.
  - 605 potential habitat trees >500 mm DBH, of which 71 contained potential nesting hollows.
- *Lerista lineata* (Perth slider) (Priority 3) was recorded at several locations within the project area.
- A quenda (P4) population comprising at least 107 individuals, with an estimated population density of 28/ha.
- A total of 23 adult oblong turtles were captured within Bibra Lake and an additional 37 were sighted, with an estimated population of 168. Anecdotal evidence and observational findings suggest they are also present in the vicinity of North Lake.

No evidence of black cockatoo nesting or breeding was recorded in the project area. No roost sites were identified during the surveys but some roost sites had previously been recorded by Birdlife Australia within 6km of the centre point of the project area.

A variety of other conservation significant fauna species were not recorded during surveys but were considered to have potential to occur in the project area due to presence of suitable habitat.

## 2.2 Site assessment

Emerge undertook multiple surveys of the site in spring 2017 by a team of experienced botanists/ecologists. These assessments consisted of a review of spatial data and aerial imagery followed by a site inspection on foot over four days:

- 31<sup>st</sup> October 2017
- 2<sup>nd</sup> November 2017
- 7<sup>th</sup> November 2017
- 10<sup>th</sup> November 2017.

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The purpose of these surveys was to identify and confirm key site features, review previous vegetation mapping and record weed and native regeneration response monitoring data to inform planning for the preparation and implementation of the RMP. Site management activities were discussed with community and stakeholders to establish a timeline of key events within the site.

The following attributes were located from interpretation of aerial imagery (captured November 2016 and October 2017) and confirmed during site inspection:

- extent of cleared areas
- extent of historical and existing remnant vegetation
- infrastructure
- fences and gates
- mulch pile storage locations
- asbestos removal locations
- historical and pre-existing paths
- machine and vehicle tracks
- large wood
- other features.

The vegetation community boundaries and vegetation condition boundaries previously identified (AECOM 2011) were reviewed within the current site boundary. Opportunistic observations were made during site traverses and a combination of notes, photographs and locations (using a hand-held GPS receiver) were recorded. The previous vegetation condition mapping was compared to categories identified in (Keighery 1994) and, for banksia woodland vegetation, the vegetation condition scale provided in the conservation advice for the 'banksia woodlands of the Swan Coastal Plain' TEC (DoEE 2016).

Data collection for monitoring weed and native regeneration response was focused within cleared areas and within remnant vegetation within 20 m of cleared areas. Using the 20 m x 20 m sampling frame identified in the RMP (Emerge Associates 2018) as a guide, an assessment was made of the indicators outlined in **Table 1**.

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Table 1: Indicators assessed during site assessment in 2017

Indicator	Location	Method
Non-native (weed) species composition	Cleared and uncleared areas	<ul style="list-style-type: none"> <li>• Identification of presence of dominant weed species across four categories:               <ul style="list-style-type: none"> <li>○ grassy<sup>2</sup></li> <li>○ bulbous<sup>3</sup></li> <li>○ woody<sup>4</sup></li> <li>○ other<sup>5</sup></li> </ul> </li> </ul>
Non-native (weed) species cover	Cleared and uncleared areas	<ul style="list-style-type: none"> <li>• Estimate of percentage cover of weed species across four categories:               <ul style="list-style-type: none"> <li>○ grassy</li> <li>○ bulbous</li> <li>○ woody</li> <li>○ Other</li> </ul> </li> </ul>
Native flora species composition	Cleared areas	<ul style="list-style-type: none"> <li>• Rapid assessment of dominant native species</li> </ul>
Native flora regeneration abundance	Cleared areas	<ul style="list-style-type: none"> <li>• Estimate of abundance by broad category (low, moderate or high) across two categories:               <ul style="list-style-type: none"> <li>○ Resprouter (plants that had resprouted from root stock or branches after the recent clearing).</li> <li>○ Germinant (juvenile plants that had grown from seed in 2017).</li> </ul> </li> </ul>

<sup>2</sup> Non-native flora species from Poaceae family.

<sup>3</sup> Non-native flora species from families such as but not limited to Araceae, Asparagaceae, Iridaceae, Oxalidaceae.

<sup>4</sup> Non-native flora species from families such as but not limited to Apocynaceae, Fabaceae, Moraceae, Myrtaceae.

<sup>5</sup> Non-native flora species from families such as but not limited to Aizoaceae, Asteraceae, Papaveraceae, Solanaceae.

### 2.3 Photopoints

Photo monitoring locations ('photopoints') were established within the site in late 2017 in cleared and uncleared areas (Cockburn Wetland Centre 2017). At each photopoint at least two digital photographs were taken, facing towards and away from the cleared areas.

### 2.4 Baseline monitoring survey

Murdoch University students, under supervision from Murdoch University and DBCA demonstrators, established and undertook surveys of permanently marked monitoring plots in cleared and uncleared areas. Surveys occurred over multiple days in October, November and December 2017.

The survey methodology for these plots is provided in **Appendix A**.

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## Roe 8 Cleared Areas



## 3 Results

### 3.1 Site assessment

Raw data recorded during the site assessment is provided as **Appendix B**.

#### 3.1.1 Site management records

Multiple actions have occurred within the site that are relevant to the restoration works including events prior to, during, and after vegetation clearing. The timing of previous events are summarised in **Table 2**.

*Table 2: Key events relevant to the restoration and management of cleared areas*

Date	Event	Description	Reference
April 2011	Previous biological surveys	Flora and vegetation survey Dieback survey Multiple fauna surveys	AECOM (2011) Glevan Consulting (2010) See <b>Section 2.1.2</b>
December 2016 – February 2017	Clearing and mulching	Clearing and mulching of vegetation and storage on site in piles. Topsoil was not removed.	Aerial photographs
Between October and April 2017	Mulch removal	Mulch piles placed into trucks using front end loader and removed from site	Aerial photographs
May 2017	Weed control	Spot spaying using glyphosate and metsulfuron to target grass and bulb weeds species	Work power (2017)
October 2017	Weed control	Spot spaying using glyphosate and metsulfuron to target grass and bulb weeds species	Work power (2017)
October - November 2017	Fence installation	Fences and gates (pedestrian, vehicle and fauna) installed around perimeter of cleared area	Details provided by MRWA
November 2017	Weed control	Grass selective herbicide targeting perennial grass weeds	-
November 2017	Vegetation surveys	Reference ecosystem surveys Site assessment surveys (Emerge) Establishment of permanent plots and baseline inventory surveys (Murdoch University)	See <b>Section 2.2</b> See <b>Section 3.2</b>

#### 3.1.2 Key site features

Features within the site that have been identified as being relevant and important to the RMP include the:

- extent of cleared areas
- existing powerline alignment and power line tower locations
- conservation fencing and gate locations
- historical mulch pile locations within cleared areas
- historical asbestos contamination locations within cleared areas
- historical and pre-existing path locations
- machine and vehicle track locations within cleared areas

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- large fallen wood locations within cleared areas
- *Araucaria heterophylla* (Norfolk Island pine) tree stumps in Turtle Corner.

These key features are shown in **Figure 3** and **Figure 4**.

### 3.1.3 Remnant vegetation

The vegetation recorded during the site assessment was generally consistent with the plant communities previously identified (AECOM 2011). Broadly, this vegetation comprises wet forest or wetland plant communities and banksia woodland plant communities. The wetland communities are located in association with wetlands to the east of the site. The banksia woodland communities are located on upland landforms.

The condition of vegetation within un-cleared areas was considered to be generally higher than that previously recorded (AECOM 2011). Some previously identified boundaries between condition categories were also not discernable. These differences in vegetation condition assessment are likely to have been partly due to the different scales used as shown in **Table 3**. The majority of remnant banksia woodland vegetation in the site was determined to be in 'good' or 'very good' condition according to the DoEE (2016) scale.

Table 3: Comparison of vegetation condition methods used in the site

Condition category	% Weed cover		Species diversity
	Braun-Blanquet Scale <sup>†</sup>	Banksia woodland TEC (DoEE 2016)	Banksia woodland TEC (DoEE 2016)
Pristine	0	0 (or close to)	Native plant species diversity fully retained or almost so
Excellent	1-5	<10	High native plant species diversity
Very good	5-25	5-20	Moderate native plant species diversity
Good	25-50	5-50	Low native plant species diversity
Degraded	50-75	20-70	Very low native plant species diversity
Completely degraded	>75	>70	Very low to no native species diversity

<sup>†</sup>Ellenberg and Mueller-Dombois (1974)

### 3.1.4 Weed distribution and cover

The cover of grassy weeds in the site is shown in **Figure 5**. A total of 16 grassy weed taxa were recorded and *\*Avena* spp. (oats), *\*Briza maxima* (blowfly grass), *\*Bromus* spp. (brome), *\*Ehrharta calycina* (perennial veldt grass) and *\*Ehrharta longifolia* (annual veldt grass), were the most common.

The cover of bulbous weeds in the site is shown in **Figure 6**. A total of 11 bulbous weed taxa were recorded and *\*Gladiolus caryophyllaceus* (wild gladiolus), *\*Freesia alba* × *leichtlinii* (freesia), *\*Romulea rosea* (Guildford grass) and *\*Zantedeschia aethiopica* (arum lily) were the most common taxa.

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The cover of woody weeds in the site is shown in **Figure 7**. A total of 12 woody weed taxa were recorded and \* *Acacia longifolia* (Sydney golden wattle), \* *Acacia iteaphylla* (Finders Range wattle), \* *Chamaecytisus palmensis* (tagasaste) and \* *Chamelaucium uncinatum* (Geraldton wax) were the most common taxa.

#### 3.1.5 Regeneration response

Understandably the cleared areas largely comprised bare ground across the majority of the site. The diversity and abundance of native germinants and resprouters across cleared areas varied considerably. The cleared areas also had lower cover of weeds than most uncleared areas in the site, albeit that these areas had been subject to herbicide weed control.

The abundance of native germinants in the site is shown in **Figure 8**. The most common native germinant taxa were *Gompholobium tomentosum* (hairy yellow pea), *Hardenbergia comptoniana* (native wisteria), *Jacksonia furcellata* (grey stinkwood), *Kennedia prostrata* (scarlet runner) and *Kunzea glabrescens* (spearwood)<sup>2</sup>.

Germinants of the annual native species *Eryngium pinnatifidum* subsp. *Palustre* (listed as Priority 3 on the Department of Biodiversity, Conservation and Attractions (DBCA)'s *Priority Flora List*) were also recorded in the cleared areas.

The general abundance of native resprouters is shown in **Figure 9**. The most common native resprouting taxa were *Corymbia calophylla* (marri), *Eucalyptus* sp. (likely comprising marri and *Eucalyptus marginata* (jarrah)), *Macrozamia fraseri* (zamia palm), *Xanthorrhoea preissii* (grass tree), *Hibbertia hypericoides* (yellow buttercups) and *Kunzea glabrescens* (spearwood)<sup>2</sup>.

## 3.2 Photopoints

A total of 50 photopoints were established in the site, with 25 located in the cleared areas and 25 located in the uncleared areas. Digital photographs were taken at each location. The locations of photopoints are shown in **Figure 10**.

## 3.3 Baseline monitoring survey

A total of 52 monitoring plots were established in the site, with 33 located in the cleared areas and 19 located in the uncleared areas. The locations of monitoring plots are shown in **Figure 10** and raw data from the baseline monitoring survey will be provided as **Appendix C** (Murdoch University, 2018)<sup>3</sup>.

<sup>2</sup> Frequently observed in eastern/wetter areas of the site.

<sup>3</sup> Full QA'd data yet to be supplied.

## Target Ecosystem Identification and Baseline Inventory Report Roe 8 Cleared Areas



### 4 Target ecosystem identification

Principle 1 of the *Standards* states that ecological restoration practice should be based on an appropriate local indigenous reference ecosystem (Standards Reference Group SERA 2017). The target ecosystem is therefore a model of the reference ecosystem that the restoration project aims to restore.

In the *Standards* a reference ecosystem is defined as a “real or notional community of organisms able to act as a model or benchmark for restoration”. Notionally a reference ecosystem is a non-degraded version of a restoration site, with attributes that would have been present prior to disturbance. However, the *Standards* also acknowledge that the attributes of a reference ecosystem may need to be adjusted to accommodate changed or predicted environmental conditions. This is relevant to the site as native vegetation, including cleared vegetation and remnant vegetation adjacent to the cleared areas, has been subject to historical disturbance prior to clearing occurring along the proposed alignment for Roe 8. Disturbance intensity varied across the site, but largely consisted of clearing for tracks, firebreaks, rubbish dumping and the introduction of non-native species. Historically, the site would also have been logged and subject to other changes in land and cultural management resulting from European settlement on the Swan Coastal Plain. However, the impact of historical disturbance is more difficult to quantify.

#### 4.1 Reference ecosystems

Reference ecosystems for the site were identified using information obtained from the pre-clearing surveys of the site (AECOM 2011) and surveys undertaken in 2017 by Emerge and Murdoch University (as described in **Section 2** and **Section 3**).

Broadly, two types of ecosystem broadly occur within the site:

- ‘wetland’
- ‘banksia/eucalypt woodland’.

Relatively intact areas of wetland vegetation occur at the interface of Hope Road North and Bibra Lake management areas. This vegetation contains an overstorey of *Melaleuca preissiana* (moonah), *Melaleuca raphiophylla* (swamp paperbark) and *Eucalyptus rudis* (flooded gum) over either a dense shrubland of *Pteridium esculentum* (bracken) or a dense native sedgeland on brown clay to loam soils. Varying levels of inundation were present in this vegetation during the 2017 surveys, ranging from completely inundated to moist soils. The most common weed in this vegetation was \**Zantedeschia aethiopica* (arum lily) which was primarily located on the boundary and where the bracken was less dense. The reference ecosystem for this wetland vegetation is representative of the FCT 11 ‘wet forests and woodlands’ identified by Gibson *et al.* (1994).

The banksia woodland vegetation throughout the site generally has an overstorey dominated by *Banksia attenuata* (slender banksia), *Banksia menziesii* (firewood banksia) and *Eucalyptus marginata* (jarrah), with some *Corymbia calophylla* (marri) and *Allocasuarina fraseriana* (sheoak). Particular management areas contain additional canopy or sub-canopy species as detailed below:

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- Stock Road West overstorey contains co-dominant *Eucalyptus gomphocephala* (tuart). This species was low to absent across the remainder of the site.
- The western portion of North Lake Road West supports *Xylomelum occidentale* (woody pear) in midstorey/overstorey layer. This species appears to be restricted to this portion of the site, potentially due to the topography and/or soil association.
- In the east of the site, the overstorey in Hope Road North and Bibra Drive management areas contain distinct bands of co-dominant *Banksia ilicifolia* (holly-leaved banksia) and *Eucalyptus todtiana* (coastal blackbutt) trees. Holly-leaved banksia often occurs in low-lying areas close to the water table (Stevens *et al.* 2016) and coastal blackbutt is commonly associated with the Bassendean soil system which is in this portion of the site.

The understorey of the banksia woodland vegetation includes some species which were consistently recorded across the site including, for example *Dasypogon bromeliifolius* (pineapple bush), *Hibbertia hypericoides* (yellow buttercups), *Macrozamia fraseri* (zamia) and *Xanthorrhoea preissii* (grass tree). Further analysis of baseline monitoring data is required to accurately characterise understory species composition of remnant vegetation within the site associated with each reference ecosystems.

A summary of the reference ecosystems identified in the site and their corresponding FCTs is provided in **Table 4**. The locations of reference ecosystems in the site are shown in **Figure 11**.

Table 4: Summary of reference ecosystems in the site

Ecosystem category	Dominant overstorey species+	Applicable FCT (Gibson <i>et al.</i> 1994)	Management area
Wetland	Flooded gum, moonah and swamp paperbark	FCT 11 'wet forests and woodlands'	Bibra Drive, Hope Road North
Banksia woodland	Jarrah	FCT 23a 'central <i>Banksia attenuata</i> – <i>B. menziesii</i> woodlands'	Hope Road North
	Coastal blackbutt	FCT 23a 'central <i>Banksia attenuata</i> – <i>B. menziesii</i> woodlands' and/or FCT 21c 'low lying <i>Banksia attenuata</i> woodlands or shrublands'	Bibra Drive, Hope Road North
	Holly-leaved banksia	FCT 23a 'central <i>Banksia attenuata</i> – <i>B. menziesii</i> woodlands'	Bibra Drive, Hope Road North
	Jarrah	FCT 28 'spearwood <i>Banksia attenuata</i> or <i>Banksia attenuata</i> – Eucalyptus woodlands'	North Lake Road East, North Lake Road West, Forrest Road South, Forest Road North.
	Woody pear	FCT 28 'spearwood <i>Banksia attenuata</i> or <i>Banksia attenuata</i> – Eucalyptus woodlands'	North Lake Road West (western portion)
	Tuart	FCT 28 'Spearwood <i>Banksia attenuata</i> or <i>Banksia attenuata</i> – Eucalyptus woodlands'	Stock Road West

\*Additional to *Allocasuarina fraseriana* and *Banksia* spp.

Turtle Corner and the western portion of Hope Road North management areas include native flora species but were assigned the label 'modified native vegetation'. Consultation with community and stakeholders identified that some of the native vegetation in these areas was a product of historical revegetation activities, including the *Eucalyptus rudis* (flooded gum) trees that are present in Hope Road North (pers. comms. Denise Crosby, Cockburn Wetland Centre). Fill has also been imported as part of construction of Hope Road and has altered the landform within Turtle Corner.

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#### 4.2 Target ecosystems

As outlined previously in **Section 4.1**, 'wetland' and 'banksia/eucalypt woodland' ecosystems occurred within the site prior to clearing. The wetland target ecosystem is analogous to FCT 11 'wet forests and woodlands' identified by Gibson *et al.* (1994). The banksia/eucalypt woodland ecosystem category was separated based on overt differences in canopy species composition, resulting in the identification six (6) banksia/eucalypt woodland target ecosystems.

The labels applied to the target ecosystems within the site are as follows:

- Wet forest and woodland (wetland)
- Banksia/coastal blackbutt woodland
- Holly-leaved banksia woodland
- Banksia woodland
- Banksia/jarrah woodland
- Banksia/woody pear woodland
- Banksia/tuart woodland<sup>4</sup>.

The six banksia woodland target ecosystems were defined based on differences in the reference ecosystem overstorey stratum. This simplification of vegetation patterns was aimed at rationalizing target ecosystems labels and descriptions. Although the understory flora is generally consistent within banksia woodland areas across the site, it is acknowledged that the pattern of vegetation is likely more complex than indicated by the identified scheme for target ecosystems. In particular, areas of banksia/jarrah woodland which align to FCT 23a are likely to have some distinct flora taxa compared to banksia woodland which aligns with FCT 28. Nonetheless, the target ecosystem labels and descriptions are considered to be a good starting point as they confer accessible themes for conceptualising the differences in ecosystems within the site. Improvements to the characterisation of each target ecosystem can be made as new information is obtained on their attributes through implementation of monitoring under the RMP.

The majority of the banksia woodland target ecosystems are synonymous with the reference ecosystem in the same location. However, two exceptions were identified. The banksia woodland target ecosystem differs from its' banksia/jarrah woodland reference ecosystem. Since this target ecosystem is located under existing electrical powerlines it must conform to Western Power height restrictions. Therefore, tall eucalypt species such as *Eucalyptus marginata* and *Corymbia calophylla* are not included in this target ecosystem. The areas of modified vegetation in Turtle corner and the western end of Hope Road North were assigned the banksia/coastal blackbutt woodland target ecosystem. This was based on consideration of broader patterns in surrounding vegetation and is an appropriate near wetland woodland option for the eastern portion of the site based on landform, soils and predicted FCT.

The seven target ecosystems are identified in **Table 5** and representative photographs are provided in **Plate 1** to **Plate 7**. The extents of the target ecosystems are shown in **Figure 12**.

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<sup>4</sup> Wetland ecosystem introduced first and banksia woodland ecosystems introduced in order of occurrence from east to west across the site.

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas

Table 5: Target ecosystems in the site

Target Ecosystem <sup>†</sup>	Description
<p><b>Wet forest and woodland</b></p>  <p>Plate 1: Example of wet forest and woodland ecosystem</p>	<ul style="list-style-type: none"> <li>The 'wet forest and woodland' ecosystem is characterized by a canopy of flooded gum, moonah and swamp paperbark and an understorey of wetland adapted species.</li> <li>This ecosystem corresponds with FCT 11 (Gibson <i>et al.</i> 1994).</li> <li>The extent of this ecosystem within the site is associated with the presence of seasonally saturated hydric soils of the Bibra Lakes wetland system, in the eastern portion of the site.</li> <li>This ecosystem is located in Hope Road North management area.</li> </ul>
<p><b>Banksia/coastal blackbutt woodland</b></p>  <p>Plate 2: Example of banksia/coastal blackbutt woodland target ecosystem</p>	<ul style="list-style-type: none"> <li>The 'banksia/coastal blackbutt woodland' ecosystem is characterized by the presence of coastal blackbutt amongst a mixed canopy of sheoak, slender banksia, firewood banksia, marri and jarrah.</li> <li>This ecosystem corresponds to FCT 23a and/or FCT 21c (Gibson <i>et al.</i> 1994).</li> <li>The extent of this ecosystem is associated with the interface between target ecosystems 'wet forest and woodland' and the adjacent banksia woodland ecosystems in the east of the site.</li> <li>This ecosystem is located in the Bibra Drive, Hope Road North and Turtle Corner management areas.</li> </ul>
<p><b>Holly-leaved banksia woodland</b></p>  <p>Plate 3: Example of holly-leaved banksia woodland ecosystem</p>	<ul style="list-style-type: none"> <li>The 'holly-leaved banksia woodland' ecosystem is characterized by the presence of holly-leaved banksia amongst a mixed canopy of sheoak, slender banksia, firewood banksia, marri and jarrah.</li> <li>This ecosystem corresponds to FCT 23a (Gibson <i>et al.</i> 1994).</li> <li>This ecosystem is on the Bassendean soil association in the transition zones between low lying and elevated vegetation.</li> <li>The extent of this ecosystem is associated with the interface between target ecosystems 'wet forest and woodland' and the adjacent banksia woodland ecosystems in the east of the site.</li> <li>This ecosystem is located in the Hope Road North and Bibra Drive management areas.</li> </ul>
<p><b>Banksia woodland</b></p>  <p>Plate 4: Example of banksia woodland ecosystem</p>	<ul style="list-style-type: none"> <li>The 'banksia woodland' ecosystem is characterized by a mixed low canopy of slender banksia and firewood banksia with occasional sheoak.</li> <li>This ecosystem is located under existing electrical powerlines and must conform to Western Power height restrictions, hence the lack of tall eucalypt trees.</li> <li>This ecosystem is located in Hope Road North management area.</li> </ul>

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas

Table 1 (cont.): Target ecosystems within the site.

Target Ecosystem <sup>†</sup>	Description
<p><b>Banksia/jarrah woodland</b></p>  <p>Plate 5: Example of banksia woodland target ecosystem</p>	<ul style="list-style-type: none"> <li>The 'banksia/jarrah woodland' ecosystem is characterized by a mixed canopy of slender banksia, firewood banksia and jarrah with occasional jarrah, marri and sheoak.</li> <li>This ecosystem corresponds to FCT 28 (Gibson <i>et al.</i> 1994).</li> <li>This ecosystem is widespread across the site and occurs in Spearwood and Bassendean soil associations.</li> <li>This ecosystem is located in Hope Road North, North Lake Road East, North Lake Road West, Forrest Road North and Forrest Road South management areas.</li> </ul>
<p><b>Banksia/woody pear woodland</b></p>  <p>Plate 6: Example of banksia/woody pear woodland target ecosystem</p>	<ul style="list-style-type: none"> <li>The 'banksia/woody pear woodland' ecosystem is characterized by the presence of woody pear amongst a mixed canopy of sheoak, slender banksia, firewood banksia, marri and jarrah.</li> <li>This ecosystem corresponds to FCT 28 (Gibson <i>et al.</i> 1994).</li> <li>The presence of woody pear is unique to this part of the site and is uncommonly recorded within FCT 28.</li> <li>The extent of this ecosystem is associated with a shallow dune swale that occurs in this location. The soil in this area is mapped as Tamala sand (Gozzard 2011).</li> <li>This ecosystem is located in the North Lake Road West management area.</li> </ul>
<p><b>Banksia/tuart woodland</b></p>  <p>Plate 7: Example of banksia/tuart woodland target ecosystem</p>	<ul style="list-style-type: none"> <li>The 'banksia/tuart woodland' ecosystem is characterized by the presence of tuart amongst a mixed canopy of sheoak, slender banksia, firewood banksia, marri and jarrah.</li> <li>This ecosystem corresponds to FCT 28 (Gibson <i>et al.</i> 1994).</li> <li>Tuarts are known to occur in a narrow band along the coast of SW WA, and correspond to the presence of limestone which is present in this area (Gozzard 2011).</li> <li>The extent of this ecosystem is associated with the western margin of the site.</li> <li>This ecosystem is located in the Stock Road West management zone.</li> </ul>

<sup>†</sup>Wetland ecosystem introduced first and banksia woodland ecosystems introduced in order of occurrence from east to west across the site.

## Target Ecosystem Identification and Baseline Inventory Report

### Roe 8 Cleared Areas



#### 4.3 Associated native flora species

Native flora species that are associated with each target ecosystem were primarily identified from the Keighery *et al.* (2012) FCT dataset. For the wet forest and woodland target ecosystem species were selected from all 13 of the Keighery sample plots. For the banksia woodland target ecosystem species were selected from the closest five Keighery sample plots for FCTs 21c, 23a and 28. Additional species were then included where they were recorded during previous surveys or monitoring undertaken in 2017. As more species are recorded during monitoring the list of associated species may be updated.

The lists of associated native flora species that are currently identified for each target ecosystem are provided in **Appendix D**.

#### 4.4 Important species

Important species are identified to guide the focus of restoration. The important species outlined include diagnostic, larger structural components of the target ecosystems (native canopy flora species), conservation significant species (native fauna) and potentially significant threats to the restoration of target ecosystems (weeds and pest fauna species). Note the important species are not the only native species that have a significant, valuable or otherwise meaningful role within the target ecosystems. The species identified as important may change over time as new information is obtained.

##### 4.4.1 Native flora

The flora species identified as 'important' to each target ecosystem include canopy and large midstorey species that were considered diagnostic for that ecosystem<sup>5</sup>. The important flora species currently identified for each ecosystem are shown in **Table 6**.

Table 6: Important species for each target ecosystem

Species	Target Ecosystem						
	Banksia woodland	Banksia/coastal blackbutt woodland	Banksia/jarrah woodland	Banksia/tuart woodland	Banksia/woody pear woodland	Holly-leaved banksia woodland	Wet forest and woodland
<i>Allocasuarina fraseriana</i>	✓	✓	✓	✓	✓	✓	
<i>Banksia attenuata</i>	✓	✓	✓	✓	✓	✓	
<i>Banksia ilicifolia</i>						✓	
<i>Banksia menziesii</i>	✓	✓	✓	✓	✓	✓	
<i>Eucalyptus gomphocephala</i>				✓			
<i>Eucalyptus marginata subsp. marginata</i>	✓	✓	✓	✓	✓	✓	

<sup>5</sup> Does not indicate that other species are not valued or important.

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



Table 6: Important species for each target ecosystem (cont)

Species	Target Ecosystem						
	Banksia woodland	Banksia/ coastal blackbutt woodland	Banksia/ jarrah woodland	Banksia/ tuart woodland	Banksia/ woody pear woodland	Holly-leaved banksia woodland	Wet forest and woodland
<i>Eucalyptus rudis</i> subsp. <i>rudis</i>							✓
<i>Eucalyptus tottiana</i>		✓					
<i>Macrozamia fraseri</i>	✓	✓	✓	✓	✓	✓	
<i>Melaleuca preissiana</i>							✓
<i>Melaleuca raphiophylla</i>							✓
<i>Xanthorrhoea preissii</i>	✓	✓	✓	✓	✓	✓	
<i>Xylomelum occidentale</i>					✓		

### 4.4.2 Non-native flora (weeds)

Non-native flora species identified as 'important' across the site are listed **Table 7**. This list comprises the non-native flora (weed) species most commonly recorded during the 2017 baseline inventory survey and the monitoring survey. Other weed species may also be present in the site and of particular note are species listed in the *Environmental weed census and prioritisation (Keighery and Bettink 2008)*.

Table 7: Non-native flora taxa recorded in the site that are considered important for management

Wee category	Species	Pest Status	
		BAM Act	Environmental Weed <sup>†</sup>
Grassy	<i>Avena</i> spp. (wild oats)	-	✓
	<i>Ehrharta calycina</i> (perennial veldt grass)	-	✓
	<i>Ehrharta longifolia</i> (annual veldt grass)	-	✓
	<i>Eragrostis curvula</i> (African love grass)	-	✓
Bulbous	<i>Freesia alba</i> × <i>leichtlinii</i> (freesia)	-	✓
	<i>Gladiolus caryophyllaceus</i> (wild gladiolus)	-	✓
	<i>Lachenalia reflexa</i> (yellow soldier)	-	✓
	<i>Zantedeschia aethiopica</i> (arum lily)	✓	✓
Woody	<i>Acacia longifolia</i> (Sydney golden wattle)	-	✓
	<i>Acacia iteaphylla</i> (Finders Range wattle)	-	✓
	<i>Chamaecytisus palmensis</i> (tagasaste)	-	✓
	<i>Chamelaucium uncinatum</i> (Geraldton wax)	-	✓
	<i>Leptospermum laevigatum</i> (Victorian tea-tree)	-	✓

<sup>†</sup>Swan Weeds (DBCA 2017)

## Target Ecosystem Identification and Baseline Inventory Report

### Roe 8 Cleared Areas



#### 4.4.3 Native fauna

Native fauna species identified as 'important' within the site are identified in **Table 8**. This list comprises fauna species of significance that were recorded during previous surveys (see **Section 2.1.2**) and/or considered to have potential to occur in the site during the 2017 surveys.

A fauna survey conducted during 2019/2020 has identified additional species that may act as biological indicators of restoration success. These species were recorded largely in control plots within the corridor but were largely absent from cleared sites. These species have been included in **Table 8**.

Table 8: Native fauna considered important for restoration and management within the site.

Species	Conservation Status		
	EPBC Act	WC Act	DFCA
<i>Calyptorhynchus baudinii</i> (Baudin's black cockatoo)	Endangered	Endangered (Schedule 2)	-
<i>Calyptorhynchus latirostris</i> (Carnaby's black cockatoo)	Endangered	Endangered (Schedule 2)	-
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	Vulnerable	Vulnerable (Schedule 3)	-
<i>Petrochelidon nigricans</i> (tree martin)	Marine	-	-
<i>Lerista lineata</i> (Perth slider)	-	-	Priority 3
<i>Isoodon obesulus fusciventer</i> (quenda)	-	-	Priority 4
<i>Chelodina oblonga</i> (oblong tortoise)^	-	-	-
<i>Heleioporus eyrei</i> (moaning frog)	-	-	-
<i>Christinus marmoratus</i> (marbled gecko)	-	-	-
<i>Cryptoblepharus buechananii</i> (fence skink)	-	-	-
<i>Gerygone fusca</i> (Western gerygone)	-	-	-
<i>Pachycephala rufiventris</i> (rufous whistler)	-	-	-

#### 4.4.4 Non-native fauna

Non-native fauna species identified as 'important' across the site are listed in **Table 9**. This list comprises non-native fauna species that were recorded during previous surveys (see **Section 2.1.2**) and considered to pose a high threat and/or considered to have potential to occur in the site during the 2017 surveys.

The 2019/2020 fauna survey also indicated that one additional fauna species listed under the BAM Act, *Trichoglossus haematodus* (rainbow lorikeet), were well established throughout the site and accounted for the highest number of recorded observations. While control of this species is difficult it should be noted that it has an impact on the ability of other local bird species to utilise suitable habitat through competition for nesting hollows and food resources.

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



Table 9: Non-native fauna taxa considered important for restoration and management within the site

Species	Pest Status (BAM Act)
<i>Oryctolagus cuniculus</i> (European rabbit)	C3
<i>Trichoglossus haematodus</i> (rainbow lorikeet)	C1, C3
<i>Vulpes vulpes</i> (European red fox)	C1, C3
<i>Apis mellifera</i> (European honeybee)	C1
<i>Felis catus</i> (feral cat)	Permitted

# Target Ecosystem Identification and Baseline Inventory Report

## Roe 8 Cleared Areas



## 5 References

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## Target Ecosystem Identification and Baseline Inventory Report

### Roe 8 Cleared Areas



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<<https://florabase.dpaw.wa.gov.au/weeds/swanweeds/>>



# Figures



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*Figure 2: Management Areas*

*Figure 3: Site features*

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*Figure 10: Photo Points and Permanently Marked Plots*

*Figure 11: Reference Ecosystems*

*Figure 12: Target Ecosystems*





**Figure 1: Site Location**

**Project:** Reference Ecosystem Identification and Baseline Inventory Report  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)--F38a  
**Drawn:** KNM  
**Date:** 31/01/2018  
**Checked:** RAO  
**Approved:** TAA  
**Date:** 31/01/2018

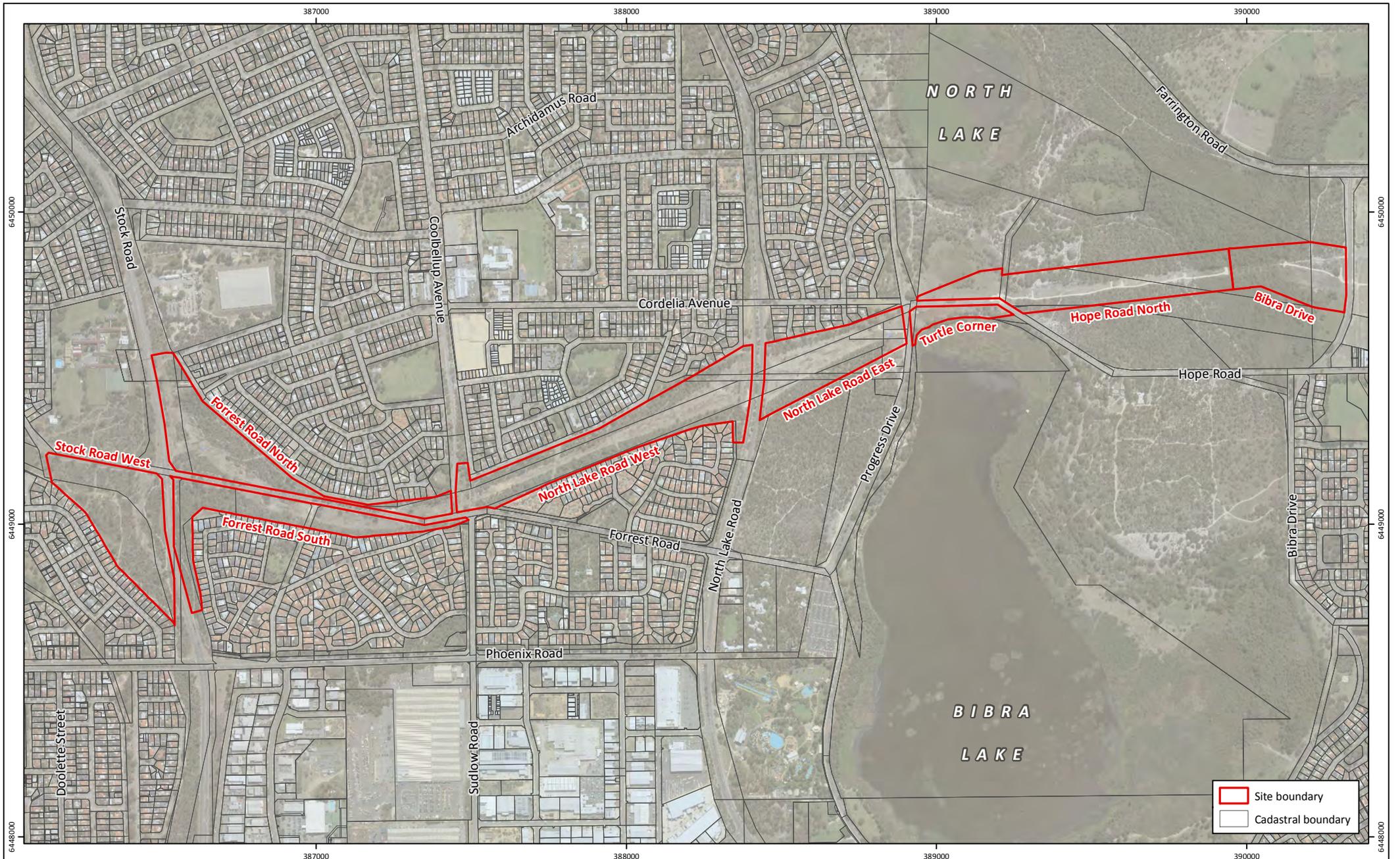


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GDA 1994 MGA Zone 50



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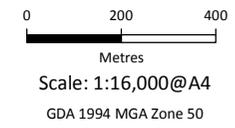




