Declared Area Management Plan – South Yarrabilba Priority Development Area

Prepared for: Lendlease Communities (Yarrabilba) Pty Limited
Prepared by: K. Richardt, J. Pittard, D. Conder and Dr M.N. Runkovski
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Natura Consulting – Document Control Sheet

Project	
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Revision History

Version:	**Purpose:**	**Issued by:**	**Date**	**Reviewer:**	**Date:**
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Signed by the Proponent

Full name (please print)

ROBERT BALL

Organisation (please print)

LENDLEASE COMMUNITIES (YARRABILBA) PTY LTD

Date

15 / 10 / 19

Signed by the Registered Owner

Hancock Resources Pty. Ltd. ACN 009 657 783

Full name (please print)

by its duly constituted attorney Julie Joy Hancock
Power of Attorney No. 7145257/4

Organisation (please print)

Hancock

Date

15 / 11 / 19

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All comments and opinions provided in this report have been based upon a limited survey of the study site and/or on information supplied by the client, their agents and/or third parties.

All the assessments of site biology, ecology and the extent and nature of impacts of and to this study site is limited to the terms of reference stated within this report; and by the limited timeframe of study. Therefore the results presented herein cannot be considered absolute or conclusive without additional long-term follow-up studies.

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1 Executive Summary

Natura Consulting has developed a Declared Area Management Plan in response to Condition 7c) of approval for Yarrabilba Urban Development, reference no. EPBC 2013/6791, dated 13 November 2014 which has been varied to amend the conditions attached to approval effective 8 December 2017. The amended Condition 7c) states *"Include details of how the offset has been or will be legally secured to ensure its long-term protection. Offset areas 2 & 3, as shown within Appendix 2, must be secured within 27 months of commencement of the action and all offset areas must be legally secured within 4 years of commencement of the action".* A copy of the approval conditions and variation of approval conditions are provided within Appendix A of this report.

The intent of the Declared Area Management Plan is to provide management measures to rehabilitate Koala habitat within the declared area which is to be legally secured through a Voluntary Declaration made under the *Vegetation Management Act 1999*. A property map of assessable vegetation proposed to be secured as Category A vegetation via PMAV over the development site is provided within Appendix C of this report. Management measures in relation to the entire Fauna Corridor, Greenspace Corridor and Environmental Protection Zone are also referred to within this report to give an overall context of environmental management across the Yarrabilba development. The areas to be rehabilitated are Existing Assessable Koala Habitat to be protected and managed and Offset Requirement areas. This plan ensures that Koala habitat is specifically maintained within the declared area as well as in the entire Offset Area exceeding 195 ha, and Existing Assessable Koala Habitat area in the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone.

The Koala habitat rehabilitation area has been divided into Offset Rehabilitation and Habitat Rehabilitation units and Crossing Rehabilitation Units, which are described in the Habitat Rehabilitation Management Plan (Natura Consulting 2015) which is included in Appendix D of this report. The offset area currently nominated totals a calculated area of 195.012 ha (82.61 ha previously secured within DAM 2017/006063 and 112.401 ha proposed to be secured within this application, refer to Figure 1 for area totals per polygon). An additional area of approximately 75.5 ha within Existing Assessable Koala Habitat areas outside of Offset areas are also being rehabilitated as part of this project meaning that a combined area of approximately 271 ha is to be rehabilitated.

An outline for the rehabilitation approach, including planting and maintenance, species selection and weed control, has been provided in the Habitat Rehabilitation Management Plan (Natura Consulting 2015) provided in Appendix D of this report. A comprehensive monitoring plan has been detailed in order to document and assess rehabilitation through time. Flexibility will remain to adjust the final location of monitoring sites depending on the final locations of roads and development layout.

Contingency measures and corrective actions have also been provided to account for instances of when Interim Benchmarks are not being met. 'As constructed' data and surveyed boundaries will also be provided for each rehabilitation unit to test and demonstrate compliance within the entire offset area (at least 195 ha) requirement.

The Yarrabilba Community Development is a staged development which will be undertaken over approximately thirty years. The specific area addressed within this Declared Area Management Plan is all remaining portions of the offset area contained within the fauna corridor to the south of the powerline easement in addition to those included in the previous Declared Area Management Plan approved and dated by Senior Development Manager for Yarrabilba 18 October 2017 and requested under a Voluntary Declaration Application against the *Vegetation Management Act 1999* on 20 October 2017, endorsed by Department of Natural Resources and Mines on 22 December 2017 (DAM 2017/006063 & PMAV 2017/006064).

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The remaining area proposed to be secured as part of this application contains 112.401 ha situated within Lot 1 on Plan SP296375, Lot 38 on Plan W31932, Lot 7 on SP296375, Lot 29 on W31919, Lot 35 on W31950, Lot 41 on W311273, Lot 913 on SP291904 and Lot 910 on Plan SP291904. A map of this area is provided in Figure 1 of this report and plans (ref:7952-SKH-695S lots 1 and 2) detailing the boundaries of this area is provided as part of Appendix B of this report. The required 195 ha offset area will be legally secured by voluntary declaration as per the requirements of Condition 7c of the approval and as a result of nomination by the two completed and submitted Declared Area Management Plans thus far.

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2 Introduction

2.1 Background

The Yarrabilba Priority Development Area (PDA) site is located on the eastern side of Waterford - Tamborine Road and to the south of Logan Village (refer to Figure 1). It is bounded by rural residential areas to the north, Plunkett Road to the south and the Plunkett Conservation Park to the east. The site consists of approximately 2,200 ha, of which 2062 ha is controlled by Lendlease Communities (Yarrabilba) Pty Ltd. The land has been historically used for pine forestry, a military training camp in WWII and for livestock grazing, when first cleared. Yarrabilba is predominately vegetated with areas of regrowth native vegetation, exotic pines which are a remaining from the historical land use as a pine plantation and exotic grasslands. Some limited areas of native remnant and regrowth vegetation exist but they are mostly confined to creeks, drainage channels and wetlands.

The Yarrabilba project was deemed a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2013/6791) due to impacts on *Phascolarctos cinereus* (Koala). To compensate for the loss of Koala habitat, at least 195 ha of MNES habitat (shown in the EPBC Conditions in Appendix A) is required as an environmental offset.

In order to define environmental offsets, this Declared Area Management Plan (DAMP) has been prepared in order to have the Offset Area, identified within the Yarrabilba Fauna Corridor, declared as a Voluntary Declaration (V-Dec) under the *Vegetation Management Act 1999*. This plan forms part of the V-Dec Application and provides information on rehabilitation, maintenance, monitoring and permissible works to occur within the declared area.

2.2 Criteria for declaration

The subject site for the proposed declared area satisfies the criteria for declaration under the Guide to Voluntary Declaration pursuant to the *Vegetation Management Act 1999*. The declared area meets criteria as follows:

- An area of high nature conservation value, which is, an area containing a vegetation clump or corridor that contributes to the maintenance of biodiversity

2.3 Management objectives of Declared Area Management Plan

The main objective of the Offset Area as a whole, is to create an ecologically functional corridor and ecosystem that provides habitat for Koala with connectivity to a locally significant, conservation area, Plunkett Reserve.

The intent of the Declared Area Management Plan is to provide management measures to rehabilitate, maintain and allow permissible works within the Offset Area. This Declared Area Management Plan is consistent with the Koala Management Plan (Austecology 2012), the Fauna Corridor Infrastructure Master Plan (Natura Consulting 2012), the Habitat Rehabilitation Management Plan (Natura Consulting 2015) and the Offset Management Plan (Austecology 2015) in terms of the corridor network, rehabilitation objectives and future management requirements. The management plans are provided within the appendices of this report.

The total Offset Area subject to the current and future V-Dec applications and PMAV will encompass in excess of 195 ha, as identified in Figure 1. This Declared Area Management Plan ensures that 112.401 ha of Koala habitat within Lots 910 on SP291904, 38 on W31932, 1 on SP296375, 913 on SP291904, 7 on SP296375, 41 on W311273, 29 on W31919 and 35 on W31950 are maintained as

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part of a staged approach to the management of the minimum 195 ha of Offset Area. The Declared Area subject to this Declared Area Management Plan is shown within the Declared Area Map provided as Appendix B of this report.

In particular the objectives of this report are to:

1. define the rehabilitation and maintenance measures that reflect an adaptive management approach to improve Koala habitat in the designated areas
2. provide clear and concise monitoring outcomes and performance indicators against which achievement of the outcomes identified will be measured
3. identify the types of permissible works within the V-Dec area
4. meet components of Conditions 7c) of the EPBC Approval (2013/6791) through a V-Dec developed in accordance with the template management plan for Voluntary Declarations published by the Department of Natural Resources and Mines

2.4 Activities to achieve management objectives

Activities to occur within the declared area include the existing monitoring and rehabilitation activities to ensure that the primary objective of maintaining an ecological functioning corridor that supports Koalas. Specifically, activities which are to continue to occur within the declared are as follows:

- Prohibit the clearing of vegetation where it is not being conducted in relation to approved infrastructure establishment or maintenance activities. This includes activities such as the potential future widening of Waterford-Tamborine Road by the Department of Transport and Main Roads, construction and maintenance of road crossings and batters, fauna crossings, bushfire trails and fire breaks in accordance with the Bush Fire Management Plan and/or advice from QPWS, recreational trail infrastructure in accordance approval from Economic Development Queensland (EDQ) and in accordance with QPWS requests, stormwater, diversion drains, erosion control, sediment control, scour protection, water and sewer infrastructure or electrical infrastructure or infrastructure for other key services required for the residential development.

- Vegetation clearing for construction / establishment of required infrastructure is to be managed through the development of Vegetation Management Plans which are assessed and approved by EDQ prior to commencement of any vegetation disturbance.

- Conduct any construction or maintenance works in accordance with this Declared Area Management Plan, Fauna Corridor Master Plan, Habitat Rehabilitation Management Plan and Natural Environment Site Strategy to ensure environmental management practices are implemented to prevent the introduction or spread of restricted invasive species; and reduce impacts to surrounding vegetation and fauna.

- Continue the monitoring of vegetation within the declared area and report on the natural regeneration to ensure the area meets rehabilitation benchmarks.

- Conduct rehabilitation activities where required including control of restricted invasive species and revegetation.

- Use adaptive weed control and vegetation management practices in accordance with emerging research.

- Continue passive fauna monitoring activities.

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- Continue to exclude, or at least restrict certain activities such as: dirt bike riding, four wheel driving, cattle grazing, horse riding and dog walking or other unlawful access by the public.

- Allow controlled access to the third parties where it relates to the construction and maintenance of infrastructure such as road crossings, fire trails, recreational trails, water, sewer, telecommunications and electrical infrastructure and for maintenance of existing bushfire and other access tracks.

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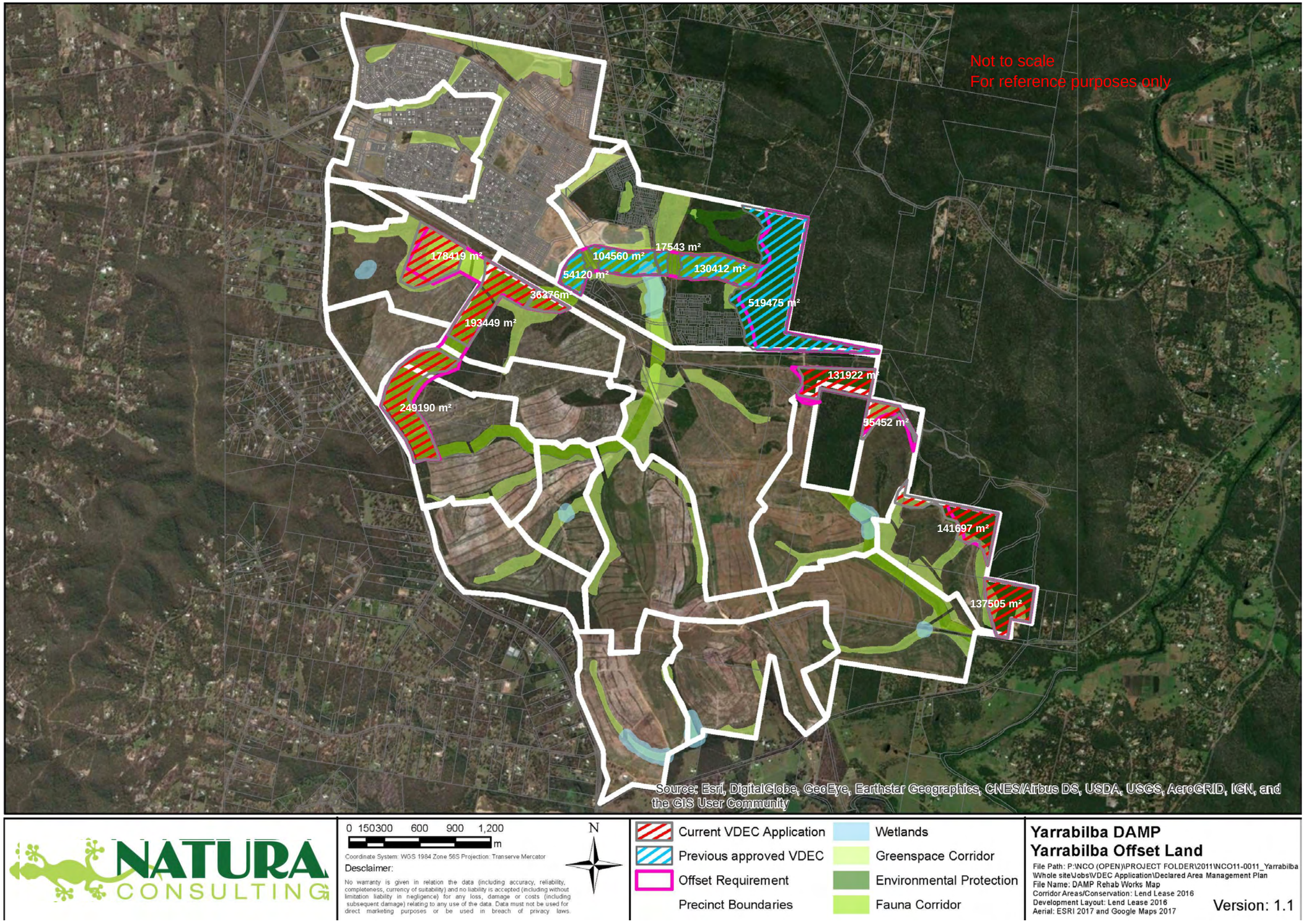

Figure 1 Yarrabilba Offset Areas

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3 Property ownership details

Proponent	Lendlease Communities (Yarrabilba) Pty Limited
Registered Owner	Hancock Resources Pty Ltd
Local Government Area	Logan City Council
Lot/Plan	Lots 910 on SP291904, 38 on W31932, 1 on SP296375, 913 on SP291904, 7 on SP296375, 41 on W311273, 29 on W31919 and Lot 35 on W31950
Area of V-Dec	112.401 ha
Applicant	Lendlease Communities (Yarrabilba) Pty Limited
Postal Address	C/- Natura Consulting PO Box 2959 Burleigh BC, Qld 4220
Phone	(07) 5576 5568
Email	kieran@natura-consulting.com

The 112.401 ha declared area is comprised Lots 910 on SP291904, 38 on W31932, 1 on SP296375, 913 on SP291904, 7 on SP296375, 41 on W311273, 29 on W319119 and Lot 35 on W31950 and is located within the Yarrabilba Priority Development Area project on Waterford-Tamborine Road, Yarrabilba. The V-Dec area which will be declared under section 19F(1)(a) of the *Vegetation Management Act 1999* is shown on the Declared Area Map (refer Appendix B).

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4 Future infrastructure rights

The overall intent for this plan and the V-Dec area is to enhance habitat quality for Koala, while maintaining or enhancing conservation values as well as allowing future infrastructure rights (permissible works). The existing interests and rights of Lendlease Communities (Yarrabilba) Pty Ltd (Lendlease) and the Registered Owner of the properties will not be affected by this Voluntary Declaration, specifically:

1 The Registered Owner will continue to be able to exercise its rights under any laws or approvals with respect to the declared area, including rights to access and attend to any maintenance and management works within the declared area in accordance with the Declared Area Management Plan and as required under any laws if and when required.

2 Lendlease and the relevant asset owners will continue to be able to exercise their rights under any laws or approvals to access and carry out infrastructure construction and maintenance works within the declared area such as: the construction and maintenance of road crossings and batters, bushfire trails and fire breaks in accordance with the Bush Fire Management Plan and/or advice from QPWS, recreational trail infrastructure in accordance approval from Economic Development Queensland (EDQ) and in accordance with QPWS requests, stormwater, diversion drains, erosion control, sediment control, scour protection, water and sewer infrastructure, electrical infrastructure or infrastructure for other key services required for the residential development.

3 Upon development of key infrastructure, Lendlease and relevant asset owners will continue to be able to access and allow controlled access to the declared area to interested parties where the access relates to the maintenance, repair, upgrade or re-construction of such infrastructure.

4 Registered interests requiring access to the declared area for maintenance to infrastructure will be consulted and be required to provide consent to any bushfire management plans and land maintenance plans, and any future changes to these plans which may affect infrastructure corridors or access tracks.

5 Lendlease will obtain consent from registered interests prior to making any amendments to the Declared Area Management Plan which may affect the interested parties rights and interests within the infrastructure corridors or existing access tracks.

6 Lendlease will obtain consent from registered interests for agreeing to any changes to the vegetation category/s of the declared area which could impact upon infrastructure access or maintenance.

7 Lendlease will obtain consent from registered interests before agreeing to any code for the clearing of vegetation within the declared area that will apply to any infrastructure corridor or access tracks.

8 Lendlease will continue to allow the use of, and maintenance of, infrastructure corridors or access tracks used by interested parties, or provide suitable alternatives with consent of registered party's.

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5 Rehabilitation management actions

In accordance with the *EPBC* Act 1999 decision notice, this Declared Area Management Plan has been formulated to reflect the onsite rehabilitation requirements of Fauna and Green Space Corridors, Regional Ecosystems, drainage lines and post development fauna movement pathways within Koala habitat areas on the site. This plan identifies areas of high significance for Koala habitat (identified in Figure 3a and 3b as Existing Assessable Koala habitat to be protected and managed and Offset Areas), identifies Koala habitat rehabilitation benchmarks and determines restoration actions to meet these benchmarks.

The management measures as part of this plan are structured as follows:

- rehabilitation
- performance indicators
- monitoring
- reporting
- contingency measures

The Yarrabilba Community Development is a staged development which will be undertaken over approximately thirty years. While rehabilitation works are generally tied to the roll-out of construction, early works are to be carried out to establish those habitat areas as soon as practical with any supplementary planting to be conducted in conjunction with the construction for each stage. Figure 2 presents the current staging plan for the development, which may be amended based on market demand, site constraints etc. The declared area is within a number of Stages / Precincts south of the powerline easement in the PDA, none of which are under construction at the time of this report.

Weed control measures are to be undertaken ahead of the construction staging, as the land owner has obligations under other legislation that requires the management of weeds on site. All weed management for the declared area is in progress and is being undertaken in accordance with the Habitat Rehabilitation Management Plan (Natura Consulting 2015), and other relevant approved documentation, and will be implemented in a manner that is consistent with the conservation of Koala habitat and other ecological values.

A summary of staging of detailed rehabilitation planning, rehabilitation works, monitoring, taking into consideration the staging plan for the development, is provided in the following sections.

5.1 Purpose of habitat rehabilitation

Habitat rehabilitation is intended to improve Koala habitat quality within the site in order to significantly increase the site's Koala carrying capacity in the medium to long term. In addition, the configuration of key elements of the open space system (Fauna Corridor, Greenspace Corridor and Environmental Protection Zone) will enhance the site's contribution to Koala movement opportunities within the context of larger areas of Koala habitat to the east and west of the site (Austecology 2012). The rehabilitation of the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone will significantly expand on habitat values by providing additional Koala habitat (Natura Consulting 2012). Rehabilitation is being undertaken across large areas of the site including within the declared area which is comprised of the section of the 'fauna corridor' that is south of the powerline easement.

Koala habitat rehabilitation is to be undertaken within "Existing Assessable Koala Habitat to be protected and managed" and "Offset Areas" within Fauna Corridors, Greenspace Corridors and Environmental Protection Zones. This totals an area in excess of 195 ha within the Offset Areas and an additional area of approximately 75.5 ha within Existing Assessable Koala Habitat areas outside of Offset areas, comprising a combined area of approximately 270.5 ha to be rehabilitated. This report

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addresses the requirements of rehabilitation within the declared area which comprises the current section of the 'fauna corridor' that is south of the powerline easement.

5.2 Rehabilitation objectives

Each rehabilitation unit is to be rehabilitated to a vegetation structure and species composition that is in line with that of the appropriate pre-clearing RE. The reference benchmark for rehabilitation of each rehabilitation unit is derived from the vegetation structure and species composition of the appropriate pre-clearing Regional Ecosystem (RE). These benchmarks quantify average canopy cover, shrub cover, ground cover, species richness and average height of the canopy and have been sourced from the Queensland Herbarium (Queensland Government 2015). These technical descriptions are a compilation of data from multiple sites for canopy cover, shrub cover, and average stem density for each strata, groundcover and average species richness (Queensland Government 2015). Through establishing these benchmarks, a reasonable comparison can be made between the floristic composition and vegetation structure of a given rehabilitation unit and the appropriate pre-clearing RE.

5.3 Performance indicators

The final benchmark for rehabilitation is derived from the definition of remnant vegetation under the *Vegetation Management Act 1999.* Vegetation can be mapped as remnant vegetation and associated essential habitat for Koalas if the canopy is 70% of the height, 50% of the cover and similar species composition of the appropriate pre-clearing RE (Queensland Government 2015). Therefore, the final benchmark for rehabilitation is 70% of the reference benchmark cover (for canopy, shrub and ground-layer) and 50% of the reference benchmark height (for canopy and shrub layer) of the appropriate RE.

Six rehabilitation performance indicators were selected:

1 average canopy cover
2 average height of canopy
3 dominant canopy species
4 average shrub cover
5 average groundcover
6 species richness
7 weed cover

Weed cover needs to be considered for rehabilitation benchmarks for this site, particularly in the canopy where numerous exotic pine trees exist. Throughout the life of the development a weed cover of ≤5% is to be maintained.

The reference and final benchmark vegetation structure and species composition for each of the pre-clearing RE's identified within the mapped rehabilitation units is identified within the Habitat Rehabilitation Management Plan (Natura Consulting 2015).

Rehabilitation units are to be managed and restored until they reach the final benchmark condition and objectives of the Habitat Rehabilitation and Management Plan. The objectives of the plan are long term and are likely to require more than 15 years to be achieved, within each rehabilitation unit, after commencement of implementation.

Interim benchmarks are also provided whereby an assessment at regular intervals can be made on the progress of the rehabilitation / revegetation efforts towards achieving this plan's outcomes. Given this, adaptive management approaches can also be employed to redirect restoration approaches, in the event that interim benchmarks are not being met.

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5.4 Rehabilitation Plan

Detailed site assessments and rehabilitation planning are being presented in preparation of the development of each stage at Yarrabilba. Within this 112.401 ha area, the following rehabilitation plan is provided. Table 1 provides current condition descriptions of natural vegetation across the 112.401 ha area according to the division of rehabilitation zones shown in Figure 3a and 3b. Condition scoring is as per Table 1 key.

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Table 1 Detailed rehabilitation works for offset areas throughout the south of easement declared areas (Note: unique polygon # are not consecutive as they form part of a larger whole-of-site rehabilitation strategy)

Key for condition scoring

Score	Description
1	Weeds dominant covering > 50% of ground, almost definitely requires supplementary planting
2	Weeds dominant covering > 25% of ground, likely requires supplementary planting
3	Weeds scattered throughout but with native vegetation healthy, requiring assisted regeneration and low likelihood of supplementary planting
4	Minor localised weed incursions with largely healthy and connected areas of native vegetation, requiring some assisted regeneration
5	Weeds rare and native vegetation healthy with little to no assisted regeneration required but natural regeneration needing to be monitored

Area	Polygon #	Site Type	Site Description	˜Site Size (m^2)	General Rehabilitation	Instructions	Total Weed Cover (%)	Condition Scoring	Available Space (%)	Available Space (m^2)	# Tree Tubestock	# Understorey Tubestock	# Groundlayer Tubestock
P5 and West Fauna Corridor	34	Open Forest	*Melaleuca quinquenervia, M. linariifolia, M. sieberi* and *M. decora, Lophostemon suaveolens, Acacia* spp. In understorey and thick ground-layer of weedy and native herbaceous perennials. *Pinus elliottii* also present.	6935	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds)	10%	3	0%	0	0	0	0
P5 and West Fauna Corridor	35	Open Forest	*Melaleuca quinquenervia, M. linariifolia, M. sieberi* and *M. decora, Lophostemon suaveolens, Acacia* spp. In understorey and thick ground-layer of weedy and native herbaceous perennials. *Pinus elliottii* also present.	19316	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds)	10%	3	0%	0	0	0	0
P5 and West Fauna Corridor	36	Open Forest	*Melaleuca quinquenervia, M. linariifolia, M. sieberi* and *M. decora, Lophostemon suaveolens, Acacia* spp. In understorey and thick ground-layer of weedy and native herbaceous perennials. *Pinus elliottii* also present.	4619	Assisted regeneration, supplementary koala tree replenishment and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Planting KTs to replace area of *Acacia* spp. regrowth (40% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	10%	2	40%	1848	462	554	462
P5 and West Fauna Corridor	37	Open Forest	*Melaleuca quinquenervia, M. linariifolia, M. sieberi* and *M. decora, Lophostemon suaveolens, Acacia* spp. In understorey and thick ground-layer of weedy and native herbaceous perennials. *Pinus elliottii* also present.	17355	Assisted regeneration, supplementary koala tree replenishment and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Planting KTs to replace area of *Acacia* spp. regrowth (40% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	10%	2	20%	3471	868	1041	868
P6 and South Fauna Corridor	58	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	7574	Assisted regeneration, supplementary koala tree replenishment and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Planting KTs along old haul road through the area (50% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	20%	2	50%	3787	947	1136	947

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Area	Polygon #	Site Type	Site Description	~Site Size (m^2)	General Rehabilitation	Instructions	Total Weed Cover (%)	Condition Scoring	Available Space (%)	Available Space (m^2)	# Tree Tubestock	# Understorey Tubestock	# Groundlayer Tubestock
P6 and South Fauna Corridor	59	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	29850	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Hand-pull regrowth *Pinus elliottii*	50%	2	0%	0	0	0	0
P6 and South Fauna Corridor	60	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	40600	Assisted regeneration and weed control	Spraying or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds).	10%	3	0%	0	0	0	0
P6 and South Fauna Corridor	61	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	48378	Assisted regeneration and weed control	Spraying or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Chainsaw-fell mature *Pinus elliottii*. Hand-pull regrowth *Pinus elliottii*.	15%	3	0%	0	0	0	0
P6 and South Fauna Corridor	62	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	22282	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Hand-pull regrowth *Pinus elliottii.*	10%	3	0%	0	0	0	0
P6 and South Fauna Corridor	63	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	21234	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds. Hand-pull regrowth *Pinus elliottii.*	2%	3	0%	0	0	0	0
P6 and South Fauna Corridor	64	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	13315	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Hand-pull regrowth *Pinus elliottii.*	6%	3	0%	0	0	0	0
P6 and South Fauna Corridor	65	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	36435	Assisted regeneration, supplementary koala tree replenishment and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Planting KTs within areas of *Acacia* spp. regrowth (40% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	17%	2	40%	14574	3644	4372	3644
P6 and South Fauna Corridor	66	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	20156	Assisted regeneration, supplementary koala tree replenishment and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Planting KTs within areas of *Acacia* spp. regrowth and open-canopy weed-dominated sites (10% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	16%	2	10%	2016	504	605	504

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Area	Polygon #	Site Type	Site Description	~Site Size (m^2)	General Rehabilitation	Instructions	Total Weed Cover (%)	Condition Scoring	Available Space (%)	Available Space (m^2)	# Tree Tubestock	# Understorey Tubestock	# Groundlayer Tubestock
P6 and South Fauna Corridor	67	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	8029	Assisted regeneration, supplementary koala tree replenishment and weed control	Intensive chainsaw-felling of mature *Pinus elliottii* throughout area and hand-pull regrowth *Pinus elliottii*. If possible, plant KTs within areas of felled timber (50% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	90%	1	50%	4015	1004	1204	1004
P6 and South Fauna Corridor	68	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	39514	Assisted regeneration, supplementary koala tree replenishment and weed control	Hand-pull regrowth *Pinus elliottii*. Planting of KTs in open-canopy weed-dominated sites (10% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	80%	2	40%	15806	3951	4742	3951
P6 and South Fauna Corridor	69	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	26451	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Hand-pull regrowth *Pinus elliottii*.	7%	3	0%	0	0	0	0
P6 and South Fauna Corridor	70	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	4739	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Hand-pull regrowth *Pinus elliottii*.	6%	3	0%	0	0	0	0
P6 and South Fauna Corridor	71	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	22885	Assisted regeneration, supplementary koala tree replenishment and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Hand-pull regrowth *Pinus elliottii.* Planting of KTs in open-canopy *Imperata cylindrica*-dominated sites (20% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	3%	2	20%	4577	1144	1373	1144
P6 and South Fauna Corridor	72	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	12255	Assisted regeneration, supplementary koala tree replenishment and weed control	Intensive chainsaw-felling of mature *Pinus elliottii* throughout area and hand-pull regrowth *Pinus elliottii*. Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). If possible, plant KTs within areas of felled timber (50% availability). KTs to include *Eucalyptus tereticornis, E. siderophloia, E. seeana, Angophora subvelutina, A. leiocarpa, Corymbia intermedia* and *C. gummifera*	80%	1	40%	4902	1226	1471	1226
P6 and South Fauna Corridor	73	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	8501	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Hand-pull regrowth *Pinus elliottii*.	35%	2	0%	0	0	0	0

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P6 and South Fauna Corridor	74	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	16356	Assisted regeneration and weed control	Intensive chainsaw-felling of mature *Pinus elliottii* throughout area and hand-pull regrowth *Pinus elliottii*. Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds).	70%	1	0%	0	0	0	0
P6 and South Fauna Corridor	75	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	19090	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Hand-pull regrowth *Pinus elliottii*.	1%	3	0%	0	0	0	0
P6 and South Fauna Corridor	76	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	128712	Assisted regeneration and weed control	Intensive chainsaw-felling of mature *Pinus elliottii* throughout area and hand-pull regrowth *Pinus elliottii*. Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds).	10%	3	0%	0	0	0	0
P6 and South Fauna Corridor	77	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	48271	Assisted regeneration and weed control	Chainsaw-felling of occasional mature *Pinus elliottii* throughout area and hand-pull regrowth *Pinus elliottii*. Spraying for exotic grasses.	25%	2	0%	0	0	0	0
P6 and South Fauna Corridor	78	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	33204	Assisted regeneration and weed control	Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds).	2%	3	0%	0	0	0	0
P6 and South Fauna Corridor	79	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	29934	Assisted regeneration and weed control	Hand-pull regrowth *Pinus elliottii*. Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara*) or stem-injection method for mature *Cinannomum camphora*. Avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds).	5%	3	0%	0	0	0	0
P6 and South Fauna Corridor	80	Open Forest	*Eucalyptus moluccana, Corymbia intermedia* and other Eucalypts with understorey of *Pteridium esculentum*, graminoids and herbaceous perennials. *Pinus elliottii* also present.	41054	Assisted regeneration and weed control	Chainsaw-felling of occasional mature *Pinus elliottii* throughout area and hand-pull regrowth *Pinus elliottii*. Spraying for exotic grasses and herbaceous weeds, use spray or manual removal for woody weeds (e.g. *Lantana camara,* juvenile *Cinnamomum camphora*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds).	18%	3	0%	0	0	0	0
P15 and North Conservation Area	81	Open Forest	*Melaleuca quinquenervia, M. linariifolia* with scattered Eucalypts and underlying riparian zone with marginal and riparian species incl. rushes, sedges and graminoids	1405	Assisted regeneration and weed control	Chainsaw *Pinus elliottii* and remove into piles. Hand-pull *Lantana camara* (to avoid native regrowth). Spray woody weeds (e.g. *Cinnamomum camphora*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds).	5%	3	0%	0	0	0	0

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P15 and North Conservation Area	82	Open Forest	*Melaleuca quinquenervia, M. linariifolia* with scattered Eucalypts and underlying riparian zone with marginal and riparian species incl. rushes, sedges and graminoids	4494	Assisted regeneration and weed control	Chainsaw *Pinus elliottii* and remove into piles. Hand-pull *Lantana camara* (to avoid native regrowth). Spray woody weeds (e.g. *Cinnamomum camphora*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Stem-inject semi-mature *C. camphora* in south of site.	5%	3	0%	0	0	0	0
P15 and North Conservation Area	83	Open Forest	*Melaleuca quinquenervia, M. linariifolia* with scattered Eucalypts and underlying riparian zone with marginal and riparian species incl. rushes, sedges and graminoids	28952	Assisted regeneration and weed control	Chainsaw *Pinus elliottii* and remove into piles. Hand-pull *Lantana camara* (to avoid native regrowth).	< 1%	3	0%	0	0	0	0
P15 and North Conservation Area	84	Open Forest	*Melaleuca quinquenervia, M. linariifolia* with scattered Eucalypts and underlying riparian zone with marginal and riparian species incl. rushes, sedges and graminoids	42053	Assisted regeneration and weed control	Chainsaw *Pinus elliottii* and remove into piles. Hand-pull *Lantana camara* (to avoid native regrowth). Spray woody weeds (e.g. *Cinnamomum camphora*) avoiding off-target damage to native grasses (e.g. Metsulfuron-methyl compounds). Stem-inject semi-mature *C. camphora*.	< 1%	3	0%	0	0	0	0
P15 and North Conservation Area	88	Open Forest	*Eucalyptus acmenoides, E. siderophloia* and *Corymbia citriodora* subsp. *variegata* diverse sclerophyll forest on sedimentary slopes and ravines. Contains high diversity of City-wide Significant species.	142570	Natural regeneration	No weeds. No action required.	0%	5	0%	0	0	0	0
P15 and North Conservation Area	89	Open Forest	*Eucalyptus acmenoides, E. siderophloia* and *Corymbia citriodora* subsp. *variegata* diverse sclerophyll forest on sedimentary slopes and ravines. Contains high diversity of City-wide Significant species.	52728	Assisted regeneration, supplementary koala tree replenishment and weed control	Chainsaw *Pinus elliottii* and remove into piles. Hand-pull *Lantana camara* (to avoid native regrowth). Plant KTs from the following list: *Eucalyptus siderophloia, E. resinifera, E. planchoniana, Corymbia intermedia, C. citriodora* subsp. *variegata, Angophora woodsiana* and *Lophostemon confertus*. Supplement with RE-aligned shrub and groundlayer species. Due to the large amount of bare pasture into which these plants will be planted, mowing / slashing will be required and continual 6 monthly monitoring of weed suppression.	5%	2	75%	39546	9887	11864	9887
P15 and North Conservation Area	90	Open Forest	*Eucalyptus carnea, E. tindaliae, Corymbia intermedia* woodland and open forest on volanic / sedimentary interbedded slopes	98129	Natural regeneration	No weeds. No action required.	0%	5	0%	0	0	0	0
P15 and North Conservation Area	91	Open Forest	*Eucalyptus carnea, E. tindaliae, Corymbia intermedia* woodland and open forest on volanic / sedimentary interbedded slopes	136559	Natural regeneration	No weeds. No action required.	0%	5	0%	0	0	0	0
						Average Weed Cover	**19%**	**Total Tubestock (per strata)**			**23635**	**28362**	**23635**
												Total Tubestock (All)	**75632**

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5.4.1 Site preparation

Rubbish removal

Prior to work commencing remove all unwanted materials within all rehabilitation areas from site. Rubbish removal is to include dumped materials such as car / machinery parts, household waste and rock rubble.