**Figure 2: Management Areas**

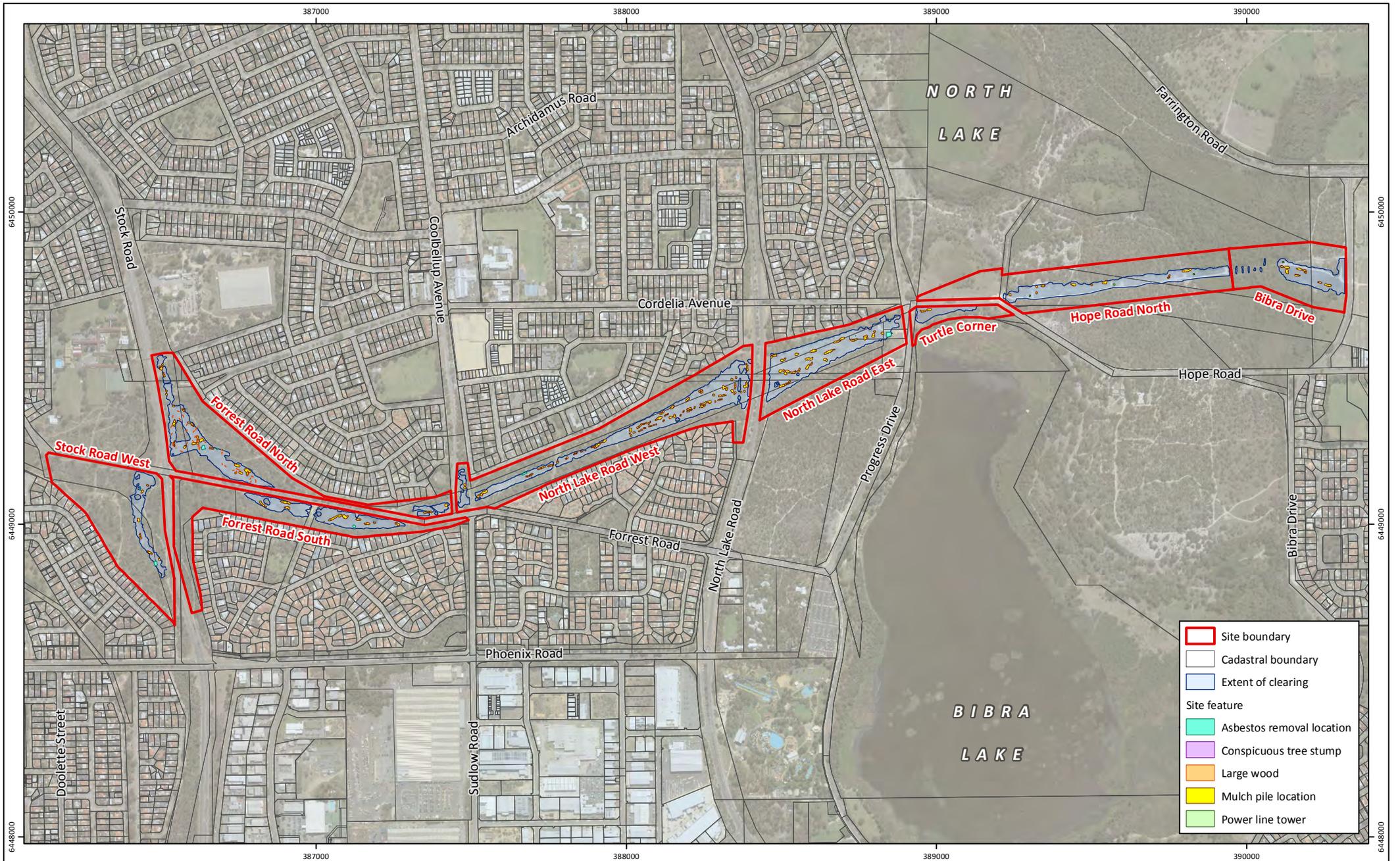
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 Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
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**Drawn:** KNM  
**Date:** 31/01/2018  
**Checked:** RAO  
**Approved:** TAA  
**Date:** 31/01/2018



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	Site boundary
	Cadastral boundary
	Extent of clearing
Site feature	
	Asbestos removal location
	Conspicuous tree stump
	Large wood
	Mulch pile location
	Power line tower

**Figure 3: Site Features**

**Project:** Reference Ecosystem Identification and Baseline Inventory Report  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

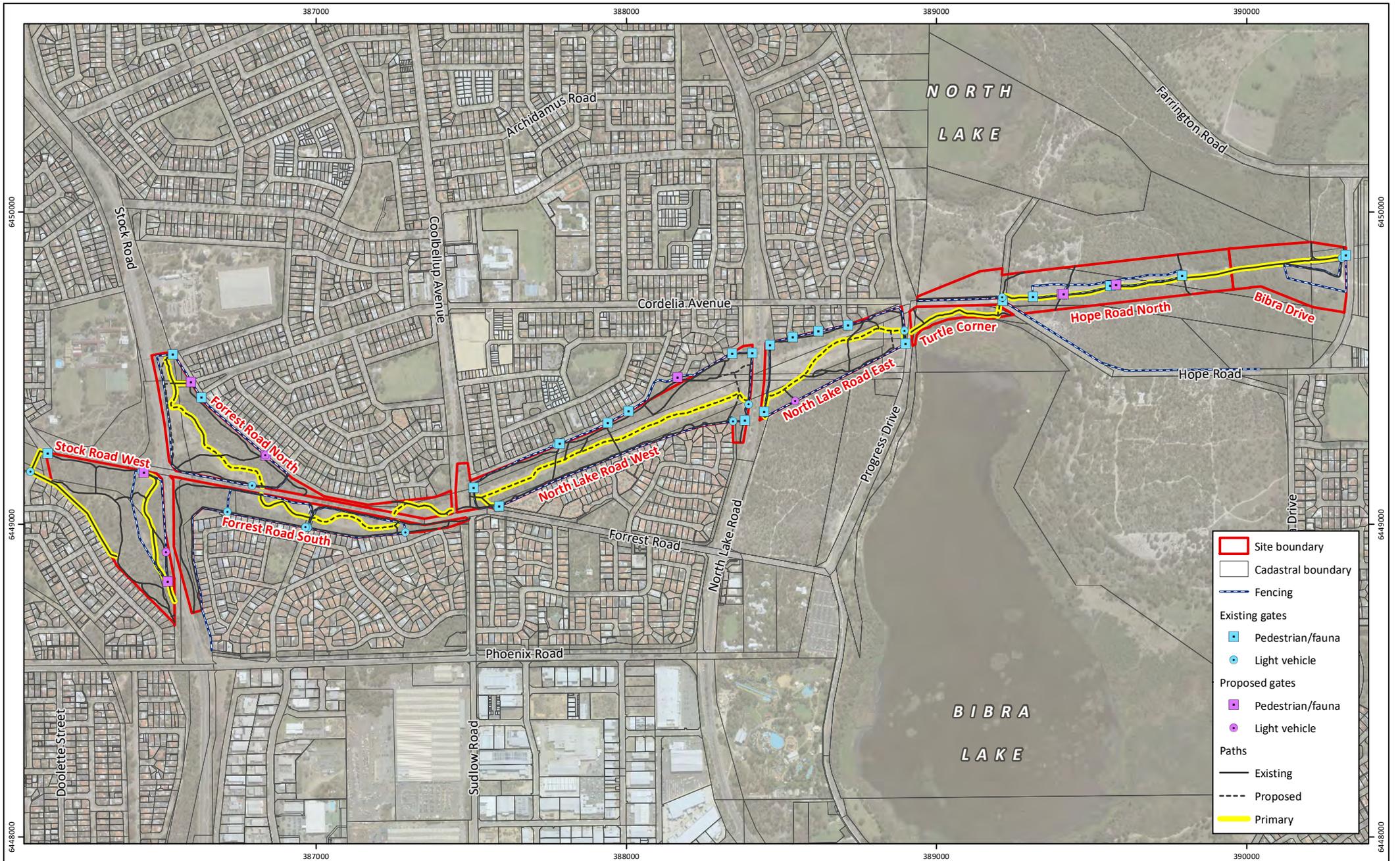
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**Date:** 23/02/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 23/02/2018



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GDA 1994 MGA Zone 50







**Figure 4: Existing and Proposed Gates and Paths**

**Project:** Reference Ecosystem Identification and Baseline Inventory Report  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

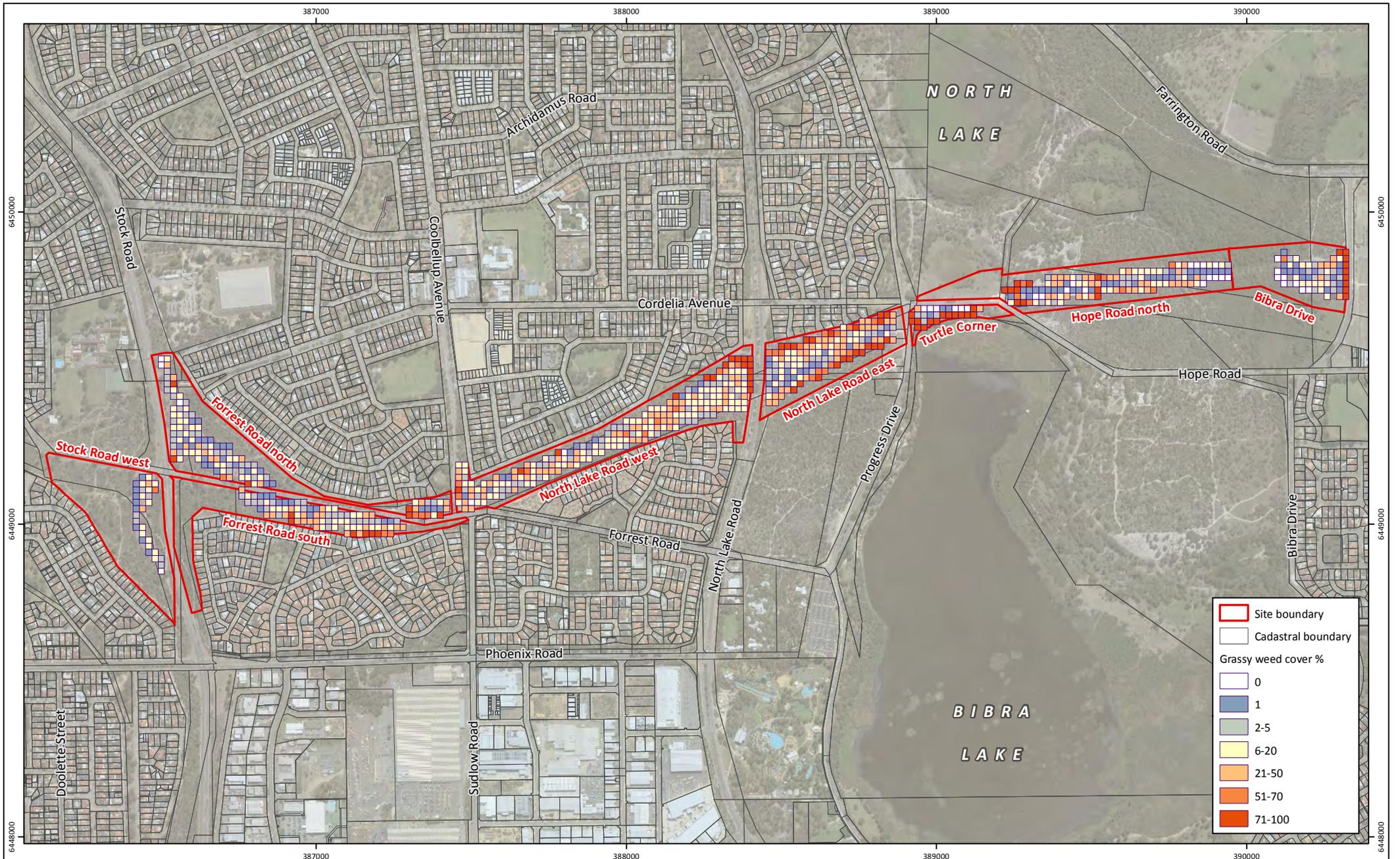
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**Date:** 06/08/2021



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GDA 1994 MGA Zone 50







**Figure 5: Grassy Weed Cover**

**Project:** Reference Ecosystem Identification and Baseline Inventory Report  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:** EP17-085(07)-F42b  
**Drawn:** RAO  
**Date:** 23/02/2018  
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**Approved:** TAA  
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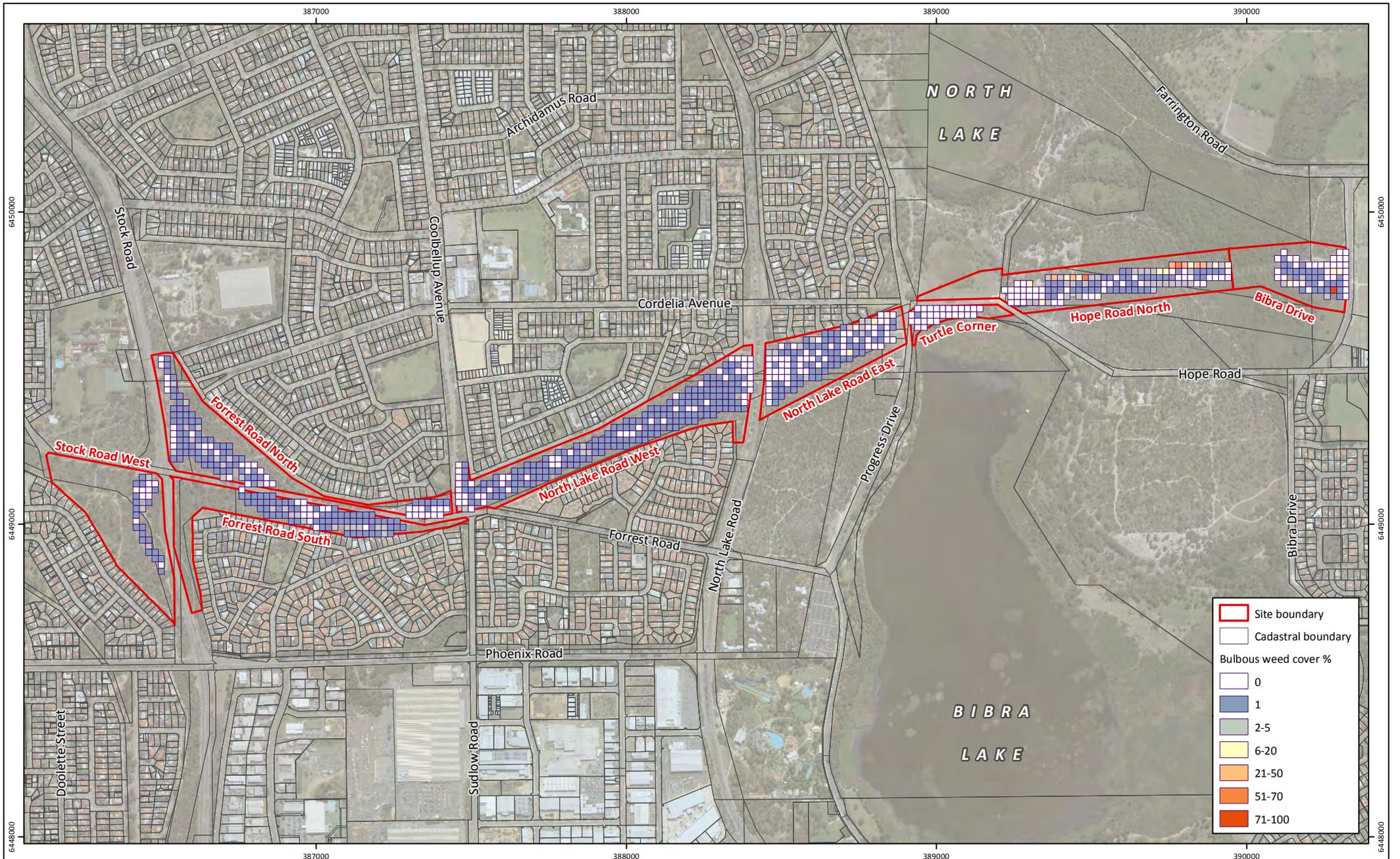


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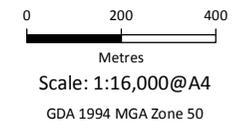




**Figure 6: Bulbous Weed Cover**

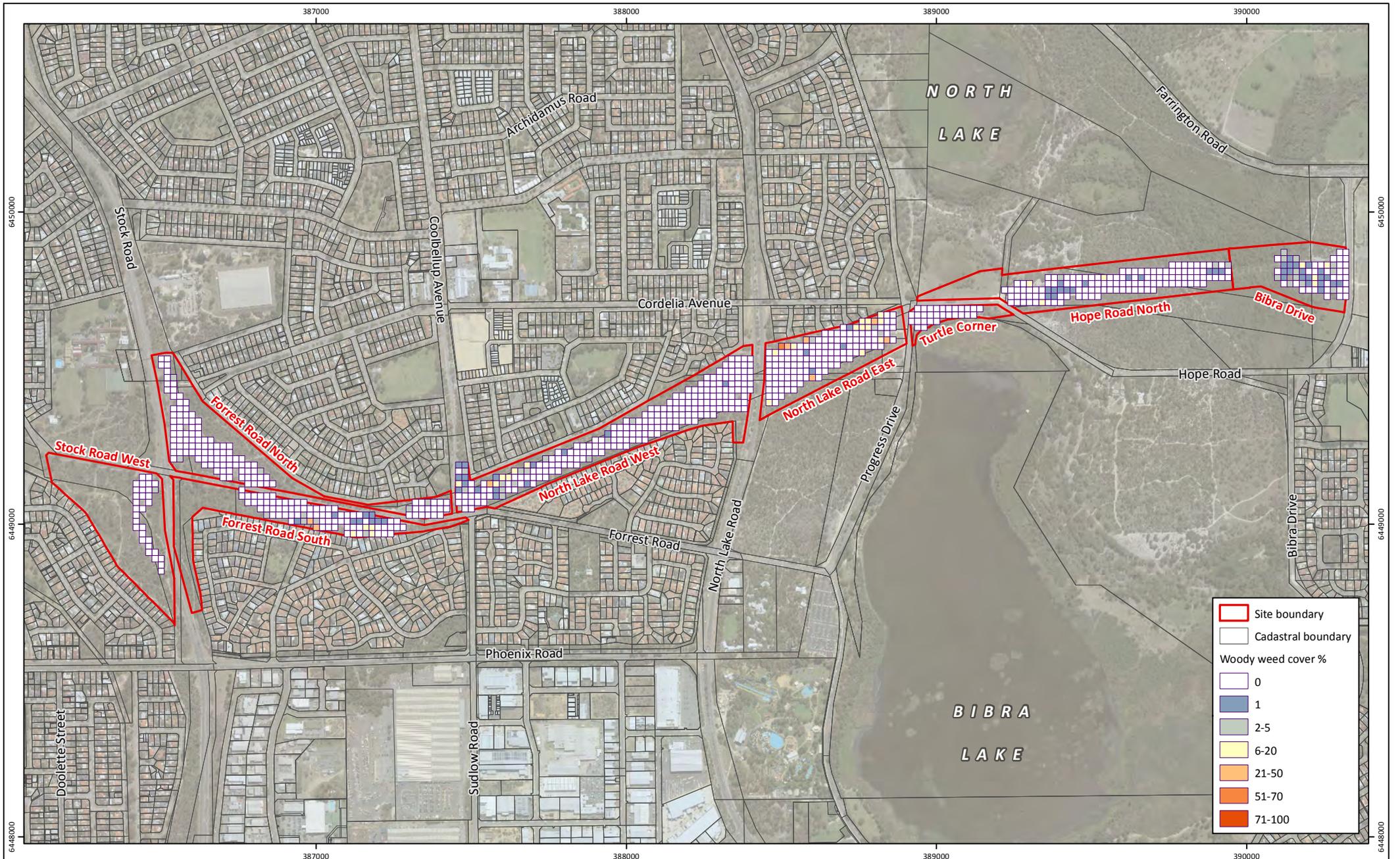
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 Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
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**Drawn:** RAO  
**Date:** 23/02/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 23/02/2018



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**Figure 7: Woody Weed Cover**

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 Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
 EP17-085(07)-F44b  
**Drawn:** RAO  
**Date:** 23/02/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 23/02/2018

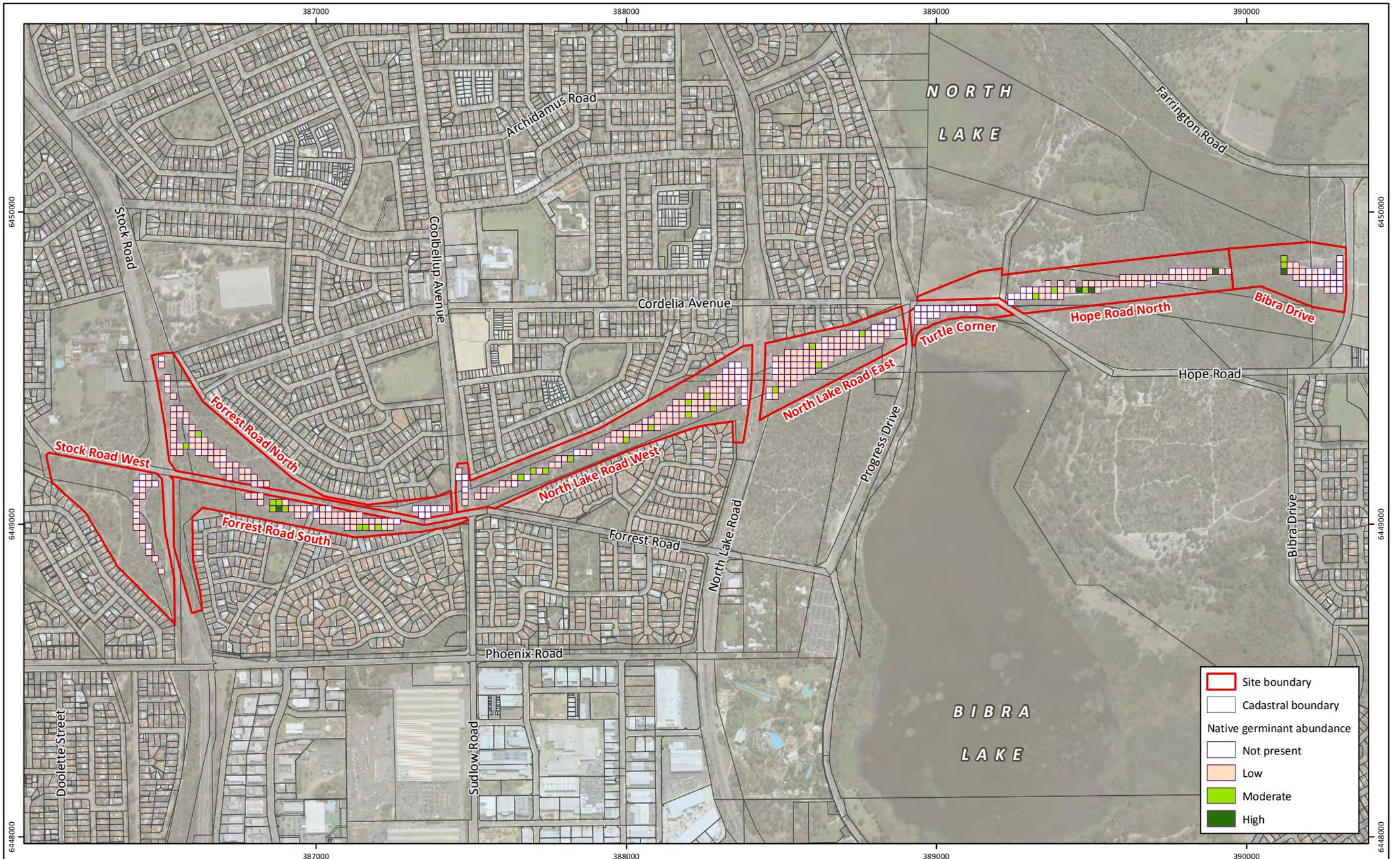


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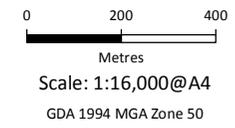




**Figure 8: Native Germinant Abundance**

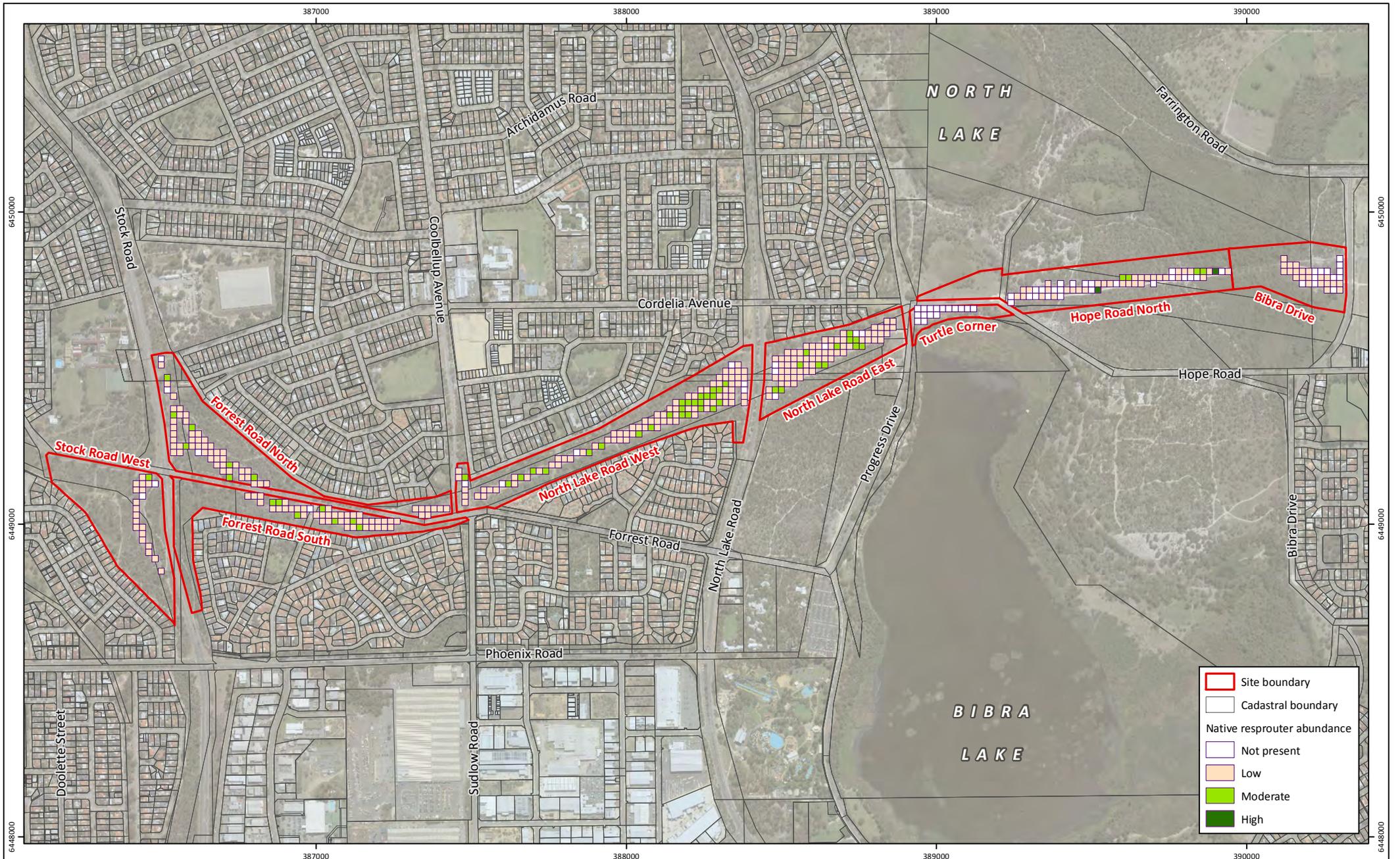
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 Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
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**Drawn:** RAO  
**Date:** 23/02/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 23/02/2018



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**Figure 9: Native Resprouter Abundance**

**Project:** Reference Ecosystem Identification and Baseline Inventory Report  
Roe 8 Cleared Areas

**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F46b

**Drawn:** RAO  
**Date:** 23/02/2018

**Checked:** TAA  
**Approved:** TAA  
**Date:** 23/02/2018

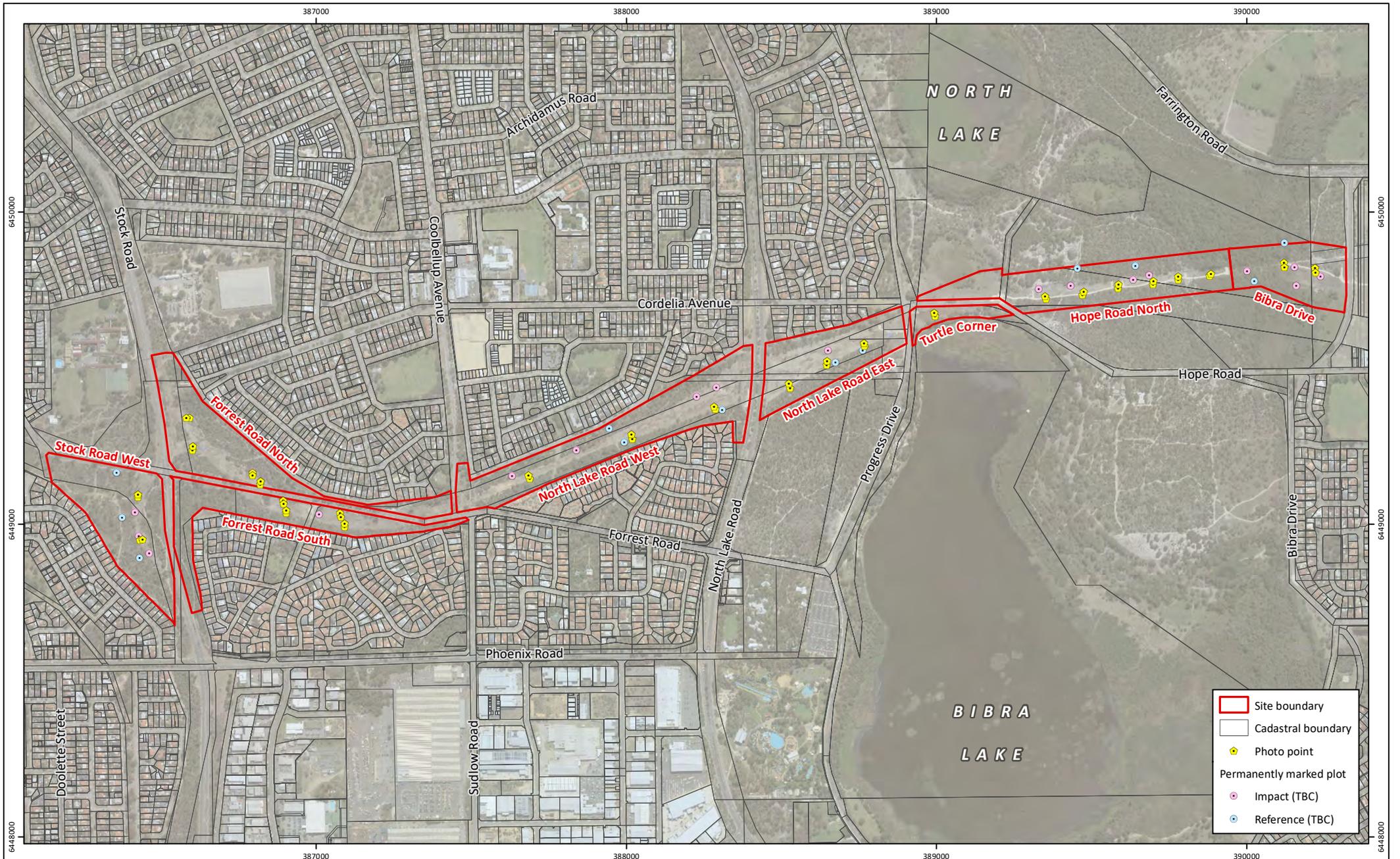


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GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

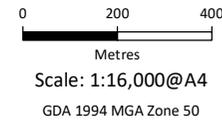




**Figure 10: Photo Points and Permanently Marked Plots**

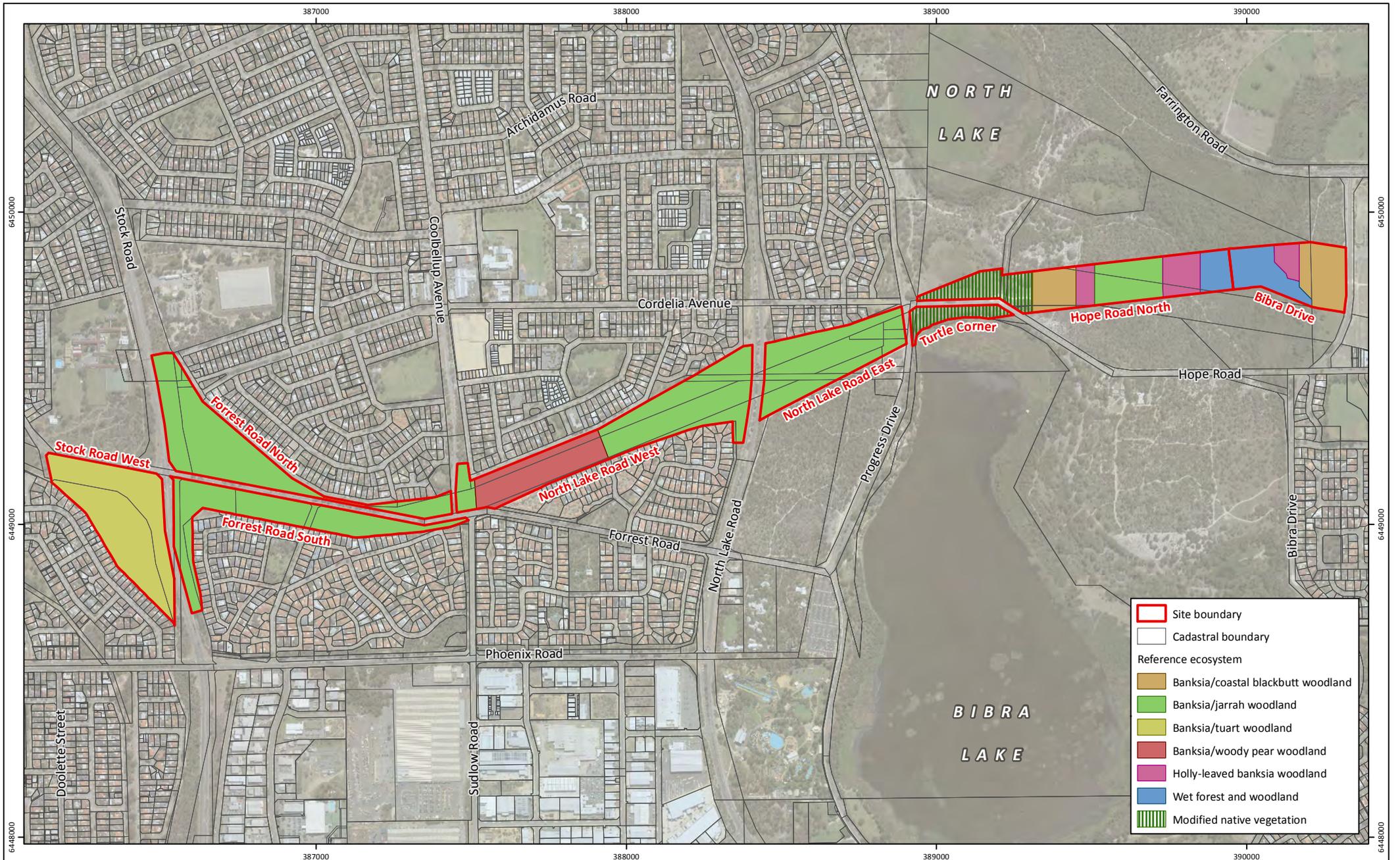
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 Roe 8 Cleared Areas  
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**Plan Number:**  
 EP17-085(07)--F47c  
**Drawn:** GAR  
**Date:** 06/08/2021  
**Checked:** RAW  
**Approved:** RAW  
**Date:** 06/08/2021



While Emerge Associates makes every effort to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used





**Figure 11: Reference Ecosystems**

**Project:** Reference Ecosystem Identification and Baseline Inventory Report  
 Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

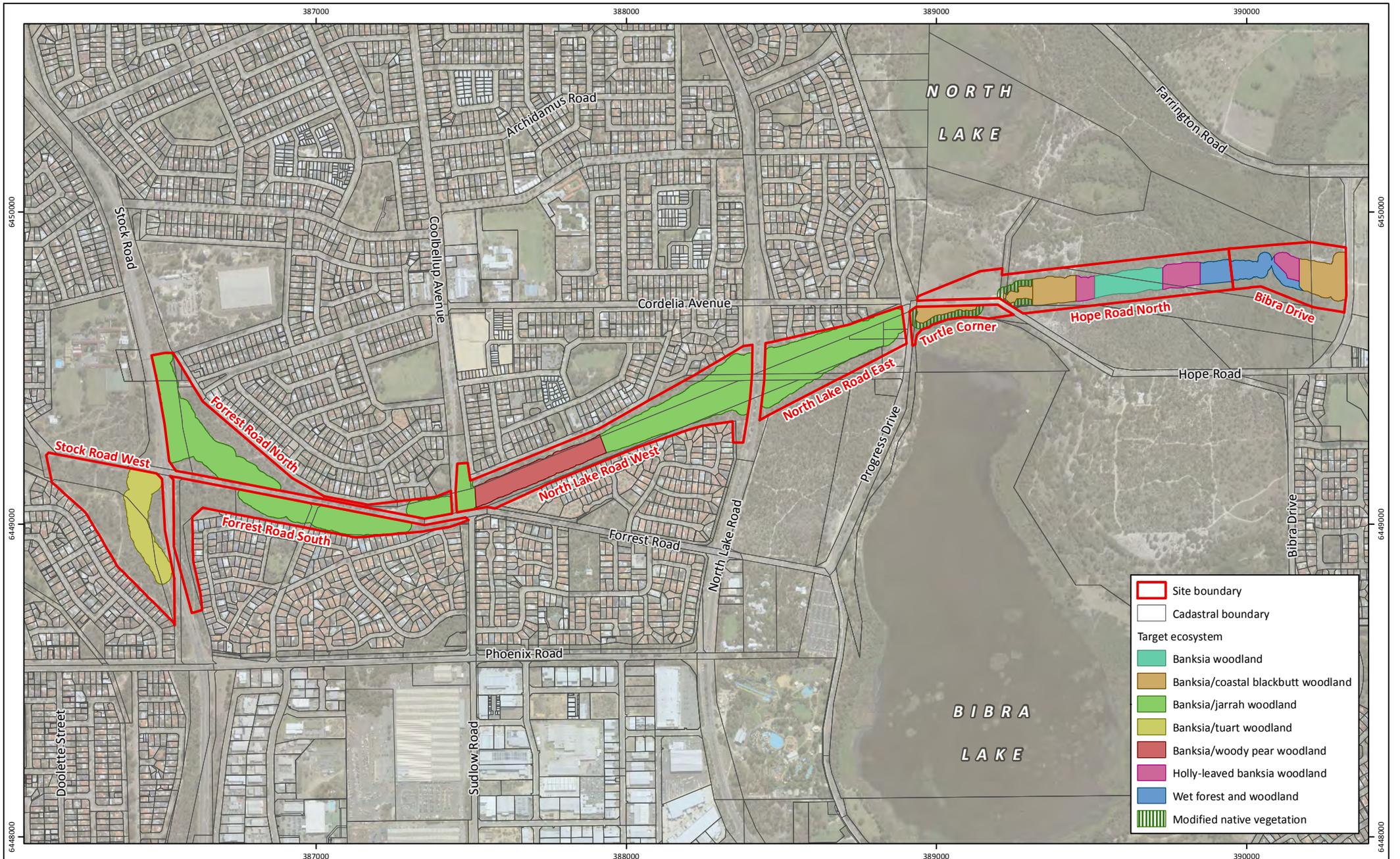
**Plan Number:**  
 EP17-085(07)-F54a  
**Drawn:** RAO  
**Date:** 23/02/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 23/02/2018



0 200 400  
 Metres  
 Scale: 1:16,000@A4  
 GDA 1994 MGA Zone 50







**Figure 12: Target Ecosystems**

**Project:** Reference Ecosystem Identification and Baseline Inventory Report  
 Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
 EP17-085(07)-F55a  
**Drawn:** RAO  
**Date:** 23/02/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 23/02/2018



0 200 400  
 Metres  
 Scale: 1:16,000@A4  
 GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used



# Appendix A

Baseline Monitoring Survey Methodology





## Recovery of native vegetation at Roe 8

Written by Dr Rachel Standish, adapting methodology for the Swan Coastal Plain developed by Dr Mark Brundrett and others (Department of Biodiversity Conservation and Attractions)

Demonstrators: Dr Rachel Standish, Dr Phil Ladd and Dr Jane Chambers, Dr Thea Linke, Dr Mark Brundrett (Department of Biodiversity Conservation and Attractions), Dr Karen Clarke (Department of Biodiversity Conservation and Attractions)

*Project 3 for ENV241 students, on and around campus, September 2017*

**Important notice:** The Roe 8 site is a construction site and as such it is managed by Main Roads. Main Roads will supervise our research and everyone must wear high-visibility vests (supplied), closed shoes, long-sleeved shirts and long trousers. People not suitably dressed will not be able to work on site. Please bring your wet weather gear.

### Meeting place:

Group D and B meet at the Cockburn Wetlands Education Centre carpark (see map on last page) at 9.00 am on Monday 25 September

Group A and C meet at the Progress Drive carpark (see map on last page) at 1.30 pm on Wednesday 27 September

### Before you start:

1. Review some field guides for common native and weedy plants that grow in Perth (e.g., Dell and Bennett 1986, Hussey et al. 2007).
2. Revise basic statistics (e.g., means, variance, tests to determine statistical significance between means) and the use of Excel spread sheets.
3. Read some of the articles listed under 'References cited'.
4. Pack a raincoat, warm clothes, closed shoes, a notebook, a memory stick and other items listed in your Unit Information and Learning Guide.

### Introduction

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed (SER 2004). At best, the practice of restoration is informed by ecological science, and actioned by the stakeholders with vested interests in the ecosystem requiring restoration. Stakeholders include conservation land managers,

ecologists, local community, and industry. One of the first steps in the restoration process is to assess the level of intervention required to achieve restoration goals. Intervention can range from doing nothing (i.e., unassisted recovery) to moderate intervention (e.g., installing fences to protect seedling recruits from herbivores; Prober et al. 2011) right through to high levels of intervention that include multiple activities (e.g., topsoil application, seeding, planting and fertiliser application; Daws et al. 2015). In some cases, the ecosystem will recover certain attributes without intervention. In these cases, restoration interventions would be designed to return attributes that the ecosystem has not recovered on its own. Measuring recovery prior to restoration is particularly important where the goal is the restoration of the historic native ecosystem (i.e., the native ecosystem that grew at the site prior to its being degraded, damaged or destroyed; the 'Vegetation reference' in Table 2).

Theory predicts unassisted recovery will occur in the absence of abiotic and biotic thresholds (Whisenant 1999). Thresholds are essentially barriers that prevent ecosystem recovery. For example, an abiotic barrier might be compact soils that limit growth of plant roots whereas a biotic barrier might be the presence of a competitive weed that negatively effects growth of native plants. Restoration would focus on interventions to overcome these barriers, so intervention to reduce soil compaction (e.g., through soil ripping) and interventions to reduce the abundance of the competitive weed (e.g., through herbicide application or hand-weeding). More than one barrier can be present at any one site and so the effort involved can be significant, particularly for large areas requiring restoration (Menz et al. 2013). For this reason, the absence of abiotic and biotic thresholds is particularly fortunate because it means the ecosystem itself will help with the process of recovery.

At the Roe 8 corridor, south of the Murdoch University South Street campus, there is an opportunity to measure how well the native vegetation has recovered since being cleared in February this year (Save Beelihar Wetlands 2017). The Roe 8 corridor cuts through a diversity of woodland and wetland communities and we will establish plots along the corridor that encompass this diversity. The data you and your fellow students collect will be used to inform the future restoration plan for the site (Flint 2017). We are very excited to give students the unique experience of seeing ecology in action! Demonstrators will be available to help students identify and distinguish seeders and sprouters (Table 1) and to ensure data are collected using the same methodology by groups of students working at different plots along the corridor. In this project, students will collect the following data from plots in the Roe 8 corridor and adjacent reference communities. For plots in the Roe 8 corridor, we will estimate

the percentage area of the plots that were covered in mulch between February and May 2017 (i.e., 0 to 100% cover). A thin layer of mulch cover will be evident indicating the footprint of the mulch piles that were removed in May. Also, we will estimate the percentage area of the plots that have been sprayed with herbicide on two occasions since the site was cleared (last application in late August 2017).

1. Plot attributes: Location, either Roe 8 corridor or reference community; distance to nearby native remnant vegetation for plots in the Roe 8 corridor (in m); and Heddle vegetation-soil type (Table 2)
2. Plot-level data: number and identity of trees (>1.2 m); soil pH and penetration resistance.
3. Sub-plot data: number, identity and percentage cover of native resprouters and seeders; percentage cover of leaf litter and bare ground.
4. Quadrat data: number, identity and percentage cover of native and weedy groundcovers.

Table 1. Glossary of key terms

Term	Definition
Seeder	Plant that recruits from seeds in soil
Resprouter	Plant that resprouts from root stock after disturbance, commonly fire, but also other disturbances such as clearing.

Table 2. Heddle soil-vegetation types along the Roe 8 corridor after Heddle (1979). Sections are numbered consecutively from east (inland; Section 1) to west (coastal; Section 20). The older soils are inland (i.e., Bassendean) and become progressively younger towards the coast. In addition to the Roe 8 disturbance, power-lines and a limestone track runs through regions 5 to 7. Sections 8, 18 and 19 won't be surveyed. **\*PLEASE REFER TO MAPS AT THE END OF THE DOCUMENT FOR DAILY MEETING POINTS.**

Section	Heddle soil type	Vegetation reference	Scheduled day & details*
1	Bassendean	Banksia woodland	MON AM Group B
2	Wetland	Low open flooded-gum forest	MON AM Group D
3	Wetland	Low open flooded-gum forest	MON AM Group D
4	Wetland	Low open paperbark woodland	MON AM Group D
5	Bassendean	Low banksia woodland	MON AM Group B
6	Bassendean	Low open banksia woodland	MON AM Group B
7	Bassendean	Banksia woodland	MON AM Group B
8	Herdsmen	Low open coastal-blackbutt woodland	NA
9	Herdsmen	Low open coastal-blackbutt woodland	WED PM Group A+C
10	Bassendean	Open jarrah-marri woodland	WED PM Group A+C
11	Karrakatta	Open jarrah-marri woodland	WED PM Group A+C
12	Karrakatta	Open jarrah-marri woodland	THURS PM Group A+C
13	Karrakatta	Jarrah-marri woodland	THURS PM Group A+C
14	Karrakatta	Jarrah-marri woodland	THURS PM Group A+C
15	Karrakatta	Jarrah-marri woodland	THURS AM Group A+C
16	Karrakatta	Jarrah-marri woodland	THURS AM Group A+C
17	Karrakatta	Jarrah-marri woodland	THURS AM Group A+C
18	Spearwood	Jarrah-marri woodland	NA
19	Spearwood	Jarrah-marri woodland	NA
20	Spearwood	Tuart woodland	TUES AM Group D+B

## Predictions

1. The vegetation structure, weed cover and species composition of vegetation in the Roe 8 corridor will be different to that of the nearby reference.
2. Resprouting plant species will be more abundant in plots compared with native plant species that recruit from seed.
3. Percentage cover and species richness of native plants will be inversely related to abundance and cover of weeds.
4. Recovery of native species will be greater for plots surrounded by mature native vegetation compared with recovery in plots close to sites where soils and/or vegetation has been modified (e.g., walking paths, urban areas).
5. Recovery of vegetation will be higher for unmodified soils (i.e., pH and penetration resistance similar to nearby soils under remnant vegetation) compared with recovery in plots with modified soils (e.g., mulch-affected, compacted).

## Materials and methods

### Field work

In the field you will need:

- Clipboard, pen and datasheets
- Robust footwear that encloses your feet (some groups will work in vegetation fringing wetlands)
- Sunscreen, hat and a raincoat in case of rain
- Drinking water to avoid dehydration and a snack
- Insect repellent if you do not like mosquitoes and hayfever medication if you suffer from hayfever.
- Zip-lock bag for soil samples (these will be provided).

Students will work in groups of three. Each group will collect data in 2-3 plots over 1.5 days and spend two half-days in the lab doing soil pH tests, checking and entering data into an Excel spreadsheet, and exploring the data. In the field on the first day, each 3-person group, will be assigned regions in which to work and a demonstrator. Groups will establish plots. Each plot is 20 m × 20 m plot and there are four 5 m × 5 m sub-plots nested within these larger plots. Additionally, students will collect data from 50 cm × 50 cm quadrats nested with the sub-plots (Figure 1). PLEASE WRITE NEATLY; ALL DATA SHEETS WILL BE COLLECTED AND KEPT AS A RECORD.

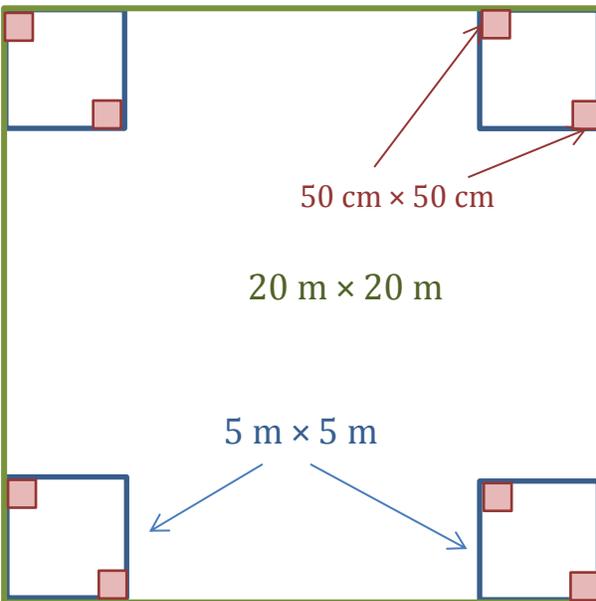


Figure 1. Size and configuration of plots (20 m × 20 m), sub-plots (5 m × 5 m) and quadrats (50 cm × 50 cm).

### Plant data

#### **20 m × 20 m plots**

- Establish a plot. Make it as square as you can by measuring the distance between diagonal corners of the plot; this distance should be 28.3 m.
- Record location of plot—corridor or reference.
- Visually estimate percentage cover of mulch-affected area in the plot.
- Visually estimate percentage cover of herbicide-affected area in the plot.
- Identify and count all the trees in the plot. Trees are defined as being taller than breast height (1.2 m).
- If you are unsure of the species identity of the trees then ask a demonstrator or take a photo.

#### **5 m × 5 m sub-plots**

- Consider each sub-plot in turn. Note whether or not you can see vehicle tracks in the sub-plot.
- Make a species list of all the native plant species in the sub-plot. Ask your demonstrator to help identify the species and whether or not they are seeders or resprouters. If you are unsure of the species identity of any plants and the demonstrator is not available then take a photo and use the pop-sticks to mark unknown plants.

- Visually estimate the percentage cover of each native plant species to the nearest ~1 % in the sub-plot using the cardboard squares provided as a guide. Some of the small and rare herbaceous species may occupy less than 1 % cover; for these species, it is fine to record percentage cover values less than 1 % (i.e., 0.5 %). Record the names of the people visually estimating percentage cover and note that the data will be more accurate if both people estimate and then verbally agree on the value to be recorded.
- Record the percentage cover of leaf litter and bare ground in the sub-plot.
- Repeat for all four sub-plots. Record data for each sub-plot separately.

### **50 cm × 50 cm quadrats**

- Consider each quadrat in turn. Make a species list of all the groundcover plant species in the sub-plot. Include both native and weedy species. Ask your demonstrator to help identify the species and whether or not they are seeders or resprouters. If you are unsure of the species identity of any plants and the demonstrator is not available then take a photo and use the pop-sticks to mark unknown plants.
- Count and also visually estimate the percentage cover of each groundcover plant species to the nearest ~5 % in the sub-plot using the cardboard squares provided as a guide. Some of the small and rare herbaceous species may occupy less than 5 % cover; for these species, it is fine to record percentage cover values less than 5 % (i.e., 1 or 2 %). Record the names of the people visually estimating percentage cover and note that the data will be more accurate if both people estimate and then verbally agree on the value to be recorded.
- Repeat for all eight quadrats. Record data for each quadrat separately.

Check if you have collected these data:

Data collected	50 cm × 50 cm quadrat	5 m × 5m sub-plot	20 m × 20 m plot
Groundcover species count	Yes		
Groundcover species percentage cover	Yes		
Native species count		Yes	
Native species percentage cover		Yes	
Leaf litter percentage cover		Yes	
Bare ground percentage cover		Yes	
Tree species count			Yes

### Soil data

Label one of the zip-lock bags provided with the plot number, date, depth of soil sample (10 cm) and name of person collecting the soil. Use the auger provided to collect one soil core from the centre of the 20 m × 20 m plot. The top of the auger should be flush with the soil to reach a depth of 10 cm. Keep the sample cool (in the shade if possible) pending lab analysis.

Liaise with your demonstrator and Rachel to ensure Penny the penetrometer measures soil penetration resistance in your plot. Insert Penny to the left or right of where soil was collected with the auger, and away from the 5 m × 5 m sub-plots. Record the depth at which the probe stops penetrating the soil.

### Other plot data

Use the measuring tapes provided to measure the distance between the centre of the 20 m × 20 m plot and the nearest patch of native vegetation. Make notes on any other things that you observe: animal scats, evidence of herbivory, animal diggings, track marks, etc.

Obtain a GPS reading for the centre of your plot.

### Laboratory-based research

In the laboratory you will need:

- Books to help identify the plant species

- Hand lens (if you have one)
- Laptop computer
- Calculator
- pH meter, spoon and balance (all provided)

There are three tasks to complete in the laboratory before you move onto the next project or go home. The first two tasks should be prioritized ahead of the third, because it is important to confirm species identification while the plants are fresh in your mind. The third task, data entry, shouldn't be neglected though because you won't be able to write the report without copies of the data. Data entry should be a group effort.

### Task 1: Soil pH

- Use a spoon to weigh out about 10 g (to the nearest half gram), of your soil sample into the container provided.
- Add 50ml of distilled water to the soil. The ideal is a 1:5 ratio of soil to water.
- Shake the container for about three minutes then allow the soil to settle for 2 minutes.
- Measure the pH value on the water above the soil in the container. Ensure you get a steady reading on the digital readout.
- Wash the container ready for the next sample.

### Task 2: Confirm identification of plant species collected in the field

- Use the field guides and search the Western Australian herbarium (1998-) online to confirm the identification of the plant species in your field herbarium.

### Task 3: Data entry

- Work within and between groups to design spread-sheets for your data.
- Ultimately you will need every group's data in one file.

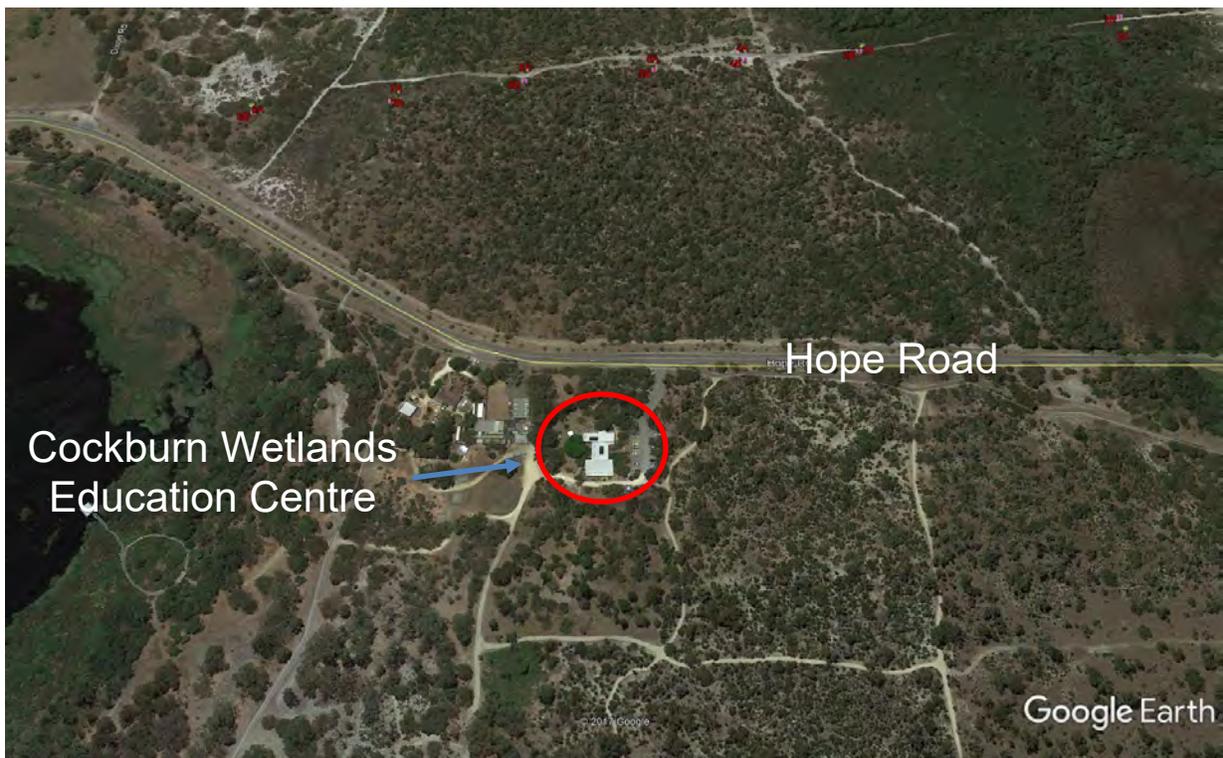
## **Data analysis**

Use bar charts and scatter plots to explore your data and test the predictions listed at the beginning of this document. Use simple tests such as t-tests, ANOVA and regression analysis to provide statistical support for the observed patterns. Refer to the Unit Information and Learning Guide for information on how to write your scientific report.

## References

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- Whisenant SG 1999. *Repairing damaged wildlands: A process-orientated, landscape-scale approach*. Cambridge University Press, Cambridge.

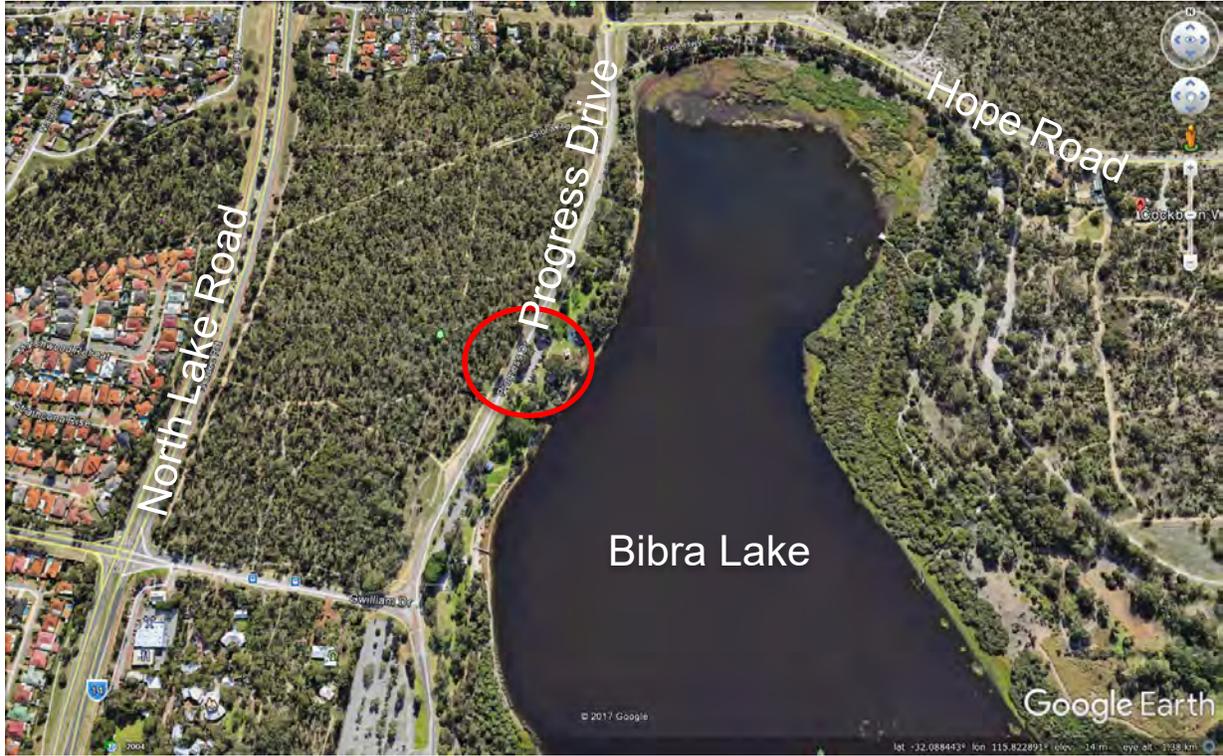
Map showing Cockburn Wetlands Education Centre carpark meeting point circled in red: MON AM + PM



Map showing Yorston Place meeting point circled in red: TUES AM



Map showing Progress Drive car park meeting point circled in red: WED PM



Map showing Malvolio Road meeting point circled in red: THURS AM + PM



# Appendix B

Raw data – 2017 Site Assessment (Emerge Associates 2017)

To be provided as a Microsoft *Excel* file





# Appendix C

Raw Data – Baseline Monitoring Survey (Murdoch University  
2017)



To be provided by Murdoch University



# Appendix D

Associated Native Flora Species Lists





**Appendix D: Native flora species associated with each target ecosystem**

Keighery *et al.* (2012) frequency % shown is for the closest five (5) sites for all target ecosystems except wet forest and woodland for which frequency % is from all Keighery *et al.* (2012) sites. Presence/absence data from a portion of Murdoch (2017) monitoring sites is also displayed as 'ongoing monitoring'. Complete data from Murdoch 2017 and Emerge Associates 2017 surveys will be included once finalised data is provided. Bold font indicates 'important species' for each target ecosystem which comprise canopy and large shrub species.

Species	Target Ecosystem													
	Banksia woodland		Banksia/coastal blackbutt woodland		Banksia/jarrah woodland		Banksia/tuart woodland		Banksia/woody pear woodland		Holly-leaved banksia woodland		Wet forest and woodland	
	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring
<i>Acacia alata</i> var. <i>alata</i>	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
<i>Acacia applanata</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Acacia cyclops</i>	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-
<i>Acacia dentifera</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Acacia huegelii</i>	20%	-	60%	-	40%	-	40%	-	40%	✓	20%	-	-	-
<i>Acacia pulchella</i>	80%	-	80%	✓	20%	✓	20%	✓	20%	✓	80%	-	20%	-
<i>Acacia saligna</i>	-	-	-	✓	-	-	-	-	-	✓	-	-	27%	✓
<i>Acacia sessilis</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Acacia stenoptera</i>	60%	-	-	-	40%	✓	40%	-	40%	-	60%	-	7%	-
<i>Acacia willdenowiana</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	20%	-	60%	-	20%	-	20%	-	20%	-	20%	-	-	-
<i>Adenanthos meisneri</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Adiantum aethiopicum</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Agrostocrinum scabrum</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<b><i>Allocasuarina fraseriana</i></b>	<b>40%</b>	-	<b>40%</b>	-	<b>20%</b>	-	<b>20%</b>	-	<b>20%</b>	-	<b>40%</b>	-	-	-
<i>Allocasuarina humilis</i>	40%	-	40%	-	-	✓	-	-	-	-	40%	-	-	-
<i>Alternanthera nodiflora</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Amphipogon laguroides</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Amphipogon turbinatus</i>	60%	-	60%	-	40%	-	40%	-	40%	-	60%	-	-	-
<i>Anarthria gracilis</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	20%	-	-	-	40%	-	40%	✓	40%	-	20%	-	-	-
<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>	-	-	60%	-	20%	✓	20%	-	20%	-	-	-	-	-
<i>Anigozanthos viridis</i> subsp. <i>viridis</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Anthotium junciforme</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Aotus intermedia</i>	-	-	-	-	-	-	-	-	-	-	-	-	20%	-
<i>Aotus procumbens</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Aphelia cyperoides</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Arnocrinum preissii</i>	20%	-	40%	-	-	-	-	-	-	-	20%	-	-	-
<i>Astartea affinis</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Astartea fascicularis</i>	-	-	-	✓	-	-	-	-	-	-	-	-	60%	-
<i>Asteridea pulverulenta</i>	-	-	20%	-	20%	-	20%	-	20%	-	-	-	7%	-
<i>Astroloma pallidum</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	7%	-
<i>Astroloma xerophyllum</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Austrostipa compressa</i>	80%	-	80%	-	40%	-	40%	-	40%	-	80%	-	7%	-
<i>Austrostipa flavescens</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Babingtonia camphorosmae</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<b><i>Banksia attenuata</i></b>	<b>80%</b>	-	<b>80%</b>	-	<b>100%</b>	✓	<b>100%</b>	✓	<b>100%</b>	✓	<b>80%</b>	-	-	-
<i>Banksia dallanneyi</i>	-	-	20%	-	20%	-	20%	✓	20%	-	-	-	-	-
<b><i>Banksia ilicifolia</i></b>	60%	-	60%	-	20%	-	20%	-	20%	-	<b>60%</b>	-	-	-
<i>Banksia littoralis</i>	-	-	-	✓	-	-	-	-	-	-	-	-	13%	-

**Appendix D: Native flora species associated with each target ecosystem**

Keighery *et al.* (2012) frequency % shown is for the closest five (5) sites for all target ecosystems except wet forest and woodland for which frequency % is from all Keighery *et al.* (2012) sites. Presence/absence data from a portion of Murdoch (2017) monitoring sites is also displayed as 'ongoing monitoring'. Complete data from Murdoch 2017 and Emerge Associates 2017 surveys will be included once finalised data is provided. Bold font indicates 'important species' for each target ecosystem which comprise canopy and large shrub species.

Species	Target Ecosystem													
	Banksia woodland		Banksia/coastal blackbutt woodland		Banksia/jarrah woodland		Banksia/tuart woodland		Banksia/woody pear woodland		Holly-leaved banksia woodland		Wet forest and woodland	
	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring
<b><i>Banksia menziesii</i></b>	100%	-	100%	-	60%	-	60%	-	60%	-	100%	-	-	-
<i>Banksia sessilis</i> var. <i>sessilis</i>	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
<i>Baumea articulata</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Baumea juncea</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Beaufortia elegans</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Boronia ramosa</i> subsp. <i>ramosa</i>	-	-	20%	-	-	-	-	-	-	✓	-	-	-	-
<i>Bossiaea eriocarpa</i>	100%	-	100%	-	40%	✓	40%	✓	40%	✓	100%	-	-	-
<i>Brachyloma preissii</i>	20%	-	20%	-	20%	-	20%	-	20%	-	20%	-	-	-
<i>Burchardia congesta</i>	80%	-	80%	✓	100%	✓	100%	✓	100%	✓	80%	-	-	-
<i>Burchardia multiflora</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Caesia micrantha</i>	-	-	-	-	40%	-	40%	✓	40%	✓	-	-	13%	-
<i>Caladenia flava</i> subsp. <i>flava</i>	20%	-	-	✓	60%	-	60%	✓	60%	✓	20%	-	7%	-
<i>Caladenia georgei</i>	-	-	-	✓	20%	-	20%	✓	20%	-	-	-	-	-
<i>Caladenia latifolia</i>	-	-	-	✓	-	-	-	-	-	-	-	-	7%	-
<i>Caladenia longicauda</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Caladenia paludosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Calandrinia corrigioloides</i>	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-
<i>Calectasia narragara</i>	20%	-	20%	-	-	-	-	-	-	-	20%	-	-	-
<i>Calothamnus lateralis</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Calytrix angulata</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Calytrix flavescens</i>	80%	-	80%	-	-	-	-	-	-	-	80%	-	-	-
<i>Calytrix fraseri</i>	40%	-	40%	-	-	-	-	-	-	-	40%	-	-	-
<i>Carex thecata</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	7%	-
<i>Cartonema philydroides</i>	-	-	40%	✓	-	-	-	-	-	-	-	-	-	-
<i>Cassytha flava</i>	40%	-	-	-	-	-	-	-	-	-	40%	-	-	-
<i>Cassytha racemosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	27%	-
<i>Centrolepis aristata</i>	-	-	-	-	-	-	-	-	-	-	-	-	33%	-
<i>Centrolepis drummondiana</i>	60%	-	60%	✓	40%	-	40%	-	40%	-	60%	-	13%	-
<i>Centrolepis glabra</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Centrolepis humillima</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Centrolepis mutica</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	40%	-	40%	-	40%	-	40%	-	40%	-	40%	-	-	-
<i>Chordifex sinuosus</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Comesperma calymega</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Conospermum stoechadis</i> subsp. <i>stoechadis</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Conospermum triplinervium</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Conostephium pendulum</i>	80%	-	-	-	60%	-	60%	-	60%	✓	80%	-	-	-
<i>Conostephium preissii</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	40%	-	60%	✓	80%	✓	80%	✓	80%	✓	40%	-	7%	-
<i>Conostylis candicans</i> subsp. <i>candicans</i>	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-

**Appendix D: Native flora species associated with each target ecosystem**

Keighery *et al.* (2012) frequency % shown is for the closest five (5) sites for all target ecosystems except wet forest and woodland for which frequency % is from all Keighery *et al.* (2012) sites. Presence/absence data from a portion of Murdoch (2017) monitoring sites is also displayed as 'ongoing monitoring'. Complete data from Murdoch 2017 and Emerge Associates 2017 surveys will be included once finalised data is provided. Bold font indicates 'important species' for each target ecosystem which comprise canopy and large shrub species.

Species	Target Ecosystem														
	Banksia woodland		Banksia/coastal blackbutt woodland		Banksia/jarrah woodland		Banksia/tuart woodland		Banksia/woody pear woodland		Holly-leaved banksia woodland		Wet forest and woodland		
	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	
<i>Conostylis caricina subsp. caricina</i>	20%	-	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Conostylis juncea</i>	20%	-	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Conostylis setigera subsp. setigera</i>	40%	-	40%	-	80%	-	80%	-	80%	-	40%	-	-	-	-
<i>Corymbia calophylla</i>	-	-	-	-	60%	✓	60%	-	60%	✓	-	-	20%	-	-
<i>Corynotheca micrantha var. micrantha</i>	-	-	20%	-	20%	-	20%	-	20%	-	-	-	7%	-	-
<i>Cotula coronopifolia</i>	-	-	-	-	-	-	-	-	-	-	-	-	47%	-	-
<i>Crassula colorata var. colorata</i>	40%	-	40%	✓	-	-	-	✓	-	-	40%	-	-	-	-
<i>Crassula decumbens</i>	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
<i>Crassula exserta</i>	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
<i>Crassula natans var. minus</i>	-	-	-	-	-	-	-	-	-	-	-	-	27%	-	-
<i>Croninia kingiana</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-	-
<i>Cyathochaeta equitans</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cycnogeton lineare</i>	-	-	-	-	-	-	-	-	-	-	-	-	20%	-	-
<i>Dampiera linearis</i>	80%	-	80%	✓	40%	✓	40%	-	40%	-	80%	-	13%	-	-
<i>Dasypogon bromeliifolius</i>	100%	-	100%	✓	60%	-	60%	-	60%	-	100%	-	13%	-	-
<i>Daucus glochidiatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-	-
<i>Daviesia divaricata subsp. divaricata</i>	20%	-	-	-	40%	-	40%	-	40%	✓	20%	-	-	-	-
<i>Daviesia nudiflora subsp. nudiflora</i>	20%	-	-	-	40%	-	40%	-	40%	-	20%	-	-	-	-
<i>Daviesia triflora</i>	40%	-	-	-	20%	-	20%	-	20%	-	40%	-	-	-	-
<i>Desmocladius fasciculatus</i>	-	-	20%	-	40%	-	40%	-	40%	-	-	-	-	-	-
<i>Desmocladius flexuosus</i>	60%	-	60%	✓	40%	-	40%	✓	40%	✓	60%	-	-	-	-
<i>Deyeuxia quadriseta</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-	-
<i>Dianella revoluta var. divaricata</i>	-	-	20%	✓	60%	✓	60%	✓	60%	✓	-	-	7%	-	-
<i>Dichelachne crinita</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	7%	-	-
<i>Dichopogon capillipes</i>	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-
<i>Dielsia stenostachya</i>	-	-	-	-	-	-	-	-	-	-	-	-	27%	-	-
<i>Dillwynia dillwynioides</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-	-
<i>Diuris longifolia</i>	-	-	-	-	60%	-	60%	-	60%	-	-	-	-	-	-
<i>Dodonaea hackettiana</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Drosera erythrorhiza subsp. erythrorhiza</i>	-	-	20%	-	-	✓	-	✓	-	✓	-	-	-	-	-
<i>Drosera glanduligera</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-	-
<i>Drosera macrantha subsp. macrantha</i>	-	-	-	-	-	✓	-	✓	-	✓	-	-	-	-	-
<i>Drosera menziesii subsp. menziesii</i>	-	-	-	✓	-	-	-	✓	-	✓	-	-	-	-	-
<i>Drosera menziesii subsp. penicillaris</i>	20%	-	40%	-	-	-	-	-	-	-	20%	-	-	-	-
<i>Drosera paleacea subsp. paleacea</i>	60%	-	-	-	-	-	-	-	-	-	60%	-	-	-	-
<i>Drosera pallida</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-	-
<i>Drosera stolonifera</i>	-	-	-	✓	80%	✓	80%	✓	80%	✓	-	-	-	-	-
<i>Drosera stolonifera subsp. porrecta</i>	-	-	20%	-	-	-	-	-	-	-	-	-	7%	-	-
<i>Epilobium billardioreanum</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-	-
<i>Epilobium hirtigerum</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-	-

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Species	Target Ecosystem														
	Banksia woodland		Banksia/coastal blackbutt woodland		Banksia/jarrah woodland		Banksia/tuart woodland		Banksia/woody pear woodland		Holly-leaved banksia woodland		Wet forest and woodland		
	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	
<i>Eremaea asterocarpa</i> subsp. <i>asterocarpa</i>	20%	-	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	40%	-	40%	-	-	-	-	-	-	-	-	40%	-	-	-
<i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>	-	-	-	-	80%	✓	80%	✓	80%	✓	-	-	7%	-	-
<b><i>Eucalyptus gomphocephala</i></b>	-	-	-	-	20%	-	<b>20%</b>	✓	20%	-	-	-	-	-	-
<b><i>Eucalyptus marginata</i> subsp. <i>marginata</i></b>	#	-	<b>40%</b>	-	<b>60%</b>	✓	<b>60%</b>	✓	<b>60%</b>	✓	<b>40%</b>	-	20%	-	-
<i>Eucalyptus rudis</i> subsp. <i>rudis</i>	-	-	-	✓	-	-	-	-	-	-	-	-	-	<b>60%</b>	-
<b><i>Eucalyptus todtiana</i></b>	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
<i>Ficinia nodosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Gahnia trifida</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Gastrolobium capitatum</i>	40%	-	-	-	100%	-	100%	-	100%	-	40%	-	-	-	-
<i>Gastrolobium ebracteolatum</i>	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-
<i>Gompholobium capitatum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gompholobium confertum</i>	20%	-	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Gompholobium tomentosum</i>	100%	-	100%	✓	100%	✓	100%	✓	100%	✓	100%	-	7%	-	-
<i>Gonocarpus pithyoides</i>	40%	-	-	-	-	-	-	-	-	-	40%	-	-	-	-
<i>Goodenia pulchella</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	20%	-
<i>Gratiola pubescens</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	20%	-
<i>Haemodorum laxum</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-
<i>Hakea candolleana</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-
<i>Hakea prostrata</i>	-	-	-	-	20%	-	20%	✓	20%	-	-	-	-	-	-
<i>Hardenbergia comptoniana</i>	20%	-	-	✓	60%	✓	60%	✓	60%	✓	20%	-	-	-	-
<i>Hemiandra pungens</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Hensmania turbinata</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-
<i>Hibbertia cuneiformis</i>	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓
<i>Hibbertia aurea</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-	-
<i>Hibbertia huegelii</i>	40%	-	40%	-	40%	-	40%	-	40%	-	40%	-	-	-	-
<i>Hibbertia hypericoides</i>	60%	-	-	✓	80%	✓	80%	-	80%	✓	60%	-	-	-	-
<i>Hibbertia racemosa</i>	40%	-	60%	-	60%	-	60%	-	60%	-	40%	-	-	-	-
<i>Hibbertia stellaris</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Hibbertia subvaginata</i>	40%	-	40%	-	-	-	-	-	-	-	40%	-	-	-	-
<i>Homalosciadium homalocarpum</i>	60%	-	60%	-	40%	-	40%	-	40%	-	60%	-	13%	-	-
<i>Hovea pungens</i>	20%	-	-	✓	-	✓	-	-	-	-	20%	-	-	-	-
<i>Hovea trisperma</i> var. <i>trisperma</i>	40%	-	-	-	60%	✓	60%	-	60%	-	40%	-	-	-	-
<i>Hydrocotyle alata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Hydrocotyle scutellifera</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Hypocalymma angustifolium</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Hypocalymma robustum</i>	60%	-	-	✓	40%	✓	40%	-	40%	✓	60%	-	-	-	-
<i>Hypocalymma xanthopetalum</i>	80%	-	-	-	-	-	-	-	-	-	80%	-	-	-	-
<i>Hypolaena exsulca</i>	60%	-	-	-	40%	-	40%	-	40%	-	60%	-	7%	-	-
<i>Hypolaena pubescens</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-

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Species	Target Ecosystem														
	Banksia woodland		Banksia/coastal blackbutt woodland		Banksia/jarrah woodland		Banksia/tuart woodland		Banksia/woody pear woodland		Holly-leaved banksia woodland		Wet forest and woodland		
	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	
<i>Isolepis cernua</i>	20%	-	-	-	-	-	-	-	-	-	-	20%	-	20%	-
<i>Isolepis marginata</i>	40%	-	-	-	-	-	-	-	-	-	-	40%	-	47%	-
<i>Isolepis oldfieldiana</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Isolepis setiformis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Isolepis stellata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Isotropis cuneifolia subsp. cuneifolia</i>	-	-	-	-	60%	-	60%	-	60%	-	-	-	-	-	-
<i>Ixiolaena viscosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Jacksonia floribunda</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-
<i>Jacksonia furcellata</i>	60%	-	60%	✓	-	✓	-	✓	-	✓	60%	-	13%	-	-
<i>Jacksonia sericea</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-	-
<i>Jacksonia sternbergiana</i>	20%	-	-	-	20%	-	20%	-	20%	-	20%	-	-	-	-
<i>Kennedia prostrata</i>	20%	-	-	✓	60%	✓	60%	✓	60%	✓	20%	-	13%	-	-
<i>Kunzea glabrescens</i>	40%	-	-	✓	-	-	-	-	-	-	40%	-	27%	-	-
<i>Lachnagrostis filiformis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	27%	-
<i>Lachnagrostis plebeia</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Lagenophora huegelii</i>	-	-	-	-	60%	-	60%	-	60%	-	-	-	-	7%	-
<i>Laxmannia sessiliflora subsp. australis</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-
<i>Laxmannia squarrosa</i>	40%	-	-	-	-	-	-	-	-	-	40%	-	-	-	-
<i>Lechenaultia expansa</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Lechenaultia floribunda</i>	60%	-	60%	-	-	-	-	-	-	-	60%	-	-	-	-
<i>Lepidobolus preissianus</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-	-
<i>Lepidosperma leptostachyum</i>	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-
<i>Lepidosperma longitudinale</i>	-	-	-	✓	-	-	-	-	-	-	-	-	-	80%	-
<i>Lepidosperma scabrum</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-	-
<i>Lepidosperma squamatum</i>	40%	-	40%	✓	60%	-	60%	✓	60%	-	40%	-	-	-	-
<i>Leporella fimbriata</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-
<i>Leptocarpus coangustatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Leptocarpus roycei</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Leptoceras menziesii</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Leucopogon australis subsp. australis</i>	80%	-	-	✓	-	-	-	-	-	-	80%	-	-	-	-
<i>Leucopogon conostephoides</i>	-	-	80%	-	-	-	-	-	-	✓	-	-	-	-	-
<i>Leucopogon gracillimus</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-	-
<i>Leucopogon parviflorus</i>	-	-	-	-	40%	-	40%	-	40%	-	-	-	-	-	-
<i>Leucopogon polymorphus</i>	20%	-	20%	-	-	-	-	-	-	-	20%	-	-	-	-
<i>Leucopogon propinquus</i>	20%	-	-	-	-	-	-	-	-	✓	20%	-	7%	-	-
<i>Leucopogon racemulosus</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-	-
<i>Levenhookia stipitata</i>	40%	-	40%	-	-	-	-	-	-	-	40%	-	7%	-	-
<i>Liparophyllum capitatum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Lobelia alata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	27%	-
<i>Lobelia tenuior</i>	40%	-	-	-	-	-	-	-	-	-	40%	-	-	-	-

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Keighery *et al.* (2012) frequency % shown is for the closest five (5) sites for all target ecosystems except wet forest and woodland for which frequency % is from all Keighery *et al.* (2012) sites. Presence/absence data from a portion of Murdoch (2017) monitoring sites is also displayed as 'ongoing monitoring'. Complete data from Murdoch 2017 and Emerge Associates 2017 surveys will be included once finalised data is provided. Bold font indicates 'important species' for each target ecosystem which comprise canopy and large shrub species.