Water restrictions

When water restrictions apply - 'No potable water to be used for landscaping'.

Levels

Except where indicated or specified, finished surface levels are to be evenly transitioned and should not be amended.

Access and safety

The contractor / land owner is to maintain safe access through site at all times and must ensure any / all excavations are fully protected at all times.

Services

It is the contractor / land owner's responsibility to confirm with authorities the location of all underground services prior to commencement. Additionally the contractor / land owner is responsible for the repair of any damage to services without delay or cost.

Plant set out and stock

- All plant stock to be verified by Natura Consulting for stock quality and size, and set out prior to planting.
- Substitutions are not to be made without prior approval.
- When setting out of mass planted areas (where not detailed):
  - plants to be set out in swathes of single species of large numbers of plants
  - swathes to be set out in naturalistic elongated forms / shapes
  - swathes of species to be prearranged to provide contrast in size, shape form, texture and colour
- Natura Consulting to discuss and verify on-site a sample section of planting set out prior to contactor proceeding to set out and completing planting / weeding.

Site inspections

Inspections by Natura Consulting will be carried out to an agreed programme throughout implementation of the works.

As built works

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All new services and modifications to documented works are to be provided by the contractor at the completion of the works.

Protection of works

The contractor / land owner shall ensure full protection of the works during the construction and maintenance periods.

Erosion and sediment control

Sediment runoff from all earth works sites is to be prevented from entering stormwater systems as per the stamped approved stormwater and sediment erosion control plan.

A suitable erosion protection product such as matting should be used that will cope with the predicted intermittent flows within the drainage channel and will also enable planting. An applicable product is to be selected by a suitably qualified professional based on the predicted flows. This product is to be installed to manufacturers' specifications which may include pinning and trenching.

Sediment trap mechanisms will include:

- all exposed areas being stabilised and rehabilitation works carried out as soon as practical
- erosion matting used within each planting area

Dust control

In order to minimise dust generation from the site, dust control measures must be implemented. This will include, but not be limited to, the establishment of vegetation as soon as practical after completion of works.

5.4.2 Revegetation plan

The following provides guidelines for the successful implementation of the revegetation plan:

- During revegetation of the areas specified, the following conditions are to be adhered to:
  - All revegetation work should be carried out by or under the guidance of an experienced and qualified person with knowledge of local and exotic species identification.
  - Plants used for revegetation must be exclusively those listed in the Revegetation Planting Schedules (Table 2).

- An extensive plant list has been provided (Table 2) to account for the possibility that not all plants may be horticulturally available at the time of planting. Despite this, every effort should be made to use a diverse mix of species and life form types.

- Planting should take into account site suitability for natural regeneration and must not be conducted in such a way as to cause damage to naturally regenerating plants or existing canopy trees (i.e. minimise planting within existing canopy tree drip-zones).

- Planting should take into account the existing vegetation composition, for example, in areas with good canopy cover but degraded lower strata, ground cover and understorey species are to form the predominant part of the revegetation planting. In some instances woody weeds may be retained to shade out other weeds and allow a native ground cover to establish. These species should be removed once native species are established.

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- Tubestock and 140 mm pots should be used wherever possible, although flexibility remains to use larger pot sizes.

- Plants are to be watered thoroughly immediately after planting, and thereafter as required. Creation of a concave hollow around the base of each plant will aid water infiltration.

- Planting should be carried out during suitable weather conditions to minimise the risk of loss of newly establishing plants through drought or by erosion.

- All areas cleared of weed infestations are to be revegetated immediately following weed removal with a diverse mix of species, particularly ground cover, but can include understorey and canopy native species where indicated.

- All plantings are to be of local provenance, where practical.

- All plants in the revegetation areas are to be endemic to the area (refer to Revegetation Planting Schedules).

- Weed removal methods must not pose a threat to existing species diversity.

- Herbicide application should be by targeted use only.

- Refer to Table 3 of guidelines for weed removal in the following section which outlines the procedures for removal of weeds identified within the Revegetation Area.

- All weed / invasive exotic species should be removed from the subject site and disposed of at an appropriate Council green waste facility.

Table 2 Comprehensive list of native plant species for revegetation works where needed, per zone (as per Figures 3a and 3b).

Rehabilitation is completed on a stage by stage basis so that activities occur following the design and construction of any key infrastructure that could require vegetation clearing for each stage. Figure 2 illustrates the proposed rehabilitation staging for the site. Rehabilitation activities within the declared area are scheduled to commence following the design and construction of road crossings and other required infrastructure.

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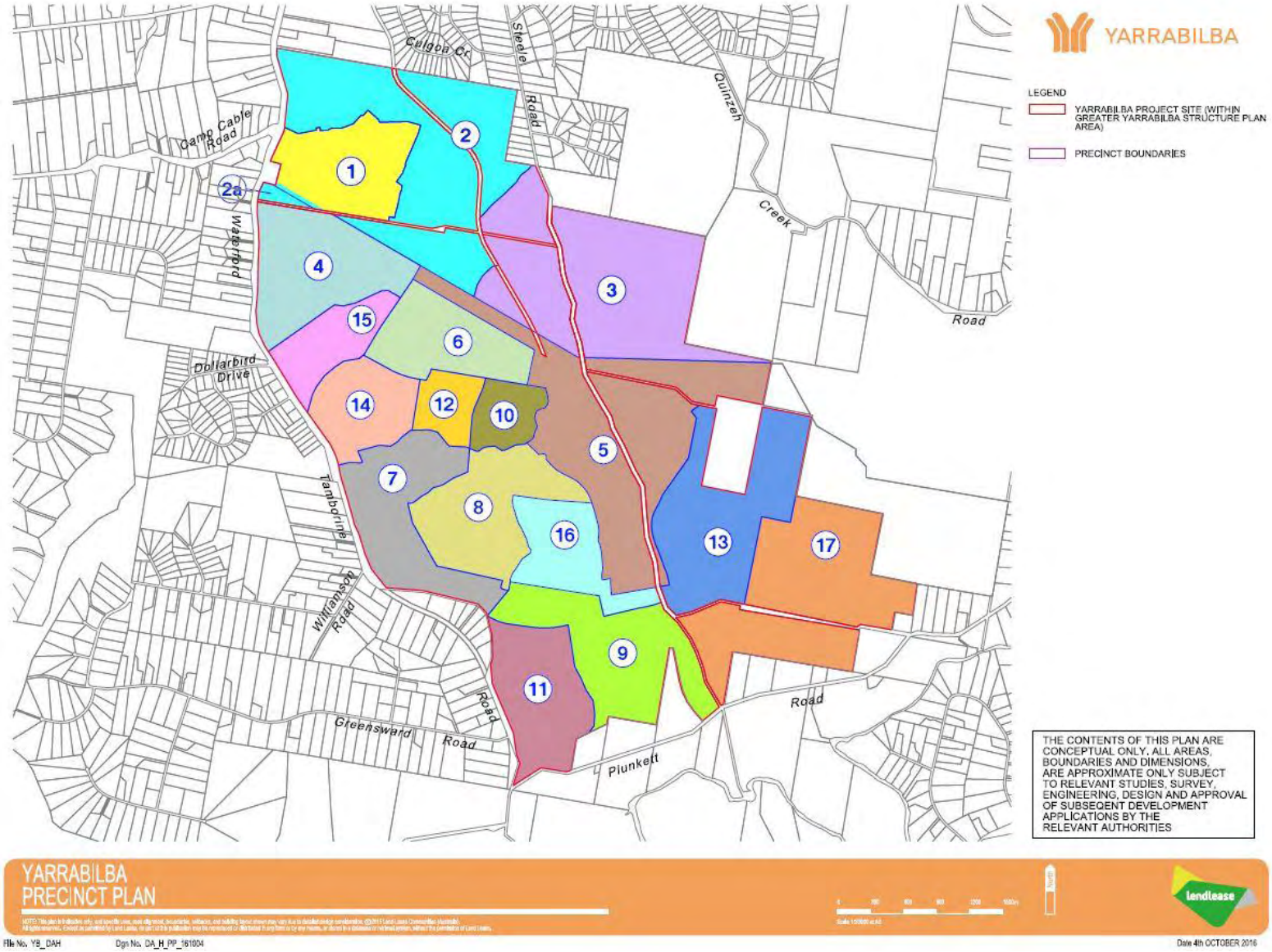

Figure 2 Indicative proposed rehabilitation staging

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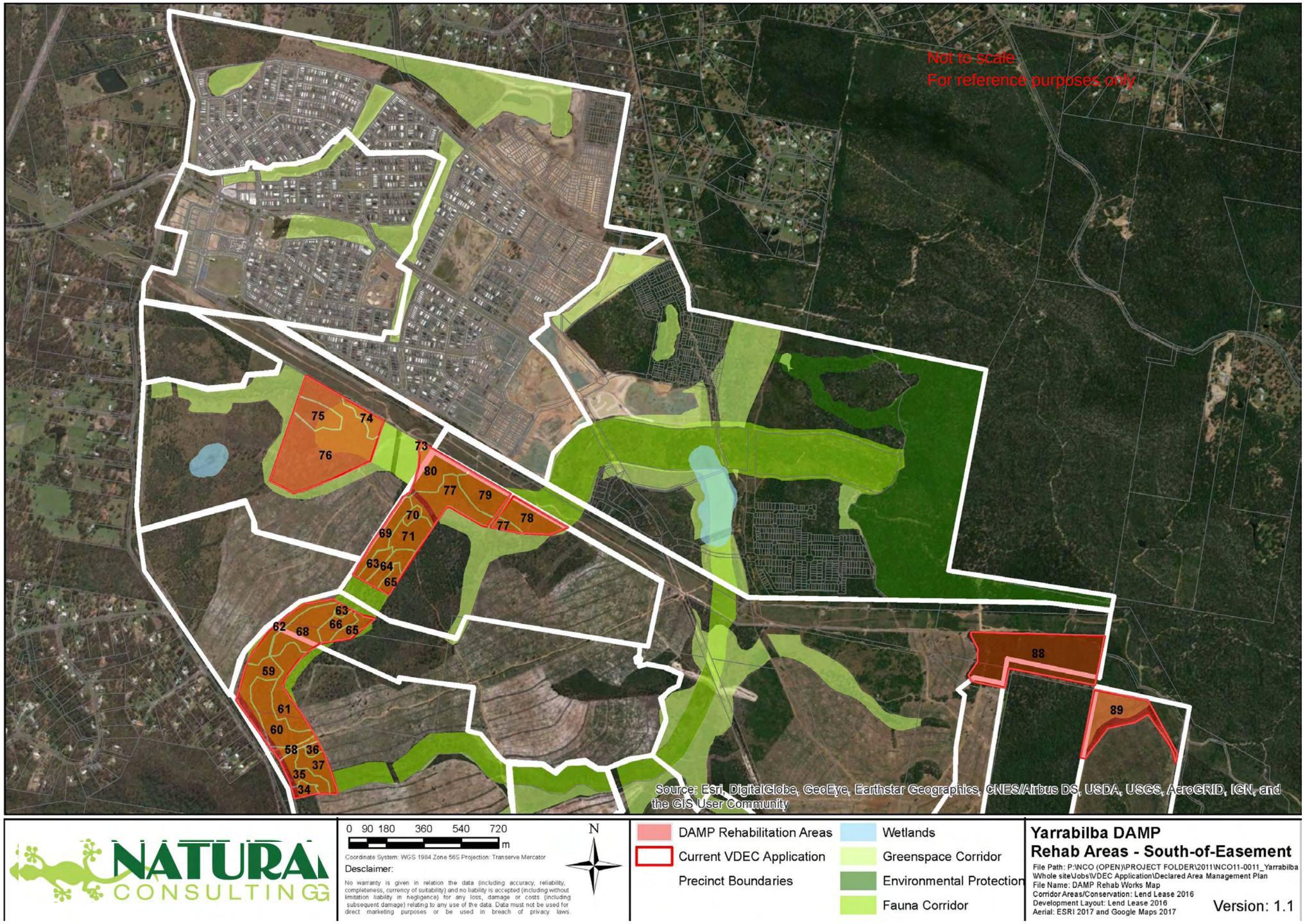

Figure 3a Overall zonation (Polygon # as per Table 1) of rehabilitation plan across the 112.401 ha of offset area located in the south of Yarrabilba Priority Development Area (Northern section)

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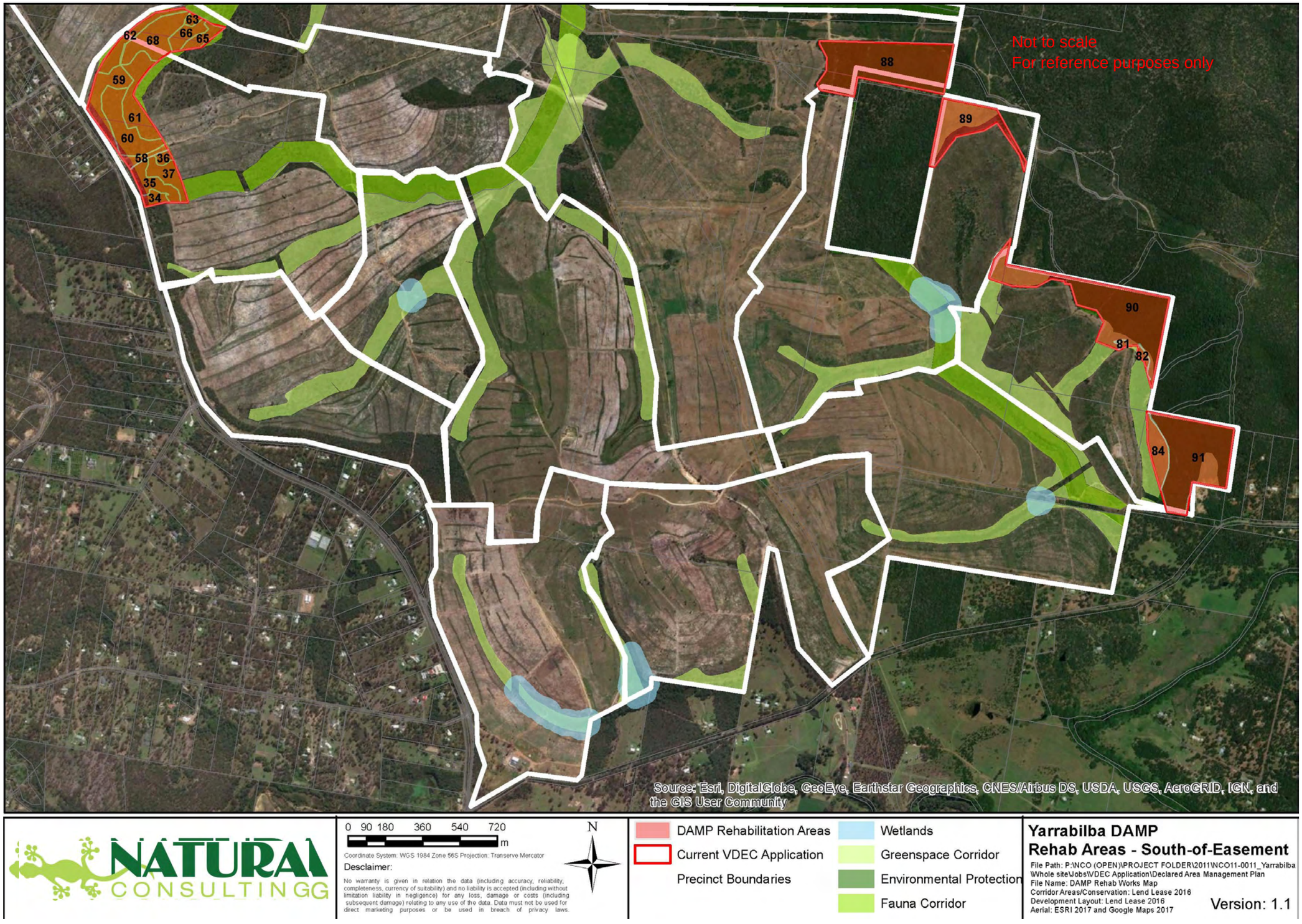

Figure 3b Overall zonation (Polygon # as per Table 1) of rehabilitation plan across the 112.401 ha of offset area located in the south of Yarrabilba Priority Development Area (Southern section)

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Table 2 Comprehensive species list of native vegetation

Botanical Name	Common Name	Family	Zones/Rehab Polygons applicable
Ground-layer			
Blechnum indicum	Bungwall	Blechnaceae	58, 65, 66, 67, 68, 71, 72
Cymbopogon refractus	Barbwire Grass	Poaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Cyperus exaltatus	Giant Sedge	Cyperaceae	58, 65, 66, 67, 68, 71, 72
Dianella caerulea	Blueberry Lily	Xanthorrhoaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Drynaria rigidula	Basket Fern	Polypodiaceae	89
Gahnia clarkei	Tall Saw-sedge	Cyperaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Imperata cylindrica	Blady Grass	Poaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Juncus usitatus	Common Rush	Juncaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Lomandra longifolia	Spiny-headed Mat Rush	Asparagaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Lomandra multiflora	Many-flowered Mat Rush	Asparagaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Panicum effusum	Hairy Panic	Poaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Pteridium esculentum	Austral Bracken	Dennstaedtiaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Schoenoplectus validus		Cyperaceae	58, 65, 66, 67, 68, 71, 72
Themeda triandra	Kangaroo Grass	Poaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Shrubs (Understorey)			
Acacia amblygona	Fan Wattle	Mimosaceae	89
Acacia baeuerlenii		Mimosaceae	89
Acacia granitica	Granite Wattle	Mimosaceae	89
Acacia fimbriata	Brisbane Wattle	Mimosaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Acacia juncifolia	Rush-leaved Wattle	Mimosaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Acacia quadrilateralis		Mimosaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Acrotriche aggregata	Red Cluster Heath	Epacridaceae	89
Baeckea frutescens	Weeping Baeckea	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Banksia spinulosa var. *collina*	Golden Candlesticks	Proteaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Hibbertia vestita	Small-leaf Guinea Bush	Dilleniaceae	89
Hovea acutifolia	Pointed-leaved Hovea	Fabaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Hovea linearis	Linear-leaved Hovea	Fabaceae	89
Leptospermum microcarpum	Small-fruited May	Myrtaceae	89
Leptospermum polygalifolium	Wild May	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Melaleuca thymifolia	Feather Honey-myrtle	Myrtaceae	58, 65, 66, 67, 68, 71, 72
Melichrus adpressus		Epacridaceae	89
Pultenaea flexilis		Fabaceae	89
Pultenaea villosa	Hairy Pea Bush	Fabaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Sannantha similis	Twiggy Myrtle	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Xanthorrhoea johnsonii	Forest Grass-tree	Xanthorrhaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Sub-canopy (Understorey)			
Acacia aulacocarpa		Mimosaceae	89
Acacia disparrima	Hickory Wattle	Mimosaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Alphitonia excelsa	Red Ash	Rhamnaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Eucalyptus curtisii	Plunkett Mallee	Myrtaceae	89
Glochidion ferdinandi	Cheese Tree	Phyllanthaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Lophostemon suaveolens	Swamp Box	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Melaleuca decora	Decorative Paperbark	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Melaleuca irbyana	Weeping Paperbark	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Melaleuca linariifolia	Snow-in-Summer	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Melaleuca sieberi	Small-leaved Paperbark	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Persoonia adenantha		Proteaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Persoonia cornifolia	Broad-leaved Geebung	Proteaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Canopy (Trees)			
Angophora leiocarpa	Smooth-barked Apple	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Angophora woodsiana	Rough-barked Apple	Myrtaceae	89
Angophora subvelutina	Broad-leaved Apple	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Brachychiton populneus	Kurrajong	Malvaceae	89
Corymbia citriodora subsp. *variegata*	Lemond-scented Gum	Myrtaceae	89
Corymbia intermedia	Pink Bloodwood	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Corymbia trachyphloia	Brown Bloodwood	Myrtaceae	89
Eucalyptus fusiformis		Myrtaceae	89
Eucalyptus moluccana	Gum-topped Box	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Eucalyptus planchoniana	Planchon's Stringybark	Myrtaceae	89
Eucalyptus resinifera	Red Mahogany	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Eucalyptus seeana	Narrow-leaved Red Gum	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Eucalyptus siderophloia	Northern Grey Ironbark	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89
Eucalyptus tereticornis	Queensland Blue Gum	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72
Lophostemon confertus	Brush Box	Myrtaceae	36, 37, 58, 65, 66, 67 ,68, 71, 72, 89

* allocation only in incidences where assisted regeneration fails to be resulting in near-benchmark conditions

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Table 3 Weed control guidelines and management

Growth Form	Removal Techniques
Woody Stems e.g. Lantana, Camphor Laurel	Manual 1. Small plants can be removed by hand using Soft Weed methodology. Exposure of rootstock to air is necessary to ensure full eradication. Failure to remove ALL of roots will result in regrowth. Herbicide *Up to 10 cm basal diameter* 1. Apply the cut, scrape and paint method using Glyphosate at a ratio of 1:1 to minimise erosion. 2. Lop into 50 cm pieces, leaving these on the ground to act as mulch. 3. Regrowth of woody weeds shall be spot sprayed. *Greater than 10 cm basal diameter and inaccessible sites* • Stem Injection 1. Use stem injection method - at tree base drill holes at a 45 degree angle into the sapwood at 5 cm intervals. 2. Inject herbicide into holes immediately before the plant cells close and translocation of herbicide ceases. • Fill or Chip 1. Cut into the sapwood with a chisel or axe. 2. Fill cut with herbicide immediately with Glyphosate at a rate of 1:1 3. Repeat the process at 5 cm intervals around the tree. Note: * For *Cinamomum camphora* cuts must overlap with no gaps in order to kill the hardwood. * Plants to be treated with herbicide should be healthy and actively growing. * Deciduous plants should be treated in Spring and Autumn when leaves are fully formed. * Multi-stemmed plants require injection below the lowest branch or treat each stem individually.
Bulbs, Corms or Tubers e.g. Watsonia	Manual 1. Dig down next to the stem until the bulb or tuber is reached. 2. Remove plant and carefully bag the bulb or tuber. Herbicide 1. Remove any seed or fruit and place in bag. 2. With an herbicide applicator, apply to the stems and leaves using brush-off.
Soft Stems (no underground reproductive parts) e.g. Blue Billy-goat Weed, Lantana seedlings	Manual 1. Gently remove any seeds or fruits and carefully place into a bag. 2. Grasp stem at ground level. Rock plant backwards and forwards to loosen roots and pull out gently. 3. Tap the roots to dislodge soil. Herbicide 1. Directly apply to suitable species. 2. Should only be used where plants are actively growing.
Underground Reproductive Structures - Taproots	Manual 1. Gently remove and bag seeds or fruit. 2. Loosen soil around taproot with suitable implement. 3. Grasp stem at ground level and gently pull out plant. 4. Tap the roots to dislodge soil. * Not suitable for Paddy's Lucerne or *Ochna serrulata* and many others - use with caution.
Vines, Runners and Scramblers	Manual 1. Locate a runner; gently pull it along the ground. Roll the runners up for easy removal.

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Growth Form	Removal Techniques
	Continue doing this until all the runners have been rolled up. Small fibrous roots growing from the runners can be cut with a knife. 2. Locate the main root system whilst removing the runners. Remove it manually. 3. Do not leave any bits of stem or large roots, as these may re-shoot. 4. Bag or compost the runners/roots and any other reproductive parts. <u>Herbicide</u> 1. With a knife, scrape 15 to 30 cm of the stem to reach the layer below the bark/outer layer. A maximum of half the stem diameter should be scraped. Large stems (>1 cm) will require two scrapes opposite each other. 2. Immediately apply herbicide along the length of the scrape. 3. Vines can be left hanging in trees after treatment.
Rhizomes e.g. Asparagus Fern	<u>Manual</u> 1. Remove and bag stems with seeds and fruit. 2. Grasp the leaves or stems together so that the base of the plant is visible. 3. Insert a knife at an angle close to the crown and cut through all the roots around the crown. 4. All vegetative materials shall be left in situ.
NOTE:	• Hand removal is recommended where possible and practical except where it may lead to soil destabilisation along creeks and drainage lines. • Non-herbicide removal should be used where possible adjacent to native species to minimise damage. Suitable methods including digging, crowning or hand pulling. • Where herbicide application is required: 1. broad-scale application is not permitted within drainage lines 2. Glyphosate Bioactive or equivalent is to be used within 30 m of water bodies as it is identified as more “frog friendly” than other herbicides 3. quantities of herbicide need to be controlled and all care be taken to prevent runoff or excess use 4. always read the lab to ensure the herbicide is used safely and no certificate is required for use 5. herbicides use should be undertaken during periods of weed growth or as per manufactures specifications • Herbicide use is not permitted 1. during windy periods 2. prior to rain forecast or 6 hours after rain 3. broadly / recklessly in areas where native vegetation dominants • If in doubt whether plants are weed or native, confirmation prior to conducting weed removal is required e.g. from Environmental Weed Guide (free from GCCC), Department of Natural Resources Pest Fact Sheets and Common Weeds of Northern NSW Rainforest (The Big Scrub Rainforest Landcare Group, 1998).

5.4.3 Rehabilitation actions per zone

Table 1 provides management advice applicable to the rehabilitation polygons / zones across the PDA. Generally follow-up repetition of the treatments per zone is suggested to be executed every 6 months. Where, following two years of ongoing 6 monthly monitoring, it is identified that zones that are subject to natural and assisted regeneration are not regenerating sufficiently to meet interim benchmarks, the rehabilitation methods within this report will be re-assessed and issued to include direct planting of tubestock to supplement natural regeneration rates on site.

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5.4.4 Consolidation

Consolidation of this rehabilitation plan will require the following:

- Establishment period: 12 months from practical completion.
- On-maintenance period: until such time as benchmarks are met through on going monitoring.
- Maintenance shall include watering, weeding, fertilising, pest and disease control, pruning, edging, mowing and monitoring as per the following:
  - Watering: during the establishment period, water every second or third day to maintain soil moisture; and once weekly during the maintenance period
  - Fertilising: to be undertaken as required where plants are not responding to the slow release fertiliser applied at planting
  - Weeding: to be undertaken as required to prevent weed competition and seeding (to include slashing, spot-spraying and tree removal by stem injection and grubbing)
  - Remulching: to be undertaken as required to maintain consistent depth
  - Pruning (formative): Shrubs & vines (< 200 mm pot): to commence 3 weeks after planting, tip prune to encourage bushy habit (> 200 mm pot): commence 6 weeks after planting
  - Monitoring: Provide list of activities completed at monthly intervals
- Replace all failed, damaged or stolen stock.
- Uphold the work against any defect due to failure or inferior quality materials and or workmanship.

5.5 Rehabilitation of road crossings

Road mortality has been attributed as a major factor contributing to the decline of many species (van der Ree *et al.* 2008). Overpasses and underpasses can be an effective tool in ensuring safe passage of wildlife between areas of high habitat value, without them succumbing to the effects of traffic pressures. The design of safe passage for fauna will be required for fauna corridor crossings within Yarrabilba. The Fauna Corridor Infrastructure Masterplan (Natura Consulting 2012) and Koala Management Plan Yarrabilba UDA (Austecology 2012) provide guidelines for these designs which will be assessed at the Context Plan stage and is included in Appendix E of this report.

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6 Monitoring

A comprehensive monitoring program has been implemented including monitoring sites within the declared area. The monitoring program has been implemented to capture baseline data prior to and during vegetation management treatments being applied and during the period of rehabilitation implementation. Adaptive management strategies will be used and where a treatment does not produce the desired result it will be identified and/or modified. There are many different types and levels of monitoring that can be used for identifying change in vegetation communities. These include assessing parameters such as presence / absence, growth, percentage of cover, total biomass, species richness etc.

For this monitoring program, a minimum of two monitoring sites per rehabilitation unit is sufficient to identify any major changes and to provide a 'snap shot' of ecological conditions. Monitoring in this way will allow the ongoing collection of information to demonstrate the effectiveness of habitat rehabilitation efforts, and the frequency of monitoring activities will enable management prescriptions to be adjusted to bring about any necessary changes and corrective actions (adaptive management). Monitoring site locations have been identified in Figure 4 and include several sites within the declared area. Flexibility will remain to adjust the final locations of the monitoring sites and priority will be given to areas within each rehabilitation unit that require the most significant amount of rehabilitation work.

The monitoring program is currently in progress and monitoring frequency is at 6 monthly intervals. Monitoring is to continue until such time that the vegetation meets the applicable benchmarks to be classified as remnant 'Category B' vegetation. Following achievement of 'Category B' remnant vegetation status, staged applications to DNRME will be made to release the area from the Voluntary Declaration and change the vegetation mapping to show the applicable Category B regional ecosystem over the area.

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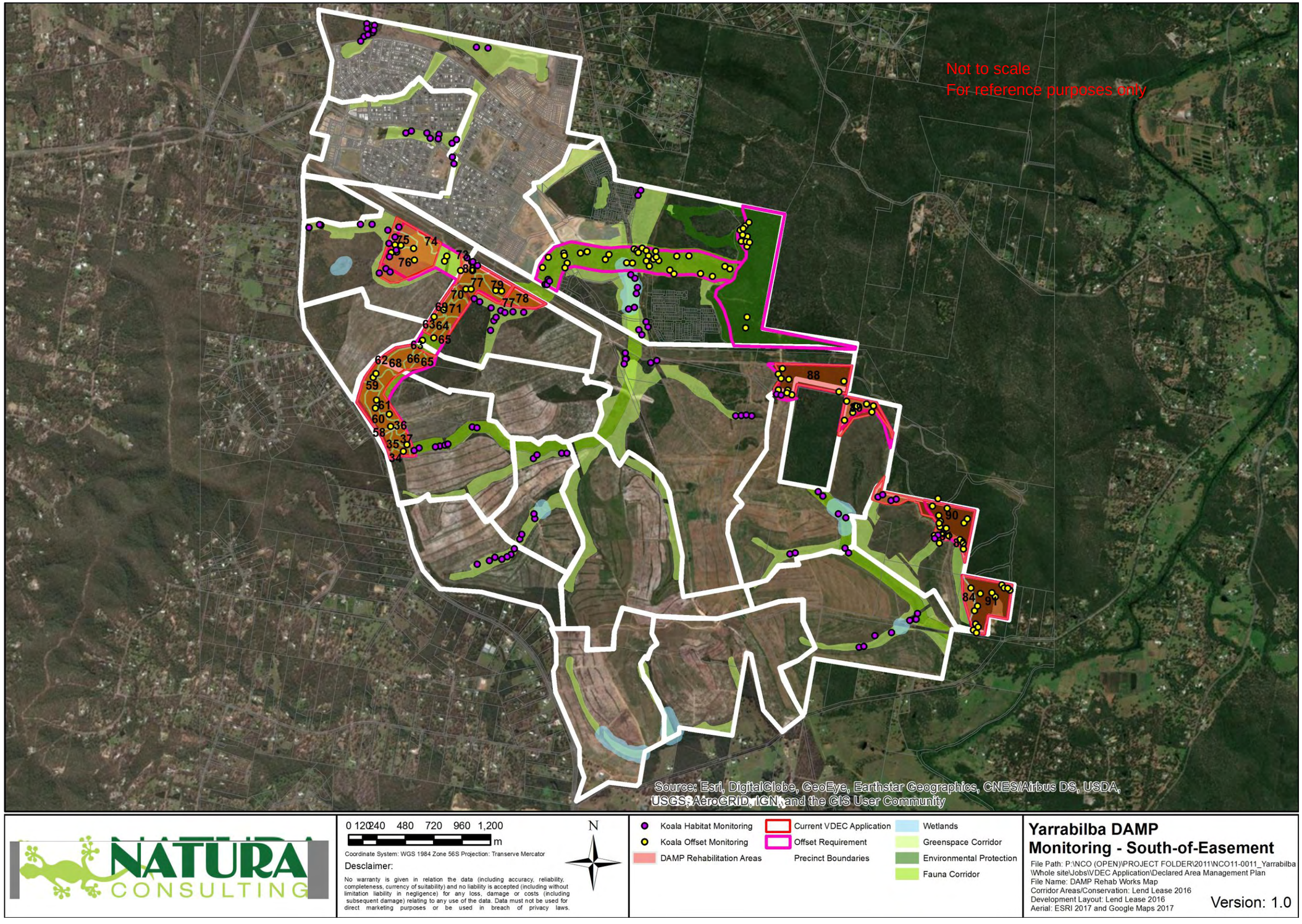

Figure 4 Monitoring site locations

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7 Reporting

Following each monitoring event completed at the set intervals, a comprehensive monitoring report is to be provided to the Department of Environment within 4 weeks of completion of the monitoring.

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8 Contingency measures and corrective actions

9.1 Meeting benchmarks

During the course of monitoring, if Interim Benchmarks set out in the Habitat Rehabilitation Management Plan (Natura Consulting 2015) are not being met, the timeframes to achieve the Final Benchmarks will be reviewed and extended, whereby Lendlease Communities will continue to undertake rehabilitation works with continued monitoring until the Final Benchmarks are met. The review of the success of meeting Interim Benchmarks will be undertaken at each monitoring event and reported on. Where the extension of rehabilitation works is required for particular Rehabilitation Units, discussions will be undertaken with the Department of Environment, to ensure that any additional requirements are also highlighted and addressed.

Additionally, following two years of ongoing monitoring, if it is identified that zones that are subject to natural and assisted regeneration are not regenerating sufficiently to meet interim benchmarks, the rehabilitation methods within this report will be re-assessed and issued to include direct planting of tubestock to supplement natural regeneration rates on site.

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10 Appendices

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Appendix A – EPBC Conditions

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Australian Government
Department of the Environment and Energy

Rob Ball
Senior Development Manager, Communities
Lend Lease Communities (Yarrabilba) Pty Ltd
GPO Box 2777
BRISBANE QLD 4001

Yarrabilba residential development south-east of Brisbane, QLD (EPBC 2013/6791) – variation of conditions 1, 6 and 7 and appendices 2 and 3, and approval of revised Offset Management Plan and Habitat Rehabilitation Management Plan

Dear Mr Ball

Thank you for your email of 20 July 2017 to the Department requesting variation of conditions attached to the approval dated 13 November 2014, and subsequent correspondence requesting approval of the *Offset Management Plan - Yarrabilba PDA, Version 3, 3 November 2017* and the *Habitat Rehabilitation Management Plan- Yarrabilba, Version 3, 8 November 2017* (the revised plans).