Species	Target Ecosystem													
	Banksia woodland		Banksia/coastal blackbutt woodland		Banksia/jarrah woodland		Banksia/tuart woodland		Banksia/woody pear woodland		Holly-leaved banksia woodland		Wet forest and woodland	
	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring
<i>Lomandra caespitosa</i>	-	-	80%	-	80%	-	80%	✓	80%	-	-	-	-	-
<i>Lomandra hermaphrodita</i>	80%	-	80%	-	20%	-	20%	-	20%	-	80%	-	-	-
<i>Lomandra maritima</i>	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
<i>Lomandra micrantha subsp. micrantha</i>	-	-	20%	✓	20%	-	20%	✓	20%	-	-	-	-	-
<i>Lomandra nigricans</i>	40%	-	-	-	20%	-	20%	-	20%	-	40%	-	-	-
<i>Lomandra preissii</i>	-	-	-	✓	20%	-	20%	-	20%	-	-	-	-	-
<i>Lomandra suaveolens</i>	20%	-	-	-	20%	-	20%	-	20%	✓	20%	-	-	-
<i>Lyginia barbata</i>	100%	-	100%	-	40%	-	40%	-	40%	-	100%	-	-	-
<i>Lyperanthus serratus</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Lysinema ciliatum</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Macarthuria apetala</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Macarthuria australis</i>	-	-	20%	-	-	-	-	-	-	✓	-	-	-	-
<b><i>Macrozamia fraseri</i></b>	<b>40%</b>	-	<b>40%</b>	✓	<b>80%</b>	✓	<b>80%</b>	✓	<b>80%</b>	✓	<b>40%</b>	-	<b>20%</b>	-
<i>Melaleuca incana subsp. incana</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Melaleuca lateritia</i>	-	-	-	-	-	-	-	-	-	-	-	-	33%	-
<b><i>Melaleuca preissiana</i></b>	20%	-	-	✓	-	-	-	-	-	-	20%	-	<b>47%</b>	-
<b><i>Melaleuca raphiophylla</i></b>	-	-	-	✓	-	-	-	-	-	-	-	-	<b>27%</b>	-
<i>Melaleuca ryeae</i>	40%	-	40%	-	-	-	-	-	-	-	40%	-	-	-
<i>Melaleuca systema</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Melaleuca teretifolia</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Melaleuca thymoides</i>	60%	-	60%	-	-	-	-	-	-	-	60%	-	-	-
<i>Melaleuca viminea subsp. viminea</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Mesomelaena pseudostygia</i>	20%	-	20%	-	100%	✓	100%	-	100%	✓	20%	-	-	-
<i>Mesomelaena tetragona</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Microlaena stipoides</i>	-	-	-	-	40%	-	40%	-	40%	-	-	-	27%	-
<i>Microtis media</i>	20%	-	20%	✓	-	-	-	-	-	-	20%	-	40%	-
<i>Millotia tenuifolia var. tenuifolia</i>	20%	-	20%	-	-	-	-	-	-	-	20%	-	-	-
<i>Monotaxis grandiflora</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Monotaxis occidentalis</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Neurachne alopecuroidea</i>	-	-	60%	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Nuytsia floribunda</i>	40%	-	40%	-	-	-	-	-	-	-	40%	-	-	-
<i>Opercularia hispidula</i>	-	-	-	-	-	-	-	-	-	-	-	-	33%	-
<i>Ornduffia albiflora</i>	-	-	-	-	-	-	-	-	-	-	-	-	27%	-
<i>Patersonia occidentalis</i>	100%	-	100%	✓	40%	-	40%	-	40%	-	100%	-	20%	-
<i>Patersonia occidentalis (wetland form)</i>	20%	-	-	-	40%	-	40%	-	40%	-	20%	-	20%	-
<i>Pelargonium littorale</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Persoonia angustiflora</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Persoonia saccata</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Petrophile juncifolia</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Petrophile linearis</i>	100%	-	100%	-	100%	-	100%	-	100%	✓	100%	-	-	-

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Species	Target Ecosystem													
	Banksia woodland		Banksia/coastal blackbutt woodland		Banksia/jarrah woodland		Banksia/tuart woodland		Banksia/woody pear woodland		Holly-leaved banksia woodland		Wet forest and woodland	
	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring
<i>Petrophile macrostachya</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Philothea spicata</i>	60%	-	60%	-	20%	✓	20%	-	20%	✓	60%	-	-	-
<i>Phlebocarya ciliata</i>	60%	-	60%	-	-	-	-	-	-	-	60%	-	-	-
<i>Phlebocarya filifolia</i>	40%	-	-	-	-	-	-	-	-	-	40%	-	-	-
<i>Phyllangium paradoxum</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Phyllanthus calycinus</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Pimelea rosea</i> subsp. <i>rosea</i>	-	-	-	-	20%	-	20%	✓	20%	✓	-	-	-	-
<i>Pimelea suaveolens</i> subsp. <i>suaveolens</i>	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
<i>Pimelea sulphurea</i>	40%	-	-	-	20%	-	20%	-	20%	-	40%	-	-	-
<i>Pithocarpa pulchella</i> var. <i>pulchella</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Platysace compressa</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	13%	-
<i>Poa drummondiana</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Podolepis gracilis</i>	20%	-	-	-	20%	-	20%	✓	20%	✓	20%	-	7%	-
<i>Podotheca angustifolia</i>	20%	-	20%	-	-	-	-	-	-	-	20%	-	-	-
<i>Podotheca chrysantha</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Polypogon tenellus</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Poranthera microphylla</i>	60%	-	-	✓	20%	-	20%	-	20%	-	60%	-	-	-
<i>Prasophyllum parvifolium</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Pseudognaphalium luteoalbum</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Pteridium esculentum</i>	-	-	-	✓	-	-	-	-	-	-	-	-	7%	-
<i>Pterochaeta paniculata</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Pterostylis</i> sp. <i>Slender Snail Orchid</i> (G.J. Keighery 14516)	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Pterostylis vittata</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Ptilotus polystachyus</i> var. <i>polystachyus</i>	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
<i>Pyrorchis nigricans</i>	20%	-	-	-	-	-	-	✓	-	-	20%	-	-	-
<i>Quinetia urvillei</i>	40%	-	40%	-	-	-	-	-	-	-	40%	-	-	-
<i>Regelia ciliata</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	7%	-
<i>Regelia inops</i>	20%	-	20%	-	-	-	-	-	-	-	20%	-	-	-
<i>Rytidosperma caespitosum</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Rytidosperma occidentale</i>	80%	-	80%	-	-	-	-	-	-	-	80%	-	-	-
<i>Scaevola canescens</i>	-	-	-	-	40%	-	40%	-	40%	✓	-	-	-	-
<i>Scaevola repens</i> var. <i>repens</i>	40%	-	-	-	60%	-	60%	-	60%	-	40%	-	-	-
<i>Schoenus brevisetis</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Schoenus clandestinus</i>	20%	-	-	-	60%	-	60%	✓	60%	-	20%	-	-	-
<i>Schoenus curvifolius</i>	100%	-	100%	-	-	-	-	-	-	-	100%	-	-	-
<i>Schoenus discifer</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Schoenus efoliatus</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	13%	-
<i>Schoenus elegans</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Schoenus grandiflorus</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Schoenus maschalinus</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-

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	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring
<i>Schoenus pedicellatus</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Schoenus rigens</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Schoenus tenellus</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Scholtzia involucreta</i>	80%	-	80%	✓	-	-	-	-	-	-	80%	-	-	-
<i>Senecio condylus</i>	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
<i>Siloxerus filifolius</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Siloxerus humifusus</i>	20%	-	20%	-	-	-	-	-	-	-	20%	-	7%	-
<i>Sowerbaea laxiflora</i>	-	-	20%	-	60%	✓	60%	✓	60%	✓	-	-	13%	-
<i>Sphaerolobium vimineum</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Stackhousia monogyna</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Stirlingia latifolia</i>	60%	-	60%	✓	80%	-	80%	-	80%	-	60%	-	-	-
<i>Stylidium brunonianum subsp. brunonianum</i>	80%	-	80%	-	20%	-	20%	-	20%	-	80%	-	20%	-
<i>Stylidium calcaratum</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Stylidium carnosum</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Stylidium divaricatum</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Stylidium junceum subsp. junceum</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Stylidium longitubum</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Stylidium piliferum subsp. piliferum</i>	20%	-	-	-	-	-	-	-	-	-	20%	-	-	-
<i>Stylidium repens</i>	60%	-	80%	-	-	-	-	-	-	-	60%	-	-	-
<i>Stylidium roseoalatum</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Stylidium schoenoides</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Stylidium utricularioides</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Taxandria linearifolia</i>	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
<i>Tetraria octandra</i>	20%	-	-	-	100%	-	100%	✓	100%	-	20%	-	-	-
<i>Thelymitra benthamiana</i>	-	-	-	-	20%	-	20%	-	20%	-	-	-	-	-
<i>Thelymitra macrophylla</i>	-	-	-	-	-	-	-	-	-	-	-	-	13%	-
<i>Thysanotus arbuscula</i>	-	-	20%	-	-	-	-	-	-	-	-	-	-	-
<i>Thysanotus arenarius</i>	-	-	-	-	40%	-	40%	-	40%	-	-	-	-	-
<i>Thysanotus manglesianus/patersonii complex</i>	20%	-	60%	-	20%	-	20%	-	20%	-	20%	-	27%	-
<i>Thysanotus multiflorus</i>	20%	-	20%	-	-	-	-	-	-	-	20%	-	7%	-
<i>Thysanotus patersonii</i>	40%	-	-	✓	40%	-	40%	✓	40%	-	40%	-	7%	-
<i>Thysanotus sparteus</i>	20%	-	-	-	40%	✓	40%	✓	40%	-	20%	-	-	-
<i>Thysanotus thyrsoideus</i>	20%	-	20%	-	20%	-	20%	-	20%	-	20%	-	13%	-
<i>Trachymene pilosa</i>	100%	-	100%	✓	80%	-	80%	-	80%	-	100%	-	20%	-
<i>Tribonanthes australis</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Tribonanthes violacea</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Tricoryne elatior</i>	-	-	20%	-	20%	-	20%	-	20%	-	-	-	7%	-
<i>Tricoryne tenella</i>	40%	-	-	-	-	-	-	-	-	✓	40%	-	-	-
<i>Utricularia violacea</i>	-	-	-	-	-	-	-	-	-	-	-	-	7%	-
<i>Wahlenbergia preissii</i>	20%	-	20%	-	20%	-	20%	-	20%	-	20%	-	7%	-

**Appendix D: Native flora species associated with each target ecosystem**

Keighery *et al.* (2012) frequency % shown is for the closest five (5) sites for all target ecosystems except wet forest and woodland for which frequency % is from all Keighery *et al.* (2012) sites. Presence/absence data from a portion of Murdoch (2017) monitoring sites is also displayed as 'ongoing monitoring'. Complete data from Murdoch 2017 and Emerge Associates 2017 surveys will be included once finalised data is provided. Bold font indicates 'important species' for each target ecosystem which comprise canopy and large shrub species.

Species	Target Ecosystem														
	Banksia woodland		Banksia/coastal blackbutt woodland		Banksia/jarrah woodland		Banksia/tuart woodland		Banksia/woody pear woodland		Holly-leaved banksia woodland		Wet forest and woodland		
	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	Keighery <i>et al.</i> (2012)	Ongoing monitoring	
<i>Waitzia suaveolens</i> var. <i>suaveolens</i>	60%	-	-	-	-	-	-	-	-	-	-	60%	-	7%	-
<b><i>Xanthorrhoea preissii</i></b>	<b>80%</b>	-	<b>80%</b>	✓	<b>100%</b>	✓	<b>100%</b>	✓	<b>100%</b>	✓	<b>80%</b>	-	<b>20%</b>	-	
<i>Xanthosia huegelii</i> subsp. <i>huegelii</i>	60%	-	-	-	60%	-	60%	-	60%	-	60%	-	7%	-	
<b><i>Xylomelum occidentale</i></b>	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	

#=species recorded in Keighery *et al.* (2012) site/s but not included in target ecosystem due to powerline vegetation height restrictions



# Appendix D

Community Questionnaire







# Rehabilitating Roe 8

## Rehabilitating Roe 8 2021

Hello:

You are invited to participate in our research relating to the Rehabilitating Roe 8 project. We're conducting a brief questionnaire on behalf of the WA government and community to determine awareness of and attitudes towards the work they are doing. Your feedback will help ensure that they are addressing community expectations. It will take approximately 7 minutes to complete the questionnaire.

Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the questionnaire at any point. It is very important for us to learn your opinions.

Your responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Ian McKenzie at [ian@perthmarketresearch.com.au](mailto:ian@perthmarketresearch.com.au). Thank you very much for your time and support. Please start with the questionnaire now by clicking on the Continue button below.

---

Before today have you heard of the project called Rehabilitating Roe 8?

- Yes
- No
- Unsure

---

What do you know about the Rehabilitating Roe 8 project?

---

Rehabilitating Roe 8 is a collaboration between the WA State Government and community organisations to enable the rehabilitation of the Roe 8 project site from the east of the Kwinana Freeway to west of Stock Rd. In collaboration with community, scientists, State government and the City of Cockburn a 10-year Rehabilitation Management Plan was prepared for the Corridor, which spans 4.5 kilometres from Bibra Drive, to west of Stock Road. The Rehabilitation Management Plan sets out objectives for both the restoration of the site, which comprises seven different ecosystems, and community engagement. The site will be used for passive recreation, environmental and cultural education and research. The Rehabilitating Roe 8 project focus is to implement the Rehabilitation Management Plan. The project is overseen by the Rehabilitating Roe 8 Advisory Committee.

Having the role of the project explained, do you believe that you were aware of the project before today?

- Yes
- No
- Unsure

---

Thinking of how you recognise and relate to the Rehabilitating Roe 8 project area, how satisfied are you with the progress of:

	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied	Don't know/unsure
Presence of art or cultural experiences	<input type="radio"/>					
Value of art or cultural experiences	<input type="radio"/>					
Sense of community ownership of the area	<input type="radio"/>					
Signage in the area	<input type="radio"/>					
Cultural recognition of the Nyungar people in the project	<input type="radio"/>					
Provision of paths & trails in the area	<input type="radio"/>					
The overall project	<input type="radio"/>					

If you were dissatisfied with aspects of the project, why is that?

Before today, have you seen the following logo?



## Rehabilitating Roe 8

Yes

No

---

Have you had any involvement with the Rehabilitating Roe 8 project?

Yes

No

---

Have you been involved in any of the following opportunities & activities? *(Please select all that apply)*

- As a community representative on a committee
  - As a participant in planting days
  - As a participant in weeding days/events
  - As a participant in Community Days
  - As a participant in Open Days
  - Sharing information
  - As a participant in Citizen Science
  - Other
- 

The Rehabilitating Roe 8 Management Plan (RMP) identifies rehabilitation and community targets, goals and objectives to ensure project activities and outcomes are focused and meaningful. How would you describe your level of awareness of the objectives of the Rehabilitation Management Plan?

- Fully aware
  - Aware
  - Somewhat aware
  - Very limited awareness
  - Not at all aware
-

The following statements describe the objectives as stated in the Management Plan. Please note which you were aware of. *(Please select all that apply)*

- I'm not aware of any objectives
- Recognition of Aboriginal heritage & continued connection to land
- Ensuring the community has input into decision making
- Ensuring the community has opportunities for hands-on involvement
- Honour and acknowledge the long and recent history of community and stakeholder involvement
- Engagement will inform & guide updates & adaptations to the RMP
- Involve the community in organised activities

Thinking about any information you have received about the project, how do you agree with the following statements?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know/unsure
The branding for Rehabilitating Roe 8 is recognisable	<input type="radio"/>					
The branding for Rehabilitating Roe 8 is used on everything I see in relation to the Rehabilitating Roe 8 project	<input type="radio"/>					
Information on the Rehabilitating Roe 8 project can be easily found in an accessible location	<input type="radio"/>					
I can easily share information on Rehabilitating Roe 8 with my network	<input type="radio"/>					
I receive regular updates on Rehabilitating Roe 8 progress	<input type="radio"/>					
Communications are consistent, accessible and transparent	<input type="radio"/>					
I feel involved in the project	<input type="radio"/>					

Thinking of how you interact with the Rehabilitating Roe 8 project area, roughly how often have you:

	Daily	Weekly	Monthly	Several times	Once	Never
Visited the area on your own in the last 12 months	<input type="radio"/>					
Visited the area with friends and family in the last 12 months	<input type="radio"/>					
Posted about the area in social media in the last 12 months	<input type="radio"/>					

---

How important do you feel each of the following is to include as a part of the Rehabilitating Roe 8 project?

	Very important	Important	Neutral	Unimportant	Very unimportant
Cultural events	<input type="radio"/>				
Wildlife events	<input type="radio"/>				
Educational events and programs	<input type="radio"/>				
Planting days	<input type="radio"/>				
Community days	<input type="radio"/>				
Trails	<input type="radio"/>				
Pathways	<input type="radio"/>				
Picnic tables, seats and benches	<input type="radio"/>				
Signage	<input type="radio"/>				
Cultural experiences	<input type="radio"/>				
	Very important	Important	Neutral	Unimportant	Very unimportant
Volunteering opportunities	<input type="radio"/>				
Scientific information	<input type="radio"/>				
Project updates	<input type="radio"/>				
Artwork	<input type="radio"/>				

What else would you like to see included as a part of the Rehabilitating Roe 8 project?

Do you feel you have received enough information about the Rehabilitating Roe 8 project?

Yes

No

---

Where have you seen, heard or received any information about Rehabilitating Roe 8? *(please select as many as apply)*

Newspaper reports

TV reports

Radio reports

Newsletter/flyers in letterbox

Email notifications

Passing by the project area

Doorknock by project representative

Internet/online

Friends/word of mouth

Signage/outdoor advertising

Electronic message signs

Other

---

Which is your preferred method of receiving information about Rehabilitating Roe 8? *(please select only one response)*

- Newspaper reports
  - TV reports
  - Radio reports
  - Newsletter/flyers in letterbox
  - Email notifications
  - Passing by the project area
  - Doorknock by project representative
  - Internet/online
  - Friends/word of mouth
  - Signage/outdoor advertising
  - Electronic message signs
  - Other
- 

How likely would you be to involve yourself in the project now, or after you had further information?

- Very likely
- Likely
- Unlikely
- Very unlikely
- Unsure

Why did you rate your likelihood of involving yourself in the project that way?

---

---

Do you have any comments you would like to make concerning the project.

---

---

What is your residential postcode?

---

---

Are you of Aboriginal or Torres Strait Islander descent?

Yes

No

What is your gender?

Male

Female

Which of the following age groups best represents your age?

- 18 - 24
  - 25 - 34
  - 35 - 44
  - 45 - 54
  - 55 - 64
  - 65 +
  - Prefer not to say
- 

If you would like to keep up-to-date with and get links to events and activities, please provide us with your name and other contact details. This information will not be linked with your responses or retained for any other purpose.

---

# Appendix E

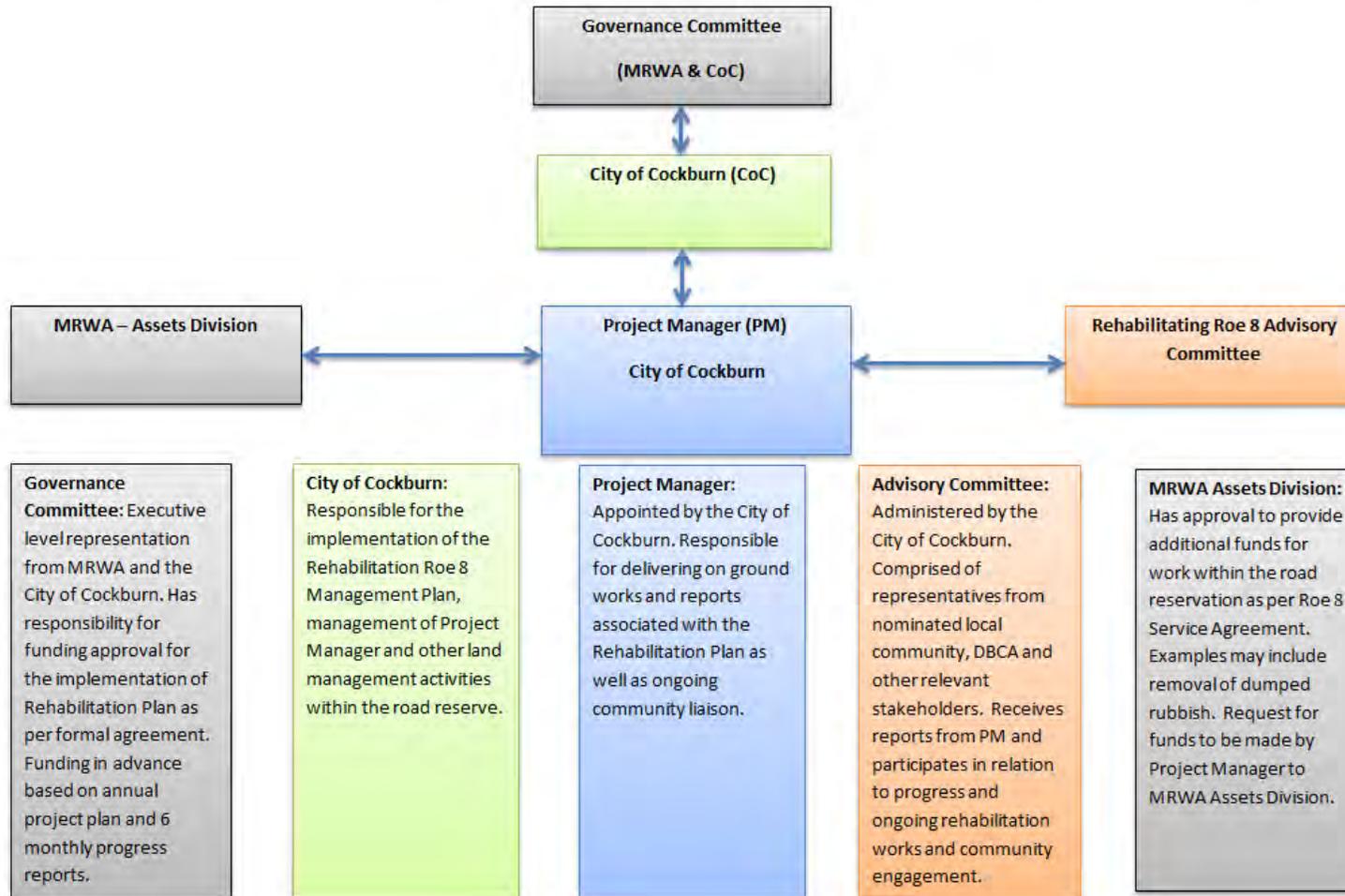
Rehabilitating Roe 8 Governance Structure





## Rehabilitating Roe 8 Governance Structure

### GOVERNANCE MODEL FOR THE IMPLEMENTATION OF THE ROE 8 REHABILITATION PLAN





# Appendix F

Rehabilitating Roe 8 Event/Project Audit





Rehabilitating Roe 8 Event/Project Audit			
Description of Event			
Place of Event			
Audit Date			
Number of participants			
Information source			
Objective	AUDIT ELEMENT	MEASURE <i>Select from the dropdown box</i>	COMMENTS
<b>1. Aboriginal Engagement</b>			
<i>Links to Objective 1.5</i>	<b>Cultural Protocol 1&amp;2</b> Acknowledgment of Country ( <i>*events with &lt;30 people</i> )	Yes	
	<b>Cultural Protocol 1</b> Welcome to Country ( <i>*events with &lt;30 people</i> )	Yes/No/NA	
<i>Links to Objective 1.4</i>	<b>Cultural Protocol 3</b> Incorporate Aboriginal colours in signage, landmarks, etc.	Yes/No/NA Considered in design Yes/No	
	<b>Cultural Protocol 3</b> Use Aboriginal artists to prepare artwork and design for signage	Yes/No/NA Considered in design Yes/No	
	<b>Cultural Protocol 4</b> The six seasons will be the recognised and celebrated in events, plantings, communications and reporting	Yes/No/NA Considered in design Yes/No	
	<b>Cultural Protocol 5</b>		

Objective	AUDIT ELEMENT	MEASURE <i>Select from the dropdown box</i>	COMMENTS
<i>Links to Objective 1.4</i>	Opportunities are provided for involvement of Aboriginal people & storytelling - leading walks and providing education	<b>Exceed/Meet/Below Expectation</b>	
	<b>Cultural Protocol 5</b> Opportunities are provided for involvement of Aboriginal people & storytelling – being part of events and celebrations as speakers, providing plant blessings at plant days etc.	<b>Exceed/Meet/Below Expectation</b>	
<i>Links to Objective 1.4</i>	<b>Cultural Protocol 5</b> Opportunities are provided for involvement of Aboriginal people & storytelling - Providing opportunities' for storytelling on the webpage, on signage, in artwork as events	<b>Yes/No/NA</b> Considered in design Yes/No	
	<b>Cultural Protocol 6</b> Link the heritage/ cultural centre and RR8 project area through signage and wayfinding to increase knowledge and cultural recognition	<b>Yes/No/NA</b> Considered in design Yes/No	
	<b>Cultural Protocol 7</b> Incorporate local language in signage through dual signage, local naming, in communications and though education opportunities'	<b>Yes/No/NA</b> Considered in design Yes/No	
	<b>Cultural Protocol 8</b> Improve Aboriginal employment opportunities, including utilizing local community skill sets, local businesses and linking to education providers and partners	<b>Exceed/Meet/Below Expectation</b>	
	<b>Cultural Protocol 9</b> Recognition of community networks through communicating & sharing information	<b>Yes/No/NA</b> Considered in design Yes/No	
	<b>Cultural Protocol 10</b>	<b>Yes/No/NA</b>	

Objective	AUDIT ELEMENT	MEASURE <i>Select from the dropdown box</i>	COMMENTS
	Recognition of pain and heartache through storytelling, artwork, signage and communications	Considered in design Yes/No	
<b>2. Community and Stakeholder Involvement</b>			
<i>Links to Objective 3.1 &amp; 3.2</i>	1. Community and stakeholders are given the opportunity be involved in events an projects	<b>Yes/No/NA</b>	
	2. Community and stakeholders are given the opportunity be involved in events an projects	>40% either male or female	
		10% of each age cohort of City of Cockburn	
		>5% attendees from outside City of Cockburn	
3. Honour, involve and acknowledge the long and recent history of community and stakeholder involvement	<b>Yes/No/NA</b> Considered in design Yes/No		
<i>Links to Objective 8.2</i>	4. Incorporate a cultural/ interpretive element into all management areas	<b>Yes/No/NA</b>	
		Considered in design	
<b>2. Community and Stakeholder feedback</b>			
	1. Enjoyment level specified by attendees	<b>Most common response from Attendees</b>	
	2. Ways in which attendees heard about event	<b>Response From Attendees</b> <b>City of Cockburn Website</b> Roe8 Rehabilitation Sustainable Living Booklet Friend/ Other relationship	

Objective	AUDIT ELEMENT	MEASURE <i>Select from the dropdown box</i>	COMMENTS
		Other (please specify in comments)	
	3. Honour, involve and acknowledge the long and recent history of community and stakeholder involvement	<b>Yes/No/NA</b>	
	4. Incorporate a cultural/ interpretive element into all management areas	Considered in design	
		<b>Yes/No/NA</b>	
		Considered in design	

# Appendix G

Forward Planning Recommendations





# Forward Planning Recommendations

Roe 8 Cleared Areas

Project No: EP17-085(07)

**Prepared for Rehabilitating Roe 8 Steering Committee  
August 2021**

# Forward Planning Recommendations

## Roe 8 Cleared Areas Roe 8 Cleared Areas

## Document Control

<b>Doc name:</b>	Forward Planning Recommendations Roe 8 Cleared Areas				
<b>Doc no.:</b>	EP17-0485(07)--006C RAW				
Version	Date	Author		Reviewer	
1	January 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Draft to client for review				
A	February 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Updated following comments from Rehabilitating Roe 8 Steering Committee				
B	February 2018	Rachel Omodei	RAO	Tom Atkinson	TAA
	Final issued to the Rehabilitating Roe 8 Working Group				
C	August 2021	Rachel Weber	RAW	Tom Atkinson	TAA
	Annual review updates				

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# Forward Planning Recommendations

Roe 8 Cleared Areas Roe 8 Cleared Areas

## Executive Summary

This document outlines actions to be undertaken during the ten years of the *Rehabilitation Management Plan Roe 8 Cleared Areas (RMP)* (Emerge Associates 2018b).

Recommended actions are provided for year 1 of the RMP (2018) as well as provisional forward planning for a further five years of the RMP (2019 to 2023). These actions relate to communication, involvement, engagement and restoration goals outlined in the RMP.

The monitoring, reporting and evaluation activities that will be required by the completion of 2018 include, but are not limited to the following:

- Creation of databases and associated protocols for storage of data recorded as part of the RMP.
- Incorporation of the results of the Aboriginal heritage survey, if undertaken during 2018, into the RMP as appropriate.
- Monitoring of restoration areas following the methods outlined in the RMP using the following protocols as a minimum:
  - monitoring of permanently marked plots
  - photopoint monitoring
  - weed mapping
- Preparation of monthly informal (brief) summary reports by the **Project Manager** detailing restoration works and presented to the Rehabilitating Roe 8 Advisory Committee.
- An internal review of all communication, engagement and involvement activities undertaken in 2018 and any feedback received.
- Preparation of an annual report at the end of 2018 by the **Project Manager** and submitted to the RR8AC for review and comment.
- Preparation of an annual community report card by the **Project Manager** to detail the results of the 'community expectations and satisfaction survey' as well as any other community and/or stakeholder feedback. The complete evaluation process for social rehabilitation outcomes is yet to be confirmed and will require additional planning and stakeholder engagement in 2018.
- Incorporation of the preliminary results of the fauna survey, if undertaken in 2018, into the RMP as appropriate.
- Review and evaluation of the annual report and updates to the RMP, if required, prior to implementation in the following year.

# Forward Planning Recommendations

## Roe 8 Cleared Areas Roe 8 Cleared Areas



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# Forward Planning Recommendations

Roe 8 Cleared Areas Roe 8 Cleared Areas

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# Forward Planning Recommendations

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# Forward Planning Recommendations

## Roe 8 Cleared Areas Roe 8 Cleared Areas

## Abbreviation Tables

*Table A1: Abbreviations – General terms*

General terms	
CES	Community expectations and satisfaction
RMP	Rehabilitation management plan

*Table A2: Abbreviations – units of measurement*

Units of measurement	
ha	Hectare

*Table A3: Abbreviations – Organisations*

Organisations	
DBCA	Department of Biodiversity, Conservation and Attractions
PURSAC	Perth Urban Restoration Scientific Advisory Committee
RR8	Rehabilitating Roe 8
RR8AC	Rehabilitating Roe 8 Advisory Committee

# Forward Planning Recommendations

## Roe 8 Cleared Areas Roe 8 Cleared Areas



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# Forward Planning Recommendations

Roe 8 Cleared Areas Roe 8 Cleared Areas

## 1 Introduction

### 1.1 Project background

The *Rehabilitation Management Plan Roe 8 Cleared Areas* (RMP) was prepared by Emerge Associates with assistance from Creating Communities (Emerge Associates 2018b). The RMP provides guidance for communications, engagement, involvement and restoration related to cleared areas along the proposed Roe 8 alignment over a ten year period (2018-2027).

The location of the site and management areas relevant to the RMP is shown in **Figure 1**.

The RMP outlines a collaborative and adaptive approach to implementation. In adaptive management the outcomes of implementation are monitored and learning is incorporated into planning and future management in process of continuous improvement (Standards Reference Group SERA 2017). Forward planning is therefore crucial to the operation of the RMP.

### 1.2 Document purpose and scope

This document provides forward planning recommendations for both 'social rehabilitation' and 'ecological restoration' which comprise initial and longer term activities proposed for the site under the RMP.

Detailed activities are proposed for year 1 (2018) of the RMP implementation period.

Provisional planning recommendations for key communication, involvement, engagement and restoration activities are also provided for the following five years (2019-2023). The activities recommended for these years should be reassessed during annual review and evaluation as the implementation of the RMP progresses.

Actions for the remaining four years of the plan (2024-2027) are yet to be determined through the annual review, evaluation and forward planning process.

### 1.3 RMP Implementation

The **Project Manager role** is identified as crucial to the implementation of the RMP as it will coordinate the implementation of restoration.

While multiple stakeholders and groups are expected to have roles in the implementation of the RMP (Emerge Associates 2018b), the forward planning recommendations assume that prior approval for activities will be decided by the **Project Administrator** in consultation with the **Rehabilitating Roe 8 Advisory Committee** (RR8AC) and the **Project Manager** who will coordinate the implementation of the tasks.