Officers of this Department have reviewed the variation request. As delegate of the Minister, I have varied conditions 1, 6 and 7 and replaced Appendix 2 and Appendix 3 of EPBC Approval 2013/6791 under section 143(1)(c) of the *Environment Protection and Biodiversity Conservation Act 1999* to allow extension of time to secure offsets and to reduce the clearance of Koala habitat. Conditions 1, 6 and 7 must now be undertaken in accordance with the varied conditions and Appendix 2 and Appendix 3 specified in the variation notification, which is attached for your information.

As delegate of the Minister, I have approved the revised plans. The revised plans must be implemented in accordance with the relevant approval conditions.

As you are aware, the Department has an active monitoring program which includes monitoring inspections, desk top document reviews and audits. Please ensure that you maintain accurate records of all activities associated with, or relevant to, the conditions of approval so that they can be made available to the Department on request.

Should you require any further information please contact Peter Blackwell, Assistant Director, Post Approvals Section, on 03 6208 2927 or by email: post.approvals@environment.gov.au.

Yours sincerely

Greg Manning
Assistant Secretary
Assessments and Post Approvals Branch
Environment Standards Division

8 December 2017

Australian Government
Department of the Environment and Energy

VARIATION TO CONDITIONS ATTACHED TO APPROVAL

Yarrabilba residential development south-east of Brisbane, Queensland (EPBC 2013/6791)

This decision to vary a condition of approval is made under section 143 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Approved action

Person to whom the approval is granted	Lend Lease Communities (Yarrabilba) Pty Ltd ACN: 103 578 436
Approved action	To construct the Yarrabilba residential development and associated infrastructure approximately 40 kilometres south east of Brisbane, Queensland [See EPBC Act referral 2013/6791 and request to vary proposal dated 5 August 2013].

Variation

Variation of conditions of approval	The variation is: Delete conditions 1, 6 and 7 and Appendix 2 and Appendix 3 attached to the approval and substitute with the conditions specified below and Appendices 2 and 3 attached to this notice.
Date of effect	This variation has effect on the date the instrument is signed

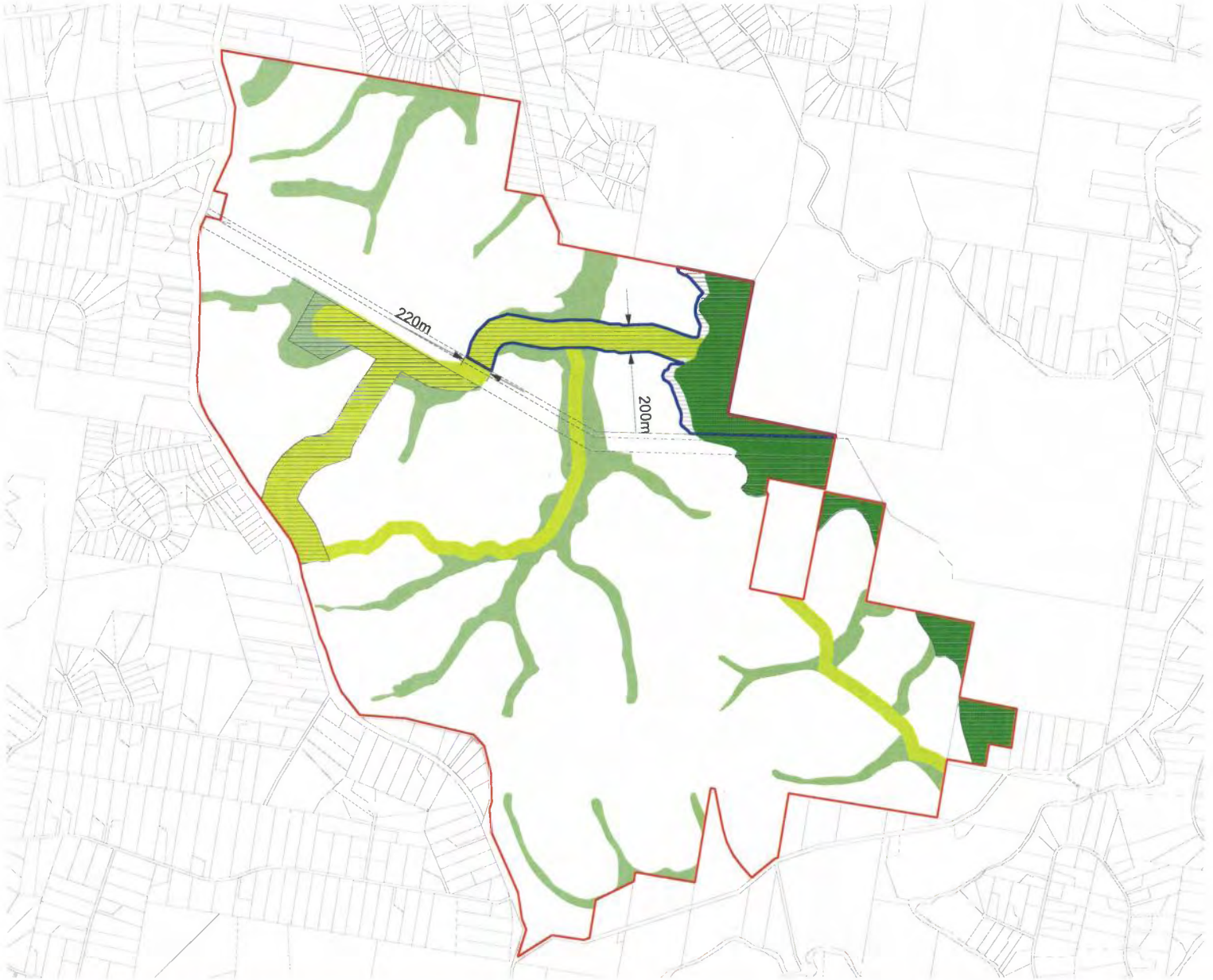
Person authorised to make decision

Name and position	Greg Manning Assistant Secretary Assessments and Post Approvals Branch
Signature	
Date of decision	8 December 2017

Conditions attached to the approval

Original conditions	Varied conditions
1. To protect, rehabilitate and expand habitat for **Koalas** on the Yarrabilba site, the **approval holder** must: a. not remove or **fragment** more than 55 hectares of koala habitat. Impacts to Koala habitat must be limited to areas indicated in Appendix 1 b. undertake the action in Area 1 and Area 2 in accordance with the **Koala Management Plan** and the **Fauna Corridor Infrastructure Master Plan**.	1. To protect, rehabilitate and expand habitat for **Koalas** on the Yarrabilba site, the **approval holder** must: a. not remove or **fragment** more than 44 hectares of koala habitat. Impacts to Koala habitat must be limited to areas indicated in Appendix 3 b. undertake the action in Area 1 and Area 2 in accordance with the **Koala Management Plan** and the **Fauna Corridor Infrastructure Master Plan**.
6. To offset residual significant impacts to koalas (55 ha of habitat critical to the survival of the koala), the approval holder must submit, at least 3 months prior to **commencement**, for the **Minister**'s written approval, an Offset Management Plan for the protection and management of 195 ha of Fauna Corridor, Greenspace Corridor and Environmental Protection Zone provided as environmental offset as shown in Appendix 2.	6. To offset residual significant impacts to koalas (44 ha of habitat critical to the survival of the koala), the approval holder must submit, at least 3 months prior to **commencement**, for the **Minister**'s written approval, an Offset Management Plan for the protection and management of at least 195 ha of Fauna Corridor, Greenspace Corridor and Environmental Protection Zone provided as environmental offset as shown in Appendix 2.
7. The **approval holder** must not commence unless the **Minister** has approved the Offset Management Plan. The Offset Management Plan must: a. identify desired outcomes, benchmarks, readily measurable **performance indicators** and goals, timeframes for reporting and implementation, corrective actions and contingency measures; b. be consistent with the **Department**'s *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy (October 2012)*; and c. include details of how the offset has been or will be legally secured within 2 years of the **commencement** to ensure its long-term protection.	7. The **approval holder** must not commence unless the **Minister** has approved the Offset Management Plan. The Offset Management Plan must: a. identify desired outcomes, benchmarks, readily measurable **performance indicators** and goals, timeframes for reporting and implementation, corrective actions and contingency measures; b. be consistent with the **Department**'s *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy (October 2012)*; and c. include details of how the offset has been or will be legally secured to ensure its long-term protection. Offset Areas 2 and 3, as shown in Appendix 2, must be legally secured within 27 months of **commencement of the action** and all offset areas must be legally secured within four years of **commencement of the action**.

YARRABILBA



LEGEND

- ENVIRONMENTAL PROTECTION
- FAUNA CORRIDOR
- GREENSPACE CORRIDOR
- YARRABILBA OFFSET REQUIREMENT UNDER EPBC ACT - 195 ha
- YARRABILBA SITE BOUNDARY
- OFFSET AREAS 2 AND 3 (85ha) INCLUDES ADDITIONAL RETAINED HABITAT

APPENDIX 2

NOTE
The boundaries and areas shown hereon are subject to detailed engineering design, final survey and approval of subsequent development applications by the relevant authorities.

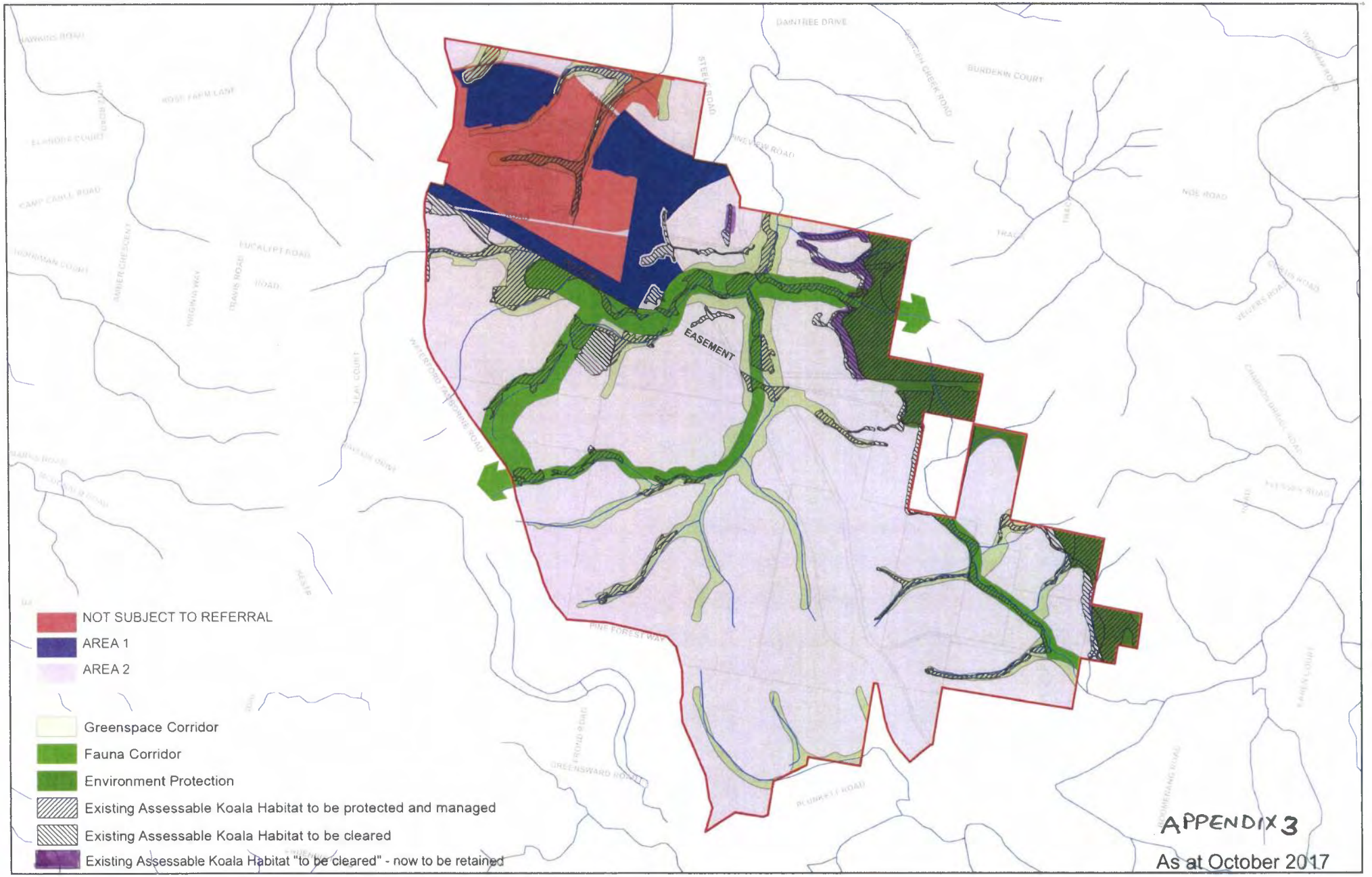
YARRABILBA - OFFSET LAND

0 300 600 900 1200 1500m

Scale 1:30 000 at A3

North

File No. YAR-OLL Dgn No. YAR-EPBC-OSL-171103 Date 03 NOV 2017



austecology

Source:	Watercourses: Department of Environment and Resource Management, DMA Queensland Regrowth, Other Watercourses, Version 2.1, Cadastral Boundaries / Department of Natural Resources and Mines 2014. Corridors and Assessable Koala Habitat vegetation layers supplied by: Austecology 2014
Disclaimer:	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
File:	File: Yarrabilba FigX.X1-Reserition Plan-141020 Date: 20/10/2014

0 500 1,000 1,500 2,000
Meters
A4 Scale 1:40,000
Coordinate System: GDA 1994 MGA Zone 56 Projection: Transverse Mercator

Yarrabilba Priority Development Area
Watercourse
Cadastral Boundary

Retention Plan - Existing Assessable Koala Habitat

Australian Government
Department of the Environment

Approval

Yarrabilba residential development and associated infrastructure, Queensland (EPBC 2013/6791)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted	Lend Lease Communities (Yarrabilba) Pty Ltd
proponent's ACN	103 578 436
proposed action	To construct the Yarrabilba residential development and associated infrastructure approximately 40 kilometres south east of Brisbane, Queensland [See EPBC Act referral 2013/6791 and request to vary proposal dated 5 August 2013].

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approve

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 30 October 2050.

Decision-maker

name and position	Deb Callister Assistant Secretary Queensland and Sea Dumping Assessment Branch
signature	
date of decision	13 November 2014

Conditions attached to the approval

1. To protect, rehabilitate and expand habitat for **Koalas** on the Yarrabilba site, the **approval holder** must:

   a. not remove or **fragment** more than 55 hectares of koala habitat. Impacts to Koala habitat must be limited to areas indicated in Appendix 1.

   b. undertake the action in Area 1 and Area 2 in accordance with the **Koala Management Plan** and the **Fauna Corridor Infrastructure Master Plan**.

2. To ensure koalas do not enter the Waterford-Tamborine Road Corridor, as defined in Appendix 1, the **approval holder** must install temporary koala exclusion fencing adjacent to the fauna corridor interface with Waterford-Tamborine Road prior to the **commencement of the action**.

3. Within 6 months of koala-friendly crossings being installed at Waterford-Tamborine Road, the **approval holder** must remove the temporary koala fencing set out in condition 2.

4. The **approval holder** must prepare and submit, at least 3 months prior to **commencement of the action**, for the **Minister**'s written approval, a Habitat Rehabilitation and Management Plan. The Habitat Rehabilitation and Management Plan must:

   a. clearly define the management measures and reflect an adaptive management approach to improve koala habitat quality within the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone (as identified in Appendix 2);

   b. state clear and concise outcomes and **performance indicators** against which achievement of the outcomes identified will be measured;

   c. state the timeframe for implementation of the plan;

   d. specify a method to monitor the impact and effectiveness of the management measures described above;

   e. identify the contingency measures and appropriate corrective actions that will be undertaken if the **performance indicators** or outcomes are not being met;

   f. be consistent with **Koala Management Plan** and **Fauna Corridor Infrastructure Master Plan**.

5. The approved Habitat Rehabilitation and Management Plan must be implemented by the **approval holder**.

6. To offset residual significant impacts to koalas (55 ha of habitat critical to the survival of the koala), the approval holder must submit, at least 3 months prior to **commencement**, for the **Minister**'s written approval, an Offset Management Plan for the protection and management of 195 ha of Fauna Corridor, Greenspace Corridor and Environmental Protection Zone provided as environmental offset as shown in Appendix 2.

7. The **approval holder** must not commence unless the **Minister** has approved the Offset Management Plan. The Offset Management Plan must:

   a. identify desired outcomes, benchmarks, readily measurable **performance indicators** and goals, timeframes for reporting and implementation, corrective actions and contingency measures;

b. be consistent with the **Department**'s *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy (October 2012)*; and

c. include details of how the offset has been or will be legally secured within 2 years of the **commencement** to ensure its long-term protection.

8. The most recent approved versions of all plans and programs described in these conditions must remain accessible to the public on the website of the **approval holder** for the duration of the approval.

9. Within ten days after the **commencement of the action**, the **approval holder** must advise the **Department** in writing of the actual date of **commencement**.

10. The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the plans required by this approval, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department**'s website. The results of audits may also be publicised through the general media.

11. Any potential or suspected non-compliance with these conditions of approval must be reported to the **Department** in writing within 48 hours of the **approval holder** becoming aware of the potential or suspected non-compliance.

12. Within three months of every 12 month anniversary of the **commencement of the action**, the **approval holder** must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any plans/programs as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the **Department** at the same time as the compliance report is published. Reports must remain on the approval holder's website for the duration of this approval.

13. Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor and audit criteria must be approved by the **Minister** prior to the commencement of the audit. The audit report must address the criteria to the satisfaction of the **Minister**.

14. If the **approval holder** wishes to carry out any activity otherwise than in accordance with a plan as specified in the conditions, the **approval holder** must submit to the **Department** for the **Minister**'s written approval a revised version of that plan. The varied activity shall not commence until the **Minister** has approved the varied plan in writing. If the **Minister** approves the revised plan, that plan must be implemented in place of the plan originally approved.

15. If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities to do so, the **Minister** may request that the **approval holder** make specified revisions to a plan specified in the conditions and submit the revised plan for the **Minister**'s written approval. The **approval holder** must comply with any such request. The revised approved plan must be implemented. Unless the **Minister** has approved the revised plan, then the **approval holder** must continue to implement the plan originally approved, as specified in the conditions.

16. If, at any time after five (5) years from the date of this approval, the **approval holder** has not **commenced** the action, then the **approval holder** must not **commence** the action without the written agreement of the **Minister**.

Definitions:

Approval holder: The person to whom the approval is granted, or any person acting on their behalf, or to whom the approval is transferred under section 145B of the EPBC Act.

Commenced / Commencement of the action: means any works involved in the construction phase of the project in Area 2 (as identified in Appendix 3) and includes clearing vegetation, the erection of any onsite temporary structures and the use of heavy duty equipment for the purpose of breaking the ground for buildings or infrastructure. This excludes the erection of signage, fences, barriers or bunting for the purposes of excluding areas containing listed threatened species.

Department: the Australian Government Department responsible for administering the *Environment Protection and Biodiversity Conservation Act 1999.*

EPBC Act: means the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

Fauna Corridor Infrastructure Master Plan: *Fauna Corridor Infrastructure Master Plan - Yarrabilba November 2012.* Prepared by Natura Consulting.

Fragment: Breaking up of fauna corridors (as shown in Appendix 1) so as to impede fauna movement.

Koala: *Phascolarctos cinereus*, a tree-dwelling, medium-sized marsupial endemic to Australia.

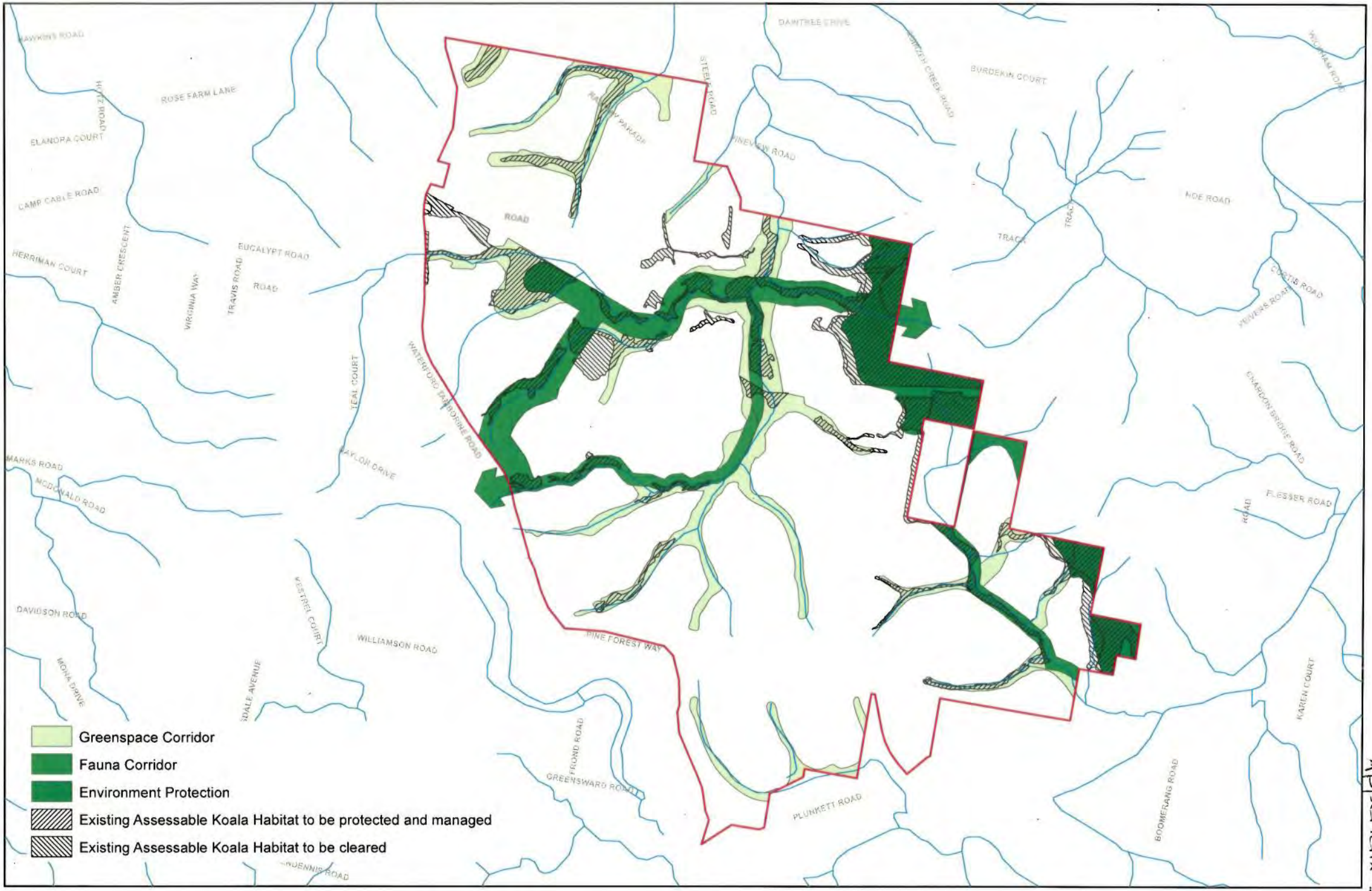
Koala habitat: means areas of vegetation that meet the criteria for critical habitat as defined in the *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* 2013.

Koala Management Plan: *Koala Management Plan - Yarrabilba UDA December 2012* Prepared by Austecology.

Minister: The Minister responsible for administering the *Environment Protection and Biodiversity Conservation Act 1999* (Cth), and includes a delegate of the Minister.

Performance indicators: a quantitative or qualitative measurement by which the performance, efficiency or achievement of a management measure can be monitored.

Yarrabilba site: the street address of the Yarrabilba site is 1568-1618 Waterford-Tamborine Road, Yarrabilba Queensland 4207. The site is located on the eastern side of Waterford-Tamborine Road and approximately 40 km south east of Brisbane.



austecology

Source	Watercourses: Department of Environment and Resource Management, VMA Queensland Regrowth, Other Watercourses Version 2.1, Cadastral Boundaries / Department of Natural Resources and Mines 2014. Corridors and Assessable Koala Habitat vegetation layers supplied by Austecology, 2014
Disclaimer	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
File	File: Yarrabilba-FigX-X1-Retention-Plan-141020 Date: 20/10/2014

0 500 1,000 1,500 2,000
Meters
A4 Scale 1:40,000

Yarrabilba Priority Development Area
Watercourse
Cadastral Boundary

Retention Plan - Existing Assessable Koala Habitat

Appendix 1

YARRABILBA

NOTE:
The boundaries and areas shown hereon are subject to detailed engineering design, final survey and approval of subsequent development applications by the relevant authorities.

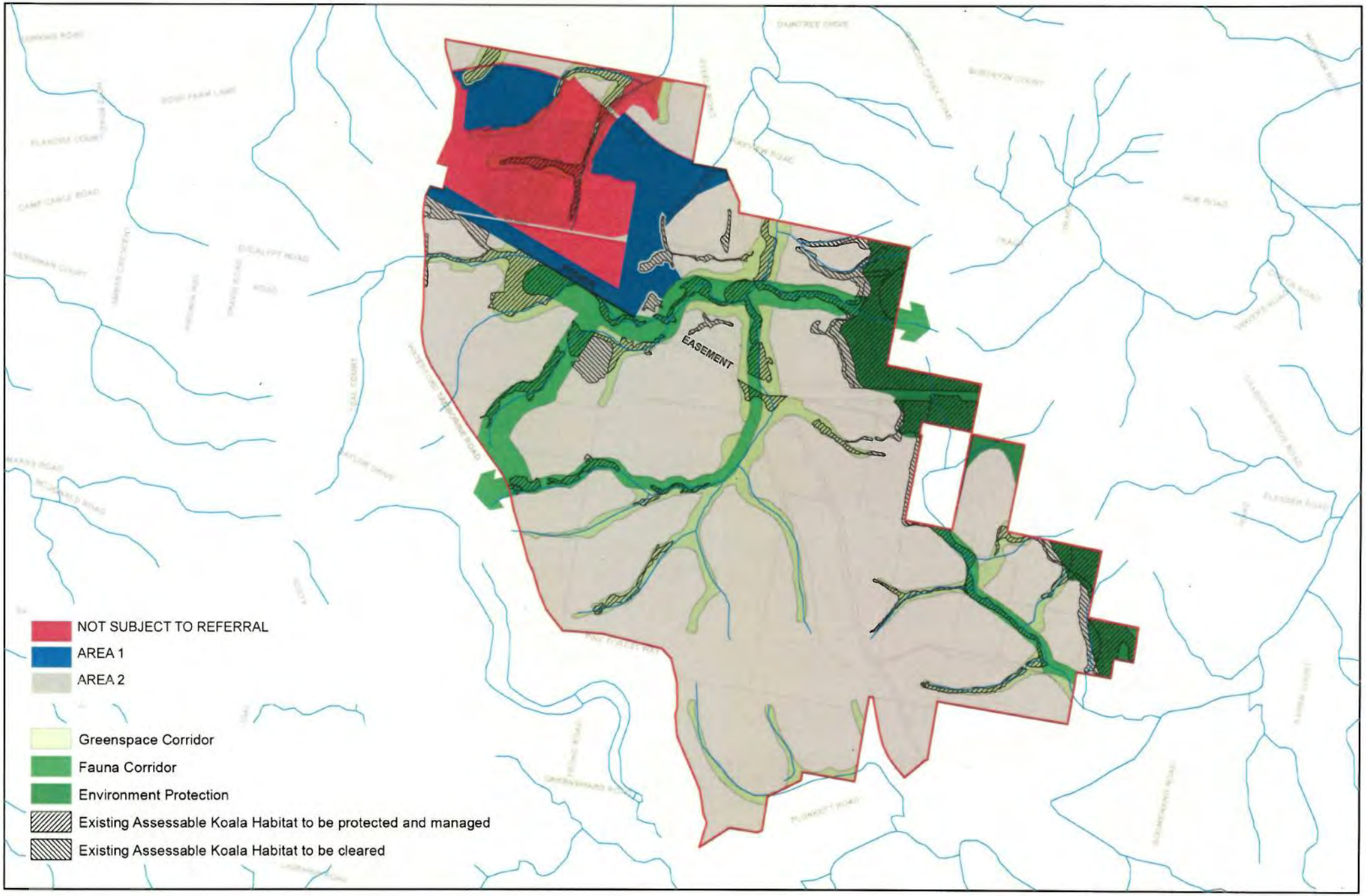
YARRABILBA - OFFSET LAND

File No. YB-OLL

Dgn No. YB-EPBC-OSL_140925

Date 25 SEPT 2014

Appendix 2



austecology

Source:	Waterhorse, Department of Environment and Resource Management - WA Queensland Regrowth Other Watercourses - Version 2.3 Cadastre Boundaries - Department of Natural Resources and Mines 2014 Condition and Assessable Koala Habitat vegetation layers supplied by Austecology 2014
Disclaimer	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
File:	File: Yarrabilba Fig4.X1 Retention Plan 141120 Date: 26/10/2014

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Meters
A4 Scale 1:40,000
Coordinate System: GDA 1994 MGA Zone 56 Projection: Transverse Mercator

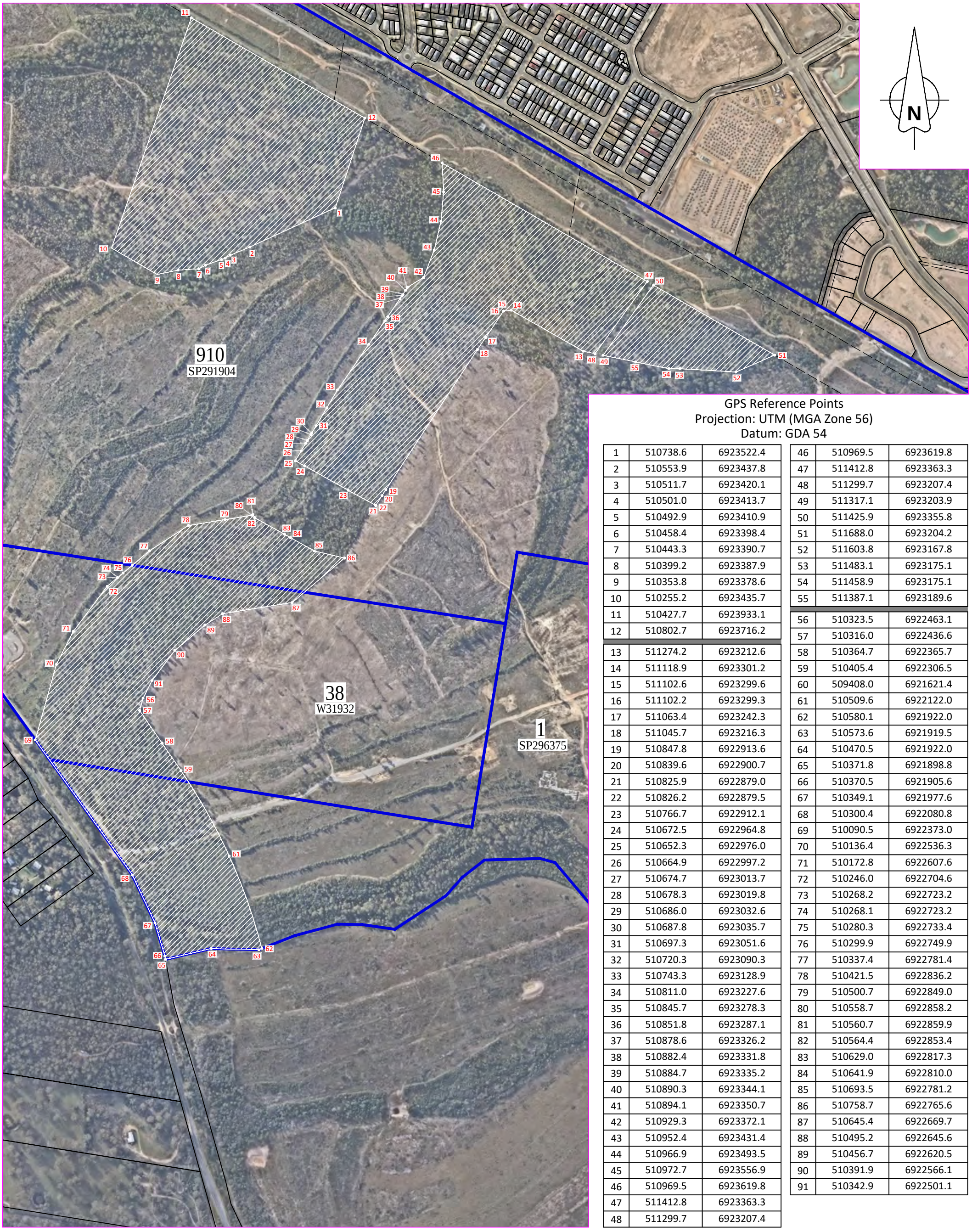
Yarrabilba Priority Development Area
Watercourse
Cadastral Boundary

Retention Plan - Existing Assessable Koala Habitat

Appendix 3

Appendix B – Declared Area Map

NATURA CONSULTING
PO Box 2959, Burleigh BC, QLD 4220 Australia Tel: +61 (0)7 55 765 568 Mob: +61(0)415 413 408
info@natura-consulting.com www.natura-pacific.com



GPS Reference Points
Projection: UTM (MGA Zone 56)
Datum: GDA 54

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89	510456.7	6922620.5
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CLIENT
LENDLEASE

PLAN
DECLARED AREA MAP

Level Datum	Date	9 OCTOBER 2019
Level Origin	Surveyed	RPS GC
	Drafted	BJB
Local Authority	Data Origin	CSDQ
LOGAN CITY	7952-BDY-Current-20191009-MGA-VDEC	

Part of Lot 1 on SP296375, Lot 38 on W31932
& Lot 910 on SP291904

YARRABILBA

SCALE:
1:7500 (A3)

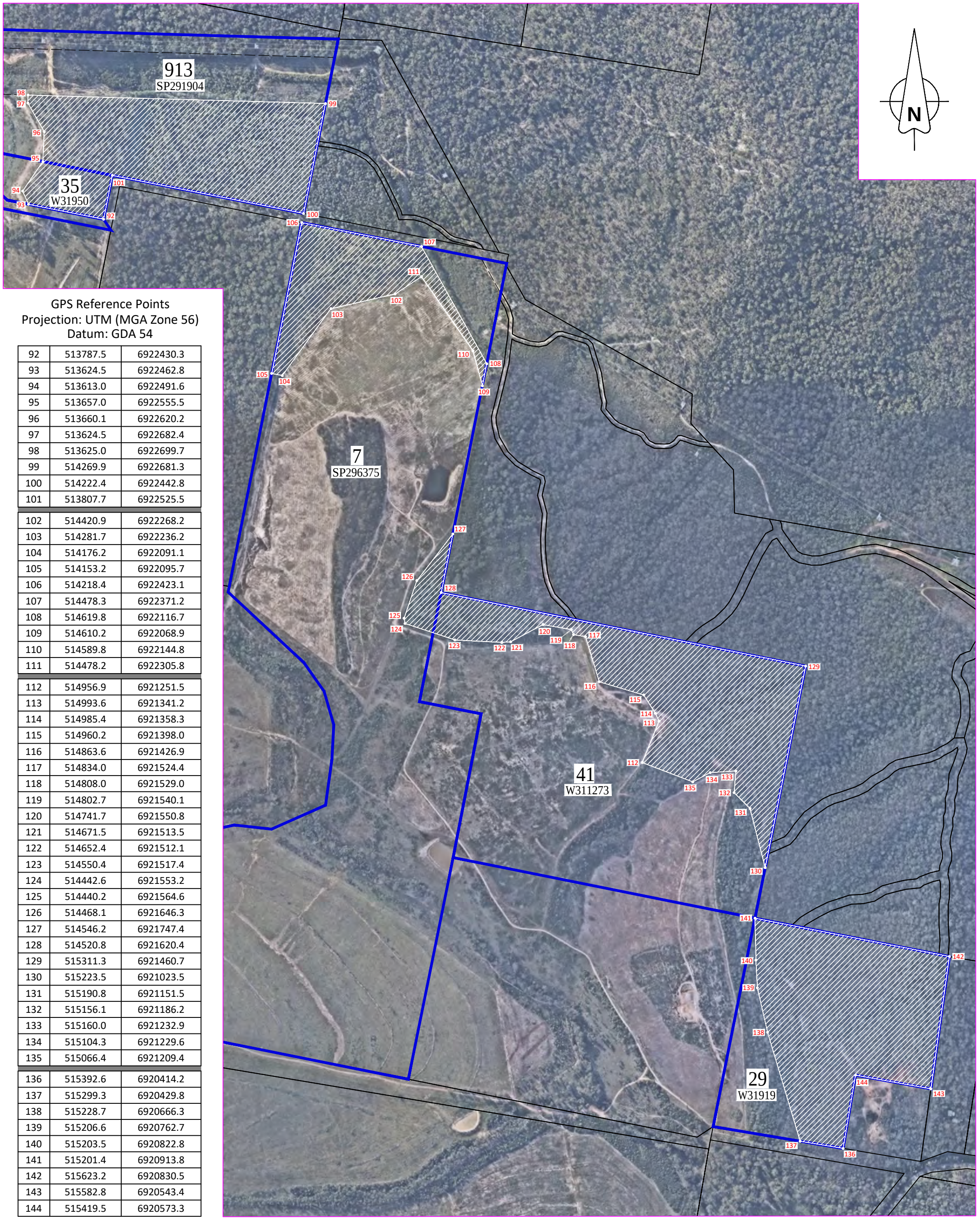
100 0 100 200 300

RPS Australia East Pty Ltd
ACN 140 292 762
ABN 44 140 292 762

Lakeside Corporate Space, Suite 425, Level 2
Building 4, 34-36 Glenferrie Drive,
Robina PO Box 1048 Robina DC, Qld 4226

T +61 7 555 36900
F +61 7 555 36999
W rpsgroup.com

Plan Ref: **7952-SKH-695**



GPS Reference Points
Projection: UTM (MGA Zone 56)
Datum: GDA 54

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CLIENT
LENDLEASE

PLAN
DECLARED AREA MAP

Part of Lot 7 on SP296375, Lot 29 on W31919,
Lot 35 on W31950, Lot 41 on W311273,
& Lot 913 on SP291904
YARRABILBA

Level Datum	Date	30 SEPTEMBER 2019
Level Origin	Surveyed	RPS GC
	Drafted	BJB
Local Authority	Data Origin	CSDQ
LOGAN CITY	7952-BDY-Current-20191009-MGA-VDEC	

SCALE:
1:7500 (A3)
100 0 100 200 300

RPS Australia East Pty Ltd
ACN 140 292 762
ABN 44 140 292 762
Lakeside Corporate Space, Suite 425, Level 2
Building 4, 34-36 Glenferrie Drive,
Robina PO Box 1048 Robina DC, Qld 4226
T +61 7 555 36900
F +61 7 555 36999
W rpsgroup.com

Plan Ref: **7952-SKH-695**

Appendix C – Property Map of Assessable Vegetation

NATURA CONSULTING
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info@natura-consulting.com www.natura-pacific.com

Queensland Government

Author : Genevieve Humble-Crofts
Ref number : 2017/006063
Unit : Vegetation Management Unit
Phone : 5352 4230

22 December 2017

C/- Mr Robert Ball
Lendlease Communities (Yarrabilba) Pty Ltd
Level 3, Kingsgate 1,
2 King St
Bowen Hills QLD 4006

Dear Mr Ball

Re: Certification of a voluntary declaration on 9048,9050,9057,9066 SP296371 - Logan City Council

This is to advise you that a voluntary declaration on 9048,9050,9057,9066 SP296371 - Logan City Council has been certified and the declaration of an area of high nature conservation value has been made —consistent with your agreement—by the Department of Natural Resources, Mines and Energy (DNRME) on 22 December 2017. A copy of each of the following certified documents is attached for your records:

- Declaration notice
- Declared area plan
- Declared area PMAV
- Declared area management plan

Additional copies of the certified documents are attached for each registered owner listed on your original application form. These have been sent to you for distribution, as you are the nominated contact on the application form.

If a registered owner requires additional copies of the certified documents, these can be purchased at Department of Natural Resources, Mines and Energy Customer Service Centre.

Please note, that in accordance with the declaration, management of the declared area, monitoring the condition of the declared area, and reporting on the condition of the declared

DNRME Gympie
27 O'Connell Street, Gympie
Locked Bag 383, Gympie 4570
Telephone 07 5352 4229
Facsimile 5352 4201
Website www.dnrme.qld.gov.au
ABN 59 020 847 551

area will be required. Please refer to the declaration documents for the specifics regarding such requirements.

This declaration will be noted on the title of the declared area—binding management, monitoring and reporting responsibilities upon current and future owners.

If you wish to discuss these matters further, please contact Genevieve Humble-Crofts on telephone number 5352 4230 quoting reference number 2017/006063.

Yours sincerely

Genevieve Humble-Crofts
Natural Resource Management Officer
Natural Resource Assessment - South Region

Voluntary Declaration notice (2017/006063)

s19E – 19K of the Vegetation Management Act 1999

1. Details of request

1.1. **Proponent's name:** Lend Lease Communities (Yarrabilba) Pty Ltd

1.2. **Date request received:** 24 October 2017

1.3. **Request:** declaration request as another area that contributes to the conservation of the environment.

1.4. **Property description: Land tenure:** Freehold

1.5. **Decision reference**: 2017/006063

2. Declaration information

2.1. **Declaration made:**

The Chief Executive of the Department of Natural Resources and Mines declares the area identified on Declared Area Map DAM (2017/006063) as an area of high nature conservation value in accordance with s19F(1) of the *Vegetation Management Act 1999*.

The chief executive considers the declared area to meet the following criteria under s19G of the *Vegetation Management Act 1999*—

The declared area is an area of high nature conservation value under s19G(1)(b), as the area is one or more of the following:

- ❑ a wildlife refugium;
- ❑ a centre of endemism;
- ❑ an area containing a vegetation clump or corridor that contributes to the maintenance of biodiversity;
- ❑ an area that makes a significant contribution to the conservation of biodiversity;
- ❑ an area that contributes to the conservation value of a wetland, lake or spring stated in the notice mentioned in section 19F(1) of the declaration;
- ✓ another area that contributes to the conservation of the environment.

The documents outlined in 2.2 form part of this declaration.

2.2. **Voluntary declaration documents:**

The following documents are part of this voluntary declaration, and must be read in conjunction with this notice:

- ✓ Declared area map (DAM 2017/006063)
- ✓ Declared Area Management Plan for Yarrabilba Priority Development Area

2.3. **Property Map of Assessable Vegetation**

In accordance with s20B of the *Vegetation Management Act 1999*, the following Property Map of Assessable Vegetation has been prepared for the declared area.

✓ Declared area PMAV (PMAV 2017/006064).

2.4. **Date of declaration:** 22 December 2017

3. Delegated officer's signature

Andrew Collins
Senior Natural Resource Management Officer

Declared Area Map

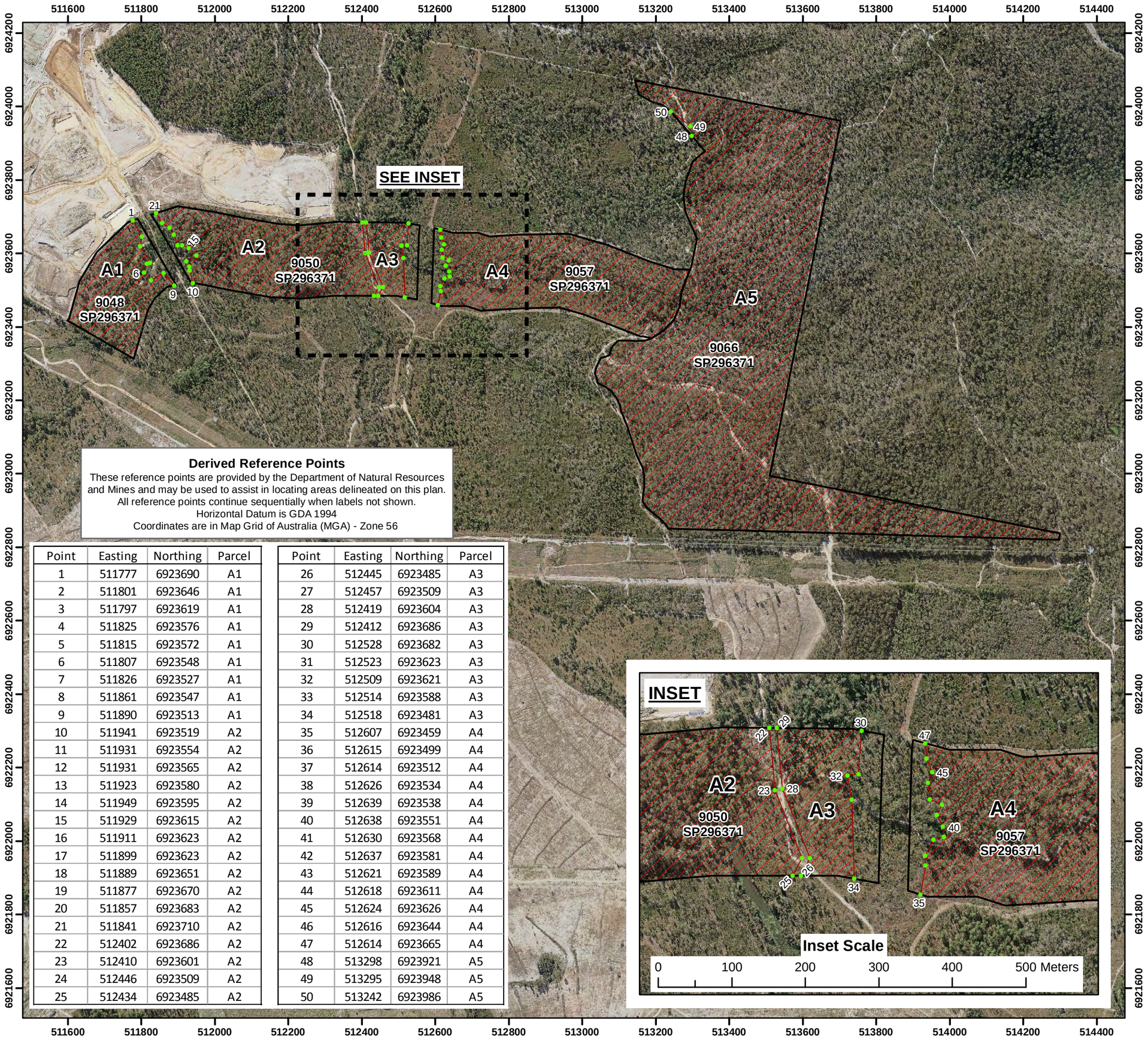
Sheet 1 of 1

DAM 2017/006063

LOT on PLAN

9048SP296371, 9050SP296371,
9057SP296371, 9066SP296371

Queensland Government



Derived Reference Points

These reference points are provided by the Department of Natural Resources and Mines and may be used to assist in locating areas delineated on this plan.
All reference points continue sequentially when labels not shown.
Horizontal Datum is GDA 1994
Coordinates are in Map Grid of Australia (MGA) - Zone 56

Point	Easting	Northing	Parcel
1	511777	6923690	A1
2	511801	6923646	A1
3	511797	6923619	A1
4	511825	6923576	A1
5	511815	6923572	A1
6	511807	6923548	A1
7	511826	6923527	A1
8	511861	6923547	A1
9	511890	6923513	A1
10	511941	6923519	A2
11	511931	6923554	A2
12	511931	6923565	A2
13	511923	6923580	A2
14	511949	6923595	A2
15	511929	6923615	A2
16	511911	6923623	A2
17	511899	6923623	A2
18	511889	6923651	A2
19	511877	6923670	A2
20	511857	6923683	A2
21	511841	6923710	A2
22	512402	6923686	A2
23	512410	6923601	A2
24	512446	6923509	A2
25	512434	6923485	A2

Point	Easting	Northing	Parcel
26	512445	6923485	A3
27	512457	6923509	A3
28	512419	6923604	A3
29	512412	6923686	A3
30	512528	6923682	A3
31	512523	6923623	A3
32	512509	6923621	A3
33	512514	6923588	A3
34	512518	6923481	A3
35	512607	6923459	A4
36	512615	6923499	A4
37	512614	6923512	A4
38	512626	6923534	A4
39	512639	6923538	A4
40	512638	6923551	A4
41	512630	6923568	A4
42	512637	6923581	A4
43	512621	6923589	A4
44	512618	6923611	A4
45	512624	6923626	A4
46	512616	6923644	A4
47	512614	6923665	A4
48	513298	6923921	A5
49	513295	6923948	A5
50	513242	6923986	A5

Locality Scale

0 200 400 600 800

Meters

LEGEND

- Reference Points
- Subject Lot(s)
- Declared Area (A1 to A5)

N

Scale: 1:10000
(original size A3)

Notes:

Property boundary provided by Department of Natural Resources, Mines and Energy.
The property boundaries shown on this plan are approximate only. They are not an accurate representation of the legal boundaries.

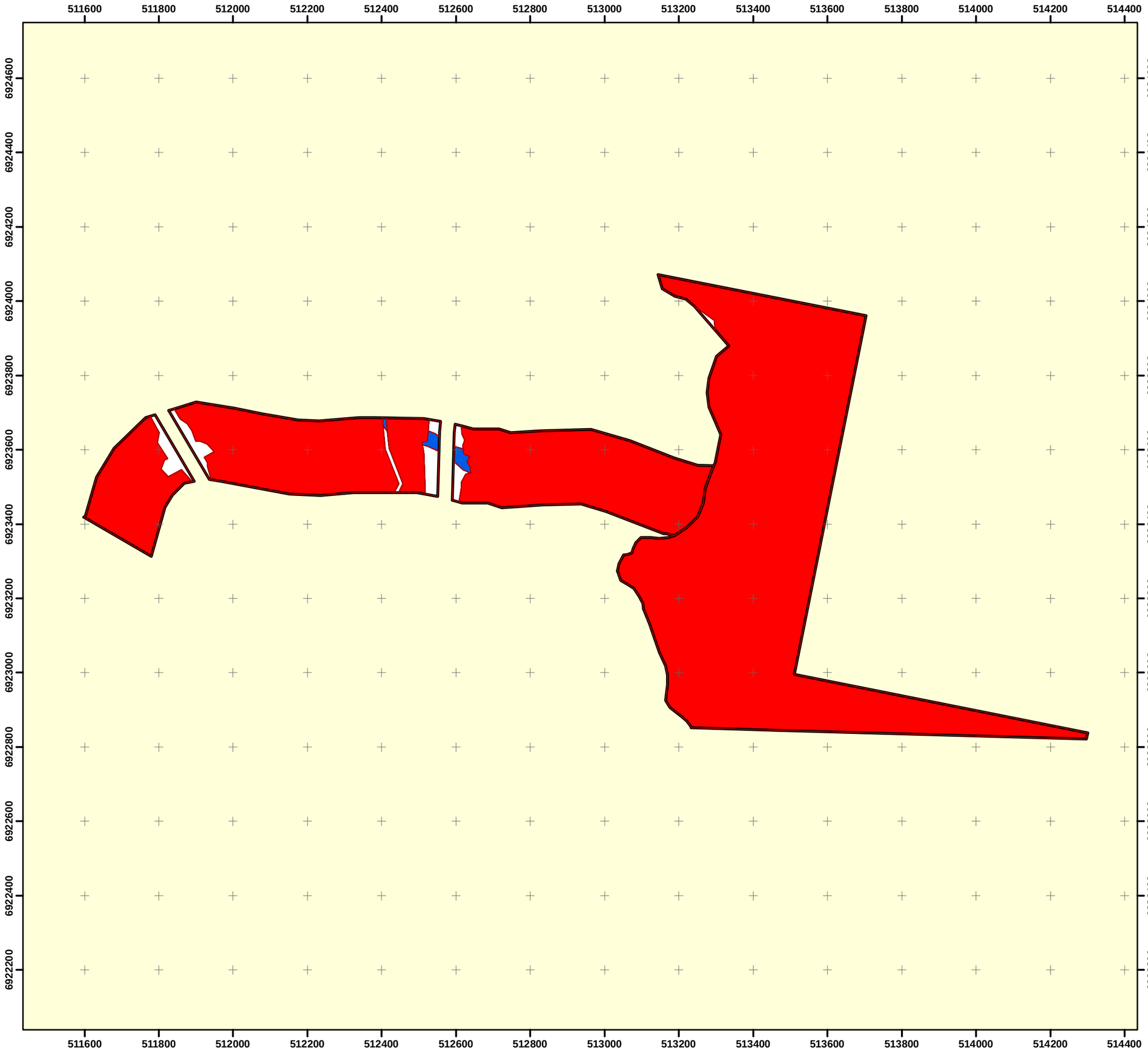
Map Information:
Horizontal Datum: GDA 1994
Projection: Universal Transverse Mercator - Zone 56

Imagery supplied by the Department of Natural Resources, Mines and Energy.
Logan_2016_10cm_Mosaic_a.ecw
(acquisition date 09/06/2016)

Based on or contains data provided by the State of Queensland (Department of Natural Resources, Mines and Energy) 2017.
In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
LMB 383, Gympie, Qld, 4570

Map Preparation Date: 22/12/2017



Property Map of Assessable Vegetation

Sheet 1 of 1

PMAV 2017/006064

LOT on PLAN

9048SP296371, 9050SP296371, 9057SP296371, 9066SP296371

Queensland Government

0 100 200 300 400 500 600 700 800

Meters

Scale: 1:10000

(original size A3)

N

LEGEND

- Subject Lot(s)
- Area to which the PMAV does not apply

Vegetation Category Area

- Category A area
- Category B area
- Category X area

Notes:

Property boundary provided by Department of Natural Resources, Mines and Energy.
The property boundaries shown on this plan are approximate only. They are not an accurate representation of the legal boundaries.

Map Information:
Horizontal Datum: GDA 1994
Projection: Universal Transverse Mercator - Zone 56

This PMAV replaces PMAV 2009/004628 under Section 20D(1) of the *Vegetation Management Act 1999* for the subject lots.

Signed for the Chief Executive of the Department of Natural Resources, Mines and Energy by:

Name: Andrew Collins

Title: Senior Natural Resource Management Officer

Signature:

Date: 22 December 2017

Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
LMB 383, Gympie, Qld, 4570

Map Preparation Date: 07/12/2017

This plan must be reproduced in colour.

Appendix D – Habitat Rehabilitation Management Plan

NATURA CONSULTING
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info@natura-consulting.com www.natura-pacific.com

Habitat Management and Rehabilitation Plan

Yarrabilba

EPBC Number: 2013/6791
Project name: Yarrabilba
Proponent's ACN: 103 578 436
Proposed action: To construct the Yarrabilba residential development and associated infrastructure approximately 40 kilometres south east of Brisbane, Queensland (see EPBC Act referral 3013/6791 and request to vary proposal dated 5 August 2013)
Prepared for: Lend Lease
Prepared by: Dr S. Butler, K. Richardt
Date: **8 November 2017**

Document Version Control

Project					
Title:	**Habitat Rehabilitation Management Plan - Yarrabilba**				
Authors:	**Kieran Richardt, Dr Sarah Butler and Mark Ballantyne**				
File reference:	**NCO11-0011_Yarrabilba**				
Project leader:	**Kieran Richardt**				
Phone:	**+(61) 7 5576 5568, +(61) 4 1541 3408**				
Email:	**info@natura-consulting.com**				
Client:	**Lend Lease**				
Client contact:	**Rob Ball**				
Revision History					
Version:	**Purpose:**	**Issued by:**	**Date**	**Reviewer:**	**Date:**
Draft	Peer review	Sarah Butler	25/02/15	Dionne Coburn	26/02/15
V1	Assessment	Sarah Butler	26/02/15	Rob Ball	26/02/15
V2	Assessment	Sarah Butler	26/02/15	Kieran Richardt	23/03/15
V3	Amendment	Rob Ball	07/11/17	M.N. Runkowski	08/11/17

Declaration of Accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the *EPBC Act* or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed

Full name (please print)

ROBERT BALL - SENIOR DEVELOPMENT MANAGER.

Organisation (please print)

LEND LEASE COMMUNITIES (YARRABILBA) PTY LTD.

Date

8 November 2017

Contents

List of Figures

List of Tables

1 Executive Summary

Natura Consulting developed a Habitat Rehabilitation Management Plan in response to Condition 4 of approval for Yarrabilba Residential Development, reference no. EPBC 2013/6791, dated 13 November 2014. Condition 4 states that *"The approval holder must prepare and submit, at least 3 months prior to commencement of the action, for the Minister's written approval, a Habitat Rehabilitation and Management Plan".*

The intent of the Habitat Rehabilitation Management Plan is to provide management measures to rehabilitate Koala habitat within the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone. The areas to be rehabilitated are Existing Assessable Koala Habitat to be protected and managed and Offset Requirement areas. This plan ensures that Koala habitat is specifically maintained within at least 195 ha of Offset Area as well as in Existing Assessable Koala Habitat area in the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone.

The Koala habitat rehabilitation area has been divided into Offset Rehabilitation and Habitat Rehabilitation units and Crossing Rehabilitation Units, which are described in the following sections. This totals an area of 1,981,771 m^2 (198.2 ha) in the Offset Areas and an additional 754,657 m^2 (75.5 ha) within Existing Assessable Koala Habitat areas outside of Offset areas, comprising a combined area of 2,736,428 m^2 (273.6 ha) to be rehabilitated. Each rehabilitation unit (ORU1 to ORU23 and HRU1 to HRU31) and crossing rehabilitation unit (CRU1 to CRU15) is mapped with the area, pre-clearing Regional Ecosystems, management type and corridor type tabulated. A short description of the Pre-clearing Regional Ecosystems is also provided.

Each rehabilitation unit is to be rehabilitated to a vegetation structure and species composition that is in line with that of the appropriate pre-clearing Regional Ecosystem (RE). The reference benchmark for rehabilitation of each rehabilitation unit is derived from the vegetation structure and species composition of the appropriate pre-clearing RE, including average canopy cover, average height of canopy, dominant canopy species, average shrub cover, average groundcover, species richness and weed cover.

The final benchmark for rehabilitation is derived from the definition of remnant vegetation under the *Vegetation Management Act 1999* (canopy is 70% of the height, 50% of the cover and similar species composition of the appropriate pre-clearing RE). Therefore, the final benchmark for rehabilitation is 70% of the reference benchmark cover (for canopy, shrub and ground-layer) and 50% of the reference benchmark height (for canopy and shrub layer) of the appropriate RE.

Interim benchmarks are also provided whereby an assessment at regular intervals can be made on the progress of the rehabilitation/revegetation efforts towards achieving this plan's outcomes. For Interim Benchmark years 1 to 10, vegetation structure has been quantified from a cumulative growth curve (CGC), which for biological organisms including trees and shrubs is sigmoidal. The reference Benchmark, Interim Benchmarks and Final Benchmarks have been tabulated for each RE, with the relevant rehabilitation unit also identified. A species list for each RE, including dominant species within each stratum, has also been provided.

An outline for the rehabilitation approach, including planting and maintenance, species selection and weed control, has been provided. These approaches need to be adhered to in the development of detailed rehabilitation planning for each rehabilitation unit during the development of the relevant development stage.

A comprehensive monitoring plan has been detailed, where there will be a minimum of two monitoring sites per rehabilitation unit in order to document and assess rehabilitation through time. The location of 148 monitoring sites has been mapped, although flexibility will remain to adjust the final location of monitoring sites depending on the final locations of roads and development layout. The monitoring plan details methodology for photo point monitoring and transect and quadrat monitoring to monitor

changes in species richness, percentage foliage cover for the ground layer, shrub and canopy layers, canopy height, and weed prevalence.

Contingency measures and corrective actions have also been provided to account for instances of when Interim Benchmarks are not being met. ‘As constructed’ data and surveyed boundaries will also be provided for each rehabilitation unit to test and demonstrate compliance within the offset area (at least 195 ha) requirement.

The Yarrabilba Urban Development is a staged development which will be undertaken over approximately thirty years. As rehabilitation works are tied to the roll-out of construction, any planting will be commenced in conjunction with the construction for each stage. A staging plan has been provided in this plan outlining when the development of each stage is planned to occur, and when each rehabilitation management objective is to take place.

2 Introduction

2.1 Background

The Yarrabilba development site is located on the eastern side of Waterford - Tamborine Road and to the south of Logan Village (refer to Figure 1). It is bounded by rural residential areas to the north, Plunkett Road to the south and the Plunkett Conservation Park to the east. The site consists of approximately 2,200 ha, of which 1931 ha is controlled by Lend Lease Communities (Yarrabilba) Pty Ltd. The land has been historically used for pine forestry, a military training camp in WWII and for live stock grazing, when first cleared. Yarrabilba is predominately vegetated with areas of regrowth native vegetation, regenerating pines and exotic grasslands. Some limited areas of native remnant and regrowth vegetation exist but they are mostly confined to creeks, drainage channels and wetlands.

The site is currently in the early stages of development with the growth of Yarrabilba projected to span approximately 30 years. With regards to areas relating to the EPBC referral, the action has not commenced. Works have only commenced at the Yarrabilba site in areas that are not subject to the EPBC referral. It is anticipated that the commencement of the action will occur within 3 months of final approval from EPBC. The long-term master-planned development incorporates an extensive network of dedicated open space (in excess of 25% of the site). A significant component of the open space is dedicated to the conservation of habitat for the Koala (*Phascolarctos cinereus*).

Natura Consulting developed a Habitat Rehabilitation Management Plan in response to Condition 4 and 5 of approval for Yarrabilba Residential Development, reference no. EPBC 2013/6791, dated 13 November 2014 (Table 1). Condition 4 states that *"The approval holder must prepare and submit, at least 3 months prior to commencement of the action, for the Minister's written approval, a Habitat Rehabilitation and Management Plan".* Specific details of the condition are outlined in Table 1.

2.2 Objectives of Habitat Rehabilitation Management Plan

The intent of the Habitat Rehabilitation Management Plan is to provide management measures to rehabilitate Koala habitat within the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone. This Habitat Rehabilitation Plan is consistent with the Koala Management Plan (Austecology 2012), the Fauna Corridor Infrastructure Master Plan (Natura Consulting 2011) and the Offset Management Plan (Austecology 2015) in terms of the corridor network and rehabilitation objectives.

The areas to be rehabilitated are identified in Figure 1 as "Existing Assessable Koala Habitat to be protected and managed" (Austecology 2012) and in Figure 2 as "Offset Requirement". This Koala Habitat Rehabilitation Management Plan ensures that Koala habitat is specifically maintained within at least 195 ha of Offset Area as well as outside of Offset Area within the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone.

In particular the objectives of this report are to:

- Clearly define the management measures that reflect an adaptive management approach to improve Koala habitat in the designated areas;
- State clear and concise outcomes and performance indicators against which achievement of the outcomes identified will be measured;
- State the timeframe for implementation of the plan;
- Specify a method to monitor the impact and effectiveness of the management measures described above;
- Identify the contingency measures and appropriate corrective actions that will be undertaken if the performance indicators or outcomes are being met;
- Be consistent with Koala Management Plan and Fauna Corridor Infrastructure Master Plan.

Table 1 Requirements of Approval Condition 4 and corresponding sections of the report.

Cond.	Condition Requirement	Plan Reference	Page	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
4	Submit a Habitat Rehabilitation and Management Plan for Minster's written approval prior to commencement	This Report	NA	This Report
4(a)	clearly define the management measures and reflect an adaptive management approach to improve koala habitat quality within the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone	**S2 – Description of Rehabilitation Area** **Figure 2** **Figure 4** **S3.1.2 Rehabilitation Approach** **S3.1.3 Weed management** **S3.3 Rehabilitation of Road Crossings**	12 11 18 53 53 64	Details location of areas to be rehabilitated for koala habitat within the corridor network (rehabilitation units); provides specification of each rehabilitation unit including size, Regional Ecosystem, landzone geology, Corridor/protection type. Details integrated approach to rehabilitation including weed management, planting and plant selection and care, and plant placement and protection in order to improve koala habitat within the corridor network. Specifies additional rehabilitation guidelines for rehabilitation of road crossings to mitigate the impact of traffic on Koalas.
4(b)	state clear and concise outcomes and **performance indicators** against which achievement of the outcomes identified will be measured	**S3.1.1 - Performance Indicators** **Table 5** **Table 6**	21 23 28	Identifies performance indicators, specifying benchmarks with a specific timeframe for achieving staged rehabilitation for each rehabilitation unit. Benchmarks have been formulated from Pre-Clearing RE maps (Qld Government 2015) and detailed information on species composition and structure for each RE (Queensland Government 2015).
4(c)	state the timeframe for implementation of the plan	**S4 – Rehabilitation Staging** **Figure 6** – Rehabilitation staging plan	65 65	The timeframe of implementing the plan is outlined in this section, with Figure 6 showing rehabilitation stage times. Rehabilitation works are tied to the roll-out of construction of each stage of development,

				which will be undertaken over approximately 30 years. However, weed control measures are to be commenced ahead of construction staging.
4(d)	specify a method to monitor the impact and effectiveness of the management measures described above	**S3.4 Monitoring**	61	This section identifies the location of monitoring sites within each habitat rehabilitation unit and road crossing rehabilitation unit. Monitoring will include photo-point monitoring, quantitative monitoring of species richness, percent foliage cover (canopy, shrub and ground layer), canopy height and weed prevalence within transects and quadrats. The timeframe for monitoring is also specified – baseline (0 months), 6 months, and 1, 1.5, 2, 2.5, 3, 4, 5, 10 and 15 years.
4(e)	identify the contingency measures and appropriate corrective actions that will be undertaken if the **performance indicators** or outcomes are not being met	**S3.6 Contingency Measures and Corrective Actions**	64	Where Interim Benchmarks are not being met, the timeframes to achieve the Final Benchmarks will be reviewed and extended, whereby Lend Lease will continue to undertake rehabilitation works with continued monitoring until the Final Benchmarks are met. Contingency measures are outlined where 'as constructed data' and surveys of Habitat Rehabilitation Area boundaries (Existing Assessable Koala Habitat to be protected and managed and Offset Area) within 3 months of completion of earthworks will be used to assess/demonstrate compliance.
4(f)	be consistent with **Koala Management Plan** and **Fauna Corridor Infrastructure Master Plan**	Throughout report	NA	The Habitat Rehabilitation Plan is consistent with the Koala Management Plan (Austecology 2012) and the Fauna Corridor Infrastructure Master Plan (Natura Consulting 2011), in terms of the corridor network and rehabilitation objectives.

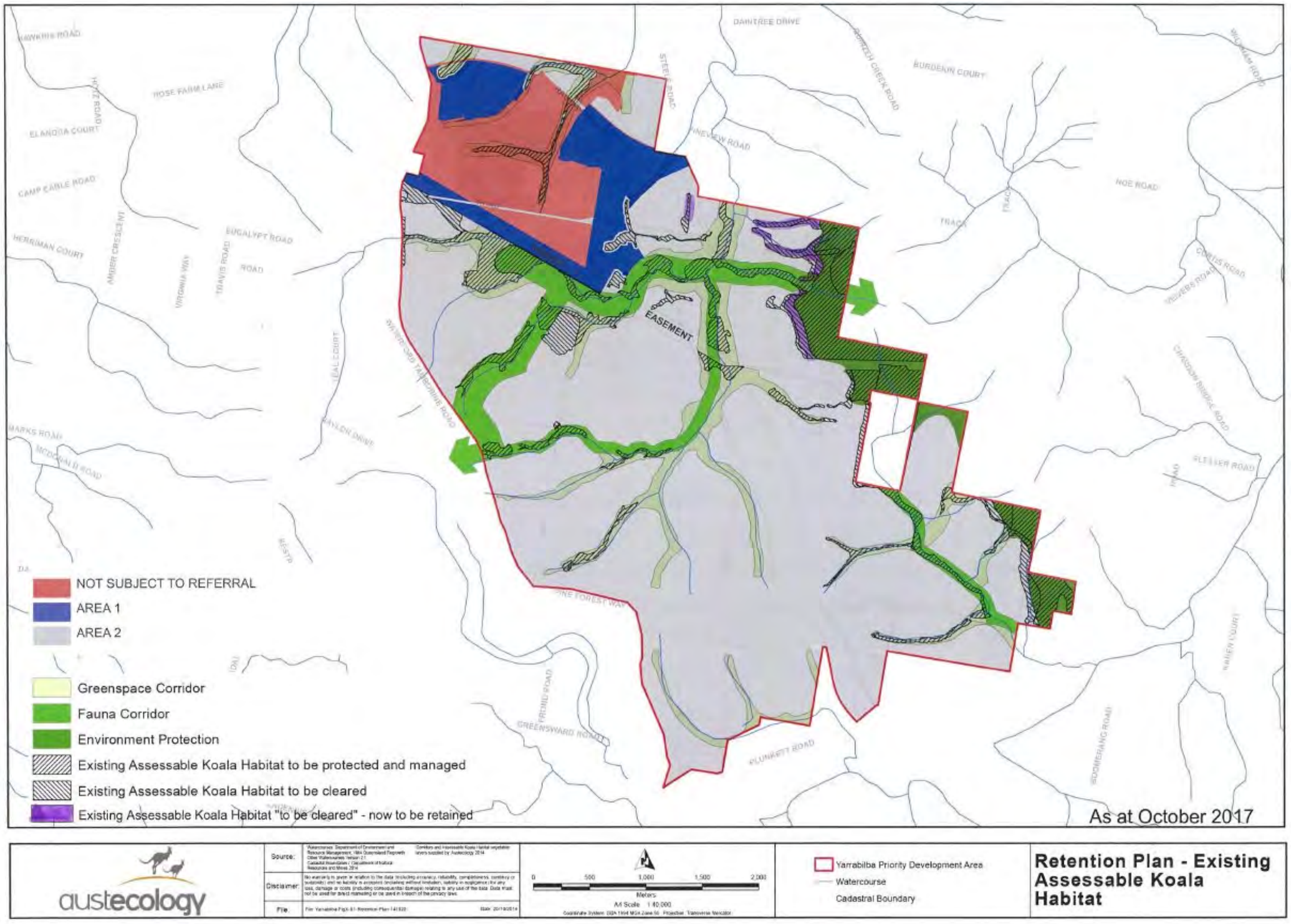

Figure 1 Site location and Existing Assessable Koala Habitat within the corridor network.