## Forward Planning Recommendations

Roe 8 Cleared Areas Roe 8 Cleared Areas

## 2 Communication, Involvement and Engagement

### 2.1 Communication

The following communication activities should be undertaken in 2018:

- Use community database to provide members with updates regarding the progress of the RMP.
- Review the Rehabilitating Roe 8 branding.
- Update the Rehabilitating Roe 8 website.
- Develop a draft information booklet including 'frequently asked questions'.
- Liaise with the City of Cockburn to utilise the City's website and social media channels.
- Promote upcoming engagement and involvement activities via advertisement or flyer format
- Install site signage.
- Utilise Perth Urban Restoration Scientific Advisory Committee (PURSAC) and tertiary institutions to inform the scientific community, community of interest and broader community of upcoming research opportunities and research/rehabilitation outcomes.
- Produce a brief (3-4 pages) annual community report card.

Communication actions for the nine remaining years of the plan are outlined in the RMP.

### 2.2 Involvement and Engagement

Involvement and engagement activities are provided in **Table 1**.

The following additional involvement and engagement activities should be undertaken in 2018:

- Liaise with the Department of Aboriginal Affairs to determine if a Section 18 approval under the *Aboriginal Heritage Act 1972* is required prior to works being undertaken in parts of the site.

# Forward Planning Recommendations

Roe 8 Cleared Areas

Table 1: Community engagement and involvement action plan

Activity	Description	Timing/frequency	Total occurrences over 10 year plan	Responsibility (and potential partners)	Methods of promotion
Aboriginal heritage survey	Consultation with Aboriginal stakeholders and other stakeholders has reinforced the need for the Aboriginal heritage of the site to be correctly understood and reflected in the ongoing implementation of the RMP. It is recommended that an 'Aboriginal heritage survey' be commissioned and that the RMP is reviewed and updated as required to reflect Aboriginal Heritage values upon its completion. The scope of work for an Aboriginal heritage survey has confirmed the need for sub-surface investigation within a specific area of the site. This area is partially located within the current registered site 3709 and other site DAA 4107. In addition, the project shall take into consideration the <i>Cultural Heritage Management Plan</i> (CHMP) (Archae-aus 2019).				
Communicate plan to community members and other stakeholders at an 'open day'	Potential for an open day or similar in early 2018 to present the launch of the <i>Rehabilitation Management Plan</i> and thank stakeholders for their input.  At RMP launch identify and promote future community events restoration activities.	Annually	10	Project Manager	Promote the event via: <ul style="list-style-type: none"> <li>Flyers to surrounding area</li> <li>Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>Posters / information sheets at Cockburn Wetlands Education Centre</li> <li>Community email database</li> <li>RR8 website</li> <li>City of Cockburn website</li> <li>Local newspapers</li> <li>Signage/banners at Wetlands Centre</li> </ul>
Aboriginal employment and training	Through consultation, it has been determined that there is significant restoration experience amongst the local Aboriginal community. Opportunities shall be further explored to employ local Aboriginal custodians and other Aboriginal people on the rehabilitation works. Training opportunities can also be considered, but genuine employment shall be prioritized.  At this stage the project has sought to actively engage with local Aboriginal suppliers. In addition, the procurement process encourages the use of registered Aboriginal suppliers.	As required	As required	Project Manager, the City of Cockburn is will-placed through their procurement processes to deliver aspects of this.	<ul style="list-style-type: none"> <li>Community email database</li> <li>RR8 website</li> <li>City of Cockburn website</li> <li>City of Cockburn Aboriginal Reference Group</li> <li>local newspapers</li> <li>Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>Local businesses may be engaged through the Melville-Cockburn Chamber of Commerce</li> </ul>
Local employment and training	There is interest in the local community to be involved and to gain employment opportunities on the rehabilitation works. Opportunities shall be further explored to employ interested local people on restoration activities.  The current procurement process encourages the use of local suppliers.	As required	As required	Project Manager	See row above
Community expectations and satisfaction survey (referred to as Rehabilitating Roe 8 Community Questionnaire)	A 'community expectations and satisfaction survey' (CES survey) referred to as the 'Rehabilitating Roe 8 Community Questionnaire' is required to inform the review and revision of the RMP and provide accountability to interested community members. This survey will serve as a monitoring and evaluation tool for the project as outlined in the RMP.  The survey would ideally be informed by a pre-implementation baseline, which means the first round of survey should be delivered as soon as possible.  The format of the survey is yet to be confirmed and will require additional planning and stakeholder engagement. This may be interview-based or based online using a web based survey portal, or interviews can be used to inform survey design that is then based online.	Open for one month annually	10	To be designed by Project Manager and Rehabilitating Roe 8 Advisory Committee	Promotion of survey via: <ul style="list-style-type: none"> <li>community email database</li> <li>RR8 website</li> <li>City of Cockburn website</li> <li>local newspapers</li> <li>Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>Dashboard (1-pager) of results to be includes in annual community report card to show what is being achieved (see row below)</li> </ul>
Review and revision of RMP	The RMP will be updated adaptively on an annual basis. These updates will be informed by monitored outcomes of activities, ongoing community engagement including the CES survey, environmental change, new knowledge and other changes, such as changes to project context. The process for the review and revision of the RMP is outlined in the RMP.	Annually	10	Project Manager/Rehabilitating Roe 8 Advisory Committee based upon stakeholder and community feedback and with guidance from sub-committees, PURSAC and other key stakeholders	Produce a brief (3-4 page) annual community report card to show what is being achieved

## Forward Planning Recommendations

Roe 8 Cleared Areas

Table 1: Community engagement and involvement action plan (continued)

Activity	Description	Timing/frequency	Total occurrences over 10 year plan	Responsibility (and potential partners)	Methods of promotion
Input into governance arrangement	<p>Representation of community groups and others in the formal governance structure is an efficient way of communicating with these groups and, when these groups share promotional materials, with their membership and audience.</p> <p>Following the confirmation of a governance arrangement an inclusive selection process for membership to the proposed 'Rehabilitating Roe 8 Advisory Committee' (RR8AC) and other roles will be established.</p> <p>Membership to the proposed RR8AC shall be reassessed bi-annually in order to ensure broad and current representation.</p> <p>The Rehabilitating Roe 8 Advisory Committee has a terms of reference and governance structure.</p>	Biannually	5	<p>Selection process open to all stakeholders. In addition to existing organisations represented, ensure:</p> <ul style="list-style-type: none"> <li>Local Traditional Owners and local Aboriginal Custodian representation.</li> <li>Local community association representation.</li> </ul>	<p>Invitation to join committees to be distributed via:</p> <ul style="list-style-type: none"> <li>Community stakeholder database</li> <li>Existing stakeholder channels</li> <li>Broader distribution to Traditional Owners and community groups through City of Cockburn &amp; City of Cockburn ARG, City of Fremantle, City of Kwinana and City of Melville</li> <li>Local businesses may be engaged through the Melville-Cockburn Chamber of Commerce</li> <li>Updates to the makeup of the groups to be communicated via: <ul style="list-style-type: none"> <li>Community email database</li> <li>RR8 website</li> <li>City of Cockburn website</li> </ul> </li> </ul>
Rehabilitating Roe 8 Advisory Committee meetings	<p>Meetings of the RR8AC are initially proposed to occur on a monthly basis, and then as required. The Project Manager shall give a monthly report to RR8AC at these meetings.</p> <p>The RR8AC have developed a terms of reference and governance model.</p>	Monthly initially, then as required	Up to 120	Rehabilitating Roe 8 Advisory Committee / sub-committees /Project Manager to attend (may not include sub-committees)	<ul style="list-style-type: none"> <li>Terms of reference to outline how group members would be contacted regarding each meeting</li> <li>Regular updates of meeting outcomes on RR8 website, shared on City of Cockburn and committee member / stakeholder Facebook pages</li> </ul>
Community education	<p>The implementation of the RMP offers excellent opportunity for education. The following community education options related to restoration are identified:</p> <ul style="list-style-type: none"> <li>Restoration and ecology workshops, including understanding local/endemic plants.</li> <li>Weed identification and weeding workshops.</li> <li>Training for citizen science community monitoring programs.</li> <li>Understanding site sensitivity and minimising impact (to ensure large groups do not damage the site).</li> <li>Link with Cockburn Wetlands Education Centre, NativeARC, Millennium Kids and City of Cockburn community education opportunities.</li> <li>Links with relevant research programs.</li> <li>Guided tours of site by community 'champions'.</li> </ul> <p>Note that these are not the only education options and options may be identified over time.</p>	4/annum	40	<p>Project Manager to work with:</p> <ul style="list-style-type: none"> <li>Cockburn Wetlands Education Centre</li> <li>Cockburn Community Wildlife Corridor</li> <li>Traditional Owners and local Aboriginal Custodians</li> <li>Millennium Kids</li> <li>NativeARC</li> <li>Primary, secondary and tertiary education institutions</li> <li>Bibra Lake Scouts</li> <li>Local Community Associations (e.g. Coolbellup Residents Association, Hamilton Hill Community Group, Friends of North Lake, Cooby Concerned Residents, Bibra Lake Residents Association etc.)</li> <li>PURSAC</li> <li>The Beeliar Group of Professors</li> <li>Align with relevant tertiary institution course schedules</li> </ul>	<ul style="list-style-type: none"> <li>Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>Posters / information sheets at Cockburn Wetlands Education Centre</li> <li>Community email database</li> <li>RR8 website</li> <li>City of Cockburn website</li> <li>Local newspapers</li> <li>Communicate future engagement and involvement initiatives at each event</li> </ul>

## Forward Planning Recommendations

Roe 8 Cleared Areas

Table 1: Community engagement and involvement action plan (continued)

Activity	Description	Timing/frequency	Total occurrences over 10 year plan	Responsibility (and potential partners)	Methods of promotion
Community involvement in planting, weeding and watering	A strong desire was identified for community involvement in planting for appropriate areas of the site (according to protocols outlined in the RMP). Community planting areas for 2018 are identified in <b>Section 3.1.4</b> .	Annually	Dependent upon number of community planting sites	Project Manager to work with: <ul style="list-style-type: none"> <li>Local residents</li> <li>Local Community Associations</li> <li>Cockburn Wetlands Education Centre</li> <li>Cockburn Community Wildlife Corridor</li> <li>Millennium Kids</li> <li>NativeARC</li> <li>Traditional Owners and local Aboriginal Custodians Bibra Lake Scouts</li> <li>PURSAC</li> </ul>	<ul style="list-style-type: none"> <li>Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>Signage on site</li> <li>Flyer drops nearby households</li> <li>Posters / information sheets at Cockburn Wetlands Education Centre</li> <li>Community email database</li> <li>RR8 website</li> <li>City of Cockburn website</li> <li>local newspapers</li> <li>Communicate future engagement and involvement initiatives at each event</li> </ul>
Citizen science / community monitoring	The implementation of the RMP offers an excellent opportunity for citizen science/community monitoring programs and input (according to protocols outlined in the RMP).	Once each season, with opportunities for additional citizen science monitoring outside the scope of this item	40	Project Manager to work with: <ul style="list-style-type: none"> <li>Local residents</li> <li>Local Community Associations</li> <li>Primary, secondary and tertiary education institutions</li> <li>Cockburn Wetlands Education Centre</li> <li>Cockburn Community Wildlife Corridor</li> <li>Millennium Kids</li> <li>NativeARC</li> <li>Traditional Owners and local Aboriginal Custodians</li> <li>PURSAC</li> <li>The Beeliar Group of Professors</li> </ul>	<ul style="list-style-type: none"> <li>Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>Flyer drops nearby households</li> <li>Posters / information sheets at Cockburn Wetlands Education Centre</li> <li>Community email database</li> <li>RR8 website</li> <li>City of Cockburn website</li> <li>local newspapers</li> <li>Communicate future engagement and involvement initiatives at each event</li> </ul>
Local community adoption of restoration areas	The details regarding the local community “adopt-a-spot” program are yet to be confirmed and require additional planning and stakeholder engagement. The Cockburn Community Wildlife Corridor have adopted an area within Stock Rd West. The Project Manager shall assist other community groups to adopt a spot.	As required (see Community Planting, Weeding and Monitoring above)	As required (see Community Planting, Weeding and Monitoring above)	Local residents Local Community Associations	<ul style="list-style-type: none"> <li>Review addresses in community database</li> <li>Flyer drops to prioritise nearest households</li> <li>Communicate future engagement and involvement initiatives at each event</li> </ul>

# Forward Planning Recommendations

Roe 8 Cleared Areas

Table 1: Community engagement and involvement action plan (continued)

Activity	Description	Timing/frequency	Total occurrences over 10 year plan	Responsibility (and potential partners)	Methods of promotion
Community Science Conference	<p>A community science conference that is targeted at informed and interested community members could potentially be the “flagship” community event in the Rehabilitating Roe 8 program calendar.</p> <p>The conference has been proposed to provide scientists, citizen-scientists and students with the opportunity to present findings and updates to the community. The conference would include presentations on the progress of the RR8 project and relevant and local research projects that are not within the scope of the RMP.</p> <p>The conference may be modelled on the Brixton St Symposium and Banksia Woodland Symposium and shall include funding to ensure that community can attend. Possibly the conference could be a component of the annual Cockburn Wetland Education Centre Wetlands Management Conference, if the theme of the wetland conference targets the same intended audience.</p>	Every two years	5	<p>To be held at Cockburn Wetlands Education Centre (if attendance does not exceed capacity) – or hold in another centre / suburbs All community members and stakeholders invited Key scientific stakeholders:</p> <ul style="list-style-type: none"> <li>• PURSAC</li> <li>• Tertiary institutions</li> <li>• Primary and secondary schools</li> <li>• Department of Biodiversity, Conservation and Attractions</li> <li>• Cockburn Wetlands Education Centre</li> <li>• Cockburn Community Wildlife Corridor</li> <li>• Millennium Kids</li> <li>• Native ARC</li> <li>• The Beeliar Group of Professors</li> <li>• Botanic Gardens and Parks Authority (incl. Kings Park Authority)</li> </ul>	<p>Promote the event via:</p> <ul style="list-style-type: none"> <li>• Flyers to surrounding area</li> <li>• Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>• Posters / information sheets at Cockburn Wetlands Education Centre</li> <li>• Community email database</li> <li>• RR8 website</li> <li>• City of Cockburn website</li> <li>• local newspapers</li> <li>• Signage/banners at Wetlands Centre</li> </ul> <p>Communicate future engagement and involvement initiatives at each event</p> <p>Outcomes of the conference to be promoted via:</p> <ul style="list-style-type: none"> <li>• Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>• Community email database</li> <li>• RR8 website</li> <li>• City of Cockburn website</li> <li>• local newspapers</li> <li>• Include results in annual community report card (see CES survey above)</li> </ul>
Partnerships with City of Cockburn Events	Opportunities to link with City of Cockburn events shall be explored where feasible.	As required seek opportunities	As required seek opportunities	<ul style="list-style-type: none"> <li>• City of Cockburn</li> <li>• City of Cockburn Aboriginal Reference Group</li> <li>• Local Community Associations</li> <li>• Use Save Beeliar Wetlands / Re-think the link to connect with all communities</li> </ul>	<ul style="list-style-type: none"> <li>• Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>• Community email database</li> <li>• RR8 website</li> <li>• City of Cockburn website</li> <li>• local newspapers</li> </ul>
Partnerships with Cockburn Wetlands Education Centre Events/Programs	Opportunities to link with Wetlands Centre Cockburn events shall be explored where feasible. For example, may include training for on-site rehabilitation, seed collection, site tours, frog-friendly gardens workshops, planting workshops For citizen science elements use the sampling frame and appropriate monitoring protocols	As required seek opportunities	As required seek opportunities	Cockburn Wetlands Education Centre	<ul style="list-style-type: none"> <li>• Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>• Community email database</li> <li>• RR8 website</li> <li>• City of Cockburn website</li> <li>• local newspapers</li> </ul>
Partnership with primary/secondary schools (rehabilitation, education and research)	The implementation of the RMP offers excellent opportunity for partnerships with primary/secondary schools including restoration activities such as planting, weeding, monitoring and other citizen science programs, the potential for an “adopt-a-spot” program to include a specific area or areas for a particular school to maintain/report on monitoring. Young people may be able to audit the area, conceptualise and implement their own citizen science projects.	As required seek opportunities	As required seek opportunities	Primary and Secondary Schools - engage Primary and Secondary Schools through Millennium Kids, NativeARC and Bibra Lake Scouts	<ul style="list-style-type: none"> <li>• Direct phone calls to schools – specifically “bushrangers” or similar programs</li> <li>• Through Millennium Kids, Native ARC and Bibra Lake Scouts</li> <li>• Stakeholder database</li> </ul>

## Forward Planning Recommendations

Roe 8 Cleared Areas

Table 1: Community engagement and involvement action plan (continued)

Activity	Description	Timing/frequency	Total occurrences over 10 year plan	Responsibility (and potential partners)	Methods of promotion
Partnership with tertiary education institutions (rehabilitation, education and research)	The implementation of the RMP offers excellent opportunity for partnerships with tertiary education institutions including engaging and supporting researchers to further understanding of restoration process and outcomes and establishing the Rehabilitating Roe 8 project as a centre of learning.	As required seek opportunities	As required seek opportunities	Project Manager to develop. Expression of Interest selection process for tertiary partnerships. Understand that different universities all have different things to offer.	<ul style="list-style-type: none"> <li>Contact institutions directly</li> <li>Stakeholder database</li> <li>PURSAC</li> </ul>
Open Days	Open days provide opportunity for gathering community input, reporting on progress and may link to education or involvement through site visits or aligning to a community planting day.	Every two years	5	<p>Potential to be held at Cockburn Wetlands Education Centre every second year, and attend in surrounding suburbs every other year.</p> <p>All community members and stakeholders invited.</p> <p>Project Manager to organise.</p> <p>Project Manager and Rehabilitating Roe 8 Advisory Committee to facilitate.</p>	<p>Promote the event via:</p> <ul style="list-style-type: none"> <li>Flyers to surrounding area</li> <li>Existing stakeholder channels, including environmental and community group Facebook pages</li> <li>Posters / information sheets at Cockburn Wetlands Education Centre</li> <li>Community email database</li> <li>RR8 website</li> <li>City of Cockburn website</li> <li>Local newspapers</li> <li>Signage/banners at Wetlands Centre</li> <li>Communicate future engagement and involvement initiatives at each event</li> </ul>

## Forward Planning Recommendations

### Roe 8 Cleared Areas

## 3 Restoration

### 3.1 2018 Forward planning

As identified in the RMP, restoration areas have been identified in which management actions will be undertaken. The restoration areas are shown in **Figure 2**.

#### 3.1.1 Landform preparation

No landform preparation is recommended prior to 2018 restoration works.

#### 3.1.2 Fauna habitat enhancement

Understanding changes to fauna, fauna habitat and fauna related ecological functions within the site will require that a detailed and comprehensive study is completed (level 2 equivalent). Ideally this fauna study will be completed within the first two years of implementation to verify the initial conditions within the site. Fauna surveys undertaken prior to clearing will provide some useful baseline information regarding fauna within the site. However, new information will also need to be collected in line with the key stratifications outlined in the RMP, to ensure that the fauna study adequately addresses information needed for project evaluation.

Therefore, the following actions are recommended for 2018 in regards to fauna:

- Engage an experienced fauna specialist to develop a fauna survey strategy for the site that can be used in conjunction with the pre-clearing surveys (outlined in ref external context report) to assess fauna habitat re-establishment in the cleared areas.
- Undertake the first round of fauna surveys within the site, as deemed appropriate by the fauna specialist.

#### 3.1.3 Seed collection

There is potential to collect seeds from some native species in the site during 2018, as well as, assess and plan for future seed collecting. An experienced restoration contractor should be engaged prior to spring 2018 to survey the remnant vegetation within the site and determine suitable source populations and/or plants for collection within 2018/2019 seed collection season.

Key species should include the following species identified as important in the RMP:

- *Allocasuarina fraseriana*
- *Banksia attenuata*
- *Banksia ilicifolia*
- *Banksia menziesii*
- *Eucalyptus gomphocephala*
- *Eucalyptus marginata subsp. marginata*
- *Eucalyptus rudis subsp. rudis*
- *Eucalyptus todtiana*
- *Macrozamia fraseri*
- *Melaleuca raphiophylla*

## Forward Planning Recommendations

### Roe 8 Cleared Areas

- *Xanthorrhoea preissii*
- *Xylomelum occidentale*.

Any species identified on the associated species list in the RMP that can be propagated and installed as tubestock should be considered for seed collection.

#### 3.1.4 Planting area

The recommended planting area for 2018 is approximately 1.14 hectares (ha) in size. The 2018 planting area is located within North Lake Road East and North Lake Road West management areas as shown in **Figure 3**.

#### 3.1.5 Tubestock order

A recommended tubestock order for 2018 is provided in **Table 2**. The list includes species of which some seed is available (Main Roads has local seed available *Final Seed Report - 2015/2016 Seed Collection Summary Report* (Workpower 2016) as does DBCA).

Table 2: Tubestock order for 2018

Species	No.
<i>Acacia pulchella</i>	1000
<i>Acacia stenoptera</i>	1000
<i>Allocasuarina fraseriana</i>	1000
<i>Allocasuarina humilis</i>	1000
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	1000
<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>	1000
<i>Banksia attenuata</i>	4000
<i>Banksia menziesii</i>	4000
<i>Bossiaea eriocarpa</i>	1000
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	1000
<i>Conostylis candicans</i> subsp. <i>candicans</i>	1000
<i>Daviesia divaricata</i> subsp. <i>divaricata</i>	1000
<i>Daviesia triflora</i>	1000
<i>Dianella revoluta</i> var. <i>divaricata</i>	1000
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	1000
<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	1000
<i>Gompholobium tomentosum</i>	1000
<i>Hemiandra pungens</i>	1000

## Forward Planning Recommendations

### Roe 8 Cleared Areas

Table 2: Tubestock order for 2018 (cont)

Species	No.
<i>Hypocalymma robustum</i>	1000
<i>Jacksonia sternbergiana</i>	1000
<i>Kennedia prostrata</i>	1000
<i>Melaleuca thymoides</i>	1000
<i>Opercularia hispidula</i>	1000
<i>Patersonia occidentalis</i>	1000
<i>Pimelea rosea</i> subsp. <i>rosea</i>	1000
<i>Scholtzia involucrata</i>	1000
<i>Xylomelum occidentale</i>	1000
<b>TOTAL</b>	<b>33,000</b>

Some species that may take longer to propagate and should be ordered in 2018 for supply in 2019. These species and recommended tubestock numbers are provided in **Table 3**. Note the numbers provided in **Table 3** are inflated due to the larger proposed planting area for 2019 (see **Section 3.2.1**).

Table 3: Part tubestock order for 2019

Species	No.
<i>Macrozamia fraseri</i>	6,000
<i>Xanthorrhoea preissii</i>	32,000
<i>Nuytsia floribunda</i>	2,000
<b>TOTAL</b>	<b>40,000</b>

### 3.1.6 Tubestock planting

The tubestock planting should be undertaken following the protocols provided in the RMP.

### 3.1.7 Direct seeding areas

No direct seeding areas are currently recommended for 2018. Additional planning and stakeholder engagement is required in order to confirm the application of direct seeding.

### 3.1.8 Weed control

Weed control will be required across all restoration areas as shown in **Figure 2**. Weed control protocols are provided in the RMP. Each year weed control should be completed over at least three separate campaigns timed to ensure important weed species are controlled at the most suitable time.

## Forward Planning Recommendations

### Roe 8 Cleared Areas

The distribution of weeds in the site was identified in the baseline survey in 2017 (Emerge Associates 2018a) and provides an indication of weed control requirements across the site. The distribution of grassy weeds in the restoration areas is shown in **Figure 4**. The distribution of bulbous weeds in the restoration areas is shown in **Figure 5**. The distribution of woody weeds in the restoration areas is shown in **Figure 6**.

### 3.2 Future forward planning

Actions for the remaining nine years of the plan are outlined in the RMP and will also be dependent on implementation of the adaptive management framework provided in the RMP.

#### 3.2.1 Planting areas

Planting areas for 2019 to 2023 have been recommended using the prioritisation protocol detailed in the RMP. Assisted regeneration and reconstruction restoration areas will likely require more than one year of planting to meet the restoration objectives and one year of planting is proposed followed by two years of infill for each planted area.

The majority of tubestock should be planted in the first planting year at a rate of 3 plants per m<sup>2</sup>. Infill planting has been recommended for the second year at a density of 1 plant per m<sup>2</sup> and for a third year at 0.5 plants per m<sup>2</sup>.

Natural regeneration in 2019 and 2020 have deemed it necessary to reduce the rate of plant installation for the first year to 2 plants/m<sup>2</sup>. Subsequent infill planting is based on a 30% mortality rate. Overall, the project seeks to have plant density in the cleared areas that is comparable with that of benchmark reference plots at the end of the 10-year rehabilitation period (Standish *et al.* 2020).

Recommended planting areas for 2019 are shown in **Figure 7**.

Recommended planting areas for 2020 are shown in **Figure 8**.

Recommended planting areas for 2021 are shown in **Figure 9**.

Recommended planting areas for 2022 are shown in **Figure 10**.

Recommended planting areas for 2023 are shown in **Figure 11**.

A nominal allocation of tubestock has been proposed for the remaining years of implementation to facilitate infill of any remaining gaps as required. Planting areas are updated annually to reflect where gaps in plant density and species richness occur. Some areas identified as assisted regeneration but as medium priority may be planted out earlier to facilitate faster recovery, where resourcing and budget allows.

## Forward Planning Recommendations

### Roe 8 Cleared Areas

## 4 Monitoring, reporting and evaluation

Monitoring and reporting protocols are outlined in the RMP should be carried out each year as specified in the program of works. The following sections outline specific activities related to monitoring, evaluation and reporting that are required to be undertaken during 2018.

### 4.1 Database creation

Records should be kept of any communication, engagement, involvement or restoration activities and associated outcomes throughout 2018 and submitted to the **Project Manager** and/or Project Administrator.

Databases and protocols for management and access to data need to be established in 2018.

### 4.2 Communication, involvement and engagement

The results of the Aboriginal heritage survey will need to be incorporated into the RMP following completion.

In August 2019 an annual report was prepared which summarised the outcomes of the project for the 12 months proceeding. This included information on community and engagement activities, volunteer numbers, numbers of tubestock installed and progress against the goals listed within the RMP. The annual report will be available to the public on the Rehabilitating Roe 8 website and copies provided to key stakeholders.

The evaluation process for social rehabilitation outcomes has been addressed in some part within the *Community Expectations Report* (Shape Urban and The KP Collective 2019). This report summarises the input received through the engagement activities, with recommendations for ten cultural protocols, measures for these protocols and a detailed toolkit on how to determine the community expectations and satisfaction with the Rehabilitating Roe 8 project. It is acknowledged that this aspect of the project is complex and may require further development of metrics based on input from experts. Some aspects of the social rehabilitation have been included in the Community questionnaire.

The first annual internal review of RMP activities, as undertaken in 2018, will need to be completed after the first 12 months of activity through the Rehabilitating Roe 8 Advisory Committee. Operating the adaptive management process for the first time will identify additional tools and process required.

### 4.3 Restoration areas

Data from Murdoch and Emerge Associates from 2017 monitoring needs to be QA'd and input into databases.

At a minimum the following monitoring should be undertaken in the restoration areas during 2018, following the protocols outlined in the RMP:

## Forward Planning Recommendations

### Roe 8 Cleared Areas

- monitoring of permanently marked plots
- photopoint monitoring
- weed mapping.

Additional monitoring/citizen science can easily be undertaken using the sampling frame identified in the RMP.

The fauna survey should be commenced as early as possible in the project and be guided by advice from a specialist fauna contractor.

#### 4.4 Review and revision of the RMP

An annual report should be prepared by the **Project Manager** and submitted to the RR8AC for review and comment. The report shall outline the scope of activities completed in the preceding 12 months and demonstrate current performance of communications, engagement, involvement and restoration activities against the objectives. It will also include an assessment against the relevant objectives outlined in the RMP.

As part of the adaptive management process, the RMP should be reviewed and updated, if required, prior to implementation in the following year. During the first few years of implementation the processes behind reporting and review and evaluation will need to be tested and confirmed.

The results of the Aboriginal heritage survey will need to be incorporated into the RMP following completion.

The preliminary methods of the fauna survey will need to be incorporated into the RMP as appropriate.

## Forward Planning Recommendations

### Roe 8 Cleared Areas

## 5 References

### 5.1 General references

Archae-aus 2019, *Cultural Heritage Management Plan – Rehabilitating Roe 8*.

Shape Urban and The KP Collective 2019, *Rehabilitating Roe 8 - Community Expectations Report*, 8454582, Version 1.

Standish, R. J., Fontaine, J. B. and Veber, W. 2020, *Report of Native Ecosystem Recovery at the Roe 8 Corridor 2 Years and 7 Months After Clearing*, Murdoch University.

### 5.2 Online references

Bureau of Meteorology (BOM) 2017, *Climate Averages*, viewed 14 June 2017,  
<<http://www.bom.gov.au/climate/data/>>.

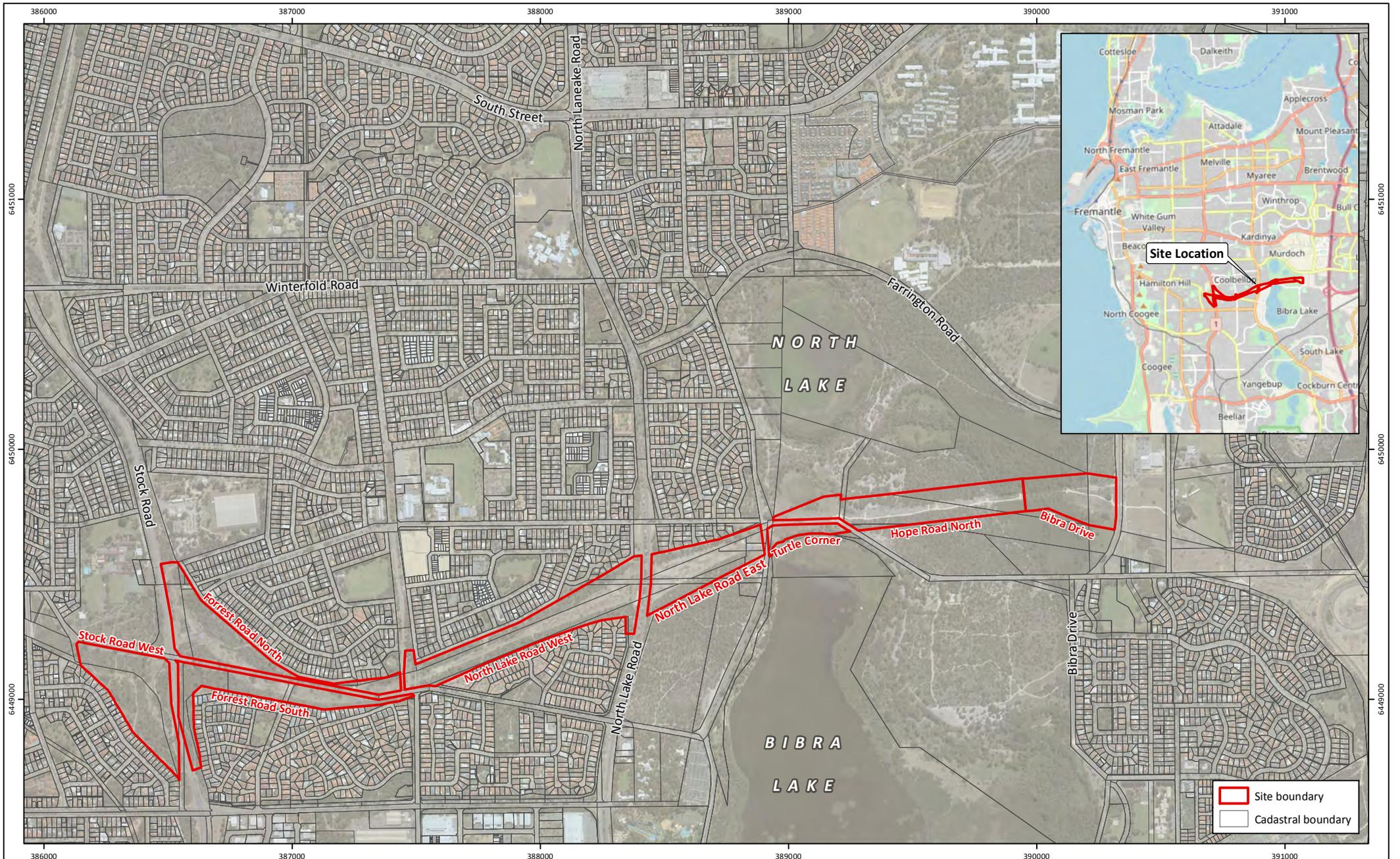
Department of Biodiversity, Conservation and Attractions' (DBCA) 2017, *Swan Weeds*,  
accessed viewed 4nd December 2017,  
<<https://florabase.dpaw.wa.gov.au/weeds/swanweeds/>>

# Figures



- Figure 1: Site Location and Management Areas*
- Figure 2: Restoration Areas*
- Figure 3: Proposed 2018 Planting Area*
- Figure 4: Grassy Weed Cover in Restoration Areas*
- Figure 5: Bulbous Weed Cover in Restoration Areas*
- Figure 6: Woody Weed Cover in Restoration Areas*
- Figure 7: Proposed 2019 Planting Areas*
- Figure 8: Proposed 2020 Planting Areas*
- Figure 9: Proposed 2021 Planting Areas*
- Figure 10: Proposed 2022 Planting Areas*
- Figure 11: Proposed 2023 Planting Areas*





**Figure 1: Site Location and Management Areas**

**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

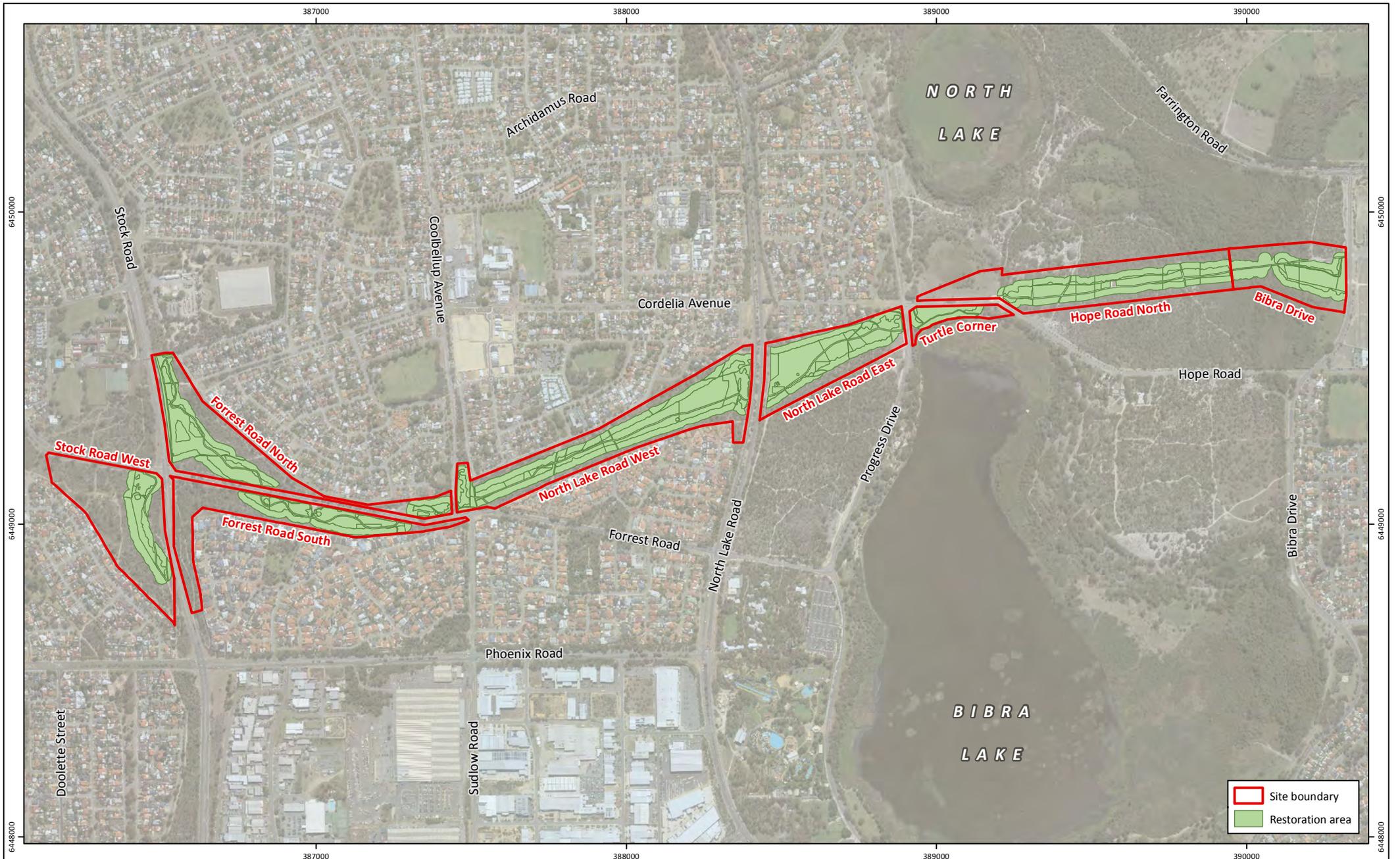
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**Checked:** TAA  
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**Date:** 31/01/2018