YARRABILBA

LEGEND

ENVIRONMENTAL PROTECTION

FAUNA CORRIDOR

GREENSPACE CORRIDOR

YARRABILBA OFFSET REQUIREMENT UNDER EPBC ACT - 195 ha

YARRABILBA SITE BOUNDARY

OFFSET AREAS 2 AND 3 (85ha) INCLUDES ADDITIONAL RETAINED HABITAT

APPENDIX 2

NOTE:
The boundaries and areas shown hereon are subject to detailed engineering design, final survey and approval of subsequent development applications by the relevant authorities.

YARRABILBA - OFFSET LAND

File No. YAR-OLL Dgn No. YAR-EPBC-OSL-171103 Date 03 NOV 2017

Figure 2 Yarrabilba Offset Requirement areas.

2 Rehabilitation Areas

2.1 Purpose of Habitat Rehabilitation

Habitat rehabilitation is intended to improve Koala habitat quality within the site in order to significantly increase the site's Koala carrying capacity in the medium to long term. In addition, the configuration of key elements of the open space system (Fauna Corridor, Greenspace Corridor and Environmental Protection Zone) will enhance the site's contribution to Koala movement opportunities within the context of larger areas of Koala habitat to the east and west of the site (Austecology 2012). Under the development of Yarrabilba, all existing fragments of remnant vegetation which have value for koalas will be retained (approximately 5.4% of the total site area) (Austecology 2012). The rehabilitation of the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone will significantly expand on these values by providing additional Koala habitat (Natura Consulting 2011).

Koala habitat rehabilitation is to be undertaken within "Existing Assessable Koala Habitat to be protected and managed" and "Offset Areas" within Fauna Corridors, Greenspace Corridors and Environmental Protection Zones. This totals an area of 1,981,771 m^2 (198.2 ha) in the Offset Areas and an additional 754,657 m^2 (75.5 ha) within Existing Assessable Koala Habitat areas outside of Offset areas, comprising a combined area of 2,736,428 m^2 (273.6 ha) to be rehabilitated.

The Koala habitat rehabilitation area has been divided into Offset Rehabilitation and Habitat Rehabilitation units and Crossing Rehabilitation Units, which are described in the following sections.

2.2 Offset and Habitat Rehabilitation Units

Koala habitat rehabilitation is to occur within Offset and Habitat Rehabilitation units as shown in Figure 3. Each rehabilitation unit (ORU1 to ORU23 and HRU1 to HRU31) is a mapped polygon, where the polygon boundaries are the mapped Pre-Clearing RE. The Regional Ecosystem (RE) code applicable to each unit was determined by overlapping Pre-Clearing Regional Ecosystem mapping (Queensland Government 2015b) with Existing Assessable Koala Habitat mapping and Offset Requirement area mapping within the Fauna Corridors, Greenspace Corridors and Environmental Protection Zones.

The following table presents a summary of rehabilitation units attributes, including:

- The area of the rehabilitation unit in square metres;
- The corridor within which the rehabilitation unit is located;
- Whether it is an Offset Area and/or Existing Koala Habitat area;
- The RE code for pre-clearing vegetation within the rehabilitation unit and the landzone/geology of the rehabilitation unit.

It is noted that the minimum rehabilitation unit size is ~2,500 m^2 to reflect the mapping limitation of the Pre-Clearing Regional Ecosystems mapping dataset (Queensland Government 2015). However, there are two rehabilitation units with areas of are slightly less than 2,500 m^2, which were retained due to their immediate proximity to adjacent rehabilitation units.

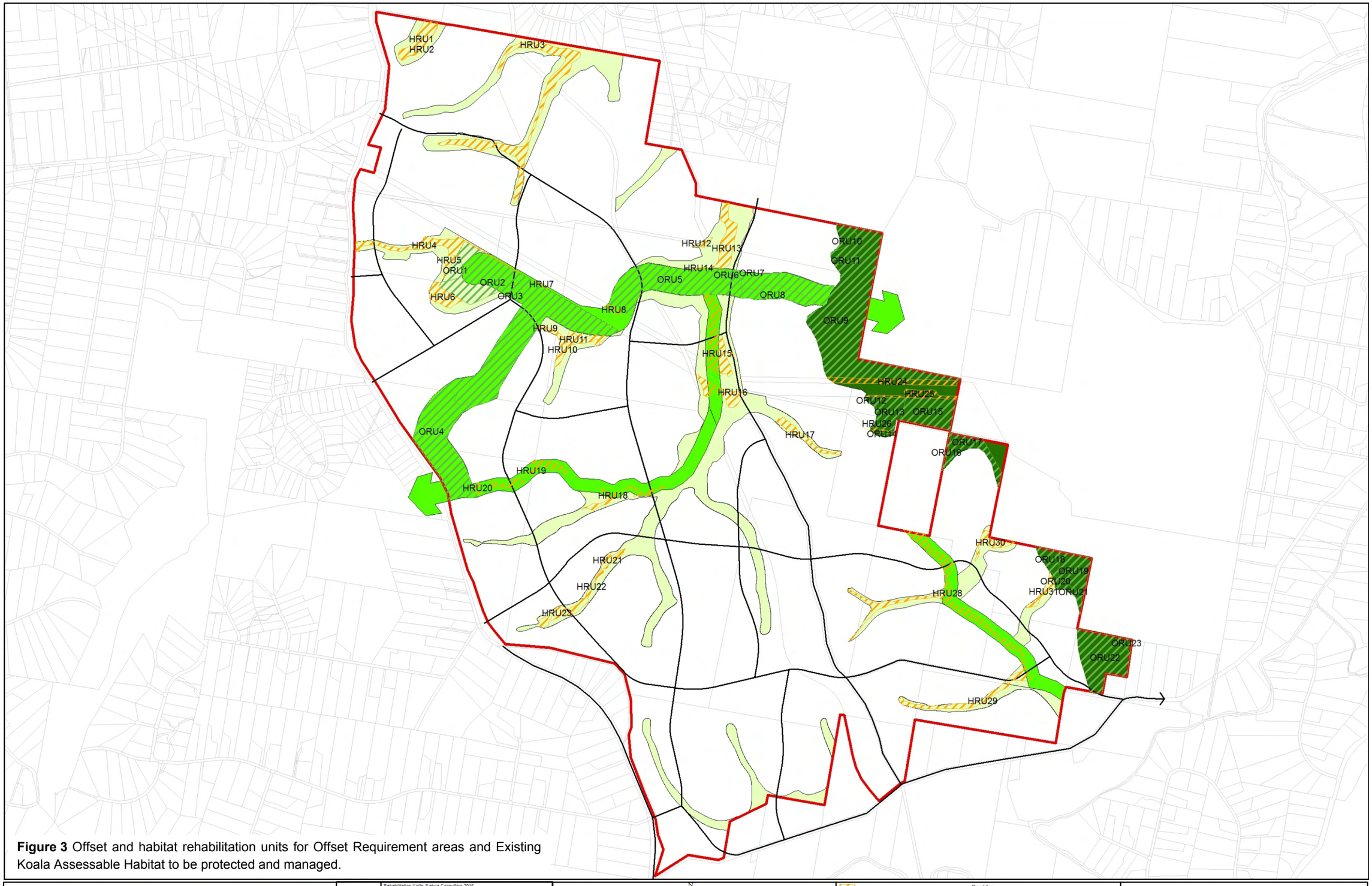

Figure 3 Offset and habitat rehabilitation units for Offset Requirement areas and Existing Koala Assessable Habitat to be protected and managed.

NATURA CONSULTING

Source:	Rehabilitation Units: Natura Consulting 2015 Watercourses: Department of Environment and Resource Management Cadastre Boundary: Department of Natural Resources and Mines Corridors and Assessable Koala Habitat: Lend Lease / Austecology Internal Roads: Lend Lease
Desclaimer:	No warranty is given in relation the data (including accuracy, reliability, completeness, currency of suitability) and no liability is accepted (including without limitation liability in negligence) for any loss, damage or costs (including subsequent damage) relating to any use of the data. Data must not be used for direct marketing purposes or be used in breach of privacy laws.
File/Date:	Koala Habitat Rehabilitation Plan - Offset and Habitat Rehabilitation Units Date: 30/03/2015

Offset and habitat rehabilitation units within Offset Requirement areas and Asssessable Koala habitat to be protected and managed

Table 2 Offset rehabilitation units (ORU) and Habitat Rehabilitation Units (HRU) within the corridor network.

Rehab. Unit	Area (m^2)	Corridor/ Protection type	RE Code(s)	Landzone/ Geology
Offset Area				
ORU1	16,933	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU2	439,297	Fauna Corridor / GreenSpace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
ORU3	1,451	Fauna Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU4	269,317	Fauna Corridor	12.3.11/12.3.6/12.3.7 12.9-10.17/12.9-10.2	Recent quaternary alluvial systems – Alluvial river and creek flats and Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU5	201,530	Fauna Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
ORU6	10,205	Fauna Corridor	12.3.11/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
ORU7	7,264	Fauna Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
ORU8	46,711	Fauna Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU9	513,080	Environmental Protection Fauna Corridor	12.9-10.17/12.9-10.19	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU10	8777	Environmental Protection	12.9-10.17	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU11	8,324	Environmental Protection	12.9-10.17	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU12	46,711	Environmental Protection	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU13	49,644	Environmental Protection	12.9-10.17/12.9-10.19/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU14	4,286	Environmental Protection	12.9-10.17/12.9-10.19/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU15	80,800	Environmental Protection	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU16	4,708	Environmental Protection	12.9-10.17/12.9-10.19	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU17	47,475	Environmental Protection	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU18	24,352	Environmental Protection	12.9-10.17	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU19	59,917	Environmental Protection	12.11.5/12.11.3	Recent quaternary alluvial systems – Alluvial river and creek flats
ORU20	3,154	Environmental Protection	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU21	13,374	Environmental Protection	12.11.5/12.11.3	Recent quaternary alluvial systems – Alluvial river and creek flats
ORU22	118,260	Environmental Protection	12.11.5/12.11.3	Recent quaternary alluvial systems – Alluvial river and creek flats
ORU23	6,201	Environmental Protection	12.11.5	Recent quaternary alluvial systems – Alluvial river and creek flats
Area	**1,981,771**			

Rehab. Unit	Area (m^2)	Corridor/ Protection type	RE Code(s)	Landzone/ Geology
Existing Assessable Koala Habitat Area (Outside of Offset Area)				
HRU1	31,875	Greenspace Corridor	12.9-10.4/12.9-10.12	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU2	2,947	Greenspace Corridor	12.9-10.4/12.9-10.12/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU3	116,097	Greenspace Corridor	12.3.11/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU4	47,894	Fauna Corridor Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU5	6,788	Greenspace Corridor	12.9-10.17/12.9-10.2	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU6	26,102	Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU7	1,684	Fauna Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU8	5,206	Fauna Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU9	2,935	Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU10	13,511	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU11	19,528	Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU12	3,128	Greenspace Corridor	12.9-10.4/12.9-10.12/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU13	42,093	Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU14	910	Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU15	62,944	Fauna Corridor Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU16	29,486	Fauna Corridor Greenspace Corridor	12.3.11	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU17	19,638	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU18	19,604	Fauna Corridor Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU19	29,070	Fauna Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU20	3,784	Fauna Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU21	5,688	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU22	14,158	Greenspace Corridor	12.3.11/12.3.6/12.3.7	Recent quaternary alluvial systems – Alluvial river and creek flats
HRU23	15,932	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks

Rehab. Unit	Area (m^2)	Corridor/ Protection type	RE Code(s)	Landzone/ Geology
HRU24	38,783	Environmental Protection	12.9-10.17/12.9-10.19	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU25	22,618	Environmental Protection	12.9-10.17/12.9-10.2/12.9-10.19	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU26	2,818	Environmental Protection	12.9-10.17/12.9-10.19	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU27	15,379	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU28	99,585	Fauna Corridor Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU29	27,237	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU30	15,378	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
HRU31	11,857	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
Total	**754,657**			
Total Area	**2,736,428**			

2.3 Crossing Rehabilitation Units

Rehabilitation and monitoring will also be undertaken where road and infrastructure traverses 'Existing Assessable Koala Habitat' or Offset Requirement Areas within the corridor network. Crossing rehabilitation units have been identified (refer to Figure 4) by overlaying the proposed internal road network with the Pre-Clearing Regional Ecosystem mapping (Queensland Government 2015), Existing Assessable Koala Habitat mapping and Offset Requirement area mapping within the Fauna Corridors, Greenspace Corridors and Environmental Protection Zones. Each crossing rehabilitation unit (CRU1 to CRU15) is a mapped polygon overlayed over Offset Rehabilitation Units and Habitat Rehabilitation Units. It is noted that these locations are indicative and may change with the final alignment of roads.

Table 3 presents a summary of the Crossing Rehabilitation Units, which are subject to rehabilitation actions outlined in this report.

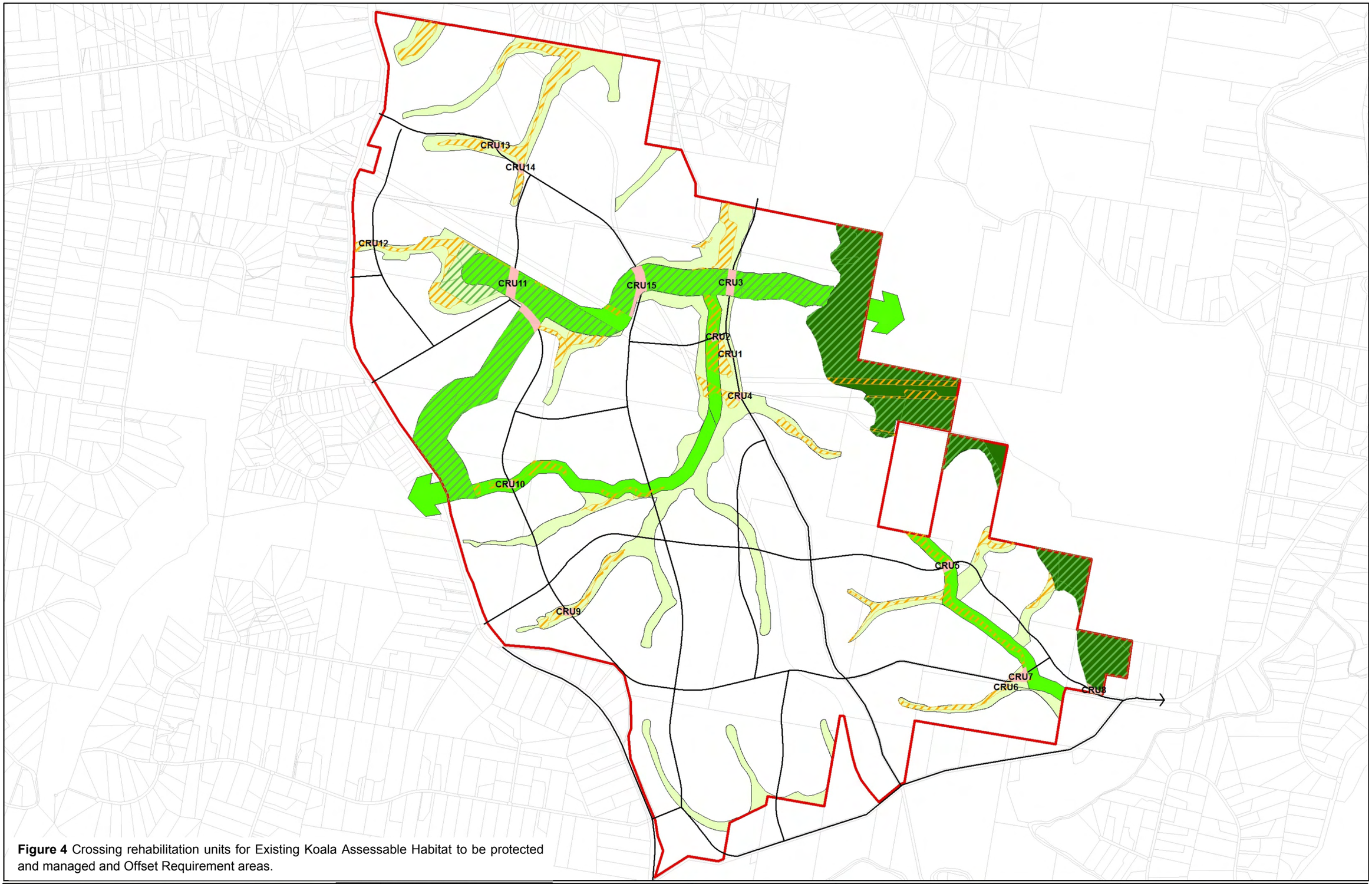

Figure 4 Crossing rehabilitation units for Existing Koala Assessable Habitat to be protected and managed and Offset Requirement areas.

NATURA CONSULTING

Source:	Rehabilitation Units: Natura Consulting 2015 Watercourses: Department of Environment and Resource Management Cadastre Boundary: Department of Natural Resources and Mines Corridors and Assessable Koala Habitat: Lend Lease / Austecology Internal Roads: Lend Lease
Desclaimer:	No warranty is given in relation the data (including accuracy, reliability, completeness, currency of suitability) and no liability is accepted (including without limitation liability in negligence) for any loss, damage or costs (including subsequent damage) relating to any use of the data. Data must not be used for direct marketing purposes or be used in breach of privacy laws.
File/Date:	Koala Habiat Rehabilitation Plan - Crossing Rehabilitation Units Date: 30/03/2015

N

0 250 500 1,000 1,500 2,000

Meters

Coordinate System: WGS 1984 Zone 56S Projection: Transerve Mercator

- Crossing Rehabilitation Unit (CRU 1 to CRU15)
- Habitat Rehabilitation Units (HRU1 to HRU31)
- Offset Rehabilitation Units (ORU1 to ORU23)
- Yarrabilba Priority Development Area
- Internal Roads

Corridor
- Greenspace Corridor
- Fauna Corridor
- Environmental Protection
- Cadastral Boundary

Crossing rehabilitation units within Offset Requirement areas and Asssessable Koala habitat to be protected and managed

Table 3 Road and infrastructure crossing rehabilitation units (CRU) traversing Offset Rehabilitation Units (ORU) and Habitat Rehabilitation Units (HRU).

Crossing Rehabilitation Unit	Area (m^2)	Offset Rehabilitation Unit (ORU) / Habitat Rehabilitation Unit (HRU)	Corridor/ Protection type	RE Code(s)	Landzone/ Geology
CRU1	1,369	HRU15	Greenspace Corridor	12.3.11/12.3.6/12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU2	3,670	HRU15	Fauna Corridor Greenspace Corridor	12.3.11/12.3.6/12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU3	12,578	ORU5, ORU6, ORU7, ORU9,	Fauna Corridor	12.3.11/12.3.6/12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU4	3,347	HRU16	Greenspace Corridor	12.11.3	Metamorphic rocks - hills and lowlands on metamorphic rocks
CRU5	6,013	HRU28	Fauna Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU6	731	HRU29	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU7	10,045	HRU28	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU8	4,082	ORU22	Environmental Protection	12.11.5/12.11.3	Metamorphic rocks - hills and lowlands on metamorphic rocks
CRU9	5,542	HRU22, HRU23	Greenspace Corridor	12.9-10.17/12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU10	3,555	HRU19	Fauna Corridor	12.3.11/12.3.6/12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU11	31,324	ORU2, HRU4, HRU9	Fauna Corridor	12.3.11//12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU12	1,775	HRU4	Greenspace Corridor	12.3.11/12.3.6/12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU13	3,766	HRU3	Greenspace Corridor	12.3.11//12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU14	3,496	HRU3	Greenspace Corridor	12.3.11//12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
CRU15	22,138	ORU5	Greenspace Corridor / Fauna Corridor	12.3.11/12.3.6/12.3.7	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks

* Coordinate system WGS84 Zone 56S Projection: Transverse Mercator

2.4 Pre-clearing Regional Ecosystems Rehabilitation Units

A short description of the Pre-clearing Regional Ecosystems identified in the habitat rehabilitation units and crossing rehabilitation units is provided in Table 4

Table 4 Summary of Pre-clearing Regional Ecosystems within Offset Rehabilitation Units, Habitat Rehabilitation Units and Crossing Rehabilitation Units.

RE Code	RE short description (extract from Qld Herbarium RE Description Database	Vegetation Management Act class	Biodiversity status
12.3.6	*Eucalyptus tereticornis, Casuarina cunninghamiana* subsp. *cunninghamiana* +/- *Melaleuca* spp. fringing woodland	Least concern	No concern at present
12.3.7	*Melaleuca quinquenervia* +/- *Eucalyptus tereticornis, Lophostemon suaveolens* open forest on coastal alluvial plains	Least concern	No concern at present
12.3.11	*Eucalyptus tereticornis* +/- *Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains	Of concern	Of concern
12.9-10.2	*Corymbia citriodora* subsp. *variegata* +/- *Eucalyptus crebra* open forest on sedimentary rocks	Least concern	No concern at present
12.9-10.4	*Eucalyptus racemosa* subsp. *racemosa* woodland on sedimentary rocks	Least concern	No concern at present
12.9-10.12	*Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa* woodland on sedimentary rocks	Endangered	Endangered
12.9-10.17	*Eucalyptus acmenoides, E. major, E. siderophloia* +/- *Corymbia citriodora* subsp. *variegata* woodland on sedimentary rocks	Least concern	No concern at present
12.9-10.19	*Eucalyptus fibrosa* subsp. *fibrosa* woodland on sedimentary rocks	Least concern	No concern at present
12.11.3	*Eucalyptus siderophloia, E. propinqua* +/- *E. microcorys, Lophostemon confertus, Corymbia intermedia, E. acmenoides* open forest on metamorphics +/- interbedded volcanics	Least concern	No concern at present
12.11.5	*Corymbia citriodora* subsp. *variegata, Eucalyptus siderophloia, E. major* open forest on metamorphics +/- interbedded volcanics	Least concern	No concern at present

(Source: QLD Government 2015a)

3 Habitat Rehabilitation Management Plan

In accordance with the *EPBC* Act 1999 decision notice, this Koala Habitat Rehabilitation Management Plan has been formulated reflecting the onsite rehabilitation requirements of Fauna and Green Space Corridors, Regional Ecosystems, drainage lines and post development fauna movement pathways within Koala habitat areas on the site. This plan identifies areas of high significance for Koala habitat (identified in Figure 1 and 2 as Existing Assessable Koala habitat to be protected and managed and Offset Areas), identifies Koala habitat rehabilitation benchmarks and determines restoration actions to meet these benchmarks.

The management measures as part of this plan are structured as follows:

- Rehabilitation
- Performance indicators
- Monitoring
- Contingency measures
- Timeframe for implementation

3.1 Rehabilitation

Each rehabilitation unit is to be rehabilitated to a vegetation structure and species composition that is line with that of the appropriate pre-clearing RE (Identified in Table 5 and Table 6). The reference benchmark for rehabilitation of each rehabilitation unit is derived from the vegetation structure and species composition of the appropriate pre-clearing Regional Ecosystem (RE) (refer to Table 5 and Table 6). These benchmarks quantify average canopy cover, shrub cover, ground cover, species richness and average height of the canopy and have been sourced from the Queensland Herbarium (Queensland Government 2015). These technical descriptions are a compilation of data from multiple sites for canopy cover, shrub cover, and average stem density for each strata, groundcover and average species richness (Queensland Government 2015). Through establishing these benchmarks, a reasonable comparison can be made between the floristic composition and vegetation structure of a given rehabilitation unit and the appropriate pre-clearing RE.

3.1.1 Performance Indicators

The final benchmark for rehabilitation is derived from the definition of remnant vegetation under the *Vegetation Management Act 1999.* Vegetation can be mapped as remnant vegetation and associated essential habitat for Koalas if the canopy is 70% of the height, 50% of the cover and similar species composition of the appropriate pre-clearing RE (Queensland Government 2015). Therefore, the final benchmark for rehabilitation is 70% of the reference benchmark cover (for canopy, shrub and ground-layer) and 50% of the reference benchmark height (for canopy and shrub layer) of the appropriate RE.

Six rehabilitation performance indicators were selected:

1 Average canopy cover
2 Average height of canopy
3 Dominant canopy species
4 Average shrub cover
5 Average groundcover
6 Species richness
7 Weed cover

Weed cover needs to be considered for rehabilitation benchmarks for this site, particularly in the canopy where numerous exotic pine trees exist. Throughout the life of the development a weed cover of ≤5% is to be maintained.

The reference and final benchmark vegetation structure and species composition for each of the pre-clearing RE's identified within the mapped rehabilitation units is identified in Table 5 and Table 6 respectively. Note that exotic species identified in Table 6 are to assist with identification purposes only and are to be controlled and managed, not planted or assisted.

Rehabilitation units are to be managed and restored until they reach the final benchmark condition as identified in Table 5 and Table 6 and objectives of this Habitat Rehabilitation and Management Plan. The objectives of this plan are long term and are likely to require more than 15 years to be achieved, within each rehabilitation unit, after commencement of implementation.

Interim benchmarks are also provided whereby an assessment at regular intervals can be made on the progress of the rehabilitation/revegetation efforts towards achieving this plan's outcomes. Given this, adaptive management approaches can also be employed to redirect restoration approaches, in the event that interim benchmarks are not being met. Table 5 provides a summary of the timeframe to achieve the interim and final benchmarks.

For Interim Benchmark years 1 to 10, vegetation structure has been quantified from a cumulative growth curve (CGC), which for biological organisms including trees and shrubs is sigmoidal (Fenner School 2015). As the reference benchmarks applied for this report are at the Regional Ecosystem level and site data and long term tree and shrub growth curves are not available for Yarrabilba, we have derived general growth curves for each Regional Ecosystem. This is based on a sigmoidal growth curve, the average reference benchmark height of the stratum, the minimum height at which regrowth vegetation is considered to be of equivalent height as the RE (50% of reference benchmark height), and the average height of tubestock (20 cm) that is predominately used for revegetation in southeast Queensland.

The final benchmark at year 15 is 70% of the reference benchmark cover (for canopy, shrub and ground-layer) and 50% of the reference benchmark height (for canopy and shrub layer) of the appropriate pre-clearing RE.

Table 5 Reference, interim and final benchmark vegetation structure for each pre-clearing RE detailed for rehabilitation units (ORU and HRU) and crossing rehabilitation units (CRU).

Benchmark Condition (where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)										
RE Code	**Name**	**Status (VMA)**	**Biodiversity Status**	**Habitat Rehabilitation Unit**			**Crossing Rehabilitation Unit**			
12.3.6	***Melaleuca quinquenervia* +/- *Eucalyptus tereticornis, Lophostemon suaveolens* open forest on coastal alluvial plains**	Least concern	No concern at present	ORU2, ORU4, ORU5, ORU7 HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU18, HRU19, HRU22			CRU1, CRU2, CRU3, CRU10, CRU12, CRU15			
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**	
Interim Benchmark by 1 year				10.0	1.5	1.5	0.5	6.0		
Interim Benchmark by 2 years				14.0	3.0	2.0	0.8	10.0		
Interim Benchmark by 3 years				16.0	4.0	2.5	1.2	15.0		
Interim Benchmark by 5 years				22.0	6.0	3.0	1.4	20.0		
Interim Benchmark by 10 years				28.0	9.2	4.0	1.5	25.0		
Final Benchmark by 15 years				**30.5**	**10.7**	**4.45**	**1.6**	**29.2**	**-**	
Reference Benchmark (Pre-Clearing RE)				**60.9**	**15.3**	**8.9**	**2.3**	**58.4**	**33.3 +/- 10.5**	
12.3.7	***Eucalyptus tereticornis*, *Casuarina cunninghamiana* subsp. *cunninghamiana* +/- *Melaleuca* spp. fringing woodland**	Least concern	No concern at present	ORU2, ORU4, ORU5, ORU6, ORU7 HRU3, HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU18, HRU19, HRU22,			CRU1, CRU2, CRU3, CRU10, CRU11, CRU12, CRU13, CRU14, CRU15			
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**	
Interim Benchmark by 1 year				5.5	1.6	2.5	0.5	6.0		
Interim Benchmark by 2 years				6.0	2.9	3.0	0.8	7.0		
Interim Benchmark by 3 years				7.0	4.1	3.5	1.2	8.0		
Interim Benchmark by 5 years				9.0	6.2	4.0	1.4	10.0		
Interim Benchmark by 10 years				12.0	10.1	6.0	1.5	12.0		
Final Benchmark by 15 years				**13.3**	**13.6**	**6.6**	**1.6**	**14.4**	**-**	
Reference Benchmark (Pre-Clearing RE)				**26.6**	**19.4**	**13.2**	**2.3**	**28.7**	**52.8 +/- 7.5**	

Benchmark Condition (where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)										
RE Code	**Name**	**Status (VMA)**	**Biodiversity Status**	**Habitat Rehabilitation Unit**			**Crossing Rehabilitation Unit**		
12.3.11	***Eucalyptus tereticornis* +/- *Eucalyptus siderophloia*, *Corymbia intermedia* open-forest on alluvial plains**	Of concern	Of concern	ORU2, ORU4, ORU5, ORU6, ORU7 HRU3, HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU16, HRU18, HRU19,			CRU1, CRU2, CRU3, CRU10, CRU11, CRU12, CRU13, CRU14, CRU15		
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				7.0	1.6	2.0	0.4	1.5	
Interim Benchmark by 2 years				10.0	3.0	4.0	0.7	2.0	
Interim Benchmark by 3 years				12.0	4.2	5.0	1.1	3.0	
Interim Benchmark by 5 years				18.0	6.4	7.0	1.3	4.5	
Interim Benchmark by 10 years				22.0	10.7	9.0	1.5	7.0	
Final Benchmark by 15 years				**25.6**	**16.7**	**10.9**	**1.9**	**8.5**	**-**
Reference Benchmark (Pre-Clearing RE)				**51.1**	**23.8**	**21.7**	**2.7**	**17**	**40.6 +/- 8.5**
12.9-10.2	***Corymbia citriodora* subsp. *variegata* +/- *Eucalyptus crebra* open forest on sedimentary rocks**	Least concern	No concern at present	ORU1, ORU3, ORU4, ORU8, ORU12, ORU13, ORU14, ORU15, ORU17, ORU20 HRU2, HRU5, HRU10, HRU12, HRU17, HRU20, HRU21, HRU23, HRU27, HRU28, HRU29, HRU30, HRU31			CRU5, CRU6, CRU7, CRU9		
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				6.0	1.6	3.0	0.4	6.0	
Interim Benchmark by 2 years				10.0	2.9	4.0	0.7	7.0	
Interim Benchmark by 3 years				12.0	4.2	5.0	1.1	12.0	
Interim Benchmark by 5 years				18.0	6.3	7.0	1.3	18.0	
Interim Benchmark by 10 years				22.0	10.5	9.0	1.5	22.0	
Final Benchmark by 15 years				**26.8**	**15.5**	**10.8**	**1.8**	**23.6**	**-**
Reference Benchmark (Pre-Clearing RE)				**53.5**	**22.2**	**21.6**	**2.5**	**47.2**	**28.2 +/- 7.7**

Benchmark Condition (where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)

RE Code	Name	Status (VMA)	Biodiversity Status	Habitat Rehabilitation Unit			Crossing Rehabilitation Unit		
12.9-10.4	***Eucalyptus racemosa subsp. racemosa* woodland on sedimentary rocks**	Least concern	No concern at present	HRU1, HRU2, HRU12					
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				6.0	1.6	1.0	0.6	8.0	
Interim Benchmark by 2 years				7.0	3.0	2.0	1.0	10.0	
Interim Benchmark by 3 years				9.0	4.2	3.0	1.5	15.0	
Interim Benchmark by 5 years				12.0	6.3	4.0	1.8	20.0	
Interim Benchmark by 10 years				15.0	10.6	7.0	2.2	25.0	
Final Benchmark by 15 years				**19.0**	**16.2**	**7.9**	**2.9**	**30.0**	-
Reference Benchmark (Pre-Clearing RE)				**38.0**	**23.2**	**15.7**	**4.1**	**59.9**	**35.4 +/- 5.2**
12.9-10.12*	***Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa* woodland on sedimentary rocks**	Endangered	Endangered	HRU1, HRU2, HRU12					
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				7.0	1.6	0.3	0.4	6.0	
Interim Benchmark by 2 years				10.0	2.9	0.5	0.8	10.0	
Interim Benchmark by 3 years				15.0	4.1	1.0	1.3	12.0	
Interim Benchmark by 5 years				20.0	6.2	1.5	1.7	20.0	
Interim Benchmark by 10 years				25.0	10.1	2.0	2.0	25.0	
Final Benchmark by 15 years				**31.0**	**13.4**	**3.4**	**2.5**	**36.2**	-
Reference Benchmark (Pre-Clearing RE)				**62.0**	**19.2**	**6.8**	**3.6**	**72.4**	**17.8 +/- 9.6**

Benchmark Condition (where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)										
RE Code	**Name**	**Status (VMA)**	**Biodiversity Status**	**Habitat Rehabilitation Unit**			**Crossing Rehabilitation Unit**			
12.9-10.17	***Eucalyptus acmenoides, Eucalyptus major, Eucalyptus siderophloia +/- Corymbia citriodora subsp. variegata* woodland on sedimentary rocks**	Least concern	No concern at present	ORU1, ORU3, ORU4, ORU8, ORU9, ORU10, ORU11, ORU12, ORU13, ORU14, ORU15, ORU16, ORU17, ORU18, ORU20 HRU5, HRU10, HRU17, HRU20, HRU21, HRU23, HRU24, HRU25, HRU26, HRU27, HRU28, HRU29, HRU30, HRU31			CRU5, CRU6, CRU7, CRU9			
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**	
Interim Benchmark by 1 year				6.0	1.6	6.0	0.6	10.0		
Interim Benchmark by 2 years				10.0	3.0	7.0	1.0	20.0		
Interim Benchmark by 3 years				12.0	4.2	10.0	1.5	25.0		
Interim Benchmark by 5 years				18.0	6.4	14.0	1.8	30.0		
Interim Benchmark by 10 years				22.0	10.9	16.0	2.2	35.0		
Final Benchmark by 15 years				**27.2**	**18.2**	**20.0**	**2.8**	**43.9**	-	
Reference Benchmark (Pre-Clearing RE)				**54.3**	**26.0**	**40.0**	**4.0**	**87.8**	**36.5 +/- 15.1**	
12.9-10.19	***Eucalyptus fibrosa subsp. fibrosa* woodland on sedimentary rocks**	Least concern	No concern at present	ORU9, ORU14, ORU16 HRU24, HRU25, HRU26						
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**	
Interim Benchmark by 1 year				6.0	1.6	2.5	0.4	2.5		
Interim Benchmark by 2 years				7.0	3.0	4.0	0.7	3.0		
Interim Benchmark by 3 years				9.0	4.2	5.0	1.1	4.0		
Interim Benchmark by 5 years				12.0	6.3	7.0	1.3	6.0		
Interim Benchmark by 10 years				15.0	10.5	9.0	1.5	8.0		
Final Benchmark by 15 years				**20.9**	**15.75**	**9.55**	**1.68**	**8.2**	-	

Benchmark Condition (where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)										
RE Code	**Name**	**Status (VMA)**	**Biodiversity Status**	**Habitat Rehabilitation Unit**			**Crossing Rehabilitation Unit**		
Reference Benchmark (Pre-Clearing RE)				**41.8**	**22.5**	**19.1**	**2.4**	**16.4**	**30.1 +/- 4.6**
12.11.3	***Eucalyptus siderophloia, E. propinqua* +/- *E. microcorys, Lophostemon confertus, Corymbia intermedia, E. acmenoides* open forest on metamorphics +/- interbedded volcanics**	Least concern	No concern at present	ORU19, ORU21, ORU22			CRU4, CRU8		
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				6.0	1.6	1.5	0.4	3.0	
Interim Benchmark by 2 years				10.0	3.0	2.0	0.7	5.0	
Interim Benchmark by 3 years				14.0	4.2	2.5	1.1	7.0	
Interim Benchmark by 5 years				20.0	6.4	4.0	1.3	10.0	
Interim Benchmark by 10 years				25.0	10.8	4.5	1.5	12.0	
Final Benchmark by 15 years				**31.1**	**17.6**	**5.3**	**1.7**	**15.4**	-
Reference Benchmark (Pre-Clearing RE)				**62.1**	**25.2**	**10.5**	**2.4**	**30.8**	**55.1 +/ 15.4**
12.11.5	***Corymbia citriodora* subsp. *variegata, Eucalyptus siderophloia, E. major* open forest on metamorphics +/- interbedded volcanics**	Least concern	No concern at present	ORU19, ORU21, ORU22, ORU23			CRU8		
Interim Benchmark by 1 year				6.0	1.6	0.5	0.4	8.0	
Interim Benchmark by 2 years				9.0	3.0	1	0.7	10.0	
Interim Benchmark by 3 years				12.0	4.2	1.5	1.1	14.0	
Interim Benchmark by 5 years				15.0	6.4	2	1.3	18.0	
Interim Benchmark by 10 years				18.0	10.8	2.5	1.5	20.0	
Final Benchmark by 15 years				**21.8**	**15.8**	**2.9**	**1.6**	**23.0**	-
Reference Benchmark (Pre-Clearing RE)				**43.5**	**22.5**	**5.8**	**2.3**	**46.0**	**48.0 +/ 12.3**

Adapted from Queensland Government (2015).* No pre-defined benchmarks for this RE are provided within the RE technical descriptions (Queensland Government 2015) and therefore, these numbers have been based on data collected in the field from previous assessments and reference sites within this RE type.

Table 6 Benchmark species lists for each pre-clearing RE.

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Canopy Layer (T1)										
Allocasuarina torulosa	X			X						
Alphitonia excelsa	X			X						
Alstonia constricta				X						
Angophora leiocarpa			X	**X**		**X**	**X**	**X**	**X**	X
Angophora woodsiana			X							X
Brachychiton populneus				X						
Banksia oblongifolia	X									
Casuarina cunninghamiana subsp. cunninghamiana		**X**								
Corymbia citriodora subsp. variegata			X	**X**		X	**X**	X	X	X
Corymbia henryi										X
Corymbia intermedia	**X**	X	**X**		**X**	**X**	**X**	**X**	X	**X**
Corymbia tessellaris		X	X	X						X
Corymbia trachyphloia subsp. trachyphloia					**X**					
Dendrophthoe vitellina			X							
Eucalyptus acmenoides							**X**	X	**X**	X
Eucalyptus biturbinata									**X**	
Eucalyptus carnea							**X**	X	**X**	**X**
Eucalyptus crebra				**X**						**X**
Eucalyptus fibrosa subsp. fibrosa								**X**		
Eucalyptus helidonica										X
Eucalyptus latisinensis	X									
Eucalyptus longirostrata								X		
Eucalyptus major								**X**	**X**	
Eucalyptus melanoleuca								X		
Eucalyptus melanophloia				X						
Eucalyptus microcorys	X				X				**X**	X
Eucalyptus moluccana				X			X			
Eucalyptus montivaga								X		
Eucalyptus pilularis					**X**					
Eucalyptus portuensis								**X**		
Eucalyptus propinqua					X				**X**	X
Eucalyptus racemosa subsp. racemosa						X				

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Eucalyptus resinifera					X					X
Eucalyptus seeana			X			**X**				X
Eucalyptus siderophloia			**X**	X		X	X		X	**X**
Eucalyptus sideroxylon								X		
Eucalyptus tereticornis	**X**	**X**	**X**	X		X	X		X	X
Eucalyptus tindaliae			X		**X**			X		**X**
Euroschinus falcatus var. falcatus		X								
Glochidion ferdinandi	X									
Glochidion sumatranum	X									
Lophostemon confertus	**X**				X				**X**	X
Lophostemon suaveolens		X	**X**							
Melaleuca bracteata		X								
Melaleuca fluviatilis		X								
Melaleuca quinquenervia	**X**		**X**							
Melaleuca salicina	X									
Parsonsia straminea	X									
Syncarpia glomulifera					**X**					
Waterhousea floribunda		X								
Sub-canopy (T2-T3)										
Acacia blakei subsp. blakei								X		
Acacia blakei subsp. diphylla								X		
Acacia concurrens			X							X
Acacia disparrima subsp. disparrima	X	X	**X**	X					**X**	**X**
Acacia fimbriata										X
Acacia glaucocarpa				X						
Acacia leiocalyx							X	X		
Acacia loroloba								X		
Acacia maidenii				X						
Acacia melanoxylon					X					
Alectryon reticulatus										
Allocasuarina luehmannii				X						
Allocasuarina littoralis	X		**X**		X			**X**		X
Allocasuarina torulosa				X	**X**			X	**X**	**X**
Alphitonia excelsa	**X**		X	X	**X**		**X**		X	

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Amyema miquelii									X	
Angophora leiocarpa			X	**X**			X	X		X
Angophora subvelutina		X			X					X
Angophora woodsiana			X					X		X
Backhousia myrtifolia										
Banksia integrifolia			X							
Banksia oblongifolia					X					
Aphananthe philippinensis		X								
Casuarina cunninghamiana subsp. cunninghamiana		**X**								
Casuarina glauca			X							
Celastrus subspicata				X						
*Cinnamomum camphora**			X							
Corymbia citriodora subsp. variegata				**X**			**X**	X	X	X
Corymbia henryi										X
Corymbia intermedia	X		**X**	X	**X**		**X**	X	X	X
Corymbia tessellaris		X	X	X						X
Cryptocarya triplinervis		X								
Cryptocarya triplinervis var. triplinervis		X								
Cupaniopsis anacardioides		X								
Diospyros australis		X								
Diplatia furcata		X								
Dockrillia bowmanii		X								
Drypetes deplanchei		X								
Elaeocarpus obovatus		X	X						X	
Endiandra discolor					X					
Endiandra sieberi					X					
Erythrina vespertilio									X	
Eucalyptus acmenoides							**X**		X	
Eucalyptus carnea									X	**X**
Eucalyptus crebra				**X**						X
Eucalyptus exserta								X		
Eucalyptus fibrosa subsp. fibrosa							X	**X**		
Eucalyptus helidonica										X
Eucalyptus longirostrata								X		

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Eucalyptus major				X				**X**		
Eucalyptus melanoleuca								X		
Eucalyptus melanophloia				X						
Eucalyptus microcorys					X				X	
Eucalyptus moluccana				X			X	X		
Eucalyptus montivaga								X		
Eucalyptus pilularis					X					
Eucalyptus propinqua									**X**	X
Eucalyptus resinifera					X					X
Eucalyptus seeana										X
Eucalyptus siderophloia			X	**X**	X		**X**		**X**	X
Eucalyptus sideroxylon								X		
Eucalyptus tereticornis			X	X			X			X
Eucalyptus tindaliae					X					X
Euroschinus falcatus var. falcatus		X								
Ficus adenosperma		X								
Ficus coronata			X							
Flindersia schottiana					X					
Geijera salicifolia		X								
Glochidion ferdinandi			X		**X**					
Glochidion sumatranum	X		X							
Jagera pseudorhus			X							X
Leptospermum polygalifolium										X
Lophostemon confertus				X	**X**			X	**X**	**X**
Lophostemon suaveolens	**X**	X	**X**		X	X	X		X	**X**
Macaranga tanarius		X								
Maclura cochinchinensis		X								
Mallotus philippensis		X							X	
Melaleuca bracteata		X								
Melaleuca fluviatilis		X								
Melaleuca linariifolia		X	X							
Melaleuca quinquenervia	**X**		**X**			X				
Melaleuca salicina			X		X					
Melaleuca saligna										X

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Melaleuca viminalis		X								
Notelaea longifolia			X	X						
Notelaea 32acrocarpa var. microcarpa		X								
Olea paniculata									X	
Pandorea pandorana									X	
Parsonsia straminea			X							
*Pinus elliottii**			X							
Pleiogynium timorense		X								
Polyscias elegans									X	
Rhodosphaera rhodanthema									X	
Syncarpia glomulifera					**X**					
Syzygium oleosum					X					
Waterhousea floribunda		X								
Shrub Layer (S1)										
Abutilon auritum		X								
Acacia amblygona				X						
Acacia binervata									X	
Acacia blakei subsp. diphylla								X		
Acacia complanata							**X**	**X**		
Acacia concurrens			X	X					X	**X**
Acacia decora				X						
Acacia disparrima subsp. disparrima	**X**	**X**	**X**	**X**	X		X	**X**	**X**	**X**
Acacia falcata				X	X			X		X
Acacia fimbriata			X	X				X		X
Acacia glaucocarpa				X						
Acacia implexa				X			X			
Acacia irrorata				X					**X**	
Acacia ixiophylla								X		
Acacia juncifolia								X		
Acacia leiocalyx		X	**X**	**X**	X		**X**	**X**		X
Acacia leiocalyx subsp. leiocalyx	X						**X**			
Acacia leptocarpa	X									
Acacia loroloba				X				X		
Acacia maidenii		X	X	X	X			X	X	X

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Acacia melanoxylon	X		X		X				X	
Acacia neriifolia				X						
Acacia oshanesii					X					
Acacia penninervis								X		
Acacia sertiformis								X		
Acalypha nemorum									X	
Acrotriche aggregata					X				X	
Alchornea ilicifolia		X								
Alchornea thozetiana		X								
Alectryon diversifolius				X						
Alectryon tomentosus		X								
Allocasuarina littoralis	X		X	X				**X**	X	X
Allocasuarina torulosa				X	X		X	X	**X**	X
Alphitonia excelsa	**X**		X	**X**	**X**		X	**X**	X	**X**
Alstonia constricta		X		X				X		
Alyxia ruscifolia								X		
Angophora leiocarpa			X	X			X			
Angophora subvelutina		X								
Angophora woodsiana										X
Aphananthe philippinensis		X								
*Argemone mexicana**		X								
*Asparagus africanus**			X							
Astrotricha latifolia				**X**				**X**	X	
Babingtonia similis										X
*Baccharis halimifolia**			X						X	
Banksia integrifolia			X							
Banksia oblongifolia					X					
Banksia spinulosa					X					
Banksia spinulosa var. collina								X		
Banksia spinulosa var. spinulosa					X					
Bertya cunninghamii		X								
Brachychiton populneus				X					X	
Brachychiton populneus subsp. *trilobus*									X	X
Brachychiton rupestris				X						

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Breynia oblongifolia		X	X	X					X	
Bursaria spinosa								X	X	
Cassinia compacta								X		
Cassinia quinquefaria								X		
Cayratia clematidea		X								
Celastrus subspicata								X		
Choretrum candollei				X				X		
*Cinnamomum camphora**			X						X	
Citrus australis				X						
*Citrus limon**		X								
Clematis glycinoides									X	
Clerodendrum floribundum			X		X			X	X	
Commersonia bartramia	X									
Corymbia citriodora subsp. variegata								X	X	X
Corymbia intermedia	X		X	X			X	X	X	X
Corymbia tessellaris			X	X						X
Corymbia trachyphloia subsp. trachyphloia								X		
Cupaniopsis anacardioides	X	X								
Cupaniopsis parvifolia		X		X						
Cryptocarya triplinervis		X								
Cyclophyllum coprosmoides	X						X			
Daviesia arborea									X	
Daviesia ulicifolia				X				X		
Daviesia villifera								X		
Denhamia pittosporoides								X		
Derris involuta									X	
Diospyros australis		X								
Diospyros geminata		X								
Diplatia furcata		X								
Dockrillia bowmanii		X								
Dodonaea lanceolata var. subsessilifolia		X								
Dodonaea triangularis								X		
Dodonaea triquetra			X		X				X	X
Drypetes deplanchei									X	

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Elaeocarpus reticulatus					X					
Elaeodendron australe									X	
Endiandra discolor					X					
Eremophila debilis				X						
Erythrina vespertilio									X	
Eucalyptus acmenoides								X	X	
Eucalyptus carnea									X	X
Eucalyptus crebra				**X**						X
Eucalyptus exserta	X							X		
Eucalyptus fibrosa subsp. fibrosa								X		
Eucalyptus helidonica										X
Eucalyptus major				X				X		
Eucalyptus melanoleuca								X		
Eucalyptus microcorys									X	X
Eucalyptus moluccana				X						
Eucalyptus montivaga								X		
Eucalyptus propinqua									X	X
Eucalyptus seeana										X
Eucalyptus siderophloia			X						X	X
Eucalyptus sideroxylon								X		
Eucalyptus tereticornis			X	X					X	X
Eucalyptus tindaliae										X
Eucalyptus tindaliae										X
Excoecaria dallachyana		X								
Exocarpus cupressiformis									X	
Exocarpus latifolius					X					
Ficus coronata		X								
Ficus fraseri		X								
Ficus opposita		X								
Flindersia australis				X						
Gahnia sieberiana					X					
Glochidion ferdinandi		X	X		**X**				X	
Glochidion lobocarpum		X								
Glochidion sumatranum	X		X		**X**					

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
*Gomphocarpus physocarpus**				X						
Goodenia ovata								X		
Grevillea banksii	X		X							
Grevillea robusta			X							
Hakea eriantha								X		
Hakea florulenta			X							
Hakea plurinervia					X					
Hodgkinsonia ovatiflora										X
Hovea acutifolia					X				X	
Hovea lorata				X						
Hovea pannosa								X		
Hibiscus heterophyllus					X				X	
Indigofera australis				X					X	
Jacksonia scoparia				X				X		X
Jagera pseudorhus										X
*Lantana camara**	**X**	**X**	**X**	**X**	**X**		X	X	**X**	**X**
Leptospermum polygalifolium	**X**		**X**					X		
Leptospermum semibaccatum					X					
Leptospermum trinervium					X					
Leucopogon juniperinus								X	X	
*Ligustrum sinense**			X						X	
Livistona australis					X					
Livistona decora	X									
Lophostemon confertus				X	**X**		**X**	X	**X**	**X**
Lophostemon suaveolens	**X**	X	**X**		X					X
Maclura cochinchinensis		**X**	X							
Mallotus philippensis		X								
Maytenus cunninghamii				X						
Maytenus bilocularis								X		
Maytenus silvestris									X	
Melaleuca bracteata		X								
Melaleuca linariifolia	X	X	X							
Melaleuca linariifolia var. trichostachya		X								
Melaleuca nodosa										X

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Melaleuca quinquenervia	X		X							
Melaleuca salicina			X						X	X
Melaleuca viminalis		X								X
Melastoma malabathricum subsp. malabathricum					X					
Melia azedarach		X								
Monotoca scoparia								X		
Murraya paniculata			X							
Myoporum montanum				X					X	
Myrsine variabilis			X					X	X	
Neolitsea australiensis		X								
Notelaea linearis								X		
Notelaea microcarpa								X		
*Ochna serrulata**					X		X			
Olea paniculata									X	
Olearia nernstii									X	
*Opuntia tomentosa**		X								
Ozothamnus diosmifolius										X
Pandorea pandorana									X	
Parsonsia straminea		X	X							
Passiflora aurantia								X		
*Passiflora suberosa**							**X**			
*Passiflora subpeltata**	X	X							X	
Persoonia iogyna									X	
Persoonia media									X	
Persoonia sericea				X				X		
Persoonia stradbrokensis			X		X					
Persoonia virgata					X					
Phyllanthus microcladus		X								
*Pinus elliottii**			X							
Pittosporum angustifolium				X						
Pittosporum ferrugineum		X								
Pittosporum revolutum			X							
Plantago debilis		X								
Pleiogynium timorense		X								

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Podolobium ilicifolium									X	
Polyscias elegans	X	X							X	X
Pomaderris queenslandica								X		
Psychotria daphnoides									X	
Psychotria loniceroides										X
Psydrax odorata								X		
Psydrax odorata forma buxifolia				X						
Pultenaea euchila				X						
Pultenaea microphylla								X		
Pultenaea paleacea			X							
Pultenaea spinosa										X
Pultenaea villosa					X			X		
Sarcochilus sp.									X	
*Schinus terebinthifolius**	X									
Senecio amygdalifolius									X	
Senna pendula var. glabrata	X		X		X					
Sida hackettiana			X							
*Sida rhombifolia**	X									
Smilax australis									X	
Solanum densevestitum									X	
Solanum ellipticum				X				X		
*Solanum mauritianum**	X									
*Solanum seaforthianum**				X						
Solanum stelligerum									X	X
*Solanum torvum**		X								
Stephania japonica			X							
Streblus brunonianus		X								
Swainsona galegifolia				X						
Syncarpia glomulifera					X					
Syzygium australe		X								
Tinospora smilacina		X								
Toona ciliata		X								
Trema tomentosa		X	X						X	X
*Triumfetta rhomboidea**										X

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Trochocarpa laurina									X	X
Trophis scandens subsp. scandens			X							
*Urena lobata**		X								
Wikstroemia indica				X					X	
Xanthorrhoea johnsonii				X				X		
Zieria collina									X	
Ground Layer (G)										
Abilgaardia vaginata	X		X							
Acacia amblygona								X		
Acacia concurrens	X		X							
Acacia disparrima subsp. disparrima	X	X	X		X					
Acacia ixiophylla								X		
Acacia leiocalyx	X		X					X		
Acacia loroloba								X		
Acacia maidenii		X					X			
Acacia melanoxylon					X					
Acacia penninervis					X					
Achyranthes aspera		X								
Acrotriche aggregata					X					
Adiantum aethiopicum		X								
Adiantum hispidulum		X								
*Ageratina riparia**			X							
*Ageratum houstonianum**	X	X	X				X			
Ajuga australis		X								
Alchornea ilicifolia		X								
Alchornea thozetiana		X								
Alloteropsis semialata	X		X		X		X		X	
Alphitonia excelsa	X	X	X				X			
Alstonia constricta		X								
*Alternanthera brasiliana**	X									
Alternanthera nana		X								
Alyxia ilicifolia subsp. magnifolia					X					
Alyxia ruscifolia subsp. ruscifolia		X								
*Amaranthus spinosus**		X								

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
*Ambrosia artemisiifolia**			X							
Angophora subvelutina		X								
Aristida calycina								X		X
Aristida calycina var. calycina			X						X	
Aristida lignosa								X		
Aristida personata		X								
Aristida queenslandica								X		
Aristida queenslandica var. dissimilis								X		
Aristida vagans		X		X			X	X		
Aristida warburgii			X							
*Aristolochia elegans**		X								
Aristolochia pubera		X	X							
Arundinella nepalensis		X	X		X			X	X	
*Asclepias curassavica**		X	X							
*Asparagus africanus**	X									
*Aster subulatus**	X									
Astrotricha latifolia					X			X		
Austrodanthonia sp.									X	
Austrostipa pubescens								X		
Austrostipa sp.									X	
Austrostipa rudis subsp. rudis								X		
*Axonopus compressus**		X								
*Axonopus fissifolius**		X								
*Baccharis halimifolia**	X				X					
Baloskion pallens			X							
Banksia robur	X									
Baumea articulata	X									
Baumea juncea	X									
Baumea rubiginosa	X									
*Bidens bipinnata**		X								
*Bidens pilosa**	X	X	X							
Billardiera scandens	X				X					
Billardiera scandens var. scandens					X					
Blechnum carilagineum					X					

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Blechnum indicum			X							
Boerhavia dominii		X								
Boronia glabra								X		
Bothriochloa decipiens				X						X
Bothriochloa decipiens var. decipiens		**X**								
Breynia oblongifolia	X	X	X		X		X	X		
Bridelia leichhardtii		X								
Brunoniella australis	X	X	X				X	X		
Bryophyllum sp.	X									
Bursaria spinosa								X		
Bursaria spinosa subsp. spinosa								X		
Caladenia catenata			X							
Calochlaena dubia			X		**X**			X		
Calotis dentex								X		
Capillipedium parviflorum									X	
Capillipedium spicigerum	X	X	X	X					X	X
Carex appressa									X	
Carex breviculmis									X	
Cassytha glabella	X				X					
Cassytha pubescens		X	X		X					
Casuarina cunninghamiana subsp. cunninghamiana		X								
Cayratia clematidea			X							
Centella asiatica	X	X	X							
Centipeda minima		X								
*Centratherum punctatum subsp. punctatum**	X									
Chamaecrista mimosoides		X								
Chamaecrista nomame			X							
*Chamaesyce hirta**		X								
Chamaesyce macgillivrayi		X								
Cheilanthes distans								X		
Cheilanthes sieberi	X	X	X				X	X		
Cheilanthes tenuifolia	X									
Chloris divaricata				X						
*Chloris gayana**	X		X							

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Chorizema parviflorum			X							
Christella dentata		X								
Christella hispidula		X								
Chrysocephalum apiculatum			X							
Chrysopogon filipes		X								
Chrysopogon oliganthus		X								
Chrysopogon sylvaticus							X	X	X	
*Cinnamomum camphora**					X					
*Cirsium vulgare**		X								
Cissus antarctica		X								
Clematis glycinoides		X								
Commelina diffusa	X	X	X					X		
Commelina lanceolata	X		X							
*Conyza sumatrensis**		X								
Corybas barbarae			X							
Corymbia tessellaris			X							
*Crassocephalum crepidioides**	X		X				X			
Crassula sieberiana subsp. sieberiana								X		
Crotalaria montana			X							
*Crotalaria spectabilis**		X								
Cryptocarya triplinervis var. triplinervis		X								
Cryptostylis erecta					X					
Cupaniopsis anacardioides			X							
Cupaniopsis parviflora		X								
Curculigo ensifolia			X							
Cyanthillium cinereum	X	X	X				X	X		
Cyclophyllum coprosmoides			X				X	X		
*Cyclospermum leptophyllum**		X								
Cymbopogon bombycinus		X								
Cymbopogon refractus		X	X	**X**	X		X	X	X	X
Cynodon dactylon var. dactylon	X	X								
Cyperus bowmanii							X			
Cyperus difformis	X	X								
Cyperus enervis									X	

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Cyperus fulvus		X								
Cyperus gracilis		**X**							X	
Cyperus haspan	X									
Cyperus javanicus	X	X								
Cyperus laevis									X	X
Cyperus pilosus	X	X								
Cyperus polystachyos	X									
Cyperus tetraphyllus									X	
Cyperus trinervis	X	X					X			
*Dactyloctenium aegyptium**		X								
Daviesia acicularis								X		
Daviesia umbellulata			X		X					
Desmodium brachypodum					X					
Desmodium gunnii			X				X			
Desmodium rhytidophyllum		X	X		X		X	X		
Desmodium varians			X							
Dianella brevipedunculata			X				X			
Dianella caerulea	X	X	X		X		X	X		
Dianella longifolia								X		
Dianella longifolia var. stupata								X		
Dianella rara			X							
Dianella revoluta			X					X		
Dichelachne micrantha									X	X
Dichondra repens		X								
Digitaria breviglumis							X			
*Digitaria ciliaris**		X								
*Digitaria didactyla**		X								
Digitaria longiflora			X							
Digitaria parviflora	X		X		X		**X**	X	X	X
Digitaria ramularis		X								
*Digitaria violascens**		X								
Diplocyclos palmatus subsp. palmatus		X								
Dipodium variegatum					X					
Dodonaea triangularis								X		

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Dodonaea triquetra					X					
Doodia caudata								X		
Doodia heterophylla					X					
*Drymaria cordata**		X								
Drypetes deplanchei		X								
Echinochloa telmatophila			X							
Echinopogon caespitosus var. caespitosus	X									
Eclipta prostrata		X								
Einadia hastata								X		
Elattostachys nervosa		X								
Eleocharis acuta	X									
*Eleusine indica**		X								
*Emilia sonchifolia**	X	X	X				X			
Endiandra sieberi					X					
Enneapogon lindleyanus								X		
Enteropogon paucispiceus								X		
Enteropogon unispiceus							X			
Entolasia stricta	X		X	**X**	X		**X**	**X**	**X**	**X**
Epacris microphylla			X							
Eragrostis brownii		X	X				X			X
Eragrostis spartinoides		X	X	X					X	X
*Eragrostis tenuifolia**		X								
Eremochloa bimaculata	X		X	**X**	X		X	X	X	X
Eriachne glabrata								X		
Eriachne pallescens	X									
Eriocaulon australe			X							
Erythrina vespertilio		X								
Euroschinus falcatus var. falcatus		X								
Eustrephus latifolius	X	X	X		X		X	X		
Evolvulus alsinoides		X								
Ficus fraseri		X								
Ficus opposita		X								
Ficus rubiginosa			X							
Fimbristylis cinnamometorum	X		X							

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Fimbristylis depauperata							X			
Fimbristylis dichotoma	X	X	X		X			X		X
Flemingia parviflora		X	X				X			
Gahnia aspera	X		X		X		X	X		
Galactia tenuiflora		X	X					X		
Geitonoplesium cymosum	X	X	X		X					
Geodorum densiflorum	X	X	X		X					
Glochidion ferdinandi	X	X	X				X			
Glochidion sumatranum	X		X							
Glycine clandestina	X		X		X			X		
Glycine clandestina var. clandestina		X			X		X			
Glycine clandestina var. sericea			X							
Glycine cyrtoloba							X			
Glycine tabacina		X								
Glycine tomentella		X	X							
*Gomphocarpus physocarpus**	X	X	X				X	X		
Gonocarpus chinensis subsp. verrucosus	X		X				X			
Gonocarpus micranthus subsp. ramosissimus			X							
Goodenia bellidifolia			X							
Goodenia bellidifolia subsp. argentea								X		
Goodenia delicata								X		
Goodenia hederacea								X		
Goodenia ovata								X		
Goodenia rotundifolia			X		X		X	X		
Grevillea leiophylla			X							
Grevillea robusta		X								
Grewia latifolia		X								
Gymnanthera oblonga		X								
Gymnostachys anceps					X			X		
Hakea florulenta	X		X							
Haloragis heterophylla							X			
Hardenbergia violacea								X		
*Heliotropium amplexicaule**		X								
Heteropogon contortus	X	X	X	**X**						X

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Hibbertia aspera					X					
Hibbertia scandens			X		X					
Hibbertia stricta								X		
Hibbertia vestita	X				X					
Homoranthus virgatus	X									
Hovea acutifolia					X					
Hybanthus enneaspermus		X								
Hybanthus monopetalus								X		
Hybanthus stellarioides			X		X		X	X		
Hydrocotyle tripartita	X		X							
Hypericum gramineum	X		X							
Hypochaeris microcephala var. albiflora		X								
*Hypochaeris radicata**					X					
Hypoxis pratensis	X		X							
Imperata cylindrica	**X**	X	**X**	**X**	**X**		X	X	**X**	**X**
Indigofera australis								X		
*Ipomoea cairica**		X								
Ischaemum australe var. australe	X									
*Jacaranda mimosifolia**			X							
Jacksonia scoparia								X		
Jagera pseudorhus		X			X					
Jasminum didymium subsp. racemosum								X		
Jasminum simplicifolium		X						X		
Juncus continuus		X								
Juncus kraussii	X									
Juncus polyanthemus			X							
Juncus usitatus	X									
Lagenophora moorei		X								
Lagenophora stipitata	X		X							
*Lantana camara**	X	X	X		X		X	X		
*Lantana montevidensis**		X								
Leersia hexandra		X								
Lepidosperma laterale	X		X		X			X	X	X
Lepidosperma lateral var. laterale								X		

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Lepironia articulata	X									
Leptospermum polygalifolium			X							
Leptospermum semibaccatum					X					
Leucopogon leptospermoides					X					
Leucopogon pimeleoides					X					
*Ligustrum sinense**			X							
Lindernia crustacea			X							
Lindsaea incisa			X		X					
Lissanthe strigosa								X		
Lissanthe strigose subsp. subulata								X		
Livistona australis					X					
Lobelia purpurascens	X	X	X		X		X			
Lomandra confertifolia			X		X					
Lomandra confertifolia subsp. pallida			X				X	**X**		
Lomandra filiformis			X					X		
Lomandra filiformis subsp. filiformis								X		
Lomandra hystrix	X	**X**								
Lomandra laxa			X		X		X			
Lomandra longifolia	**X**	X	**X**		X		X			
Lomandra multiflora			X					X		
Lomandra multiflora subsp. multiflora					X		X	X		
Lomatia silaifolia			X		X			X		
Lophostemon suaveolens		X	X					X		
Ludwigia octovalvis		X								
*Macfadyena unguis-cati**		X								
Maclura cochinchinensis		X	X							
Macroptilium atropurpureum		X								
Macrotyloma axillare			X							
Mallotus philippensis		X								
*Malvastrum americanum var. americanum**		X						X		
Malvastrum coromandelianum		X								
Marsdenia brevis								X		
Marsdenia fraseri								X		
Maytenus disperma		X								

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
*Mecardonia procumbens**		X								
*Megathyrsus maximus**	X	X	X						X	X
Melaleuca bracteata		X								
Melastoma malabathricum			X							
Melastoma malabathricum subsp. malabathricum	X									
Melia azedarach		X								
Melichrus urceolatus								X		
*Melinis minutiflora**									X	**X**
*Melinis repens**		X								X
Microlaena stipoides			X				X		X	X
Microlaena stipoides var. stipoides		X						X	X	
Mitrasacme alsinoides			X							
Monotoca scoparia					X			X		
Murdannia graminea	X		X				X			
Murraya paniculata		X								
Notelaea ovata			X							
Nyssanthes diffusa		X								
*Ochna serrulata**	X		X		X					
Olea paniculata		X								
Olearia nernstii								X		
Opercularia diphylla								X		
Oplismenus aemulus	X	**X**	X		X		X		X	
Oplismenus imbecillis			X		X				X	X
*Opuntia tomentosa**		X					X	X		
Ottochloa gracillima	**X**	X	**X**				**X**		X	
Ottochloa nodosa		X			**X**				X	
Oxalis chnoodes	X									
*Oxalis corniculata**		X			X					
Oxalis perennans			X							
Oxalis radicosa	X									
Oxalis rubens					X			X		
Panicum effusum			X	**X**	X		**X**		X	X
Panicum simile			X		X					
Parsonsia eucalyptophylla	X									

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Parsonsia straminea	X	X	X							
Paspalidium distans	X		X				X			
Paspalidium gausum			X							X
Paspalidium gracile	X		X						X	X
*Paspalum conjugatum**									X	
*Paspalum dilatatum**		X			X				X	
Paspalum longifolium	X									
Paspalum scrobiculatum	X		X						X	
*Paspalum urvillei**	X									
*Passiflora edulis**	X									
*Passiflora foetida**			X							
*Passiflora suberosa**	X	X	X		X		X			
*Passiflora subpeltata**	X	X	X					X	**X**	
Patersonia sericea var. sericea								X		
Pavetta australiensis var. australiensis		X								
Pennisetum alopecuroides		X								
Peripleura hispidula		X								
Persicaria hydropiper		X								
Persoonia cornifolia					X					
Persoonia media			X							
Persoonia sericea								X		
Persoonia virgate					X					
Petrophile canescens								X		
Philydrum lanuginosum	X									
Phyllanthus gunnii								X		
Phyllanthus mitchellii								X		
Phyllanthus virgatus	X	X	X		X		X	X		
Pimelea linifolia			X		X					
Plantago debilis		X								
Platylobium formosum					X					
Plectranthus parviflorus		X						X		
Pleiogynium timorense		X								
Poa cheelii									**X**	
Poa sieberiana								X		

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Polycarpaea corymbosa var. minor		X								
Polygala linariifolia							X			
*Polygala paniculata**			X							
Polymeria calycina	X	X	X		X					
Pomax umbellata					X			X		
Poranthera microphylla			X							
*Portulaca oleracea**		X								
*Praxelis clematidea**							X			
Pseuderanthemum variabile			X					X		
Psychotria loniceroides					X					
Pteridium esculentum	X	X	**X**		**X**					
Pterostylis nutans			X							
Pterostylis ophioglossa								X		
Pultenaea microphylla	X							X		
Pultenaea petiolaris								X		
Pultenaea retusa					X					
Pultenaea spinosa			X							
Pycnospora lutescens		X	X							
Rhynchosia minima		X								
*Richardia brasiliensis**		X	X							
*Rivina humilis**		X	X							
Rostellularia adscendens			X							
Rostellularia obtusa			X							
Rubus parvifolius			X							
Sacciolepis indica	X	X	X							
*Salvia coccinea**		X								
Sarga leiocladum			X						X	
Sarga plumosum		X								
*Schefflera actinophylla**			X							
*Schinus terebinthifolius**			X							
Schizaea bifida					X					
Schoenus apogon			X							
Scleria brownii		X								
Scleria levis			X		X					

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Scleria tricuspidata	X									
Scleria mackaviensis		X							X	X
Scleria sp.									X	
Scleria spacelata					X			**X**	X	
Scleria tricuspidata							X			
*Scoparia dulcis**	X									
Senna floribunda		X								
*Senna pendula var. glabrata**		X	X							
Seringia corollata								X		
*Sida cordifolia**		X								
Sida filiformis								X		
Sida hackettiana		**X**								
*Sida cordifolia**	X									
*Sida rhombifolia**		**X**	X							
Sigesbeckia orientalis		X	X					X		
Smilax australis		X	X							
Smilax glyciphylla			X		X					
Solanum americanum	X	X			X					
Solanum ellipticum								X		
*Solanum mauritianum**		X	X							
Solanum nemophilum								X		
Solanum nigrum	X	X	X							
*Solanum seaforthianum**	X	X	X							
Solanum stelligerum								X		
*Sonchus oleraceus**	X	X	X							
Sorghum x almum	X									
Sporadanthus caudatus			X							
Sporobolus creber		X								X
Sporobolus elongatus		X								
Sporobolus laxus		X								
Stellaria media		X								
Stephania japonica	X	X	X		X					
Stylidium laricifolium								X		
Syagrus romanzoffiana		X								

Species	Regional Ecosystem									
	12.3.6	12.3.7	12.3.11	12.9-10.2	12.9-10.4	12.9-10.12**	12.9-10.17	12.9-10.19	12.11.3	12.11.5
Syzygium australe		X								
Themeda triandra	**X**	X	**X**	**X**	**X**		**X**	**X**	**X**	**X**
*Tradescantia fluminensis**		X								
Trema tomentosa	X	X								
Tricoryne elatior			X							
*Tridax procumbens**		X								
Triglochin procerum	X									
Trophis scandens subsp. scandens		X	X							
Turraea pubescens		X								
*Urochloa decumbens**									X	X
*Urochloa mutica**			X							
Velleia spathulata	X									
*Verbena bonariensis**	X									
Viola banksii			X							
Viola hederacea			X		X					
Wahlenbergia gracilis		X					X			
Westringia eremicola								X		
Wikstroemia indica					X					
Xanthorrhoea johnsonii								**X**		
Xanthorrhoea latifolia					X		X			
*Xanthium occidentale**		X								
Xanthosia pilosa					X					
Xyris juncea	X									
Zieria minutiflora					X					
Zornia dyctiocarpa var. dyctiocarpa		X								

Source: Adapted from Queensland Government 2015. Note: * exotic species; **X =** dominant species; **Species list was not available for RE 12.9-10.12; Koala habitat and rehabilitation units (RU) and crossing rehabilitation units (CRU) within the each RE: **12.3.6**: ORU2, ORU4, ORU5, ORU7, HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU18, HRU19, HRU22, CRU1, CRU2, CRU3, CRU10, CRU12, CRU15; **12.3.7**: ORU2, ORU4, ORU5, ORU6, ORU7, HRU3, HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU18, HRU19, HRU22, CRU1, CRU2, CRU3, CRU10, CRU11, CRU12, CRU13, CRU14, CRU15; **12.3.11**: ORU2, ORU4, ORU5, ORU6, ORU7, HRU3, HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU16, HRU18, HRU19, CRU1, CRU2, CRU3, CRU10, CRU11, CRU12, CRU13, CRU14, CRU15; **12.9-10.2**: ORU1, ORU3, ORU4, ORU8, ORU12, ORU13, ORU14, ORU15, ORU17, ORU20, HRU2, HRU5, HRU10, HRU12, HRU17, HRU20, HRU21, HRU23, HRU27, HRU28, HRU29, HRU30, HRU31, CRU5, CRU6, CRU7, CRU9; **12.9-10.4**: HRU1, HRU2, HRU12; 12.9-10.12: HRU1, HRU2, HRU12; **12.9-10.17**: ORU1, ORU3, ORU4, ORU8, ORU9, ORU10, ORU11, ORU12, ORU13, ORU14, ORU15, ORU16, ORU17, ORU18, ORU20, HRU5, HRU10, HRU17, HRU20, HRU21, HRU23, HRU24, HRU25, HRU26, HRU27, HRU28, HRU29, HRU30, HRU31, CRU5, CRU6, CRU7, CRU9; **12.9-10.19**: ORU9, ORU14, ORU16, HRU24, HRU25, HRU26; 12.11.3: ORU19, ORU21, ORU22, CRU4, CRU8 **12.11.5**: ORU19, ORU21, ORU22, ORU23, CRU8.