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GDA 1994 MGA Zone 50







**Figure 2: Restoration Areas**

**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
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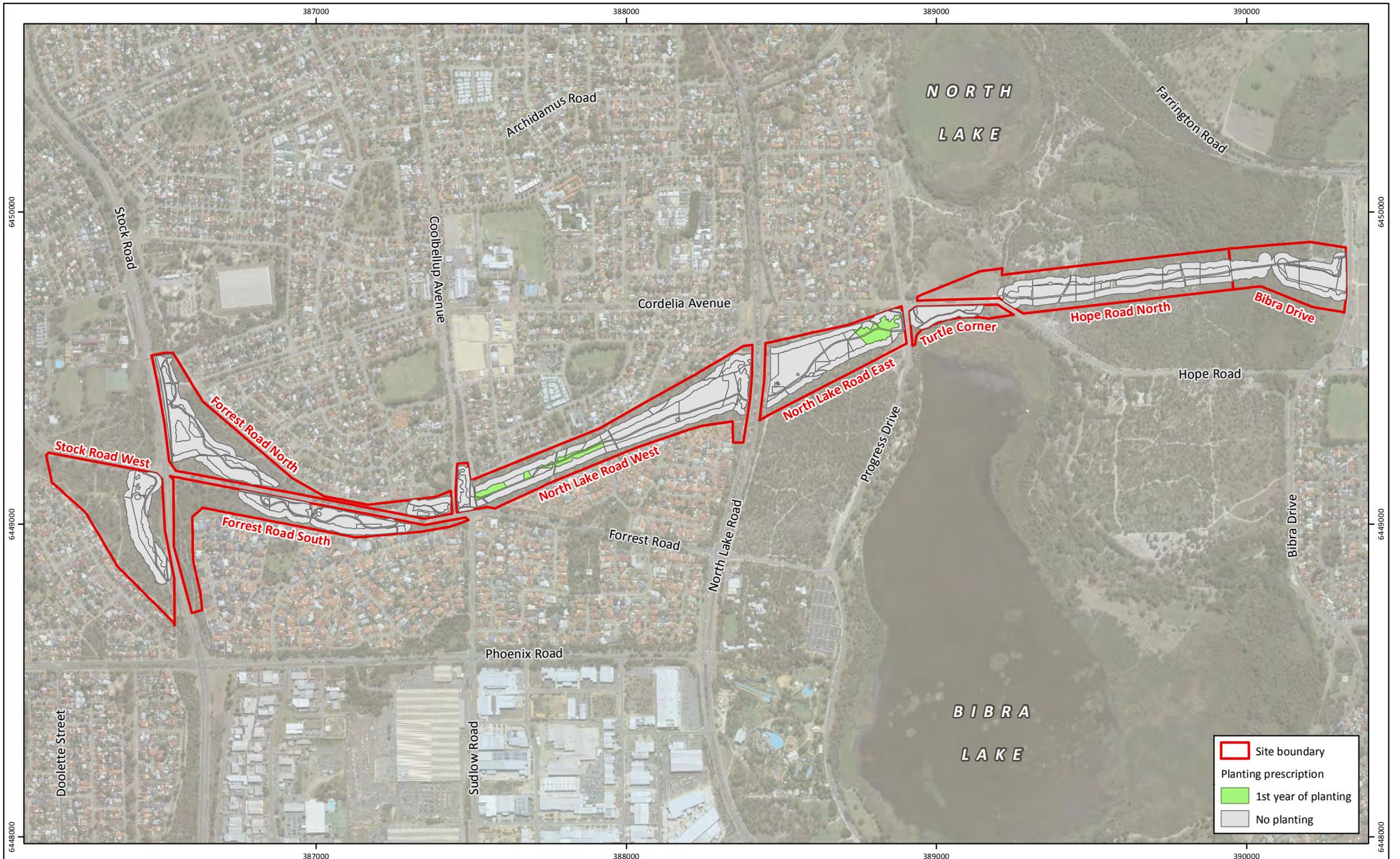


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While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

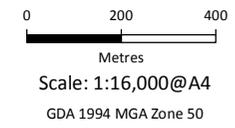




**Figure 3: Proposed 2018 Planting Areas**

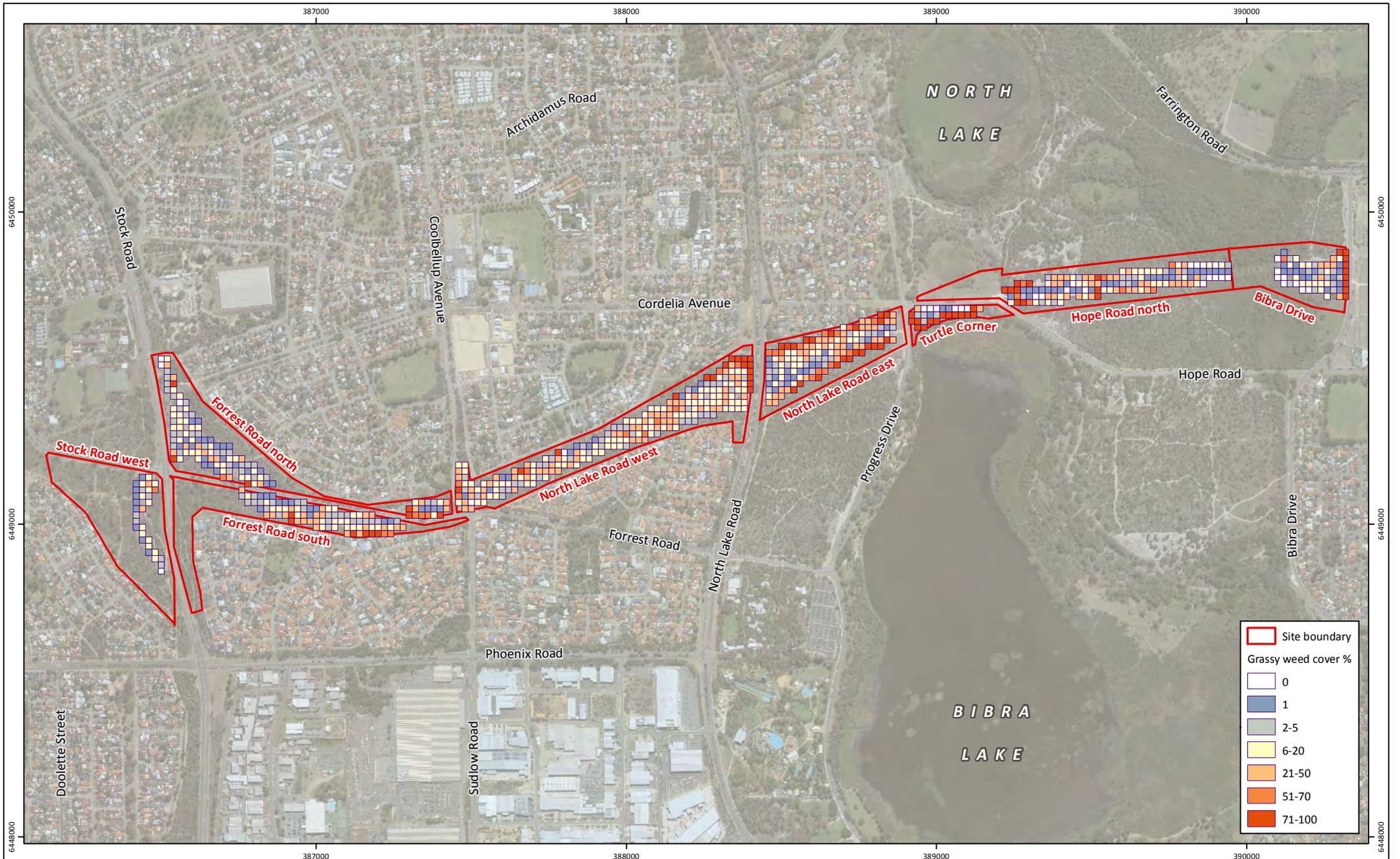
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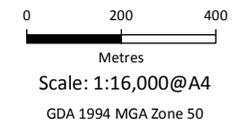




**Figure 4: Grassy Weed Cover in Restoration Areas**

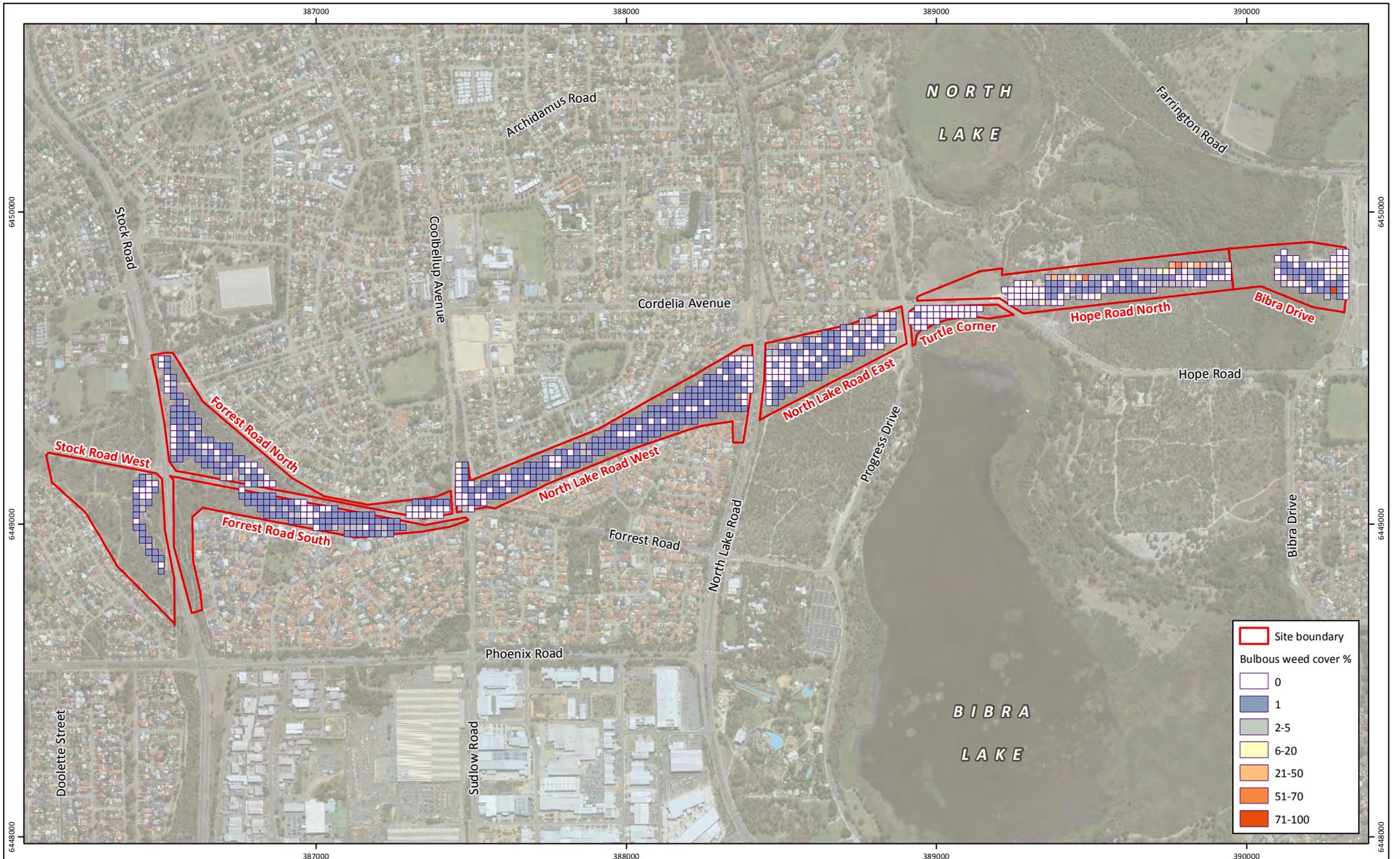
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<b>Client:</b>	Rehabilitating Roe 8 Steering Committee

<b>Plan Number:</b>	EP17-085(07)-F62
<b>Drawn:</b>	RAO
<b>Date:</b>	31/01/2018
<b>Checked:</b>	TAA
<b>Approved:</b>	TAA
<b>Date:</b>	31/01/2018



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used





**Figure 5: Bulbus Weed Cover in Restoration Areas**

**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F63  
**Drawn:** RAO  
**Date:** 31/01/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 31/01/2018

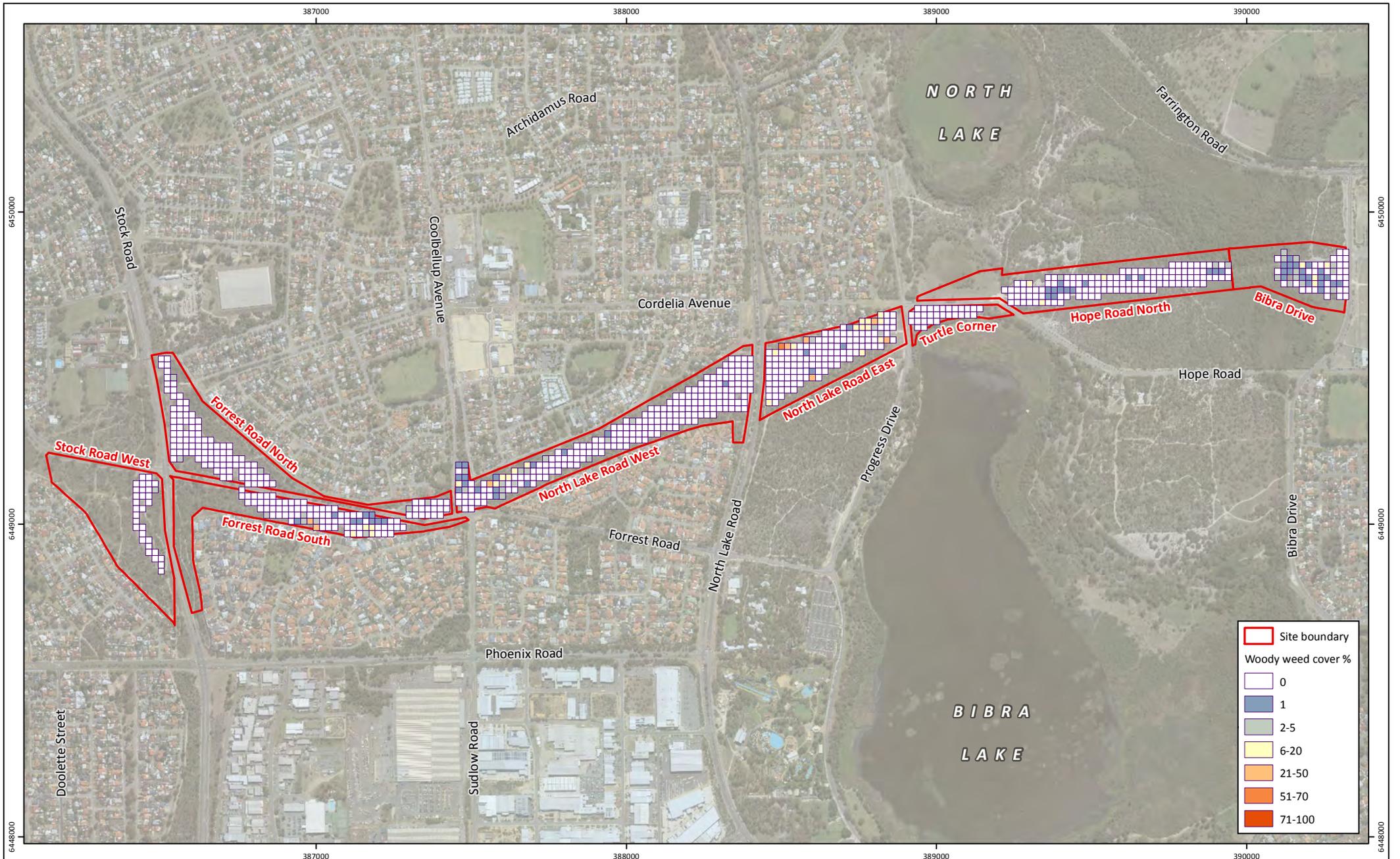


0 200 400  
Metres  
Scale: 1:16,000@A4  
GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used





**Figure 6: Woody Weed Cover in Restoration Areas**

**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F64  
**Drawn:** RAO  
**Date:** 31/01/2018  
**Checked:** TAA  
**Approved:** TAA  
**Date:** 31/01/2018

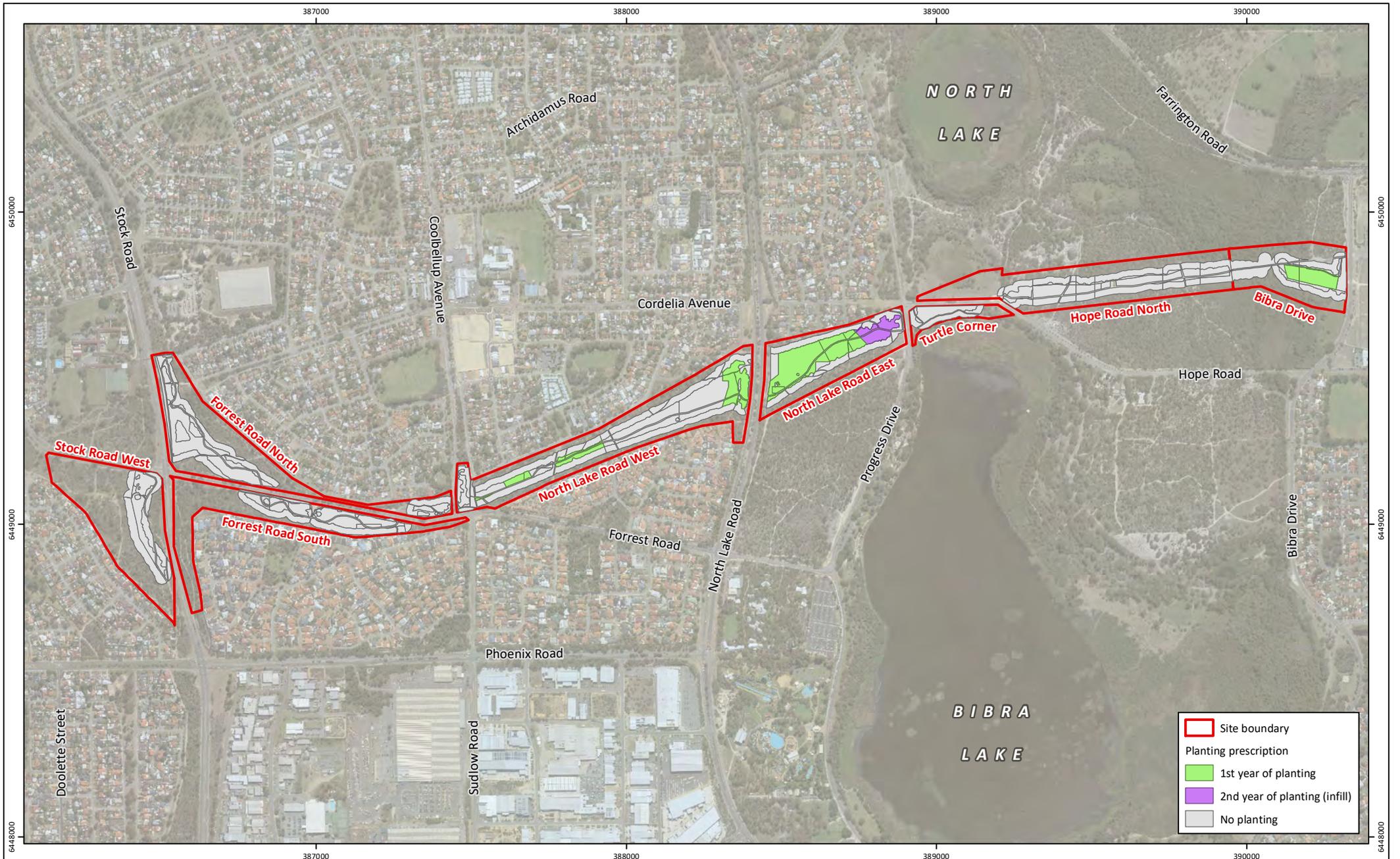


0 200 400  
Metres  
Scale: 1:16,000@A4  
GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used





**Figure 7: Proposed 2019 Planting Areas**

**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas

**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)--F65b

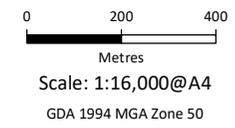
**Drawn:** GAR

**Date:** 06/08/2021

**Checked:** RAW

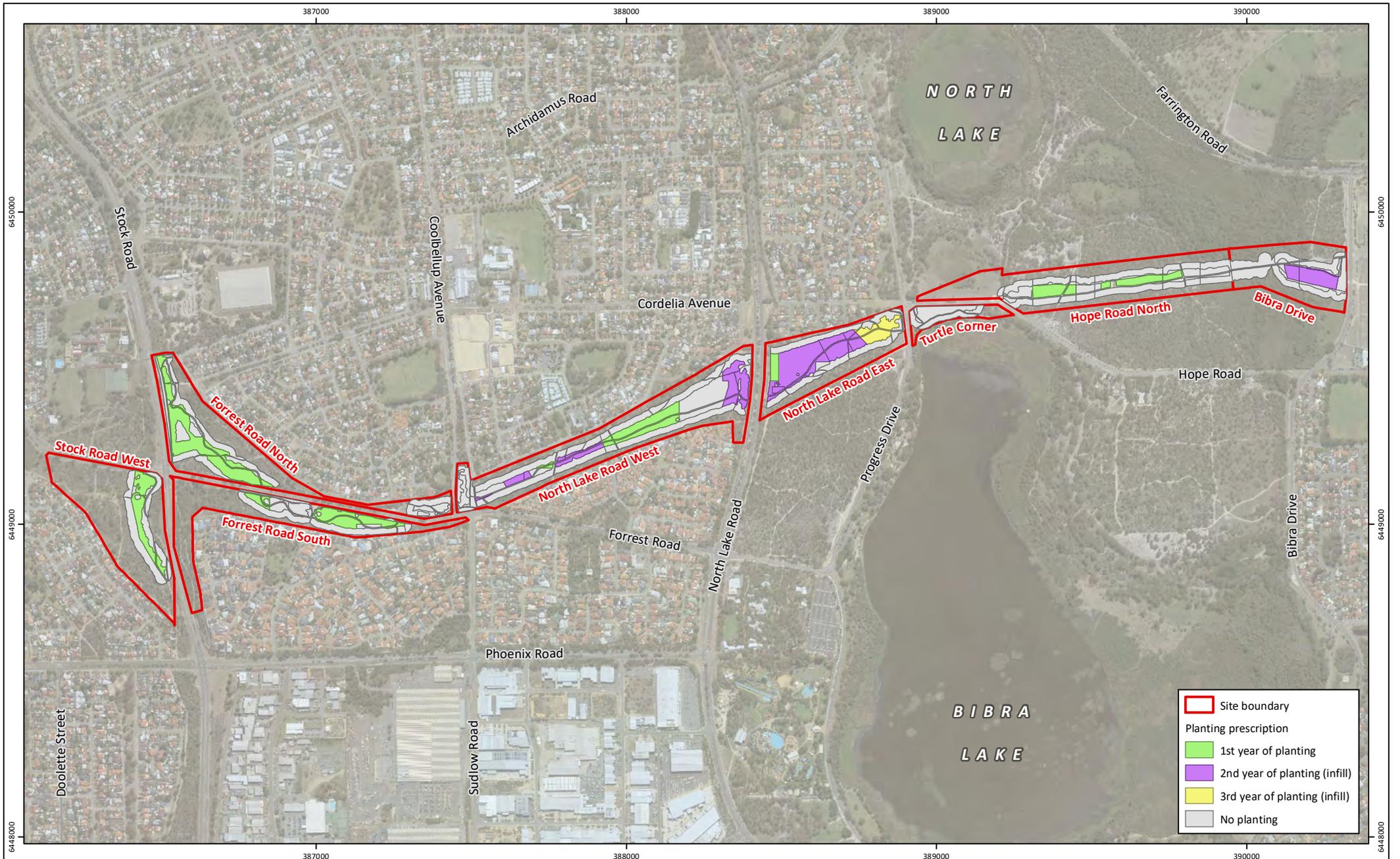
**Approved:** RAW

**Date:** 06/08/2021



While Emerge Associates makes every effort to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

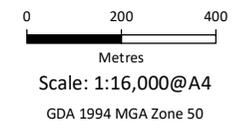




**Figure 8: Proposed 2020 Planting Areas**

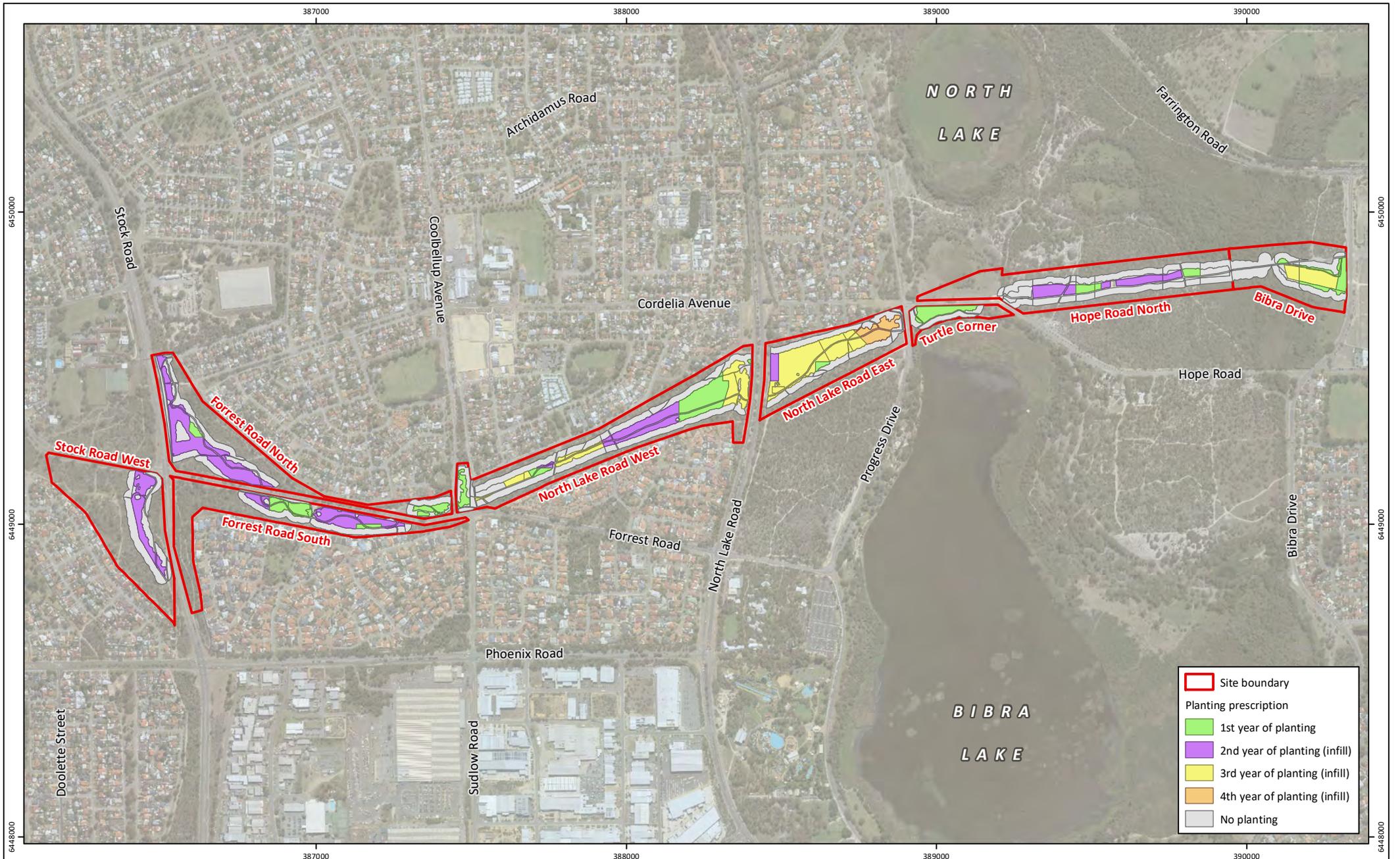
**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)--F66b  
**Drawn:** GAR  
**Date:** 06/08/2021  
**Checked:** RAW  
**Approved:** RAW  
**Date:** 06/08/2021



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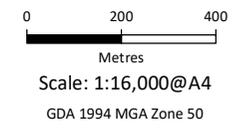




**Figure 9: Proposed 2021 Planting Areas**

**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F67b  
**Drawn:** GAR  
**Date:** 06/08/2021  
**Checked:** RAW  
**Approved:** RAW  
**Date:** 06/08/2021

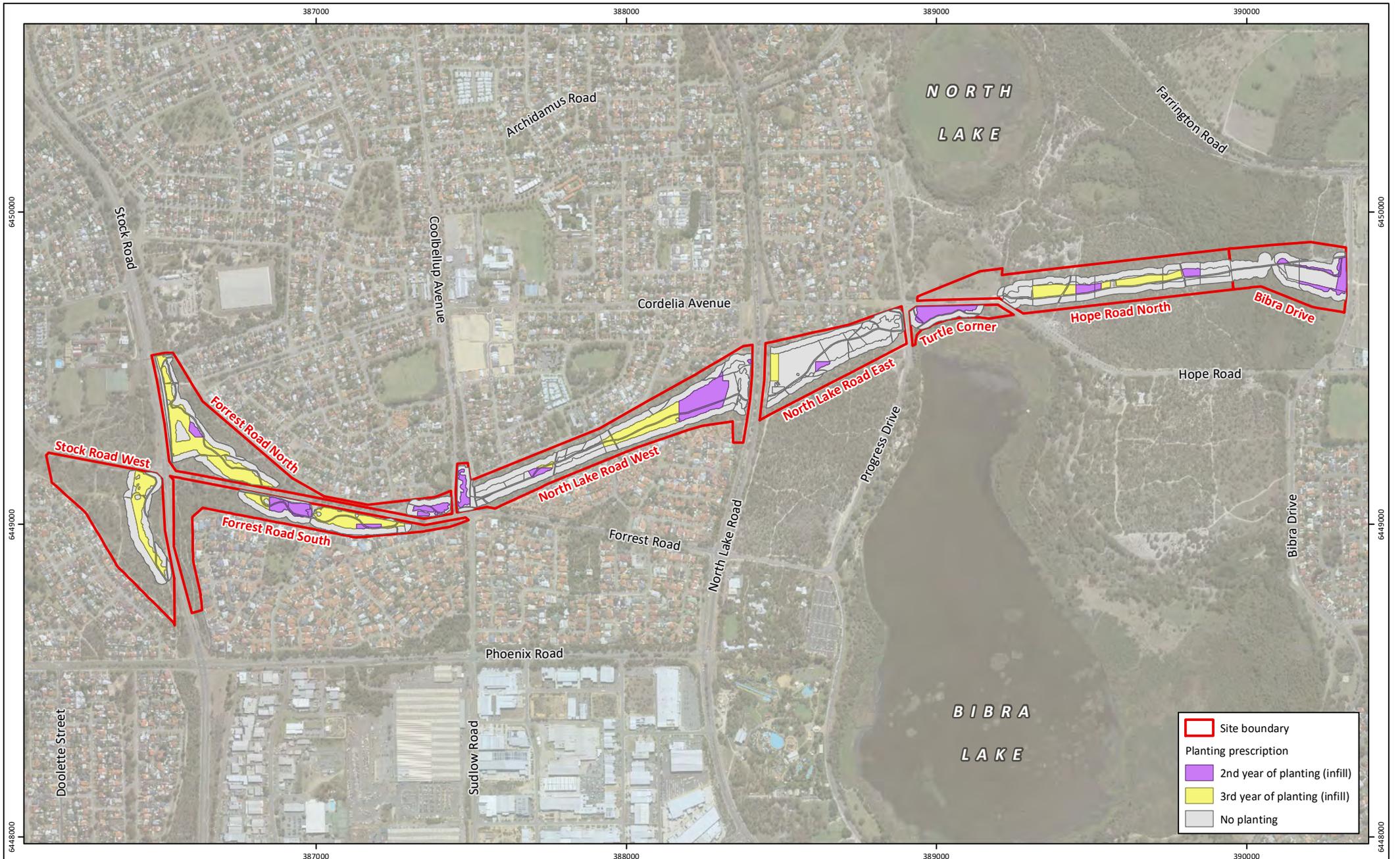


	Site boundary
Planting prescription	
	1st year of planting
	2nd year of planting (infill)
	3rd year of planting (infill)
	4th year of planting (infill)
	No planting



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

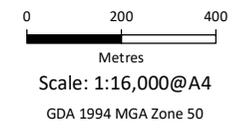




**Figure 10: Proposed 2022 Planting Areas**

**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F68b  
**Drawn:** GAR  
**Date:** 06/08/2021  
**Checked:** RAW  
**Approved:** RAW  
**Date:** 06/08/2021

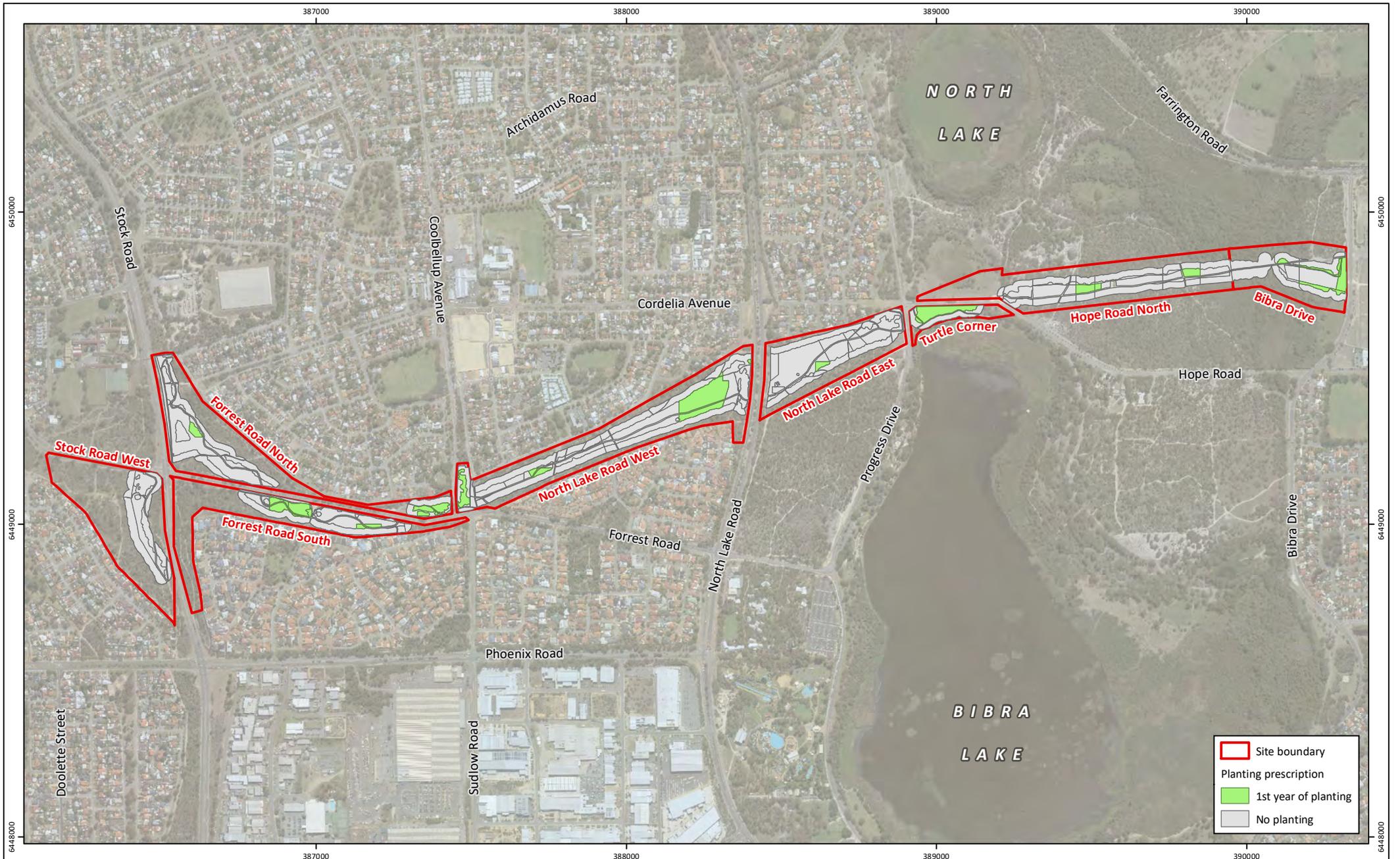


	Site boundary
Planting prescription	
	2nd year of planting (infill)
	3rd year of planting (infill)
	No planting



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

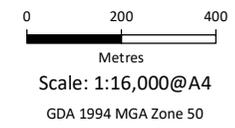




**Figure 11: Proposed 2023 Planting Areas**

**Project:** Forward Planning Recommendations  
Roe 8 Cleared Areas  
**Client:** Rehabilitating Roe 8 Steering Committee

**Plan Number:**  
EP17-085(07)-F69a  
**Drawn:** GAR  
**Date:** 06/08/2021  
**Checked:** RAW  
**Approved:** RAW  
**Date:** 06/08/2021



	Site boundary
	Planting prescription 1st year of planting
	No planting



# Appendix H

Community Expectations Report





# REHABILITATING ROE 8

## Community Expectations Report



**THE KP**  
COLLECTIVE



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## DOCUMENT CONTROL

Version	Date	Author	Approved
Draft 1	11 April 2019	Martin Spencer	Kara Pisconeri
Draft 1.2	26 April 2019	Anna Kelderman	Kara Pisconeri (added Community Open Day)
Final 2.0	20 May 2019	Martin Spencer	Kara Pisconeri
Final 2.1	23 May 2019	Kara Pisconeri	Linda Metz
Final 2.2	5 June 2019	Kara Pisconeri	Linda Metz
Final 2.3	11 June 2019	Kara Pisconeri	Linda Metz

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# Executive Summary

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The City of Cockburn has recently undertaken a community engagement process to assist in developing a range of suitable communications, metrics and tools outlined in the Roe 8 Rehabilitation Management Plan (RMP).

This process builds on the extensive community engagement work already conducted through the development of the RMP to inform key performance indicators.

Three opportunities were facilitated between March and April 2019 to collect thoughts, ideas and expectations about the objectives in the RMP, including:

1. BBQ and yarn with the local Aboriginal community through liaison with the Cockburn Aboriginal Reference Group.
2. Facilitated workshop with the Rehabilitating Roe 8 Advisory Committee; and
3. Rehabilitating Ro8 Community Open Day engagement activities.

This report summarises the input received through the engagement activities, with recommendations for ten cultural protocols, measures for these protocols and a detailed toolkit on how to determine the community expectations and satisfaction with the Rehabilitating Roe 8 project.



# 1. Introduction

---

## 1.1 Acknowledgment of Country

We acknowledge the Australian Aboriginal and Torres Strait Islander peoples of this nation.