3.1.2 Rehabilitation Approach

Detailed site assessments and rehabilitation planning is to occur in preparation of the development of each stage at Yarrabilba. Within each stage, detailed rehabilitation planning is to occur for each rehabilitation unit, detailing:

- Results of site assessments for vegetation structure, composition, weed incursion
- Appropriate rehabilitation model which incorporates zones with site specific restoration actions
- Planting matrix (where planting is part of rehabilitation model)
- Weed management
- Management of rehabilitation zones
- Monitoring
- Assessment of performance indicators

A number of integrated approaches within each rehabilitation unit will assist with achieving rehabilitation objectives by streamlining works and management, implementing and documenting ecological changes (monitoring), and basing well founded principles to on-ground works. This integrated approach will assist with logistical issues associated with the delivery of implementing a practical restoration strategy due to the size of Yarrabilba. Restoration in each of the rehabilitation units may incorporate one or more of the following approaches:

1. **Natural regeneration** – this applies to relatively intact plant communities where recovery is automatic with the removal of the cause of the damage or disturbance e.g. after cyclonic events and bushfires (i.e. usually no human intervention is required).

2. **Assisted regeneration** – this approach is appropriate in relatively intact native plant communities where limited intervention such as weed control, track closure, erection of fencing, etc. is sufficient to restore the native vegetation through natural regeneration and successional processes.

3. **Reconstruction** – this approach is required in highly disturbed, modified and degraded areas where the potential for native plant regeneration is considered to be limited, such as heavily disturbed ecosystems. In these situations, native species are unlikely to return to the site without greater intervention, such as replanting, large scale weed control, drain restoration.

4. **Fabrication** (type conversion) – this approach is required where conditions are permanently changed and better adapted local systems can be constructed to restore integrity to the landscape (McDonald 1996).

The site requires rehabilitation techniques that use a combination of the above approaches. The approaches undertaken depend on the exact locality and the degree of modification to the environment (Hobbs and Cramer 2008), such as the installation of water treatment devices or artificial wetlands within riparian communities.

3.1.3 Weed management

Strategies for Weed Management

A major problem associated with many bushland areas in South East Queensland, especially within the urban landscape, is the distribution and abundance of weed infestations. '*Environmental weeds are plants, which through various methods of distribution and proliferation have become a threat to the survival of native plants and animals*' (Bushland Friendly Nursery Scheme 2001).

There are a number of weed species which occur over the site, potentially inhibiting succession from native seed banks through competition with native seedlings. Weed control is essential for

regeneration in these areas as the removal of invasive species reduces competition and will assist in germination from the natural seed bank.

The following table (Table 7) presents the dominant environmental weed species found on the site during the field assessment along with various ranks and scores according to local and state documentation. Table 8 provides general weed control measures for the site.

All of the rehabilitation units will require weed removal and the guidelines highlighted in Table 7 will be followed during this stage of works. During these works, the following objectives will be adhered to:

Objective 1: Prevention, Early Detection and Eradication

This management objective focuses on preventing the incursion and establishment of any weed species into areas where it is not yet established. In the event of an incursion that is attributable to the project activities, rapid management action will be implemented to prevent establishment. Monitoring of project work areas and access tracks is essential to allow early detection and management actions. Management will be undertaken as per the monitoring requirements outlined in this report.

Objective 2: Containment and Reduction

This management objective will be applied to areas where the target weed species has the potential to cause a high impact but has already established in the general area and is being actively contained by Lend Lease. Weed spread prevention measures will be implemented to reduce further spread and managing satellite infestations attributed to project activities.

Objective 3: Reduction through Routine Management

This management objective will be applied to areas where the target weed species is well established and is likely to only cause a moderate-to-low impact. Management will occur as part of general maintenance cycles and to reduce establishment during construction works.

Table 7 Weed species relevant to the project including species recorded within and adjacent to the project area, with potential to occur in the site, priority weeds in the region and additional declared weeds in the region.

Species	Common name	Status	Presence	Relevance					
				WONS	State Declaration	Local Council	Known to Occur	Known in Region	High Potential to Spread
Ageratum houstonianum	Blue Billy Goat Weed	Not declared	Within Site				X		
Ambrosia artemisiifolia	Annual ragweed	Class 2	Within Site				X		
Andropogon virginicus	Whiskey grass	Not declared	Within Site				X		
Bidens pilosa	Cobblers Pegs	Not declared	Within Site				X		
Cinnamomum camphora	Camphor laurel	Class 3	Within Site		X	X	X	X	X
Lantana camara	Lantana	Class 3	Within Site	X	X	X	X	X	X
Lantana montevidensis	Creeping Lantana	Class 3	Within Site	X	X	X	X	X	X
Melinis minutiflora	Molasses Grass	Not declared	Within Site				X		
Panicum maximum	Green Panic Grass	Not declared	Within site				X		
***Paspalum* spp.**	Paspalum	Not declared	Within site				X		
Passiflora subpeltata	White passionflower	Not declared	Within site						
Pinus ellotti	Slash Pine	Not declared	Within site				X		
Senna penula	Easter Cassia	Not declared	Within site				X		
Solanum chrysotrichum	Giant devil's fig	Not declared	Within site				X		
Solanum mauritianum	Wild Tobacco	No declared	Within site				X		
Sphagneticola trilobata	Singapore daisy	Class 3	Within site				X		

Source: Biosecurity Queensland (2013), Commonwealth Australia (2014).

Status: Declaration under Land Protection (Pest and Stock Route) Management Act 2002.

- Class 1 Pest plants are serious weeds that are either not present or not generally established in Queensland and have the potential to cause extreme damage to economy, social well-being and environment. All landholders are required by law to keep their land free of Class 1 pests.
- Class 2 Pest plants are generally established in Queensland and are responsible for the majority of economic and social impacts caused by weeds. Landholders are responsible for treating infestations to prevent spread to other properties and working towards removing the infestation.
- Class 3 Pest plants are environmental weeds generally well established in Queensland and are responsible for the majority of environmental impacts caused by weeds. The management objective of all C3 weeds is containment and reduction in and adjacent to Environmentally Significant Areas (ESAs) (The LP Act 2002 provides a list of criteria by which an ESA is determined)

Table 8 Weed removal/control methods within the protected areas.

Growth Form	Removal Techniques
Woody Stems e.g. Lantana, Camphor Laurel	Manual Small plants can be removed by hand using Soft Weed methodology. Exposure of rootstock to air is necessary to ensure full eradication. Failure to remove ALL of roots will result in regrowth. Herbicide *Up to 10 cm basal diameter* 1. Apply the cut, scrape and paint method using Glyphosate at a ratio of 1:1 to minimise erosion. Lop into 50cm pieces, leaving these on the ground to act as mulch. Regrowth of woody weeds shall be spot sprayed. *Greater than 10 cm basal diameter and inaccessible sites* Stem Injection Use stem injection method - at tree base drill holes at a 45 degree angle into the sapwood at 5 cm intervals. Inject herbicide into holes immediately before the plant cells close and translocation of herbicide ceases. Frill or Chip Cut into the sapwood with a chisel or axe. Fill cut with herbicide immediately with Glyphosate at a rate of 1:1 Repeat the process at 5 cm intervals around the tree. * For *Cinamomum camphora* cuts must overlap with no gaps in order to kill the hardwood. * Plants to be treated with herbicide should be healthy and actively growing. * Deciduous plants should be treated in Spring and Autumn when leaves are fully formed. * Multi-stemmed plants require injection below the lowest branch or treat each stem individually.
Bulbs, Corms or Tubers e.g. Ground Asparagus, Watsonia	Manual Dig down next to the stem until the bulb or tuber is reached. Remove plant and carefully bag the bulb or tuber. Herbicide Remove any seed or fruit and place in bag. With an herbicide applicator, apply to the stems and leaves using brush-off.
Soft Stems (no underground reproductive parts) e.g. Blue Billy-goat Weed, Lantana seedlings	Manual Gently remove any seeds or fruits and carefully place into a bag. Grasp stem at ground level. Rock plant backwards and forwards to loosen roots and pull out gently. Tap the roots to dislodge soil. Herbicide Directly apply to suitable species.

	Should only be used where plants are actively growing.
Underground Reproductive Structures -Taproots	Manual Gently remove and bag seeds or fruit. Loosen soil around taproot with suitable implement. Grasp stem at ground level and gently pull out plant. Tap the roots to dislodge soil. * Not suitable for Paddy's Lucerne or *Ochna serrulata* and many others - use with caution.
Vines, Runners and Scramblers	Manual Locate a runner; gently pull it along the ground. Roll the runners up for easy removal. Continue doing this until all the runners have been rolled up. Small fibrous roots growing from the runners can be cut with a knife. Locate the main root system whilst removing the runners. Remove it manually. Do not leave any bits of stem or large roots, as these may re-shoot. Bag or compost the runners/roots and any other reproductive parts. Herbicide With a knife, scrape 15 to 30 cm of the stem to reach the layer below the bark/outer layer. A maximum of half the stem diametre should be scraped. Large stems (>1 cm) will require two scrapes opposite each other. Immediately apply herbicide along the length of the scrape. Vines can be left hanging in trees after treatment.
Rhizomes e.g. Asparagus Fern	Manual Remove and bag stems with seeds and fruit. Grasp the leaves or stems together so that the base of the plant is visible. Insert a knife at an angle close to the crown and cut through all the roots around the crown. All vegetative materials shall be left in situ.

Notes:

- Hand removal is recommended where possible and practical except where it may lead to soil destabilisation along creeks and drainage lines.
- Non-herbicide removal should be used where possible adjacent to native species to minimise damage. Suitable methods including digging, crowning or hand pulling.
- Where herbicide application is required:
  1. Broad-scale application is not permitted within drainage lines;
  2. Glyphosate Bioactive or equivalent is to be used within 30 m of water bodies as it is identified as more "frog friendly" than other herbicides;
  3. Quantities of herbicide need to be controlled and all care be taken to prevent runoff or excess use;
  4. Always read the lab to ensure the herbicide is used safely and no certificate is required for use; and
  5. Herbicides use should be undertaken during periods of weed growth or as per manufactures specifications.
- Herbicide use is **not permitted**
  1. During windy periods;
  2. Prior to rain forecast or 6 hours after rain,
  3. Broadly/recklessly in areas where native vegetation dominants.
- If in doubt whether plants are weed or native, confirmation prior to conducting weed removal is required e.g. from *Environmental Weed Guide* (free from GCCC), Department of Natural Resources Pest Fact Sheets and *Common Weeds of Northern NSW Rainforest* (The Big Scrub Rainforest Landcare Group, 1998).

3.1.4 Planting

Where revegetation is to take place in rehabilitation units where a reconstruction or fabrication approach is required, plantings are to be of local provenance and significant species should be included in the planting matrix. General steps to be undertaken for successful revegetation are outlined below and must be adhered to during rehabilitation works. These steps will enhance the success of revegetation and will promote the objectives of rehabilitation.

Although the following provides a general guideline it should be noted that a detailed rehabilitation plan for each stage of the development is required to determine the location, density and species matrix required for successful rehabilitation in each rehabilitation unit.

General notes:

- The Habitat Rehabilitation Management Plan must be read in conjunction with the Operational Works Decision Notice and Conditions as issued by Economic Development Queensland (EDQ), along with approved drawing packages:
  - Electrical
  - Civil
  - Refer to Engineers Drawings for all, Civil, Structural and Services.
- Setting out:
  - All revegetation work shall be carried out by an experienced and qualified Contractor with knowledge of local and exotic species identification.
  - Contractor is to verify all set out and dimensions prior to proceeding with the works.
  - Supplementary planting shall take into account site suitability for natural regeneration and must not be conducted in such a way as to cause damage to naturally regenerating habitat.
  - Locate and peg all underground services and adjust planting set out if necessary for adequate clearances.
  - Works to be carried out in accordance with approved specifications and details.
- Prestart:
  - Before work commences the subcontractor is to organise a pre-start meeting with Lend Lease's appointed Environmental Scientist to establish scope of work and clarify any issues.
- Site works:
  - Remove all unwanted materials within all Habitat Rehabilitation areas from site.
  - Control weeds and prepare the site for planting.
  - Suitable planting medium may need to be provided in some circumstances such as denuded or eroded areas.
  - Water Restrictions may apply - 'No potable water to be used for landscaping'.
  - Trucked water to be supplied by contractor.
- Levels:
  - Except where indicated or specified, finished surface levels are to be flush with adjacent surfaces. Ensure grades are evenly transitioned.
- Safety:
  - Contractor to maintain safe access through site at all times. Ensure all excavation points are fully protected at all times.
- Services:
  - It is the Rehabilitation Contractor's responsibility to confirm with authorities and civil contractor the location of all underground services prior to commencement. Repair any damage to services without delay or cost.
- Plant set out and stock:
  - All plant stock to be verified by Lend Lease's appointed Environmental Scientist for stock quality and size, and set out prior to planting.

  - Acquire native species or seeds from local nursery where plant stock is sourced from the local area (local provenance).
  - Substitutions are not to be made without written approval.
  - Set out of mass planted areas (where not detailed):
    - Plants to be set out in swathes of single species of large numbers of plants.
    - Swathes to be set out in naturalistic elongated forms/shapes
    - Swathes of species to be prearranged to provide contrast in size, shape form, texture and colour.
  - Lend Lease's appointed Environmental Scientist to discuss and verify on site a sample section of planting set out prior to contactor proceeding to set out and complete planting.
- Standards:
  - Works to be carried out in accordance with relevant Australian and Industry Standards, unless directed otherwise.
- Site inspections:
  - Inspections by Lend Lease's appointed Environmental Scientist will be carried out to an agreed programme during implementation of the works.
- Fencing:
  - Supply and install Koala exclusion fencing as per the endorsed Koala Management Plan Yarrabilba UDA (Austecology 2012) drawings.
  - All works to comply with all relevant Australian Standards.
- Consolidation:
  - Establishment period: 12 months from practical completion.
  - On-maintenance period: up to 14 years from completion of establishment period.
  - Maintenance shall include watering, weeding, fertilising, pest and disease control, pruning, edging, mowing and monitoring as per the following:
    - Watering: during establishment period water every second or third day to maintain soil moisture; once weekly during the maintenance period.
    - Fertilising: as required where plants are not responding to slow release fertiliser applied at planting.
    - Weeding: as required to prevent weed competition and seeding.
    - Re-mulching: as required to maintain consistent depth.

Plant condition, selection and care

The selection and care of plants is to be undertaken as follows:

- Planted species are to incorporate those identified in Table 8 of this report as being dominant in individual pre-clearing RE's, with preference given to Koala food shelter and food trees (refer to Table 9).
- Plants are to be vigorous, well established, hardened off, consistent with site species or variety, free from disease and insect pests, with large root systems and no evidence of having been restricted or damaged.
- Plants are to be planted immediately after delivery to the site. If this is not possible, they should be stored in the shade and watered sufficiently during the day.
- All specimens used for revegetation within rehabilitation areas shall be of local provenance (i.e. sourced from genetic stock located within a 2 km radius or catchment area of the subject site).
- Preference should be given to seed sourced from vegetation collected from the site prior to harvesting works.
- A minimum 90% survival rate should be achieved.

Table 9 Koala habitat and food tree planting palette within individual Regional Ecosystems.

Species	Regional Ecosystem									
	12.3.6	**12.3.7**	**12.3.11**	**12.9-10.2**	**12.9-10.4**	**12.9-10.12**	**12.9-10.17**	**12.9-10.19**	**12.11.3**	**12.11.5**
Canopy Trees (T1)										
Corymbia citriodora subsp. variegata			X	**X**		**X**	**X**	X	X	X
Corymbia intermedia	**X**	X	**X**		**X**		**X**	**X**	X	**X**
Corymbia trachyphloia subsp. trachyphloia										
Eucalyptus acmenoides							**X**	X	**X**	X
Eucalyptus carnea							**X**	X	**X**	**X**
Eucalyptus major								**X**		
Eucalyptus microcorys	X				X			**X**	X	
Eucalyptus moluccana							X			X
Eucalyptus pilularis										
Eucalyptus propinqua									**X**	X
Eucalyptus resinifera					X					X
Eucalyptus siderophloia			**X**	X	X	X	X		X	**X**
Eucalyptus tereticornis	**X**	**X**	**X**	X	X	X	X		X	X
Lophostemon confertus	X				X				**X**	X
Melaleuca quinquenervia	**X**		**X**		X					

Source: Adapted from Queensland Government (2015). Note: **Bold** values symbolise the dominant species within that vegetative stratum.

Koala habitat and rehabilitation units (RU) and crossing rehabilitation units (CRU) within the each RE:

12.3.6: ORU2, ORU4, ORU5, ORU7, HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU18, HRU19, HRU22, CRU1, CRU2, CRU3, CRU10, CRU12, CRU15; **12.3.7**: ORU2, ORU4, ORU5, ORU6, ORU7, HRU3, HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU18, HRU19, HRU22, CRU1, CRU2, CRU3, CRU10, CRU11, CRU12, CRU13, CRU14, CRU15; **12.3.11**: ORU2, ORU4, ORU5, ORU6, ORU7, HRU3, HRU4, HRU6, HRU7, HRU8, HRU9, HRU11, HRU13, HRU14, HRU15, HRU16, HRU18, HRU19, CRU1, CRU2, CRU3, CRU10, CRU11, CRU12, CRU13, CRU14, CRU15; **12.9-10.2**: ORU1, ORU3, ORU4, ORU8, ORU12, ORU13, ORU14, ORU15, ORU17, ORU20, HRU2, HRU5, HRU10, HRU12, HRU17, HRU20, HRU21, HRU23, HRU27, HRU28, HRU29, HRU30, HRU31, CRU5, CRU6, CRU7, CRU9; **12.9-10.4**: HRU1, HRU2, HRU12; 12.9-10.12: HRU1, HRU2, HRU12; **12.9-10.17**: ORU1, ORU3, ORU4, ORU8, ORU9, ORU10, ORU11, ORU12, ORU13, ORU14, ORU15, ORU16, ORU17, ORU18, ORU20, HRU5, HRU10, HRU17, HRU20, HRU21, HRU23, HRU24, HRU25, HRU26, HRU27, HRU28, HRU29, HRU30, HRU31, CRU5, CRU6, CRU7, CRU9; **12.9-10.19**: ORU9, ORU14, ORU16, HRU24, HRU25, HRU26; 12.11.3: ORU19, ORU21, ORU22, CRU4, CRU8

12.11.5: ORU19, ORU21, ORU22, ORU23, CRU8.

Plant placement and protection

Plants are to be placed in the revegetation area and protected as follows:

- Supplementary planting should take into account the existing community structure.
- Planting should be carried out during suitable weather conditions to minimise the risk of loss of newly establishing plants through drought or by floodwaters.
- Weed removal methods must not pose a threat to vegetation community structure or existing Koala habitat.
- In revegetation areas, plants are to be spaced no less than 5 m apart.
- Planting ratios will vary between RE's, Rehabilitation Units and specific areas however, the following guide should be followed:
  - Canopy trees (Koala food and habitat trees): 70% of planting
  - Shrubs and understory: 10% of planting
  - Ground layer: 20% of planting.

3.2 Monitoring

The following comprehensive monitoring program will be implemented to capture baseline data prior to and during vegetation management treatments being applied and during the period of rehabilitation implementation. Adaptive management strategies will be used and where a treatment does not produce the desired result it will be identified and/or modified. There are many different types and levels of monitoring that can be used for identifying change in vegetation communities. These include assessing parameters such as presence/absence, growth, percentage of cover, total biomass, species richness etc.

For this monitoring program, a minimum of two monitoring sites per rehabilitation unit is sufficient to identify any major changes and to provide a 'snap shot' of ecological conditions. Monitoring in this way will allow the ongoing collection of information to demonstrate the effectiveness of habitat rehabilitation efforts, and the frequency of monitoring activities will enable management prescriptions to be adjusted to bring about any necessary changes and corrective actions (adaptive management).

3.2.1 Sites

Vegetation monitoring will occur in a network of 148 sample sites with:

- 2 sample sites Crossing Rehabilitation Units and within Rehabilitation Units <50,000 m^2;
- 3 sample sites within Rehabilitation Units >50,000 m^2 but <150,000 m^2; and
- 4 sample sites within Rehabilitation Units >200,000 m^2.

Monitoring site locations have been identified in Figure 5, however flexibility will remain to adjust the final locations of the monitoring sites and priority will be given to areas within each rehabilitation unit that require the most significant amount of rehabilitation work.

Figure 5 Monitoring site locations.

Source:	Rehabilitation Units: Natura Consulting 2015 Watercourses: Department of Environment and Resource Management Cadastre Boundary: Department of Natural Resources and Mines Corridors and Assessable Koala Habitat: Lend Lease / Austecology Internal Roads: Lend Lease
Desclaimer:	No warranty is given in relation the data (including accuracy, reliability, completeness, currency of suitability) and no liability is accepted (including without limitation liability in negligence) for any loss, damage or costs (including subsequent damage) relating to any use of the data. Data must not be used for direct marketing purposes or be used in breach of privacy laws.
File/Date:	Koala Habiat Rehabilitation Plan - Monitoring sites for Offset Rehabilitation Units, Habitat Rehabilitation Units and Crossing Rehabilitation Units Date: 30/03/2015

N

0 250 500 1,000 1,500 2,000

Meters

Coordinate System: WGS 1984 Zone 56S Projection: Transerve Mercator

- Monitoring sites
- Crossing Rehabilitation Unit
- Habitat Rehabilitation Units
- Offset Rehabilitation Units
- Yarrabilba Priority Development Area
- Internal Roads

Corridor

- Greenspace Corridor
- Fauna Corridor
- Environmental Protection
- Cadastral Boundary

Monitoring sites for Offset Requirement areas and Asssessable Koala habitat to be protected and managed

The following methodology, for photo point monitoring and 100 m transects, will be applied to monitor at each site.

3.2.2 Photo point monitoring

The final location of each monitoring site within its representative rehabilitation unit will be identified by GPS coordinates and direction (bearing). Photo point monitoring sites are located at the start of each monitoring site. On the ground, each site will be permanently marked by two steel pickets placed approximately 10 m apart. A third picket will be placed 100 m from the first picket to represent the end of the monitoring site.

For each site, a permanently marked photo point will be established at the first marker picket and photographing towards the second marker along the relevant compass bearing, with the site information recorded on a board and second marker in the lower centre foreground. The information board must be used when recording photo point records from each site and must clearly describe the:

- Site number
- Rehabilitation Unit number
- Date

3.2.3 Transect and quadrat monitoring

Quantitative site data, including the attributes of species richness, percentage foliage cover for the ground layer, shrub and canopy layers, canopy height, and weed prevalence are to be collected from field transects and quadrats established at each of the monitoring sites:

Fixed transects will be permanently established lines located by use of metal pickets, metal tags and GPS:

- A 100 m transect will be placed between the first and third positioning metal pickets.
- Quadrats will be placed along the transect:
  - 50 x 10 m plots will be positioned at the transect start (0 m)
  - 1 x 1 m subplots will be position at 0 m, 10 m, 20 m, 30 m and 40m. Adjustments can be made for each subplot if its positioning is placed over a trunk, fallen tree, roots etc.

Given the above, each monitoring site will have the following information collected (Table 10). This benchmark monitoring process will be undertaken, immediately prior to initiation of works (0 months – baseline), and at the following intervals for each rehabilitation unit: 6 months, 1 year, 18 months, 2 years, 2.5 years, 3 years, 4 years, 5 years, 10 years and 15 years. Reporting from each of the monitoring events shall be provided to the Department of Environment within 4 weeks of completion of monitoring.

Table 10 Data collected at monitoring sites.

Method of collection	Data collected
50 m x 10 m quadrat (plot)	Species richness (including weeds), tubestock survival, height of each canopy species
100 m transect	Canopy species cover, shrub cover
Five 1 x 1 m quadrats (subplot)	Percentage cover in ground layer (excluding weeds but including regenerating native canopy cohorts)

3.3 Rehabilitation of Road Crossings

Road mortality has been attributed as a major factor contributing to the decline of many species (van der Ree *et al.* 2008). Overpasses and underpasses can be an effective tool in ensuring safe passage of wildlife between areas of high habitat value, without them succumbing to the effects of traffic pressures. The design of safe passage for fauna will be required for fauna corridor crossings within Yarrabilba. The Koala Management Plan Yarrabilba UDA (Austecology 2012) provides guidelines for these designs which will be assessed at the Context Plan stage.

3.4 Contingency Measures and Corrective Actions

3.4.1 Meeting benchmarks

During the course of monitoring, if Interim Benchmarks are not being met, the timeframes to achieve the Final Benchmarks will be reviewed and extended, whereby Lend Lease will continue to undertake rehabilitation works with continued monitoring until the Final Benchmarks are met. The review of the success of meeting Interim Benchmarks will be undertaken at each monitoring event and reported on. Where the extension of rehabilitation works is required for particular Rehabilitation Units, discussions will be undertaken with the Department of Environment, to ensure that any additional requirements are also highlighted and addressed.

3.4.2 As constructed data

Constructed data and surveyed boundaries will be provided for each rehabilitation unit, within three months of completion of earthworks. This will be undertaken to test and demonstrate compliance within the offset area (at least 195 ha) requirement.

Following discussions with project officer Karina Richards from the Queensland Assessment Section Environmental Assessment and Compliance Division, Department of the Environment in November 2014, boundary lines of the mapped rehabilitation area identified as 'Existing Assessable Koala Habitat to be protected and managed' are permitted to be amended on site:

- Within mapping scale limitations of the original landscape scale mapping (i.e. up to 25 m); and
- Following detailed site surveys; and
- Where there is an opportunity to retain koala food or shelter trees outside of the 'Existing Assessable Koala Habitat to be protected and managed' area and/or where encroachment within the scale limitations of the mapping is also permitted within the 'Existing Assessable Koala Habitat to be protected and managed' area where there are no koala food or shelter trees.

Additionally, amendments to the boundary lines are to comply with approved buffer and corridor widths of the approved Koala Management Plan (refer to Figure 1) (Austecology 2012), the Fauna Corridor Infrastructure Master Plan (Natura Consulting 2011) and within the total Offset Area (at least 195 ha, refer to Figure 2), as specified in the EPBC approval/conditions (30 November 2014). Where amendments to the boundary lines of the 'Existing Assessable Koala Habitat to be protected and managed' have been undertaken within the mapping scale limitations, as outlined above, compliance with the approved documentation will be demonstrated in the 'as constructed data'.

4 Rehabilitation Staging Plan

The Yarrabilba Urban Development is a staged development which will be undertaken over approximately thirty years. As rehabilitation works are tied to the roll-out of construction, any planting will be commenced in conjunction with the construction for each stage. Figure 6 presents an indicative staging plan for the development, which may be amended based on market demand, site constraints etc.

It is proposed that weed control measures be undertaken ahead of the construction staging, as the land owner has obligations under other legislation that requires the management of weeds on site. All weed management will be undertaken in accordance with this report, and other relevant approved documentation, and will be implemented in a manner that is consistent with the conservation of Koala habitat and other ecological values. A summary of staging of detailed rehabilitation planning, rehabilitation works, monitoring, taking into consideration the staging plan for the development, is provided in Table 11.

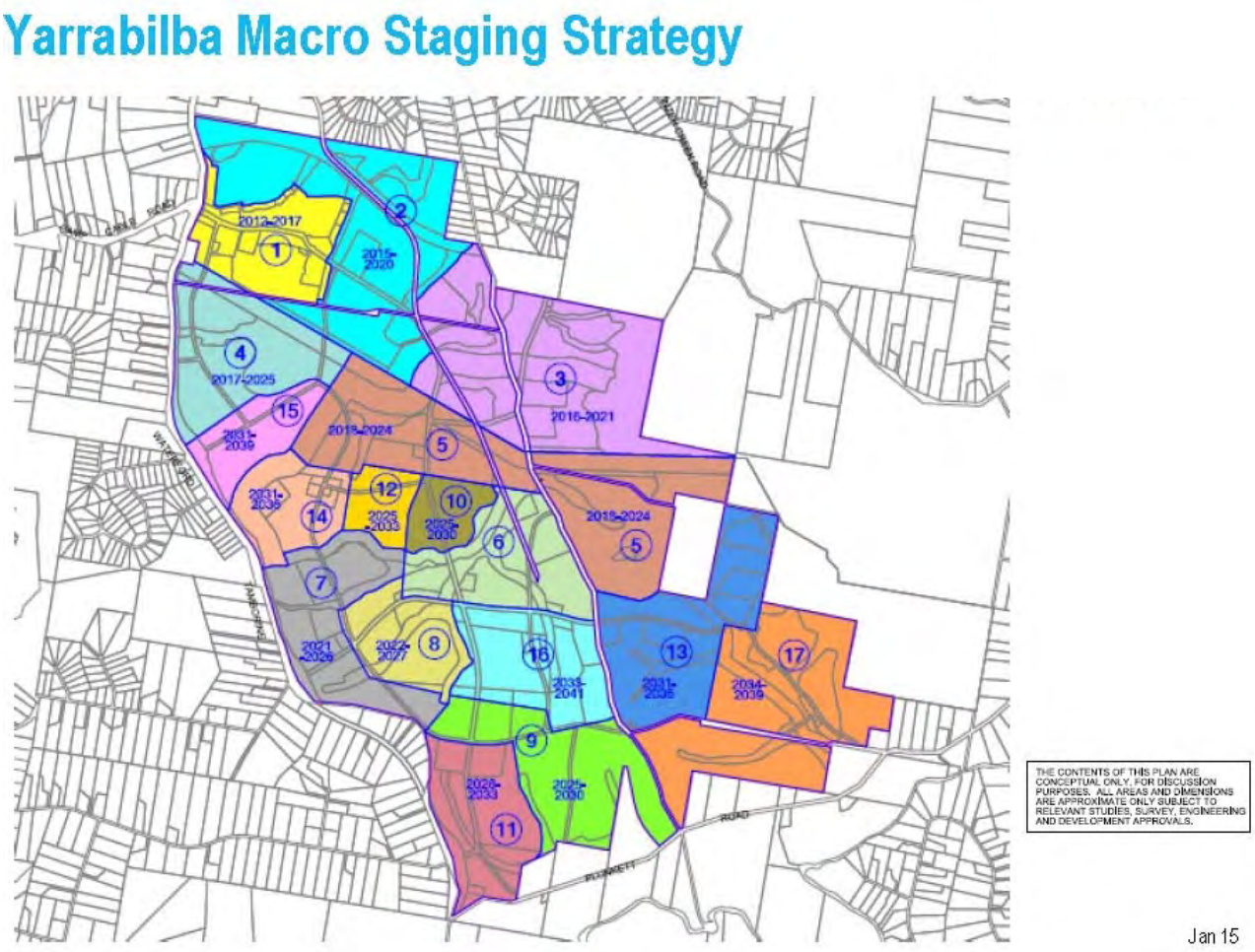

Figure 6 Indicative rehabilitation staging.

Table 11 Summary of Staging of Koala Habitat Rehabilitation and Management*.

Development Stage	Year of Construction	Detailed Rehabilitation Plan	Rehabilitation		Commencement of Monitoring Interim and Final Benchmark	Commencement of Assessment Against Benchmarks	Assessment of Final Benchmark	Contingency Measures Implemented	Responsible Party
			Weed Control	Infill Planting					
1	Not part of EBPC Referral Area								
2	2015 - 2020	2015	Commenced	2016	2015	2016	2030	Implemented where necessary after assessment of each Interim Benchmark and Final Benchmark	Lend Lease
3	2016 - 2021	2017	2017	2018	2017	2018	2032		
4	2017 - 2025	2018	2018	2019	2018	2019	2033		
5	2018 - 2024	2017	2017	2018	2017	2018	2032		
6	2019 - 2026	2018	2018	2019	2018	2019	2033		
7	2021 - 2026	2019	2019	2020	2019	2020	2034		
8	2022 - 2027	2020	2020	2021	2020	2021	2035		
9	2025 - 2030	2020	2020	2021	2020	2021	2035		
10	2025 - 2030	2021	2021	2022	2021	2022	2036		
11	2026 - 2033	2022	2022	2023	2022	2023	2037		
12	2025 - 2033	2022	2022	2023	2022	2023	2037		
13	2031 - 2036	2023	2023	2024	2023	2024	2038		
14	2031 - 2036	2023	2023	2024	2023	2024	2038		
15	2031 - 2039	2024	2024	2025	2024	2025	2039		
16	2033 - 2041	2024	2024	2025	2024	2025	2039		
17	2034 - 2039	2025	2025	2026	2025	2026	2040		

***all figures in this table are indicative and may be subject to change based on market demand and site constraints.**

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Appendix E – Fauna Corridor Masterplan

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22 FEB 2013

Queensland Government

Department of
State Development, Infrastructure and Planning

20 February 2013

Mr Rob Moore
Project Director
Lend Lease Communities (Yarrabilba) Pty Ltd
PO Box 1512
MILTON QLD 4064

Dear Rob

Compliance assessment Fauna corridor infrastructure master plan and Natural environment overarching site strategy

I refer to your correspondence of 4 December 2012 enclosing the Fauna Corridor Infrastructure Master Plan Yarrabilba prepared by Natura Consulting for Lend Lease dated 28 November 2012 (Fauna Corridor Infrastructure Master Plan), and the Natural Environment Overarching Site Strategy Yarrabilba prepared by Natura Consulting prepared for Lend Lease dated 16 July 2012 (Natural Environment Overarching Site Strategy) for compliance assessment in accordance with the requirements set out in the UDA development conditions of the UDA development approval DEV2011/187 on land at Waterford Tamborine Road Yarrabilba.