We acknowledge the traditional custodians of the lands on which our organisations are located and where we conduct our business. We pay our respects to ancestors and Elders, past and present. In particular, we would like to acknowledge that the Rehabilitating Roe 8 project area is Whudjuk country and pay respect to Elders and all Nyungar people, past, present and future.

We are committed to honouring Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land, waters and seas and their rich contribution to society.

## 1.2 Background

The Roe 8 Rehabilitation Management Plan (Emerge 2018) raises the concept of social rehabilitation (*refer section 2.1*). This concept taken from the Society for Ecological Restoration Principles, suggests that as a landscape is degraded so too is the connection that the local people have with that space. The intent of the Rehabilitation Management Plan (RMP) is to both repair the land and also the people's connection with it.

Section 2.1.2 of the RMP details several key performance indicators and goals for community engagement (*refer RMP section 2.1.2 on page 6 of this report*). These goals are currently ambiguous in regards to what metrics are to be used to adequately gauge the level of satisfaction and expectations within the community.

The City of Cockburn has recently undertaken community engagement to inform the development of a range of metrics and communications tools to determine community satisfaction, expectations and involvement with the Rehabilitating Roe 8 project.

## 1.3 Desired Outcomes

This report outlines recommendations on a range of metrics that will allow effective measurement of community engagement, expectations and satisfaction with the project (*as per section 2.1.2 in the RMP and Schedule 6 in the Service Agreement*).

This report includes:

- A Community Feedback Report, including workshop discussions and metrics raised by stakeholders during consultation;
- Specific recommendations on a range of metrics that will allow effective measurement of community engagement, expectations and satisfaction with the project;
- A cultural protocol tool to ensure that cultural values are reflected through the course of the project;
- A detailed toolkit on how data will be collected; and
- A draft survey to capture community support for the project, identify community expectations, and gauge the level of involvement with the project.

Roe 8 Rehabilitation Management Plan Section 2.1.2, Engagement and involvement objectives

Goal	Objectives
<p>1. Recognise Aboriginal heritage and continued connection to land ensuring Nyungar culture is maintained at each step in the implementation of the RMP</p>	<p>1.1 The Wadjuk Working Group and other key Aboriginal stakeholders support the Rehabilitating Roe 8 project’s approach to Aboriginal heritage</p> <p>1.2 The Wadjuk Working Group and other key Aboriginal stakeholders are further consulted and through consultation indicate support for any proposed update to the RMP’s approach to Aboriginal heritage</p> <p>1.3 A full ‘Aboriginal heritage survey’ is completed within the first two years of implementation and the outcomes of that survey inform review of the RMP as required*</p> <p>1.4 A cultural protocol tool is developed through work with the Wadjuk Working Group that outlines how Nyungar culture will be reflected in each step of the project</p> <p>1.5 An ‘acknowledgement of country’ recognises Nyungar culture at each step of the project</p>
<p>2. Ensure the community has input into decision-making and into the implementation of the RMP</p>	<p>2.1 Membership to the Rehabilitating Roe 8 Advisory Committee* is open to all interested community groups and individuals</p> <p>2.2 Term limits are established for members of the Rehabilitating Roe 8 Advisory Committee</p> <p>2.3 Invitation is extended every year to the local community to join the Rehabilitating Roe 8 Advisory Committee</p> <p>2.4 At least 60% of respondents to the ‘community expectations and satisfaction’ survey* support the Rehabilitating Roe 8 project*</p> <p>2.5 At least 60% of respondents to the ‘community expectations and satisfaction’ survey* feel involved in the Rehabilitating Roe 8 project*</p>
<p>3. Ensure the community has opportunities for hands-on involvement in the implementation of the RMP</p>	<p>3.1 A range of different community organisations are given the opportunity to involve their members in implementation of the RMP</p> <p>3.2 Key stakeholder organisations identified in this plan are given the opportunity to involve their members in implementation of the RMP</p> <p>3.3 At least 60% of respondents to the ‘community expectations and satisfaction’ survey report having had the opportunity to be involved in RMP activities</p>
<p>4. Develop trust, alignment and a shared understanding of the RMP</p>	<p>4.1 At least 60% of respondents to the ‘community expectations and satisfaction’ survey indicate that they understand the objectives of the Rehabilitating Roe 8 project</p>

Roe 8 Rehabilitation Management Plan Section 2.1.2, Engagement and involvement objectives

Goal		Objectives
5.	Honour, involve and acknowledge the long and recent history of community and stakeholder involvement on the Rehabilitating Roe 8 project during the implementation of the RMP	5.1 Community and stakeholder participation to date is acknowledged at the commencement of all engagement and involvement initiatives
6.	Regularly guide updates and adaptations to the RMP informed by engagement	6.1 Complete one review of the plan per year, informed by the 'community expectations and satisfaction' survey and an analysis of other community and stakeholder feedback
		6.2 Using the adaptive management process, update and improve all components of the RMP as required
7.	Ensure communications are consistent, accessible and transparent from the outset of the implementation of the RMP	7.1 At least 60% of respondents to the 'community expectations and satisfaction' survey indicate that communications are consistent, accessible and transparent
8.	Strengthen the unique community and sense of place associated with the site	8.1 Respondents to the 'community expectations and satisfaction' survey give examples of strengthened community and sense of place in open-ended responses
		8.2 Incorporate a cultural/interpretive element into all management areas

\*Refer Section 5.2

\*refer Section 3.2

# 2. Our Approach

Our methodology was designed to expand on the work that was undertaken in gathering community perspectives and expectations for the project (see Appendix A for final Community Engagement Plan and a detailed list of engagement activities).

Three engagement activities were conducted between March and April 2019:

1. Wednesday 27 March, from 5pm - 7pm: BBQ and yarn with the local Aboriginal community through liaison with the Aboriginal Reference Group.
2. Friday 29 March, from 9am - 11am: Facilitated workshop with the Rehabilitating Roe 8 Advisory Committee; and
3. Sunday 14 April, from 10am - 2pm: Rehabilitating Roe 8 Community Open Day engagement activities.

The sessions were designed to collaborate with the Cockburn Aboriginal Reference Group, broader Aboriginal community, Rehabilitating Roe 8 Advisory Committee and broader community to design metrics and measures that inform the Annual Report Card.

The discussions included:

- Community expectations and measures of satisfaction.
- What protocol should be followed in planting, construction, maintenance and is the protocol being followed.
- Process for consultation, showing respect to traditional custodians, land, stories etc.
- Preferred tools and communications for assessing the project.

- Other project communications.
- Who else might need to be involved in the assessment.

Feedback on the draft report from key stakeholders, including the Cultural Protocol and survey will be incorporated into the final version of this report. This may include follow up conversations with the Aboriginal people suggested during initial consultation.

A detailed Community Engagement Feedback report of all conversations, ideas and expectations is included in Appendix B.



# 3. Cultural Protocol

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Cultural protocols refer to and reflect the customs, lores and codes of behaviour of a particular cultural group.

This Cultural Protocol has been developed as an action of the Rehabilitating Roe 8 RMP to outline how Nyungar culture is to be reflected throughout the project.

The RMP lists as Objective 1.4:

*'A cultural protocol tool is developed through work with the Whudjuk Working Group that outlines how Nyungar culture will be reflected in each step of the project.'*

The Cultural Protocol has been developed through a dialogue with members of the Rehabilitating Roe 8 Advisory Committee and the Cockburn Aboriginal Reference Group, and assumes that ongoing engagement and review with the community will occur to ensure we respect and honour the heritage and culture and reflect the connection to Boodjar (Country).

It states the principles which will guide the behaviour of the City of Cockburn and other partners to protect Nyungar culture and improve the relationships between the Traditional Owners and all other partners in the rehabilitation project.

More than just a 'point-in-time', this document will continue to be monitored to test the impact on and adherence to cultural protocols, whilst also recognising that culture is complex, dynamic and evolving; and protocols may change over time.

Preparation of this Cultural Protocol has also been guided by the City of Cockburn's Reconciliation Action Plan (RAP).

See Appendix C: Relevant Actions from the Reconciliation Action Plan.

Key actions from the RAP that have guided this Cultural Protocol are reflected in:

**Action 10** *Embed cultural protocols as part of the way our organization functions;*

**Action 11** *Extend Signage Style Guide to provide guidance on meaningful use of Aboriginal names throughout the City of Cockburn; and*

**Action 17** *Establish Aboriginal employment pathways.*

# Cultural Protocol

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## 2.1 Protocols

This Cultural Protocol provides direction to achieve four distinct outcomes:

1. Acknowledgment of Country, and formal recognition of traditional owners.
2. Recognition of connection and inclusion of Aboriginal heritage, culture and presence.
3. Recognition of community networks.
4. Honour and acknowledge the long and recent history (recognition of pain and healing).

**To achieve the stated outcomes, 10 distinct Protocol's should be followed:**

<b>Protocol 1:</b>	Formal 'Welcome to Country' is delivered at major events and an Acknowledgment of Country occurs as a normal part of proceedings at all other times.
<b>Protocol 2:</b>	Acknowledgment of Country is included on all official information, signage and on-line pages.
<b>Protocol 3:</b>	Aboriginal and seasonal colours will be incorporated into signage, displays and communications. Some of the key actions may include: <ul style="list-style-type: none"><li>• Incorporate Aboriginal colours in signage, landmarks, etc;</li><li>• Use local Aboriginal artists to prepare artwork and design for signage; and</li><li>• Promote the colours associated with the seasons and their relationship to specific areas.</li></ul>
<b>Protocol 4:</b>	The six seasons will be the recognised and celebrated in events, plantings, communications and reporting. The six seasons can be used as a base for all communications including theming of news postings, plantings, weeding and colour schemes. This provides ongoing education as well recognition.

# Cultural Protocol

<p><b>Protocol 5:</b></p>	<p>Opportunities are provided for involvement of Aboriginal people and storytelling. Key actions may include:</p> <ul style="list-style-type: none"> <li>• Encourage local Aboriginal people to become involved in leading walks or providing education events;</li> <li>• Encourage local Aboriginal people to be a part of events and celebrations as speakers, providing plant blessings at planting days, incorporating storytelling as part of the event, and including smoking ceremonies for major project openings or activities; and</li> <li>• Providing opportunities for storytelling on the website, on signage, in artwork and at events.</li> </ul>
<p><b>Protocol 6:</b></p>	<p>Communications and messaging should link the heritage/cultural centre and the Rehabilitating Roe 8 project area through signage and wayfinding to increase knowledge and cultural recognition.</p>
<p><b>Protocol 7:</b></p>	<p>Recognise local language through communication, dual signage and education. Key actions may include:</p> <ul style="list-style-type: none"> <li>• Incorporate local language in signage through dual signage, local naming;</li> <li>• Use local language in communications (Kaya - Hello); and</li> <li>• Provide language learning opportunities tied to the area (Cultural Centre, Wetlands Centre or on site).</li> </ul>
<p><b>Protocol 8:</b></p>	<p>Aboriginal employment and education will be prioritised throughout the project. Key actions may include:</p> <ul style="list-style-type: none"> <li>• Provide opportunities and support for Aboriginal businesses and individuals to conduct walks, tours, education activities within the project area;</li> <li>• Work with Murdoch TAFE and other education providers to provide traineeships and skills-based learning certificates that involve connections to the project area (horticulture, rangers, cultural studies);</li> <li>• Provide opportunities for Aboriginal businesses and individuals to undertake construction and environmental projects within the area; and</li> <li>• Explore opportunities to utilise the skill sets within the local communities, e.g. skills gained in mining and construction.</li> </ul>

# Cultural Protocol

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<b>Protocol 9:</b>	<p>Community networks will be recognised and utilised for communication and reaching a wider base. Key actions may include:</p> <ul style="list-style-type: none"><li>• Recognise the strong community networks by using the existing structures and groups to circulate and gather information;</li><li>• Provide resources for community groups to disseminate information and obtain information, pictures, branding etc to enable continuity and consistency of messaging; and</li><li>• Maintaining an up-to-date database of stakeholders to share information and communicate project updates.</li></ul>
<b>Protocol 10:</b>	<p>Honour and acknowledge the long and recent history (pain and heartache felt by the community will be recognised throughout the project). Key actions may include:</p> <ul style="list-style-type: none"><li>• Publish and display a timeline to show what has led to this point and what has happened - both positive and negative;</li><li>• Create opportunities for storytelling and sharing of experiences; and</li><li>• Invite the community to participate and recognise the importance of the healing process of planting, telling stories and being able to walk on the land to reconnect.</li></ul>

A measurement framework is also described in Section 5, which includes a toolkit for delivering the outcomes and requirements for ongoing review.

# 4. Recommended Tools

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There are four key tools proposed to measure achievement of objectives from the RMP. The required measurements have similar reporting timeframes and resourcing requirements.

1. Community Survey
2. Aboriginal Feedback
3. Event Audits
4. Annual Reporting

Each of these tools is described in greater detail in Section 4.1 to 4.4.

## 4.1 Community Survey

The community survey is to be conducted annually and asks a series of questions to produce answers that can be compared year on year to see progress towards a target score.

Questions are based around the specific objectives that have been set and the survey will be developed on the City's engagement portal - Comment on Cockburn.

The survey will be distributed to the Advisory Committee, relevant community groups nominated by the Advisory Committee, key stakeholders listed in the RMP (*refer section 3.3*) and RR8 newsletter subscribers, as well as widely distributed to the Cockburn community on social media and through City of Cockburn communications channels.

Although an estimation and subject to testing, it is anticipated that resources required would be available within the organisation and the survey planning, distribution and analysis would involve approximately one FTE over two working weeks.

The outcomes of the survey are to be included in the Annual Report Card.

## 4.2 Aboriginal Feedback

The community survey will also be circulated to the regional Aboriginal Group (such as the Whudjuk Working Group), Cockburn Aboriginal Reference Group, Cockburn Aboriginal community and other key Aboriginal stakeholders.

In order to measure the outcome of Objective 1.1 (*the regional Aboriginal Group, Cockburn Aboriginal Reference Group and Aboriginal community support the Rehabilitating Roe 8 project approach to Aboriginal Heritage*), Question 3 of the survey will be analysed both across the entire respondent group and independently for this group.

This will provide a measure specific to the Nyungar people that can be tracked over time and will allow ongoing engagement and improved project outcomes over time. This should not require any further resources than already required for the Community Survey.

The separate analysis of this specific question is to be included in the Annual Report Card.

Additional feedback would also be collected from a casual 'yarn' once per Nyungar season, as well as through the delivery and assessment of the cultural protocols.

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### 4.3 Event/ Project Audits

The RMP anticipates a number of events and projects throughout delivery of the rehabilitation plan.

Events may include:

- Community Days;
- Planting Days;
- Arts and Culture Days;
- Education programs;
- Nursery programs; and
- Cultural programs.

Projects may include:

- Landcare activities;
- Walk trails;
- Signage;
- Artwork; and
- Publications.

Several of the goals and objectives of the RMP, and therefore this toolkit (see section 5.2), will be met through these ongoing activities. It is proposed that each event or project be audited across a number of measures to enable lessons learned, ongoing improvement and enhanced project outcomes (see Appendix D for checklist).

No estimate of time or resourcing is suggested for audits, as these will be based on the event or project scale and the impact of the event or project.

The outcomes of all individual audits throughout the year are to be included in the Annual Report Card.

### 4.4 Annual Report Card

The Annual Report card will comprise an assessment of the success of the project across all of the measurement tools.

This is likely to be the most recognisable, public facing document for the project and should reflect on both the past year and the data trends. The Annual Report Card will also include reporting on planting and revegetation measures that are included in the RMP and not included in this Toolkit.

Inputs are detailed under Section 4.5.

### 4.5 The Tools

The tools and their relationship to the Goals and Objectives of the RMP are summarised in Table 1.

Table 1 describes the following:

1. **Goal** – taken directly from the RMP.
2. **Objective** – taken directly from the RMP.
3. **Measurement Tool** – describes the proposed method of receiving feedback/assessment.
4. **Measure** – describes the target to be achieved.
5. **Timing** – describes the regularity of measurement and any specific deadlines.
6. **Resources** – suggests a recommended resource/time allowance per measure (assumes internal resources).

Table 1 - The Tools

GOAL	OBJECTIVES	MEASURING TOOL	MEASURE	TIMING	RESOURCES		
1	Recognise Aboriginal heritage and continued connection to land ensuring Nyungar culture is maintained at each step in the implementation of the RMP.	1.1 The Whudjuk Working Group and other key Aboriginal stakeholders support the Rehabilitating Roe 8 project approach to Aboriginal Heritage.	Annual community expectations and satisfaction survey	Analysis of Question (Q) 2 and 3 75% of Whudjuk Working Group and other identified Aboriginal stakeholders (identified through Q2) score Q3 'Support' or 'Strongly Support' (increase 3% per year)	Annually - November	Approximately two weeks FTE	
		1.2 The Whudjuk Working Group and other key Aboriginal stakeholders are further consulted and through consultation indicate support for any proposed update to the RMP's approach to Aboriginal heritage.	Agenda Item at Working Group Meeting	Amendments to RMP endorsed by Whudjuk Working Group and other key Aboriginal stakeholders	Ongoing	By others	
		1.3 A full 'Aboriginal heritage survey' is completed within the first two years of implementation and the outcomes of that survey inform review of the RMP as required.	Aboriginal Heritage survey	Survey Complete Yes/No	Within 2 years	By others	
		1.4 A cultural protocol tool is developed through work with the Whudjuk Working Group that outlines how Nyungar culture will be reflected in each step of the project.	The Protocol	Protocol tools	Protocol Developed Yes/No	Immediate	Current project
			Protocol 3, 4, 5, 6, 7, 9, 10		Audit Per Event/Activity Yes/No/NA/ Considered in design 80% Yes or Considered in Design	Audit Per Event/Activity	TBD based on project scale and impact
			Protocol 5, 8		Audit Per Event/Activity Exceed/ Meet/ Below Expectation 80% Exceed or Meet Expectation	Audit Per Event/Activity	TBD based on project scale and impact
1.5 An 'acknowledgment of country' recognises Nyungar culture at each step of the project.	Protocol 1	Protocol tools	Audit Per Event/Activity Yes/No/NA 90% Yes	Audit Per Event/Activity	N/A		
	Protocol 2				N/A or Approximately 1 Day FTE per event and fees for 'Welcome'		
2	Ensure the community has input into decision-making and into the implementation of the RMP.	2.1 Membership to the Rehabilitating Roe 8 Advisory Committee is open to all interested community groups and individuals.	Membership of group is advertised in accordance with Terms of Reference.	Yes/No - Membership advertised every two years. Reported in Annual Report. 100% Yes	Annually - April/May	Approximately three days FTE	
		2.2 Term limits are established for members of the Rehabilitating Roe 8 Advisory Committee.	Terms of reference developed by group	Terms of reference accepted and membership advertised every two years. Reported in Annual Report.	Annually - June	Complete	
		2.3 Invitation is extended every two years to the local community to join the Rehabilitating Roe 8 Advisory Committee.	Membership of group is advertised regularly	Yes/No - Membership advertised yearly. Reported in Annual Report. 100% Yes	Annually - June	Allowed for in 1.1	
		2.4 At least 60% of respondents to the community expectations and satisfaction survey support the Rehabilitating Roe 8.	Annual community expectations and satisfaction survey	Analysis of Question Q3 60% of respondents score Q3 'Support' or 'Strongly Support' (increase 5% per year)	Annually - November	Allowed for in 1.1	
		2.5 At least 60% of respondents to the 'community expectations and satisfaction' survey feel involved in the Rehabilitating Roe 8 project.	Annual community expectations and satisfaction survey	Q4 and Q5 60% respond with one or more activity (increase 5% per year)	Annually - November	Allowed for in 1.1	

Table 1 - The Tools

OBJECTIVES	OBJECTIVES	MEASURING TOOL	MEASURE	TIMING	RESOURCES	
3	Ensure the community has opportunities for hands on involvement in the implementation of the RMP.	3.1 A range of different community organisations are given the opportunity to involve their members in implementation of the RMP.	Invites on events and registration at events/ projects	Diversity measured from registrations to events. Long term target: >40% either male or female +/- 10% of each age cohort of City of Cockburn >5% attendees from outside City of Cockburn >50% of invited parties attend	Audit Per Event/ Activity	Approximately two weeks FTE
		3.2 Key stakeholder organisations identified in this plan are given the opportunity to involve their members in implementation of the RMP.	Invites to events and registration at events/ projects	Diversity measured from registrations to events.	Audit Per Event/ Activity	Allowed for in 3.1
		3.3 At least 60% of respondents to the 'community expectations and satisfaction survey' report having had the opportunity to be involved in RMP activities.	Annual community expectations and satisfaction survey	Q4 and Q6 - 60% of respondents respond with one or more activities (increase 5% per year).	Annually - November	Allowed for in 1.1
4	Develop trust, alignment and a shared understanding of the RMP.	4.1 At least 60% of respondents to the community expectations and satisfaction survey indicate that they understand the objectives of the Rehabilitating Roe 8 project.	Annual community expectations and satisfaction survey	Q7 - Self assessment followed by testing of knowledge through Q8 - 60 % tick all boxes (increase 5% per year)	Annually - November	Allowed for in 1.1
5	Honour, involve and acknowledge the long and recent history of community and stakeholder involvement on the Rehabilitating Roe 8 project during the implementation of the RMP.	5.1 Community and stakeholder participation to date is acknowledged at the commencement of all engagement and involvement initiatives.	Audit	Record of stories online and updates of timeline. Updated 6-monthly Yes/No	Audit Per Event/ Activity	See G12
6	Regularly guide updates and adaptations to the RMP informed by engagement.	6.1 Complete one review of the plan per year, informed by the 'community expectations and satisfaction' survey and an analysis of other community and stakeholder feedback.	Report	Reported in Annual Report	Annually - June	Approximately one week FTE
		6.2 Using the adaptive management process, update and improve all components of the RMP as required.	Report	Reported in Annual Report	Annually - June	Allowed for in 6.1
7	Ensure communications are consistent, accessible and transparent from the outset of the implementation of the RMP.	7.1 At least 60% of respondents to the 'community expectations and satisfaction' survey indicate that communications are consistent, accessible and transparent	Annual community expectations and satisfaction survey	Q9 - average 60% of respondents 'Agree' or 'Strongly Agree' across each option.	Annually - November	Allowed for in 1.1
8	Strengthen the unique community and sense of place associated with the site.	8.1 Respondents to the 'community expectations and satisfaction' survey give examples of strengthened community and sense of place in open-ended responses.	Annual community expectations and satisfaction survey	Q10 - visitation across each option increases over time (no minimum initial %). Long term aim average 3-4 time per year. Q11 - outlines important project areas for the community (what creates sense of place) Q12 - satisfaction across each option increases over time (no minimum initial %). Long term aim 60% 'Satisfied' or 'Highly Satisfied' average across each option.	Annually - November	Allowed for in 1.1
		8.2 Incorporate a cultural/interpretive element into all management areas.	Audit	Yes/No. Reported in Annual Report. 80% Yes increasing to 100%.	Audit Per Project Delivered	TBD based on project scale and impact

# 5. Detailed Toolkit

Details of the measurement tools recommended are included in this Section.

## 5.1 Survey Questions

The *community expectations and satisfaction survey* questions are listed in Table 2 below.

Table 2 references the questions in the Community survey and how they relate to measurement of objectives. This may change over time, as is indicated in Table 1.

Number	Question	Answer options	Reference	Comment
1	What is your post code?	<i>Post code field</i>	Qualification	Location of respondent to assess reach
2	Are you of Aboriginal or Torres Strait Islander origin?	<i>Yes / No</i>	Qualification	Qualification to measure objective 1.1
3	The Rehabilitating Roe 8 project aims to rehabilitate the land cleared for construction of the Roe 8 project. What is your level of support for the rehabilitation of the land?	<ul style="list-style-type: none"> <li>• <i>Strongly opposed</i></li> <li>• <i>Opposed</i></li> <li>• <i>Neutral</i></li> <li>• <i>Support</i></li> <li>• <i>Strongly Support</i></li> </ul>	Objective 1.1 Objective 2.4	Measure self-reflection on level of support
4 / 5	Have you seen or been aware of the following?  Other (please specify):	<ul style="list-style-type: none"> <li>• <i>Opportunity to be a community representative on a committee</i></li> <li>• <i>Volunteer for planting days</i></li> <li>• <i>Volunteer for weeding days</i></li> <li>• <i>Sharing information - online or emails</i></li> <li>• <i>Attend workshops/education events</i></li> <li>• <i>Citizen Science (e.g. insect collection or recording of plants and animals)</i></li> <li>• <i>Open Day/Community Days</i></li> </ul>	Objectives 2.5	Measure of awareness of opportunities

Table 2 Survey Questions and Links to RMP Objectives

Table 2 Survey Questions and Links to RMP Objectives

Number	Question	Answer options	Reference	Comment
6	Have you been involved in any of the following opportunities and activities? (Choose all that apply).	<ul style="list-style-type: none"> <li>• As a community representative on a committee</li> <li>• As a participant in planting days</li> <li>• As a participant in weeding events</li> <li>• As a participant in Community Days</li> <li>• As a participant in Open Days</li> <li>• Sharing information</li> <li>• Participant in Citizen Science</li> <li>• Other (please specify)</li> </ul>	Objective 3.3	Measure of participation
7	The Management Plan identifies rehabilitation and community targets, goals and objectives to ensure project activities and outcomes are focused and meaningful. How would you describe your level of awareness of the objectives of the Rehabilitation Management Plan? (Choose all that apply)	<ul style="list-style-type: none"> <li>• Extremely aware</li> <li>• Very aware</li> <li>• Somewhat aware</li> <li>• Not so aware</li> <li>• Not at all aware</li> </ul>	Objective 4.1	Measure self-reflection on level of understanding
8	Which of the following statements describe the objectives as stated in the Rehabilitation Management Plan? (Choose all that apply)	<ul style="list-style-type: none"> <li>• I'm not aware of any objectives.</li> <li>• Recognition of Aboriginal heritage and continued connection to land.</li> <li>• Ensuring the community has input into decision making.</li> <li>• Ensuring the community has opportunities for hands-on involvement.</li> <li>• Honour and acknowledge the long and recent history of community and stakeholder involvement.</li> <li>• Engagement will inform and guide updates and adaptations to the Rehabilitation Management Plan</li> <li>• Involve the community in organised activities.</li> </ul>	Objective 4.1	Measure of recognition of objectives

Table 2 Survey Questions and Links to RMP Objectives

Number	Question	Answer options	Reference	Comment
9	Thinking about the information you have received about the Rehabilitating Roe 8 (RR8) project, how would you rate the following?	<p><i>Strongly agree - Strongly disagree:</i></p> <ul style="list-style-type: none"> <li>• The branding for RR8 is recognisable.</li> <li>• The branding for RR8 is used on everything I see in relation to the RR8 project.</li> <li>• Information on the RR8 project can be easily found in an accessible location.</li> <li>• I can easily share information on RR8 with my network.</li> <li>• I receive regular updates on RR8 progress.</li> <li>• I would like to see more information.</li> </ul>	Objective 7.1	Measure of concepts of consistency accessibility and transparency.
10	Thinking of how you interact with the Rehabilitating Roe 8 project area, roughly how often have you:	<p><i>Daily, Weekly, Monthly, Several Times, Once, Never:</i></p> <ul style="list-style-type: none"> <li>• Visited the area on your own in the last 12 months?</li> <li>• Visited the area with friends and family in the last 12 months?</li> <li>• Posted about the area in social media in the last 12 months?</li> </ul>	Objective 8.1	Sense of place measured through visitations and ownership.
11 / 12	<p>What do you think is important to see as part of the Rehabilitating Roe 8 project?</p> <p>I'd like to see: <i>(open field text)</i></p>	<p><i>Not important - Very important:</i></p> <ul style="list-style-type: none"> <li>• Events                             <ul style="list-style-type: none"> <li>* Cultural Events</li> <li>* Wildlife events</li> <li>* Educational events and programs</li> <li>* Planting days</li> <li>* Community days</li> </ul> </li> <li>• Facilities                             <ul style="list-style-type: none"> <li>* Trails</li> <li>* Pathways and boardwalks</li> <li>* Picnic tables, seats and benches</li> <li>* Signage</li> </ul> </li> <li>• Other                             <ul style="list-style-type: none"> <li>* Cultural experiences</li> <li>* Volunteering opportunities</li> <li>* Scientific information</li> <li>* Project updates</li> <li>* Artwork</li> </ul> </li> </ul>	Objective 8.1	Sense of place and important project areas for community.

Table 2 Survey Questions and Links to RMP Objectives

Number	Question	Answer options	Reference	Comment
13	Thinking of how you recognise and relate to the Rehabilitating Roe 8 project area, how satisfied are you with the progress of:	<ul style="list-style-type: none"> <li>• Presence of art or cultural experiences?</li> <li>• Value of art or cultural experiences?</li> <li>• Sense of community ownership of the area?</li> <li>• Signage in the area?</li> <li>• Cultural recognition of the Nyungar people in the project?</li> <li>• Provision of paths, trails in the area?</li> </ul>	Objective 8.1	Sense of place and strengthened community measured through recognition of art, facilities, cultural recognition and community ownership.
14	Would you like to receive more information on how to get involved in the Rehabilitating Roe 8 opportunities and activities? Provide contact details.	<ul style="list-style-type: none"> <li>• Name</li> <li>• Email Address</li> <li>• Phone Number (optional)</li> <li>• Address (optional)</li> </ul>	Registration	Information about survey participant. Registration for more information and involvement.

## 5.2 Event / Project Audit

This section provides a list of the audit requirements per event/activity. Considered in reverse, this list could form part of an events plan/run sheet for an event, or a scope of works for a project. The audit would apply to events and projects described in Section 4.3.

Table 3 identifies the required audit elements. Audits should be completed immediately upon the conclusion of each event and/or project. The resources required for the audit will depend upon the event, however, Table 3 can be used as a checklist.

Audit Element	When Considered	Measure
<b>Cultural Protocol 1 &amp; 2:</b> Acknowledgment of Country	<ul style="list-style-type: none"> <li>• official RMP documentation,</li> <li>• signage</li> <li>• online documentation</li> <li>• events with &lt;30 people expected</li> </ul>	Yes/No/NA
<b>Cultural Protocol 1:</b> Welcome to Country	<ul style="list-style-type: none"> <li>• events with &gt;30 people expected</li> <li>• significant project openings</li> </ul>	Yes/No/NA
<b>Cultural Protocol 3:</b> Incorporate Aboriginal colours in signage, landmarks, etc	<ul style="list-style-type: none"> <li>• official RMP documentation</li> <li>• signage</li> <li>• online documentation</li> <li>• artworks</li> <li>• buildings/infrastructure</li> <li>• landscape treatments (based on seasons)</li> <li>• planting days – species selection (based on seasons)</li> <li>• events and promotions</li> </ul>	Yes/No/NA/ Considered in design
<b>Cultural Protocol 3:</b> Use local Aboriginal artists to prepare artwork and design for signage		
<b>Cultural Protocol 4:</b> The six seasons will be the recognised and celebrated in events, plantings, communications and reporting		
<b>Cultural Protocol 5:</b> Opportunities are provided for involvement of Aboriginal people and storytelling – leading walks and providing education	<ul style="list-style-type: none"> <li>• community days</li> <li>• planting days</li> <li>• arts and culture days</li> <li>• education programs</li> <li>• nursery programs</li> <li>• cultural programs</li> <li>• significant project openings</li> </ul>	Exceed/ Meet/ Below Expectation

Table 3: Event/Project Audit Elements

Audit Element	When Considered	Measure
<p><b>Cultural Protocol 5:</b> Opportunities are provided for involvement of Aboriginal people and storytelling – being a part of events and celebrations as speakers, providing plant blessings at planting days etc</p>	<ul style="list-style-type: none"> <li>• community days</li> <li>• planting days</li> <li>• arts and culture days</li> <li>• education programs</li> <li>• nursery programs</li> <li>• cultural programs</li> <li>• significant project openings</li> </ul>	<p>Exceed/ Meet/ Below Expectation</p>
<p><b>Cultural Protocol 5:</b> Opportunities are provided for involvement of Aboriginal people and storytelling – providing opportunities for storytelling on the webpage, on signage, in artwork as events</p>	<ul style="list-style-type: none"> <li>• official RMP documentation,</li> <li>• signage</li> <li>• online documentation</li> <li>• artworks</li> <li>• website</li> <li>• landscape treatments planting days – species selection</li> </ul>	<p>Yes/No/NA/ Considered in design</p>
<p><b>Cultural Protocol 6:</b> Link the heritage/cultural centre and the RR8 project area through signage and wayfinding to increase knowledge and cultural recognition</p>	<ul style="list-style-type: none"> <li>• official RMP documentation,</li> <li>• signage</li> <li>• online documentation</li> <li>• artworks</li> <li>• landscape treatments</li> <li>• planting days – species selection</li> <li>• community days</li> <li>• planting days</li> <li>• arts and culture days</li> <li>• education programs</li> <li>• nursery programs</li> <li>• cultural programs</li> <li>• significant project openings</li> </ul>	<p>Yes/No/NA/ Considered in design</p>
<p><b>Cultural Protocol 7:</b> Incorporate local language in signage through dual signage, local naming, in communications and through education opportunities</p>		

Table 3 continued: Event/Project Audit Elements

Audit Element	When Considered	Measure
<p><b>Cultural Protocol 8:</b> Improve Aboriginal employment opportunities, including utilising local community skill sets, local businesses and linking to education providers and partners</p>	<ul style="list-style-type: none"> <li>• community days</li> <li>• planting days</li> <li>• arts and culture days</li> <li>• education programs</li> <li>• nursery programs</li> <li>• cultural programs</li> <li>• significant project openings</li> <li>• artworks</li> <li>• landscape treatments</li> </ul>	<p>Exceed/ Meet/ Below Expectation</p>
<p><b>Cultural Protocol 9:</b> Recognition of community networks through communicating and sharing information</p>	<ul style="list-style-type: none"> <li>• All communication of events and projects through recognised groups</li> <li>• In preparation of:               <ul style="list-style-type: none"> <li>» official RMP documentation</li> <li>» signage</li> <li>» on-line documentation</li> </ul> </li> </ul>	<p>Yes/No/NA/ Considered in design</p>
<p><b>Cultural Protocol 10:</b> Recognition of pain and heartache through storytelling, artwork, signage and communications</p>	<ul style="list-style-type: none"> <li>• signage</li> <li>• online documentation</li> <li>• artworks</li> <li>• community days</li> <li>• arts and culture days</li> <li>• education programs</li> <li>• cultural programs</li> <li>• significant project openings</li> </ul>	<p>Yes/No/NA/ Considered in design</p>

Table 3 continued: Event/Project Audit Elements

Audit Element	When Considered	Measure
Community and stakeholders are given the opportunity to be involved in events/projects	All known groups invited to: <ul style="list-style-type: none"> <li>• community days</li> <li>• planting days</li> <li>• arts and culture days</li> <li>• education programs</li> <li>• nursery programs</li> <li>• cultural programs</li> <li>• significant project openings</li> </ul>	Yes/No/NA
Community and stakeholders are given the opportunity to be involved in events/projects	Attendance at: <ul style="list-style-type: none"> <li>• community days</li> <li>• planting days</li> <li>• arts and culture days</li> <li>• education programs</li> <li>• nursery programs</li> <li>• cultural programs</li> <li>• significant project openings</li> </ul>	>40% either male or female +/- 10% of each age cohort of City of Cockburn >5% attendees from outside City of Cockburn >50% of invited parties attend
Honour, involve and acknowledge the long and recent history of community and stake-holder involvement	<ul style="list-style-type: none"> <li>• official RMP documentation</li> <li>• signage</li> <li>• online documentation</li> <li>• events</li> </ul>	Yes/No/NA/ Considered in design
Incorporate a cultural / interpretive element into all management areas	<ul style="list-style-type: none"> <li>• official RMP documentation</li> <li>• signage</li> <li>• online documentation</li> <li>• artworks</li> <li>• landscape treatments</li> </ul>	Yes/No/NA/ Considered in design

Table 3 continued: Event/Project Audit Elements

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### 5.3 Annual Reporting

The summary of survey and all event and project audits shall be included in the Annual Report Card.

The Annual Report Card will identify where measures are consistently being met or exceeded, and measures should be reviewed to consider increasing the threshold.

# 6. APPENDICES

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## Appendix A: Community Engagement Plan

# Rehabilitating Roe 8 Project Reporting

March 2019

Community Engagement Plan

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# 1. Executive Summary

The City of Cockburn is undertaking community engagement to inform the development of a range of metrics and communications tools to determine community satisfaction, expectations and involvement with the Rehabilitating Roe 8 project.

In preparing the Roe 8 Rehabilitation Management Plan there were recommendations to develop a community expectations and satisfaction survey, explore protocols for data management and develop a reporting card.

This Consultation Plan has been developed to engage and involve the community and key stakeholders in order to further explore the areas that will determine how satisfaction can be measured. This will help to create a series of measures that are relevant to those who are close to the process as well as providing a review that will satisfy the expectations of all stakeholders.

This Consultation Plan describes the key activities and supporting actions that together make up the engagement. It is to be read as an engagement management tool, describing activities and actions in accordance with a set timeframe and clarifying the objective of each activity, linking back to the requirements of the City.

## 2. Context

The proposed Roe 8 extension has been an important community, infrastructure, environmental and political issue for many years. Roe 8 was intended to link the Roe Highway from the Kwinana Freeway to Stock Road, ultimately culminating in expanded roadways to the Fremantle Port.

Approximately 18 hectares of bushland was cleared in this alignment between December 2016 and February 2017. At the March 2017 election, the newly elected Labor Government promised to scrap the contracts for this road and revegetate the areas that had been cleared.

The vision for Rehabilitating Roe 8 corridor is:  
To create a thriving, connected and accessible suite of natural areas. These areas will be home to local biological diversity as well as become connected community spaces, allowing the public access to enjoy and respect the local environment via a connected pathway network. The Roe 8 corridor will become an important community asset that will be enjoyed by the public for generations to come.

Over a 10 year period, rehabilitation and management actions will transform this cleared area into a young but thriving range of ecological communities. The site will be used for passive recreation, environmental and cultural education and research.

The Roe 8 alignment remains on the Metropolitan Regional Scheme (MRS), and it may take several years to remove it from this state planning document. Hence, there is a level of uncertainty surrounding the long-term management of this area.

However, the community is very interested in progressing with the immediate rehabilitation of the Roe 8 corridor.

The current State Government has made a commitment to do so and has facilitated the establishment of a working group 'Rehabilitating Roe 8'. After 12 months the working group produced a 10 year Rehabilitating Roe 8 Rehabilitation Plan 2018 (RMP) that has been endorsed by the Minister for Transport and Minister for the Environment. The intent of the RMP is to both repair the land but also the people's connection with it.

In the RMP, several key performance indicators and goals for community engagement were identified, but are currently ambiguous in regards to what metrics are to be used to adequately gauge the level of satisfaction and expectations within the community.

This consultation plan will facilitate a number of community engagement events between identified stakeholder groups and identification of a range of suitable metrics, survey tools and communication tools to ensure effective strategies are utilised to determine community input, expectations and engagement during the implementation of the Rehabilitating Roe 8 Management Plan.



This community petitioned for the Roe 8 roadworks to be halted. It now sits in the green quadrant – with shared leadership and action by the City of Cockburn and the Roe 8 Rehabilitation Advisory Committee.

### 3. Scope

Traditional Owners and Aboriginal custodians, community and stakeholders have expressed a strong interest in being involved in the Rehabilitating Roe 8 Project.

It is paramount that the key stakeholders are engaged to further explore the areas that will determine how satisfaction can be measured and inform the RMP's deliverables.

This project will engage the Aboriginal Reference Group and Rehabilitating Roe 8 Advisory Committee to ensure that the protocols, data management and reporting required by the RMP, are designed in line with community expectations. Determining relevant measures of satisfaction will also ensure the process of reporting progress of the rehabilitation plan is significant to all stakeholders.

There will be two workshops conducted in March:

- Nyungar conversation with the Aboriginal Reference Group, Traditional Owners and Aboriginal community.
- Advisory committee, community and stakeholders conversation.

Plus, engagement activities at the Community Open Day (see Appendix 1 for an outline of all engagement activities).

### 4. People and Influence

The list of stakeholders and their estimated level of interest/influence in the project includes:

#### Phase 1 – Workshops and Open Day

Stakeholder	Influence
<b>Internal stakeholders</b>	
RR8 Project Manager	Decision-makers
Staff	
• Community Development	Involve
• Communications	Consult
• Ron Broadfield	Consult
<b>External stakeholders</b>	
Aboriginal Reference Group	Consult
Roe 8 Advisory Committee	Consult
Aboriginal Custodians and Traditional Owners	Consult
Local Aboriginal organisations (including youth)	Consult

Open Day visitors (including nearby residents, community members and key stakeholders listed in RMP section 3.3)	Inform / Consult
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## Phase 2 – Broader communications, survey and Annual Report Card

Stakeholder	Influence
<b>Internal stakeholders</b>	
RR8 Project Manager	Decision-makers
Elected Members	Inform
Executive Team	Inform
Staff	
<ul style="list-style-type: none"> <li>• Strategic Planning</li> </ul>	Inform
<ul style="list-style-type: none"> <li>• Stat Planning</li> </ul>	Inform
<ul style="list-style-type: none"> <li>• Environment</li> </ul>	Involve
<ul style="list-style-type: none"> <li>• Parks</li> </ul>	Inform
<ul style="list-style-type: none"> <li>• Comms</li> </ul>	Consult
<ul style="list-style-type: none"> <li>• Customer Service</li> </ul>	Inform
<ul style="list-style-type: none"> <li>• Grants</li> </ul>	Inform
<ul style="list-style-type: none"> <li>• Community development</li> </ul>	Consult
<b>External stakeholders</b>	
Aboriginal Reference Group	Consult
Roe 8 Advisory Committee	Consult
Aboriginal Custodians and Traditional Owners	Consult
Nearby landowners	Involve
Residents, City of Cockburn	Involve
State MPs	Inform
Media	Inform
Cockburn Community Wildlife Corridor	Involve
Cockburn Wetlands Education Centre	Involve
DBCA	Involve
PURSAC	Involve
Main Roads WA	Involve
Murdoch University	Involve
Beeliar Regional Park Community Advisory Committee	Inform
Landcare groups	Inform
Local community associations	Inform
Local environmental groups	Inform
Scientific and research community	Inform
Tertiary education institutions	Inform
Young people and youth organisations	Inform
Volunteers	Inform

## 5. Purpose

To collaborate with the Aboriginal Reference Group, broader Aboriginal community and Advisory committee to design metrics and measures that inform the Annual Report Card.

We will discuss:

- Community expectations and measures of satisfaction.
- What protocol should be followed in planting, construction, maintenance and is the protocol being followed.
- Process for consultation, showing respect to traditional custodians, land, stories etc.
- Preferred tools and communications for assessing the project.
- Other project communications.
- Who else might need to be involved in the assessment.

A communication audit and action plan will also be developed to help communicate more effectively with key stakeholders and the broader general public. The tactics developed through the communications plan will also help generate more engagement with the the Community Expectations and Satisfaction survey.

The outcomes of this project will be:

- A range of metrics and tools that will allow effective measurement of community engagement, expectations and satisfaction with the project.
- A cultural protocol tool to ensure that cultural values are reflected through the course of the project.
- A survey or similar tool to distribute in May.
- Brand and communications review.
- An Annual Report card in June that illustrates the survey results and project performance.

## 6. Timing

Stage	Timing
<b>Phase 1 Inception, Engagement Plan and Review</b>	
Inception meeting	11 February 2019
Review of Rehabilitation Plan and associated feedback reports	18 February 2019
Prepare Community Engagement Plan	4 March 2019
Prepare materials for engagement	8 March 2019
Undertake Communications and Content Review /Prepare Draft Communications Plan	8 March 2019
<b>Phase 2 Engagement and Content Development</b>	
Prepare invitations and pass to City for distribution,	6 March 2019
Contact stakeholders outside of committee / reference group	8 - 15 March 2019
Design workshop format and finalise materials / resources / event runsheet	15 March 2019
Present draft Communications Plan, actions and finalise implementation plan	25 March 2019
Workshop 1 with local Aboriginal community in liaison with Aboriginal Reference Group.	27 March 2019
Workshop 2 with RR8 Advisory Committee (or representatives)	29 March 2019
<b>Phase 3 Recommendation Report and Communications Plan</b>	
Website development - content, design etc	26 - 30 March
Develop and test Communication tools and content	25 March - 18 May
Presentation of engagement findings	11 April 2019
Draft Community Expectations Report	12 April 2019
Final Community Expectations Report	1 May 2019
<b>Phase 4 Annual Report Card</b>	
Concepts for AR Card	10 May 2019
Draft AR Card	June 2019
Final AR Card	June 2019
Final Communications Plan for 2019-20, with results from engagement, test content and final recommendations	June 2019

## **7. REHABILITATING ROE 8 ENGAGEMENT ACTIVITIES**

### **SESSION 1 – BBQ & YARN**

Wednesday 27 March, 5pm to 7pm

Invite:

One of the main goals of the Roe 8 Rehabilitation Management Plan is to recognise Aboriginal heritage and continued connection to country, ensuring Nyungar culture is maintained throughout implementation.

We want to hear your views, feedback and stories to help us develop a cultural protocol that outlines how Nyungar culture will be reflected in each step of the project. This includes planting, construction and maintenance.

We'll also discuss how the project is going, how we will be measuring our performance against community expectations and how we will communicate that with you going forward.

#### **Session format:**

Discussion

- Are significant and sensitive areas covered under the other Cultural Centre and Significant Sites study or is there more expected? What is the expected outcome.
- When is the project finished and what does it look like.

Explore measures, e.g.

- Aboriginal Community involvement and scale of consultation
- Are cultural values being reflected through the course of the project. What does this mean?
- Aboriginal Employment as a proportion of overall employment.

Explore:

- What kind of jobs (paid and volunteer)
- Other involvement / opportunities
- Naming / Signage
- Approvals
- Communications

## SESSION 2 – RR8 ADVISORY COMMITTEE

Friday 29 March, 9am – 11am

One of the main goals of the Roe 8 Rehabilitation Management Plan (RMP) is to ensure the community has input into the decision making and implementation of the plan. In the RMP, there were recommendations to develop a community expectations and satisfaction survey, explore protocols for data management and develop a reporting card.

Members of the Rehabilitating Roe 8 Advisory Committee were invited to come along and share their thoughts, ideas and expectations.

Session format:

Introduction (presentation)

- Why we have gathered
- Quick look at the outcomes from the process
- Expected outcomes / priorities of the RR8 project
- When is the project finished and what does it look like?

Discussion:

- Measures and Scales for:
- Support of the RR8 project
- Understand the objectives of RR8
- Community involvement
- Awareness of projects
- Awareness of community days
- Awareness of newsletter
- Community education
- Local employment as proportion of overall employment (bring in discussion from ARG engagement)
- communications and protocol.

## SESSION 3 – Community Open Day

Sunday 14 April, 10am – 2pm

Stall was held at Community open day providing opportunity to gather information from participants.

Sticky dots were available to place on a map to show locations of significance (colour coded, e.g. sites of significance etc), using following themes:

- a. Country
- b. Family
- c. Protection of Plants and Animals
- d. Spirit
- e. Seasons
- f. Anything else

Post it notes were provided for those with extra comments (e.g. events and initiatives).

Sign ups sheets were also provided for those wanting to be added to the database and ideas were gathered on what events, activities and communications the community wanted.

## Appendix B: Community Engagement Feedback Report

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### ABORIGINAL ADVISORY GROUP

Wednesday 27 March

#### Attendance:

- Marissa Verma
- Follow up discussions with Heidi Mippy

#### Feedback:

- Presence – feel invisible because of no presence
- Need to be seen and heard
- Have a holistic view of area – animals and birds
- Feel our heart and soul ripped out
- Role in providing exposure
- Colours/ signage down the street / artwork - examples can be seen in the Wall for freeway
- Artwork /signage / names would be great
- Planting native species and colours in accordance with season
- At centre – Bushtucker Garden.
- Seasonal planting (Aboriginal seasons)
- Seasons are important
- Storytelling
- Food
- Need cultural protocols that are flexible
- Host events under season – celebrate each season.
- More conversations with the community – have a yarn
  - Follow seasons (maybe one per season)
  - Come to us for a yarn about different ideas
  - Work with SWLC:
    - use them as a partner / to host events

- to help get different speakers
- direct/ in what can't do/ through ideas.
- expect fluctuations in attendance

- Need to consult at cultural events
- There needs to be parts that include education
- Sensitive areas – women's business – really important
- Ensure protection of areas – registered.
- Areas for interaction
- Cultural centre
- Planting days- how to ensure everyone is involved?
- Strong Aboriginal leaders to lead (Marissa/ Heidi)
- Open strong, together how to? "Everybody place"

#### Employment

- Younger generation need to be involved
- Schools
  - How to provide opportunities for training 10- 14 years
  - Full day half Nyunger program
  - Planting days.
  - Conservation volunteers
  - Jobs that get them out on country
  - Nursery programs
  - Get certificate at same time (TAFE)
- Types of jobs suited to community, what they want.
- Certificates of Education are important
- A lot of expertise in jobs like Graders, diggers, forklifts. Ex miners HR etc, so need opportunities to diversify

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## Communications

- Facebook communications
- Social and Media advertising
- Aboriginal jobs pages
- Use Reference Group
- Hosted, Happening
- 'Talk our tale'
- Partner Posting
- Start of something – When something is flowering
- Conversational
- Post Maps
- Area Looking @ Yarn
- Holistic.
- Visuals/ Circles

## Events / Engagement

- Protocols need to continue to evolve – not too structured
- Have an end date – but not timeframes – need to be flexible within that
- Family is important
- Find out what happens in community re timing – verbal reporting – network.
- Word of Mouth is key
- Facebook – use leaders to share messages
- Need to be flexible in times to move around funerals. Thursday for travel – Fridays for funeral – Saturday for travel
- Having a yarn
- Talking about the way forward
- Think about doing some planting
- You have got dates ask for dates plant ideas
- Cultural storytelling (Elders)

- Plant Blessings and get Elders – Find out Who.

## Reporting

- One Pager – kept it succinct
- Roe / Heidi Face Book Page call to action save Coolbellup
- Vick – Planting days / Seasons
- Heidi Gayle Aunty Netta Nap Marissa
- Use our language , e.g. Come have a yarn

## Consider contacting:

- Gayle Beck
- Marie Taylor
- Netta Nap
- Sally Ann Gamble
- Sharon Eagan
- Gladys Yamen
- Leonard Thorn
- Tim Kelly

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## COMMUNITY ADVISORY COMMITTEE

### Friday 29 March

#### Attendance:

- Heidi Mippy
- Catherine Baudains
- Lou Corteen
- Kim Dravnieks
- Angela Jakob
- Felicity Bairstow
- Diana Corbyn

#### Feedback:

#### Word or phrase that reflects your vision in 10 years' time – the end product?

- Restored Faith
- Restored ecosystem
- Thriving ecology and community
- Healing of land and community
- Wetland to waves corridor
- Ecological linkages
- Linkages for people
- Healing
- Shared Values – Respecting where we are all coming from – bringing together.

#### What is your vision in 10 Years?

- Shared Value
- Balancing diversity and recreation
- All people respecting and enjoying and conserving the area.
- Waves to wetlands connection
- Telling/ sharing stories
- Cultural tourism
- Art
- Interpretation
- Expectations
- Minimum – rehabilitation

- Restoration
- Protection
- Healing
- Network
- Doctors for the environment
- Community Groups
- Maintain political support
- Optimum Full restoration
- Community connectedness and ownership
- Full protection
- Conservation status
- Art capturing the community mosaic
- Full support of politicians
- Happy community

#### Issues

- Inclusion of all
- Appreciation
- Fear
- Don't want to feel out of the loop

#### Communications

- Through website & key contacts list
- Acknowledge what we did
- Photo of activities
- Events
- Involvement
- Engagement
- Diversity
- Other ways.
- Disseminate contact lists
- Key Contact Distribution lists
- Not just about project – need to make sure they get on the journey if they haven't been on it before

- 
- More community and sharing knowledge
  - Transparency is better way of having discussion
  - Somewhere inclusion of quiet of voices.
  - How to bring back people that were involved.
  - Re-establishing connections in a positive way.
  - Celebrating all the little things
  - How do we benefit from these spaces
  - Survey needs preamble to explain what it is about
  - Knowledge that is being fixed. How satisfied you are with. Satisfied v involved

#### **Communications should cover all aspects:**

- Website
- You Tube
- Instagram
- News
- Flyers
- Branding

#### **Measures and Tools**

- Use lead in and conditional sentences
- Clarifying questions to help drill down data
- Acknowledge continuous sliding scale 1-10 (pain scale)
- Get it out to as many as possible.
- Can possibly use Rethink the Link database for participants in survey
- Ascertain if they were supporter, helper or opposed to the project
- Get postcodes – show broader geographic support
- Ask if they have had opportunities and/or if they took advantage of those opportunities
- How satisfied are you with this activity
- How can we get them involved?
- Scale to different audiences

## Measures / Satisfaction discussion

Target	Verbatim Comments	Objectives
<b>1. Support of the RR8 project</b>	<ul style="list-style-type: none"> <li>• What was your role</li> <li>• Postcodes</li> <li>• Rethink the link – Mail chimp</li> <li>• Biodiversity Resources</li> <li>• Are you aware – Yes</li> </ul> <p>Have you been involved in:</p> <ol style="list-style-type: none"> <li>1. Community day</li> <li>2. Info sharing</li> <li>3. All I can be</li> <li>4. Shared facebook</li> <li>5. Other</li> <li>6. Are you aware - No</li> <li>7. Didn't get involved</li> </ol> <ul style="list-style-type: none"> <li>• Where did you hear about it? (all of the above)</li> <li>• Use a number scale to avoid interpretation and because level of satisfaction is a continuous variable.</li> <li>• Were you involved in the campaigning in any way little or big?</li> <li>• What was your role in protecting the Roe 8 corridor?</li> <li>• Postcodes.</li> <li>• Preceding Q's</li> <li>• Where are people coming from               <ul style="list-style-type: none"> <li>- Interests</li> <li>- geographically</li> <li>- do you want to be</li> <li>- is enough opportunity</li> <li>- have you been involved in...</li> </ul> </li> <li>• Who do we measure?</li> <li>• Range of expectations and issues.</li> <li>• Min Ecological rehab , restoration, protection and healing</li> <li>• Opt Full ecological, community ownership, full protection, art, acknowledging all contributions.</li> <li>• Happy community</li> <li>• Issues               <ul style="list-style-type: none"> <li>- Individual</li> <li>- Appreciation</li> <li>- Fear and pain acknowledgment</li> </ul> </li> </ul>	<p>At least 60% of respondents to the community expectations and satisfaction survey support the RR8 project</p> <p>Online survey accessed by invitation to campaign network.</p>

## Measures / Satisfaction discussion

Target	Verbatim Comments	Objectives
<p><b>2. Feeling involved in the RR8 project</b></p>	<p><i>For example: How do the number or quality of opportunities to be involved meet this target? Include a guide to what number/type of activities constitute involvement. This topic considers more of the opportunities for involvement in the whole project including surveys, community days, promotion and personal feelings.</i></p> <ul style="list-style-type: none"> <li>- Did you want to be involved?</li> <li>- If so did you feel there was opportunity?</li> <li>- Want ? 50% of Pro Roe 8 to be involved or aware – highly involved.</li> <li>- Conditional -&gt; DWP 80% opportunity</li> <li>- What have you been involved in – list of activities.</li> <li>- 1 awareness</li> <li>- 2 opportunity to be involved</li> <li>- Information</li> <li>- Taken up or not</li> <li>- Able to get information</li> <li>- Do you want to be involved?</li> <li>- Do you feel there are enough opportunities</li> </ul> <p>Have you been involved in any of the following,</p> <ol style="list-style-type: none"> <li>a. Committees</li> <li>b. Planting</li> <li>c. Weeding</li> <li>d. Sharing info</li> <li>e. Community days</li> <li>f. Science (citizen science).</li> </ol> <ul style="list-style-type: none"> <li>- Are you aware of the opportunities to be involved, then...</li> <li>- Did they have the opportunity to be involved in restoration, whether you have taken that up or not?</li> <li>- Why ask about the protests?</li> <li>- We can restore it but is it protected.</li> </ul>	<p>At least 60% of respondents to the community expectations and satisfaction survey feel involved in the RR8 project</p>

## Measures / Satisfaction discussion

Target	Verbatim Comments	Objectives
<b>3. Opportunity to be involved in the RMP activities</b>	<p><i>For example: How do the number or quality of opportunities to be involved in actual activities. Include a guide to what number/type of community activities constitute opportunities for involvement. This topic considers more of the community days, planting and committees.</i></p> <ul style="list-style-type: none"> <li>- Happy satisfied information</li> <li>- Broader people</li> <li>- Communications opportunities</li> <li>- Know it is being fixed</li> <li>- What would you like to see... open ended question</li> <li>- How satisfied are you with the work that has been done up to this point?</li> <li>- Govt Hours</li> <li>- Volunteer hours</li> <li>- Regrowth</li> <li>- Paths</li> <li>- Fences</li> <li>- Planting</li> <li>- Weeding</li> <li>- Number of hours</li> <li>- Work done up to this point</li> </ul>	<p>At least 60% of respondents to the community expectations and satisfaction survey report having had the opportunity to be involved in RMP activities</p>

## Measures / Satisfaction discussion

Target	Verbatim Comments	Objectives
<p><b>4. Understand the Objectives of the RR8</b></p>	<p><i>For example: A response of 'Satisfied' or 'Very Satisfied' with understanding objectives of the RR8 project would meet this target The methods of educating the community of the objectives of the RR8 project can point to expected responses.</i></p> <p>Can be measured in terms each of the listed objectives or as a general understanding.</p> <ul style="list-style-type: none"> <li>- Communications</li> <li>- Sharing knowledge</li> <li>- Engagement of youth</li> <li>- Symbolism for youth RR8</li> <li>- Target audience – age appropriate</li> <li>- Across the ages</li> <li>- Understanding</li> <li>- involvement</li> <li>- contribution</li> <li>- communication through hands activities.</li> <li>- 6 Seasons</li> <li>- Communication of objectives</li> <li>- Environmentally recreation</li> <li>- Cultural</li> </ul> <p>Do they need to know?</p> <ul style="list-style-type: none"> <li>- Be involved in an event to understand</li> <li>- Build education of objectives into events.</li> <li>- Explanation of objectives and why they are happening</li> <li>- Symbolism e.g. T-shirts, colours.</li> <li>- Insects</li> <li>- Slogans – Seasons- Colours</li> <li>- Engage youngsters.</li> <li>- Storylines</li> </ul>	<p>At least 60% of respondents to the community expectations and satisfaction survey report indicate they understand the objectives of the RR8 project</p>

Target	Verbatim Comments	Objectives
<p><b>5. Information is consistent, accessible and transparent.</b></p>	<p><i>A response of 'Satisfied' or 'Very Satisfied' with the information provided to the community and stakeholders is consistent, accessible and transparent would meet this target.</i></p> <p><i>Accessibility can be seen in terms of ease of access to information as well as availability to different user groups.</i></p> <p><i>Topics to explore also include timing, detail and frequency of communication.</i></p> <ul style="list-style-type: none"> <li>• Use original branding</li> <li>• Consistent messaging and branding</li> <li>• This month ... here's some info for your group to use. Focus/month</li> <li>• Website</li> <li>• All ages – e.g. Snapchat</li> <li>• Instagram</li> <li>• YouTube</li> <li>• Newspaper</li> <li>• Flyers</li> <li>• Find out what local groups want</li> <li>• Printed materials.</li> <li>• Other methods of social media local groups know what works for their members. Use them as a conduit.</li> <li>• Resources cupboard that community groups can gather information from.</li> <li>• Regularity of communications</li> <li>• Role of advisory committee should be clarified to the community</li> <li>• Somewhere to put opposing views.</li> <li>• Clean guidelines on where and how discussions</li> <li>• Guidelines on what is in scope.</li> </ul>	<p>At least 60% of respondents to the community expectations and satisfaction survey report indicate that communications are consistent accessible and transparent.</p>

Target	Verbatim Comments	Objectives
<b>6. Strengthened community and sense of place.</b>	<p><i>For example:</i>  <i>Measured in terms of key words</i>  <i>What key words can be considered as measures of strengthened community</i>  <i>What key words can be considered as key measures of sense of place</i></p> <ul style="list-style-type: none"> <li>• Key words not ideal</li> <li>• Anecdotal stuff, keywords depend on age and interest</li> <li>• Engagement</li> <li>• Photos of activities with people participating</li> <li>• Visitors Number and diversity</li> <li>• Anecdotal videos</li> <li>• Measuring projects on extension of attendance and diversity of people.</li> <li>• Welcome to Country</li> <li>• Sense of place – indications of involvement</li> <li>• Happiness</li> <li>• From internet</li> <li>• Safety clear</li> <li>• Recognition</li> <li>• Selfie spots</li> <li>• Visitation numbers</li> <li>• Diversity.</li> <li>• Geocaches</li> <li>• Ties in with adjoining uses e.g. Adventure world/ bungie – cross promotion.</li> </ul>	<p>Respondents to the community expectations and satisfaction survey give examples of the strengthened community and sense of place in open ended responses.</p>
<b>7. Strengthen local and indigenous employment</b>	<p><i>For example:</i>  <i>Straight forward measurement in terms of % of budget.</i>  <i>Clarification needed on what forms of employment and engagement are considered relevant.</i></p> <ul style="list-style-type: none"> <li>• WTC</li> <li>• Suppliers</li> <li>• Consultants</li> <li>• Cultural tourism</li> <li>• Culture</li> <li>• Art – in materials</li> <li>• Events and workshops</li> <li>• Rangers</li> </ul>	

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**COMMUNITY OPEN DAY**  
**Sunday 14 April**

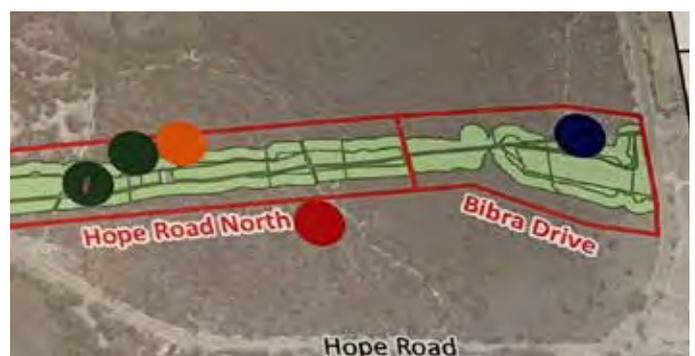
Booth:

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**Mapping Feedback:**

- Country (orange)
- Seasons (red)
- Spirit (yellow)
- Protection of plants and animals (green)
- Family (blue)
- Anything else (black)



Theme / Question	Feedback / Comments (verbatim)
<b>Protection of plants and animals (green)</b>	Opportunities to be involved in surveys, studies etc of flora and fauna
	* Turtles nesting in this area. People walking through the bush could trample on eggs/nest. Needs revegetation and fencing (accessible to turtles but not humans)
	Nature link
	Native wildlife protection including birds, turtle, fish
	(1) Replanting – Xmas trees, Nyutsia Floribunda, a whole grove wiped out. Information and stories about trees
	Currently, there are lots of bare patches between the vegetation on the corridor. There are lots of roads between.... What happens when animals and reptiles need to find / renew other places to live? Their mortality rate is high. What can we do to help them? Construct safe spaces, living spaces, burrows protected by rocks, leaves, stakes, perhaps. Not 1 per site or park area, but several spaced not so far apart.
	Naming trees, plants, animals along pathways
	Humane evidence based invasive spp. management, e.g. foxes.
	On the Gardening Australia website, I found a feature about a project in the Adelaide Hills where a group of people Citizen Scientists have been constructing staged protective habitats for local Bandicoots in their corridor. We must also start a project!
<b>Spirit (yellow)</b>	Traditional spirituality of the site (Marie Taylor)
<b>Country (orange)</b>	Used to be short term camping hunting ground (*)
	Sacred men's site (1)
<b>Anything else (black)</b>	Better ways to link across the road – protected tunnels and lines overhead for possums
	Pathway / cycle way through corridor
	Support a real wildlife corridor w/ all levels of veg

<b>What activities and events would you like to see in the Roe 8 Corridor</b>	Trails – walks, hikes, bike rides
	Walks where planting has happened
	Walks to show what planting is happened
	Support concept of corridor
	Planting / weeding days
	Indigenous walk with culture / stories / history
	Nature Link Perth Symposium – 4 July @ Murdoch R8 as a case study Link between community, Govt, State Naturelinkperth.org
<b>What would you like to hear about (communications)?</b>	Education
	Events
	Family activities
	Cultural activities
	Planting days and events

## Appendix C: Relevant Actions from the Reconciliation Action Plan

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10. Embed cultural protocols as part of the way our organization functions
  - a) Further develop the City of Cockburn (CoC) Cultural Protocol document into formal policy and guidelines endorsed by both the ARG and Council that:
    - i. Outlines at which events CoC will commission a Welcome to Country (Citizenship ceremonies; NAIDOC, Reconciliation Week and other events)
    - ii. Staff and senior leadership continue to provide a Welcome to Country and/or an Acknowledgement of Country at all key events and Council meetings, public events; and where appropriate at internal events or meetings
    - iii. Requires the appropriate use of Nyungar language
    - iv. A list of key contacts for delivery of a Welcome to Country
    - v. Guidelines for a 'cultural share' – engaging cultural facts that can be shared at meetings and other events
  - b) Ensure that an Acknowledgment of Country plaque is displayed at all CoC premises.
  - c) Continue Cultural Awareness Training, with the enhancements described at Point 8.
  - d) Continue to fly the Aboriginal and Torres Strait Islander flags daily and conduct flag raisings at significant times.
  - e) Continue to engage Aboriginal and Torres Strait Islander artists and purchase Aboriginal art.
  - f) Seek and commission advice on Aboriginal and Torres Strait Islander input on matters of cultural relevance.
11. Extend Signage Style Guide to provide guidance on meaningful use of Aboriginal names throughout the City of Cockburn
  - a) Expand the Signage Style Guide to promote and provide guidance on how to integrate appropriate meaningful names and the Aboriginal translation to signs.
  - b) Undertake a program to update all signage of named parks and reserves (which have an equivalent Aboriginal word and meaning), such that signage incorporates that word and meaning.
  - c) Research the possibility of officially dual naming important natural topographic features, as per Section 7 of the Policies and Standards for Geographical Naming in WA.
  - d) Apply dual naming of North Lake and Bibra Lake to include Aboriginal naming.
17. Establish Aboriginal employment pathways
  - (a) Establish at least two Aboriginal Traineeships positions each year and closely link the program with Work Experience.
  - (b) Establish two Aboriginal cadetship positions for roles that require a tertiary qualification. This program will allow for the summer placement of Aboriginal tertiary students in a CoC team.

## Appendix D: Events and Project Audit - Checklist

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	Identify opportunities to involve stakeholders and community organisations
	Invite stakeholders and community organisations to event
	Provide shareable information for stakeholders and community organisations to communicate across their networks
	Registration or evaluation forms for event: <ul style="list-style-type: none"> <li>• Male / Female</li> <li>• Age</li> <li>• Location</li> <li>• Invited to attend</li> </ul>
	Organise Acknowledgement of Country / Welcome to Country
	Increase knowledge and cultural recognition:
	Recognise or incorporate Aboriginal language, colours and/or seasons
	Opportunities are provided for involvement of Aboriginal people and storytelling – leading walks and providing education
	Engage Aboriginal suppliers and/or education providers



# Appendix I

Ecological Monitoring Method





# ROE 8 REHABILITATION MONITORING METHODOLOGY (ADAPTED FROM MURDOCH UNIVERSITY (2017))

## INTRODUCTION

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed (SER 2004). At best, the practice of restoration is informed by ecological science, and actioned by the stakeholders with vested interests in the ecosystem requiring restoration. Stakeholders include conservation land managers, assess the level of intervention required to achieve restoration goals. Intervention can range from doing nothing (i.e., unassisted recovery) to moderate intervention (e.g., installing fences to protect seedling recruits from herbivores; Prober *et al.* 2011) right through to high levels of intervention that include multiple activities (e.g., topsoil application, seeding, planting and fertiliser application; Daws *et al.* 2015). In some cases, the ecosystem will recover certain attributes without intervention. In these cases, restoration interventions would be designed to return attributes that the ecosystem has not recovered on its own. Measuring recovery prior to restoration is particularly important where the goal is the restoration of the historic native ecosystem (i.e., the native ecosystem that grew at the site prior to its being degraded, damaged or destroyed).

Theory predicts unassisted recovery will occur in the absence of abiotic and biotic thresholds (Whisenant 1999). Thresholds are essentially barriers that prevent ecosystem recovery. For example, an abiotic barrier might be compact soils that limit growth of plant roots whereas a biotic barrier might be the presence of a competitive weed that negatively effects growth of native plants. Restoration would focus on interventions to overcome these barriers, so intervention to reduce soil compaction (e.g., through soil ripping) and interventions to reduce the abundance of the competitive weed (e.g., through herbicide application or hand-weeding). More than one barrier can be present at any one site and so the effort involved can be significant, particularly for large areas requiring restoration (Menz *et al.* 2013). For this reason, the absence of abiotic and biotic thresholds is particularly fortunate because it means the ecosystem itself will help with the process of recovery.

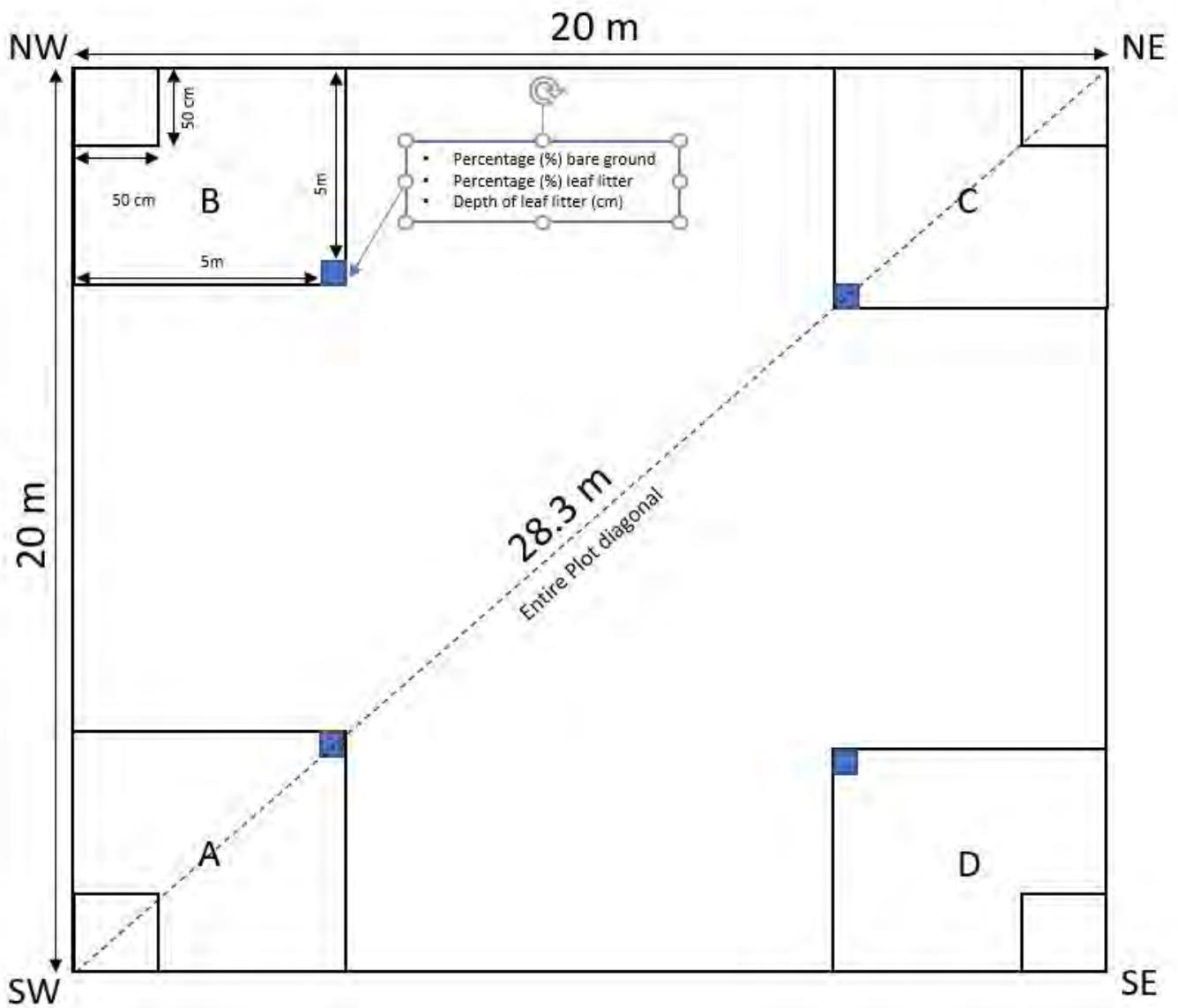
At the Roe 8 corridor, south of the Murdoch University South Street campus, there was an opportunity to measure how well the native vegetation has recovered since being cleared in February 2017. The Roe 8 corridor cuts through a diversity of woodland and wetland communities monitoring plots were established along the corridor that encompasses this diversity.

## MONITORING OVERVIEW

Roe 8 rehabilitation monitoring records the following:

1. **Plot attributes:** Location, either Roe 8 corridor or reference community and Heddle vegetation-soil type
2. **Plot-level data:** number and identity of trees (> 1.2 m).
3. **Sub-plot data:** number, identity and percentage cover of native perennials; percentage cover and depth of leaf litter and bare ground.
4. **Micro-plot data:** number, identity and percentage cover of native and weedy herbs.

## PLOT CONFIGURATION



**Configuration of Plots (20 m x 20 m), Sub-Plots (5 m x 5 m) and Micro-Plots (50 cm x 50 cm)**

## RECORDED DATA

### 20 m × 20 m plots

- Identify and count all the trees in the plot. Trees are defined as being taller than breast height (1.2 m).
- Measure and record the diameter at breast height (DBH) or all stems at 1.2 m height.

### 5 m × 5 m sub-plots

- Consider each sub-plot (ABCD; commencing with B at the north-west corner, then clockwise around the plot to A, then D then C) in turn.
- Make a species list of all the native perennial (woody) plant species in the sub-plot.
- Count and record the number of plants of each woody species in the sub-plot and visually estimate the percentage cover of each species to the nearest ~1%. Record percentage cover values of less than 1 % (i.e., 0.5 %) where appropriate for small species/plants.
- Record the percentage cover of leaf litter and bare ground and depth of leaf litter at the inner corner of the sub-plot, with the percentage cover applicable across an area of around 2 m diameter.
- Repeat for all four sub-plots. Record data for each sub-plot separately.

### 50 cm × 50 cm micro-plots

- Consider each micro-plot in turn. Make a species list of all the groundcover/herbaceous plant species in the micro-plot. Include both native and weed species.
- Count and also visually estimate the percentage cover of each herb plant species to the nearest ~1%
- Repeat for all four micro-plots at each corner of the plot. Record data for each micro-plot separately.

#### Summary of data to be collected:

Data Collected	50 cm x 50 cm micro-plot	5 m x 5 m sub-plot	20 m x 20 m plot
Herb species count	Yes		
Herb species percentage cover	Yes		
Perennial native species count		Yes	
Perennial native species percentage cover		Yes	
Leaf litter percentage cover		Yes	
Leaf litter depth (cm)		Yes	
Bare ground percentage cover		Yes	
Tree species, count and DBH			Yes

### Data Analysis and Reporting

Use bar charts and scatter plots to explore your data and test the predictions listed at the beginning of this document. Use simple tests such as t-tests, ANOVA and regression analysis to provide statistical support for the observed patterns. Prepare a scientific report.