The Economic Development Queensland (EDQ) has undertaken a compliance assessment of the Fauna Corridor Infrastructure Master Plan in accordance with the requirements set out in the UDA development condition 3 Infrastructure master plan and the UDA development condition 32 Fauna corridor. As a result of this assessment EDQ is satisfied with the information submitted. EDQ is pleased to advise that the Fauna Corridor Infrastructure Master Plan is endorsed and the conditions of approval are determined to have been met. The endorsed Fauna Corridor Infrastructure Master Plan is stamped and enclosed with this correspondence.

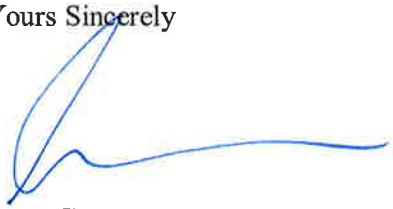
The EDQ has undertaken a compliance assessment of the Natural Environment Overarching Site Strategy in accordance with the requirements set out in condition 5 Overarching site strategy and condition 35 Natural environment. As a result of this assessment EDQ is satisfied with the information submitted. EDQ is pleased to advise that the Natural Environment Overarching Site Strategy is endorsed and the conditions of approval are determined to have been met.

Economic Development Queensland
Level 4, 229 Elizabeth Street Brisbane
GPO Box 2202 Brisbane
Queensland 4001 Australia

Telephone +61 7 3024 4150
Website www.edq.qld.gov.au

The endorsed Natural Environment Overarching Site Strategy is stamped and enclosed with this correspondence. If you have any further questions with regard to this advice, please do not hesitate to contact me on telephone number (07) 3024 4150.

Yours Sincerely



Steve Conner
DIRECTOR – PLANNING

Fauna Corridor Infrastructure Master Plan

Yarrabilba

Prepared for: Lend Lease
Prepared by: L. McLeay, K. Richardt, S. Towner and M. Brett
Date: 28 Nov 2012
Job #: NCO11-0011_Yarrabilba

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DISCLAIMER

This report and any files associated with it contain information which is confidential and may also be legally privileged. It is for the exclusive use of the client and its use is entirely limited to the specific purpose of the proposed development as was agreed to under the signing of the contract between the provider (us) and the recipient (you).

All the information contained within this report is provided in good faith in the belief that no information or recommendations made are misleading.

All comments and opinions provided in this report have been based upon a limited survey of the study site and/or on information supplied by the client, their agents and/or third parties.

All the assessments of site biology, ecology and the extent and nature of impacts of and to this study site is limited to the terms of reference stated within this report; and by the limited timeframe of study. Therefore the results presented herein cannot be considered absolute or conclusive without additional long-term follow-up studies.

Natura Consulting, its agents and employees, expressly disclaim any and all liability for representations, expressed or implied, contained in, or omissions from, this report or any of the written or oral communications transmitted to the client or any third party.

Acceptance of this document denotes acceptance of the above terms.

1 Introduction

1.1 Background

Natura Consulting developed a Fauna Corridor Master Plan in response to Condition 3 and 32 of approval for Yarrabilba Residential Development, reference no. DEV2011/187, dated the 4 April 2012.

The Yarrabilba development site is located on the eastern side of Waterford - Tamborine Road and to the south of Logan Village (refer to Figure 1 and 2). It is bounded by rural residential areas to the north, Plunkett road to the south and the Plunkett Conservation Park to the east. The site consists of approximately 2012 ha of land which has been historically used as pine forestry, a military training camp in WWII and for grazing, when first cleared. Yarrabilba is predominately vegetated with areas of regrowth native vegetation, regenerating pines and weedy grasslands (refer to Figure 2). Some limited areas of regrowth vegetation exist but they are mostly confined to creeks, drainage channels and wetlands. The site is currently in the early stages of development with the growth of Yarrabilba projected to span approximately 30 years. The Land Holding portion of the urban development area managed by Lend Lease is expected to provide over 17,000 dwellings for a population of around 45,000 residents.

1.2 Objectives of Fauna Corridor Infrastructure Masterplan

The intent of the Fauna Corridor Master Plan is to provide management strategies to mitigate impacts of development to local or regional fauna populations. In particular the objectives of this report include:

- Reflect the alignment and areas for the fauna corridors in accordance with Maps 2 and 4 of the development scheme
- Detail how and when Koala Habitat obligation for the Yarrabilba UDA as detailed in ULDA guideline no 17: Remnant vegetation and Koala habitat obligation in Greater Flagstone and Yarrabilba UDAs will be delivered
- Include undertakings for monitoring and reporting on the achievement of the master plan outcomes including:
    - Retain and revegetate areas of remnant vegetation and waterways
    - Contribute to a net gain in bushland Koala habitat within the region
    - Protect viable remnant vegetation containing endangered regional ecosystem
    - Cater for Koala movement between conserved areas of bushland Koala habitat
    - Incorporate Koala sensitive urban design
    - Outline measures to conserve and enhance the biodiversity values of the fauna corridors
    - Provide mitigation management actions and recommendations
    - Address direction of clearing to ensure fauna safety
    - Identify spotter catcher requirements
    - Discuss corridor width and function
    - Identify rehabilitation strategies for any corridors of native vegetation to improve habitat extent and wildlife movement.

1.3 Purpose of fauna corridors

A fauna corridor is a link of habitat, generally consisting of native vegetation, which joins two or more larger areas of similar habitat (Dept. Infrastructure, Planning and Natural Resources, 2004).

Fauna corridors preserve biodiversity, allow populations to interbreed and supply access to larger, more promising habitats (Urban Ecology Australia, 2006). Corridors connecting areas of high habitat value increase the effective amount of habitat that is accessible for species and can reduce the effects of habitat fragmentation (Dept. Infrastructure, Planning and Natural Resources, 2004). This is especially important for animals with large home ranges such as Koalas (Urban Ecology Australia, 2006). Larger habitats support greater biodiversity, larger populations, and a wider range of food sources and shelter.

1.4 Proposed fauna corridors within the site

Ecological corridors across the site have been established in Map 4 of the ULDA to protect natural values. These corridors will provide linkage of the best quality vegetation and opportunities for fauna movement, protection of waterways and buffering to protect water quality.

The ecological corridors through the site are primarily for fauna movement and waterway protection. Together with larger patches of vegetation on the eastern boundary and other planned green space areas, they provide a network covering over 500 hectares and provide a connection between the patches of remnant vegetation in the western and central parts of the site. Outside of the site further large patches, or remnant vegetation with connectivity to the site, can be found to the east, west, and south. The largest patch of remnant vegetation with connectivity to the subject site is located to the east (Plunkett Conservation Reserve), and is identified on Regional Ecosystem mapping as Essential Habitat for the Koala (refer to Figure 3). Some vegetation connectivity also exists to the west of the site, adjacent to Waterford - Tamborine Road, although this is likely to be adversely affected by existing road networks.

Figure 1: Site Location (Google Extract)

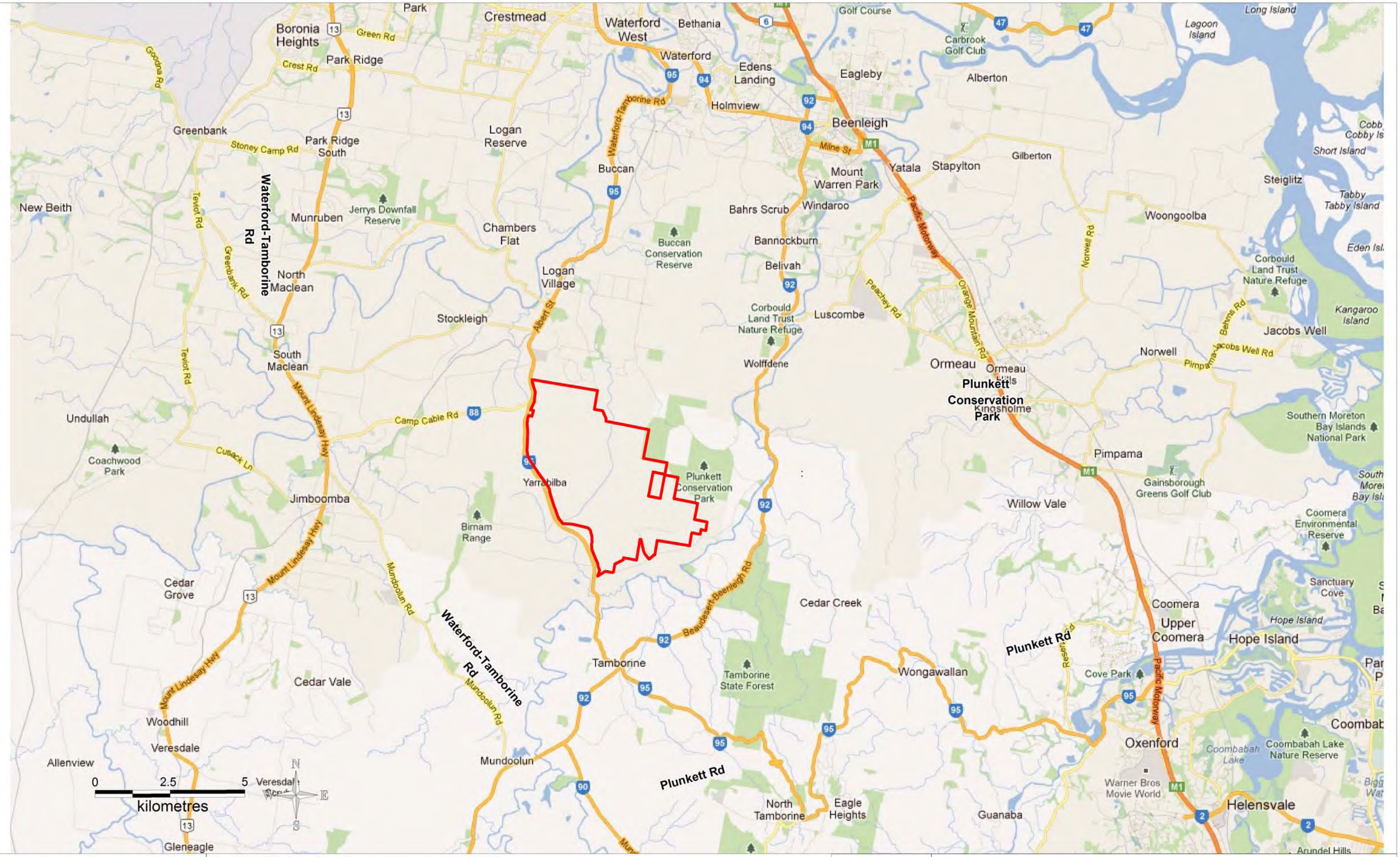

Figure 1: Site Location (Source: Google Maps 2012)

Legend

Site Boundary

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Client: Lend Lease	Checked: K.R	Paper: A3

Figure 2: Aerial image of the subject site (Google Earth Extract)

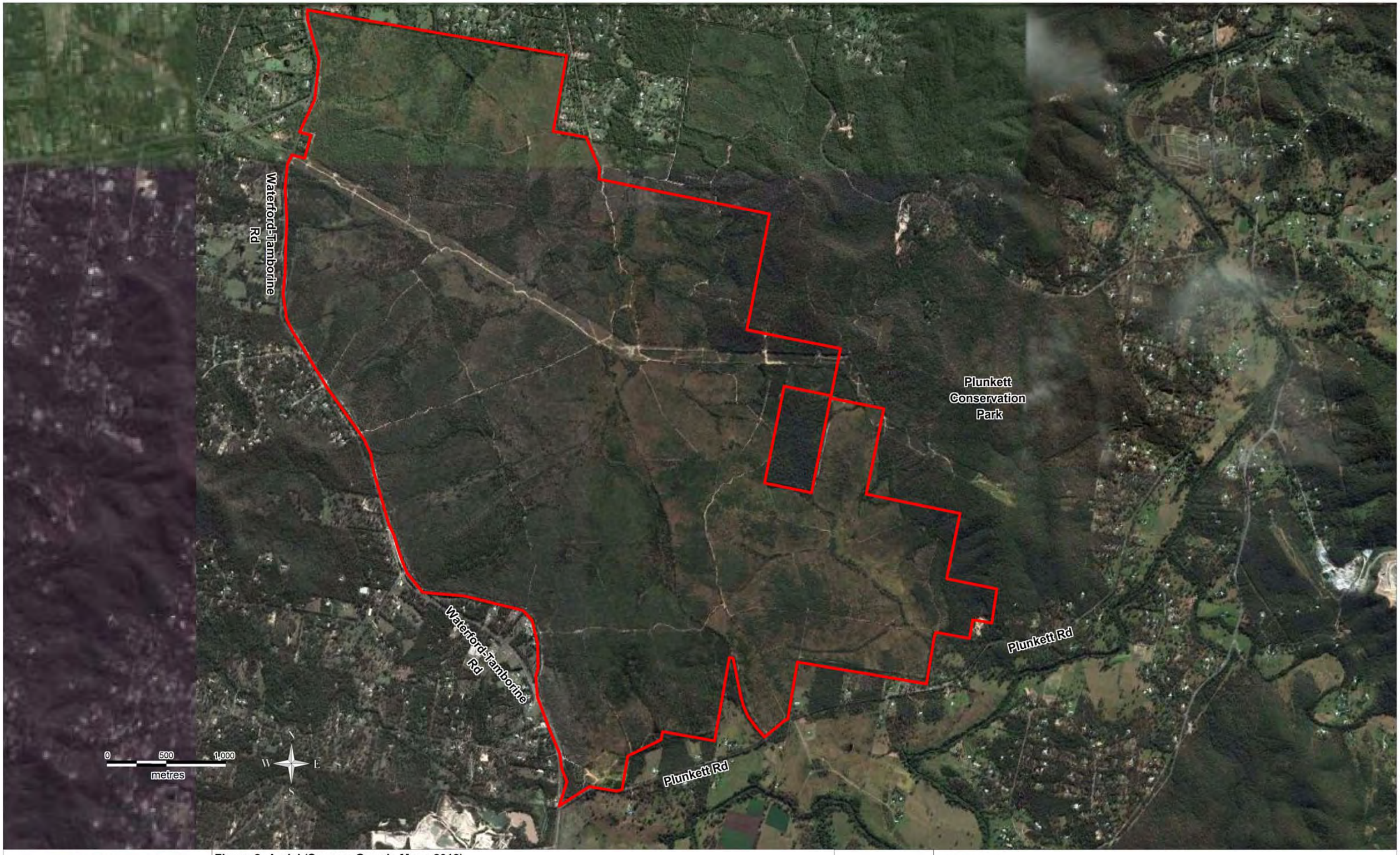

Figure 2: Aerial (Source: Google Maps 2012)

Legend

Site Boundary

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Client: Lend Lease	Checked: K.R	Paper: A3

2 Review

The following table contains a summary of key issues within the Yarrabilba UDA Development Scheme and the ULDA Guideline No 17: Remnant vegetation and Koala habitat obligation in Greater Flagstone and Yarrabilba, in response to the MCU condition 32:

Table 1: Fauna corridor key issues

Item	Key Issues	How the layout addresses key issues
Map 2 – Yarrabilba UDA boundary	Alignment and areas for the fauna corridor in accordance with **Map 2**	According to Map 2 of the UDA Development Scheme (refer to Appendix 1), it can be noted that the fauna corridors generally encompass drainage lines and areas of high vegetative cover. Areas considered to be containing high ecological and habitat value are protected within the fauna corridors. The key areas of urban development are to occur primarily in areas of former pine plantation, grass land areas, acacia regrowth, and areas deemed of having a lower overall habitat value.
	Location of corridors	Designated fauna corridors have been strategically placed throughout the site to enable fauna to pass from one area of high habitat value to another (Figure 3). The corridors will provide linkage of the best quality vegetation and opportunities for fauna movement, protection of waterways and buffering to protect water quality. Areas containing remnant vegetation, drainage lines and high eucalypt cover are incorporated into fauna corridors in accordance with Map 2 of the UDA Development Scheme as these attributes are integral to upholding the integrity and function of the fauna corridor network. Fauna and greenspace corridors encompass approximately 545 ha of the total site. Fauna corridors approximately 147 ha, and greenspace corridors 397 ha (Figure 3). According to Map 2 of the UDA Development Scheme, roadways will be intersecting the fauna and greenspace corridors within the development. In order to comply with section 3.3.8 Natural and cultural values - Koala Conservation of the UDA Development Scheme, koala sensitive urban design must be used to ensure that koalas and other fauna can maintain safe passage throughout the site by implementing strategies defined in sections 4.8, 4.9 and 4.10 of this report.

Item	Key Issues	How the layout addresses key issues
	Areas of significant vegetation to the north, south and east	Corridors within the site link with 'off site' areas of ecological importance to the north, south and east of the site (Figure 3).
Map 4 – Community Greenspace Network	Alignment of fauna corridors in relation to **Map 4**	The location of the fauna and greenspace corridors within the site are in accordance with Map 4 of the UDA Development Scheme (Appendix 1). In accordance to Map 4 in the UDA Development Scheme the main corridor runs in an east-west direction between Plunkett Conservation Park and Waterford - Tamborine Road. The corridor to the south of the site leads from Plunkett Conservation Park to Plunkett Road (Figure 3). The location of the fauna corridors within Yarrabilba will enable fauna to traverse the site from one high habitat area to another. The inclusion of greenspace networks comprising of parks, environmental areas and open space corridors along waterways will provide linkage, connectivity and habitat potential for a variety of fauna species (Figure 3). The amalgamation of the fauna and greenspace corridors will provide an integrated open space network.
	Development contributes to the provision of an integrated, high quality, regional community greenspace network that caters for a range of environmental needs	Some of the features the fauna and greenspace corridor network will achieve within the site include: • Retention of locally significant vegetation and fauna habitat where possible • A minimum of a 200 m wide fauna corridor traversing the site from Plunkett Conservation Park to Waterford - Tamborine Rd (Refer to Figure 3) • A 100 metre wide corridor in the fauna corridor south west of Plunkett Conservation Park along the tributary of the creek flowing south to the Albert River and central east-west corridor • Enhancement of wetland communities via weed control and revegetation.
ULDA guideline No. 17 Remnant Vegetation and Koala Habitat Obligation in Greater Flagstone	Remnant vegetation containing endangered regional ecosystems	Areas of remnant vegetation have been retained as part of the fauna corridor network and these areas will be rehabilitated to enhance fauna passage. Corridors have been included in the development along drainage lines in addition to Figure 1 of the guideline - Koala movement corridors in the UDA which are to be rehabilitated and/or protected with buffer areas, which will add to the aesthetic values and increase habitat value.

and Yarrabilba		
Item	**Key Issues**	**How the layout addresses key issues**
	A 200m wide corridor helping to connect Plunkett Conservation Park, across Waterford - Tamborine Road to the Birnam Range, achieving (on average) a minimum 100 metre corridor of Koala Habitat	The main fauna corridor connecting Plunkett Conservation Park to Birnam Range achieves a minimum width of 200m, and a maximum width of 340m (Refer to Box 'A' of Figure 3 displaying the main fauna corridor and associated greenspace). This corridor contains and protects areas of high Koala habitat value and is in compliance with the ULDA guideline No. 17 Remnant Vegetation and Koala Habitat Obligation in Greater Flagstone and Yarrabilba.
	A 100 metre wide corridor linking Plunkett Conservation Park (via a creek tributary flowing south towards the Albert River) to the south east corner of the UDA that contains mapped High Value Bushland Koala Habitat, achieving (on average) a minimum 50 metre wide Koala Habitat corridor	The main corridor linking Plunkett Conservation Park to Plunkett Road in the south east of the site is achieves a minimum width of 100m. This corridor contains and protects areas of High Value Bushland Koala Habitat and is in compliance with the ULDA guideline No. 17 Remnant Vegetation and Koala Habitat Obligation in Greater Flagstone and Yarrabilba (Refer Box 'C' Figure 3 displaying fauna corridor between Plunkett Conservation Park and the south east corner of the UDA and associated greenspace areas).
	A 100 metre wide corridor linking the western end of the 200 metre wide vegetated corridor at Waterford - Tamborine Road, achieving (on average) a minimum 50 metre wide Koala habitat corridor	The corridor linking the western end of the main corridor at Waterford - Tamborine Rd achieves a minimum width of 100m. This corridor contains and protects areas of high value Koala Habitat and is in compliance with the ULDA guideline No. 17 Remnant Vegetation and Koala Habitat Obligation in Greater Flagstone and Yarrabilba (Refer to Box 'B' of Figure 3).
Regional Vegetation Management Code, 2006	Watercourse and stream order	As per the Regional Vegetation Management Code, 2006 clearing shall not occur within 10 metres from each high bank of a watercourse with a stream order of 1 or 2. A stream order classification is a numerical value assigned to a particular segment of a total watercourse. The steam order number loosely translates to the position of a specific segment of watercourse within a catchment. When two streams of the order number merge, the merged watercourse becomes one stream order larger, i.e. if two stream order 2's merge, the resulting

		watercourse will become a stream order 3. If two streams of a different order number merge, the merged watercourse will remain the same value of that of the larger stream, i.e. if a stream order 2 and stream order 1 merge, the resulting watercourse will remain a stream order 2. Stream orders are assigned to segments of a watercourse to allow efficient desktop evaluation of the size and water carrying capacity of a particular segment of a watercourse. This provides a mechanism to set up legislative framework and development constraints on how land and associated ecosystems will be modified around watercourses. The fauna and greenspace corridors are in compliance with the Regional Vegetation Management Code, 2006.
	Koala conservation via siting and layout of development	Koala conservation in the site will be achieved by: • Incorporating koala conservation and habitat protection via retention of habitat and revegetation • Future implementation of Koala sensitive design
All maps	Additional areas of Fauna Corridor included in development not included in UDA	Additional greenspace corridor and linkage areas, typically along the major drainage lines of the site have been incorporated into development in addition to Map 4 of the UDA and Figure 1- Koala movement corridors in the UDLA which are to be rehabilitated and/or protected with buffer areas, which will add to the aesthetic values of the area and increase wildlife value (Refer to Box 'D' Figure 3).

3 Fauna Corridor Master Plan

In accordance with the UDA planning scheme and MCU conditions, a Fauna Corridor Master Plan has been formulated reflecting the location and width of fauna and green space corridors, regional ecosystems both on and immediately off the site, drainage lines and post development fauna movement pathways traversing the site.

Following completion of the development, green space corridors will provide additional opportunity for some species to move throughout and across the site. These areas are identified on Figure 3 along with the functional fauna corridors, as required by the UDA.

Figure 3: Fauna Corridor Master Plan

Figure 3: Fauna Corridor Master Plan

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Client: Lend Lease	Checked: K.R	Paper: A3

Legend

- Site Boundary
- Fauna Corridor
- Green Space Corridor
- Regional Ecosystem Off Site
- Regional Ecosystem On Site
- Drainage Lines
- Indicative Context Plans
- X m Direction of Clearing

4 Actions

To address the UDA conditions, rehabilitation will be undertaken within fauna corridors to improve habitat extent and wildlife movement. Initially, corridors will be identified through surveys and pegged. A slashed boundary will be established and fencing will be erected as required to protect areas from degradation, should stock be introduced to the site during the interim use period.

4.1 Rehabilitation

4.1.1 Rehabilitation planning

The following assessment and action plans are required to address rehabilitation items at each Context Plan Stage:

- A full site assessment and detailed rehabilitation plan for fauna corridors
- A vegetation management plan (VMP) detailing protection measures and rehabilitation management actions for each precinct.

These plans will identify areas of high significance, determine restoration strategies and balance other interim land management uses (if applicable) with proposed conservation outcomes. A strategic rehabilitation management plan should, at a minimum, contain the following sections:

PART 1: INTRODUCTION

- Background
- Aims and Objectives
- Regional Setting
- Site Description
- Conservation Values

PART 2: ASSESSMENT METHODS

- Desktop Data Searches and Literature Review
- Review of Fauna Assessment
- Review of Vegetation Assessment
- Review of State Vegetation Types
- Regional Ecosystems Review
- Site Assessment and Findings
- Environmental and Declared Weeds

PART 3: VEGETATION MANAGEMENT ISSUES AND ACTIONS

- Controlling Weeds of Special Significance
- Civil Works Associated with the Development
- Historical Uses
- Soil Stability, Soil Microclimate and Erosion
- Bushfire Management
- Protection of Threatened Plant Species
- Weed Species
- Protection of Fauna and Habitat (possibly including weedy areas)
- Demarcation and protection of Natural Areas

PART 4: RESTORATION STRATEGY

- Restoration of native plant communities
- Restoration Models for the site
- Assisted regeneration: strategic management

  - Strategy for Ecological Restoration
  - Assisted Regeneration Zones
  - Assisted Regeneration Actions
- Revegetation: reconstruction and fabrication
  - Revegetation Objectives
  - Site Preparation
  - Revegetation Species List
  - Revegetation Actions
  - Plant Establishment
- Scheduled maintenance
  - Revegetation and Plant Establishment Period
- Monitoring
  - Monitoring and Recording Process
- Native seed provenance

4.1.2 Restoration approach

A number of integrated approaches will help to achieve rehabilitation by streamlining works and management, implementing and documenting ecological changes (monitoring) and basing well founded principles to on-ground works. The size of the site presents a number of logistical issues with the delivery of implementing a practical restoration strategy. Restoration may incorporate one or more of the following approaches:

1. **Natural regeneration** – this applies to relatively intact plant communities where recovery is automatic with the removal of the cause of the damage or disturbance e.g. after cyclonic events, bushfires etc. (i.e. usually no human intervention is required).
2. **Assisted regeneration** – this approach is appropriate in relatively intact native plant communities where limited intervention such as weed control, track closure, erection of fencing, etc. is sufficient to restore the native vegetation through natural regeneration and successional processes.
3. **Reconstruction** – this approach is required in highly disturbed, modified and degraded areas where the potential for native plant regeneration is considered to be limited, such as heavily disturbed ecosystems. In these situations, native species are unlikely to return to the site without greater intervention, such as replanting, large scale weed control, restoration of drains etc.
4. **Fabrication** (type conversion) – this approach is required where conditions are permanently changed and better adapted local systems can be constructed to restore integrity to the landscape (McDonald 1996).

The site requires rehabilitation techniques that use a combination of the above approaches. The approaches undertaken depend on the exact locality and the degree of modification to the environment (Hobbs and Cramer, 2008), such as the installation of water treatment devices or artificial wetlands within riparian communities. Therefore detailed site assessments will be required to determine the site specific approach required.

4.1.3 Strategies for weed management

In areas where weed control is required, the following general guidelines should be followed (Table 2). The following guidelines provide a methodology for weed control according to growth form, and include weeds with woody stems. However, a detailed site assessment is required to determine the location and severity of weed incursion, which will influence the approach taken.

Table 2: General weed removal/control methods within the protected areas

Growth Form	Removal Techniques
Woody Stems e.g. Lantana, Camphor Laurel	Manual Small plants can be removed by hand using Soft Weed methodology. Exposure of rootstock to air is necessary to ensure full eradication. Failure to remove ALL of roots will result in regrowth. Herbicide *Up to 10 cm basal diametre* 1. Apply the cut, scrape and paint method using Glyphosate at a ratio of 1:1 to minimise erosion. Lop into 50cm pieces, leaving these on the ground to act as mulch. Regrowth of woody weeds shall be spot sprayed. *Greater than 10 cm basal diametre and inaccessible sites* Stem Injection Use stem injection method - at tree base drill holes at a 45 degree angle into the sapwood at 5 cm intervals. Inject herbicide into holes immediately before the plant cells close and translocation of herbicide ceases. Frill or Chip Cut into the sapwood with a chisel or axe. Fill cut with herbicide immediately with Glyphosate at a rate of 1:1 Repeat the process at 5 cm intervals around the tree. * For *Cinamomum camphora* cuts must overlap with no gaps in order to kill the hardwood. * Plants to be treated with herbicide should be healthy and actively growing. * Deciduous plants should be treated in Spring and Autumn when leaves are fully formed. * Multi-stemmed plants require injection below the lowest branch or treat each stem individually.
Bulbs, Corms or Tubers e.g. Ground Asparagus, Watsonia	Manual Dig down next to the stem until the bulb or tuber is reached. Remove plant and carefully bag the bulb or tuber. Herbicide Remove any seed or fruit and place in bag. With an herbicide applicator, apply to the stems and leaves using brush-off.

Soft Stems (no underground reproductive parts) e.g. Blue Billy-goat Weed, Lantana seedlings	<u>Manual</u> Gently remove any seeds or fruits and carefully place into a bag. Grasp stem at ground level. Rock plant backwards and forwards to loosen roots and pull out gently. Tap the roots to dislodge soil. <u>Herbicide</u> Directly apply to suitable species. Should only be used where plants are actively growing.
Underground Reproductive Structures -Taproots	<u>Manual</u> Gently remove and bag seeds or fruit. Loosen soil around taproot with suitable implement. Grasp stem at ground level and gently pull out plant. Tap the roots to dislodge soil. * Not suitable for Paddy's Lucerne or *Ochna serrulata* and many others - use with caution.
Vines, Runners and Scramblers	<u>Manual</u> Locate a runner; gently pull it along the ground. Roll the runners up for easy removal. Continue doing this until all the runners have been rolled up. Small fibrous roots growing from the runners can be cut with a knife. Locate the main root system whilst removing the runners. Remove it manually. Do not leave any bits of stem or large roots, as these may re-shoot. Bag or compost the runners/roots and any other reproductive parts. <u>Herbicide</u> With a knife, scrape 15 to 30 cm of the stem to reach the layer below the bark/outer layer. A maximum of half the stem diametre should be scraped. Large stems (>1 cm) will require two scrapes opposite each other. Immediately apply herbicide along the length of the scrape. Vines can be left hanging in trees after treatment.
Rhizomes e.g. Asparagus Fern	<u>Manual</u> Remove and bag stems with seeds and fruit. Grasp the leaves or stems together so that the base of the plant is visible. Insert a knife at an angle close to the crown and cut through all the roots around the crown. All vegetative materials shall be left in situ.

Notes:

- Hand removal is recommended where possible and practical except where it may lead to soil destabilisation along creeks and drainage lines.
- Non-herbicide removal should be used where possible adjacent to native species to minimise damage. Suitable methods including digging, crowning or hand pulling.
- Where herbicide application is required:
  1. Broad-scale application is not permitted within drainage lines;
  2. Glyphosate Bioactive or equivalent is to be used within 30 m of water bodies as it is identified as more "frog friendly" than other herbicides;
  3. Quantities of herbicide need to be controlled and all care be taken to prevent runoff or excess use;
  4. Always read the lab to ensure the herbicide is used safely and no certificate is required for use; and
  5. Herbicides use should be undertaken during periods of weed growth or as per manufactures specifications.
- Herbicide use is **not permitted**
  1. During windy periods;
  2. Prior to rain forecast or 6 hours after rain,
  3. Broadly/recklessly in areas where native vegetation dominants.
- If in doubt whether plants are weed or native, confirmation prior to conducting weed removal is required e.g. from *Environmental Weed Guide* (free from GCCC), Department of Natural Resources Pest Fact Sheets and *Common Weeds of Northern NSW Rainforest* (The Big Scrub Rainforest Landcare Group, 1998).

4.1.4 Plantings

Where revegetation is to take place in areas when a reconstruction or fabrication approach is required, plantings are to be of local provenance and significant species should be included in the planting matrix. General steps to be undertaken for successful revegetation are outlined in Table 3 and must be adhered to during rehabilitation works. These steps will enhance the success of revegetation and will promote the objectives of rehabilitation.

Although the following provides a general guideline it should be noted that a detailed rehabilitation plan is required to determine the location, density and species matrix required.

Table 3: Steps for revegetation within corridors and dedicated conservation areas

Steps	Revegetation Works
1	Control weeds and prepare the site for planting. Suitable planting medium may need to be provided in some circumstances such as denuded or eroded areas.
2	Acquire native species or seeds from local nursery where plant stock is sourced from the local area
3	Prepare soil by loosening dirt at the planting rates outlined in the Rehabilitation Plan. Water needs to be added to the holes prior to planting
4	If the soil is poor and not suitable for the species to be planted, supplementation with good quality soils may be necessary. A long-term slow release fertiliser such as Osmocote native must be used for all plantings
5	After planting, the top soil needs to be watered. Forest-blend mulch is then to be spread around the plants carefully not to place any mulch directly against the stem
6	The plantings need to be rewatered approximately every 3-7 days for a period of 2 months or more if there are signs of wilting. If the soil is still damp from the previous watering activity the frequency of water can be reduced

Note: Contact the local council to check for water restrictions on watering plants

4.1.5 Monitoring

A comprehensive monitoring program will be developed and implemented to capture baseline monitoring prior to the vegetation management treatments being applied. Adaptive management strategies will be used and where a treatment does not produce the desired result it can be identified and/or modified. Appendix 2 provides an example of methods for setting up a monitoring plot and Appendix 3 provides standard cross sections of areas pre and post rehabilitation.

4.2 Direction of clearing

Prior to any clearing within the site, the following guidelines shall be adhered to (Figure 4):

- The clearing of the site will occur in a controlled and precise manner to reduce the direct impacts on any fauna populations within the region
- Clearing shall occur from developed areas towards areas of vegetation to be retained or bordering the site, using a staged clearing method
- Staged clearing is a method of removing trees where operation works are conducted in discrete sections which ensures fauna are provided sufficient time and space to

move from the clearing site of their own accord without their physical removal by a spotter catcher. This will reduce stress and ensure that fauna is not flushed out into an exposed area or disturbed

- A qualified spotter catcher is assigned to each piece of machinery
- A qualified spotter catcher must be employed to inspect trees for arboreal mammals prior to clearing
- If a tree is identified with fauna present it must be either allowed to move from the site on its own accord or be removed and relocated by the spotter catcher
- To improve chances of survival, animals must not be relocated long distances
- Koalas cannot be physically removed, but must be left to move of it's own accord

Note that Figure 4 is only a strategic map depicting direction of clearing; a final map depicting direction of clearing will be generated following advice from spotter catcher prior to commencement of clearing for each stage and should form part of the Tree Clearing Plan or Vegetation Management Plan for each stage of clearing.

Figure 4: Direction of clearing

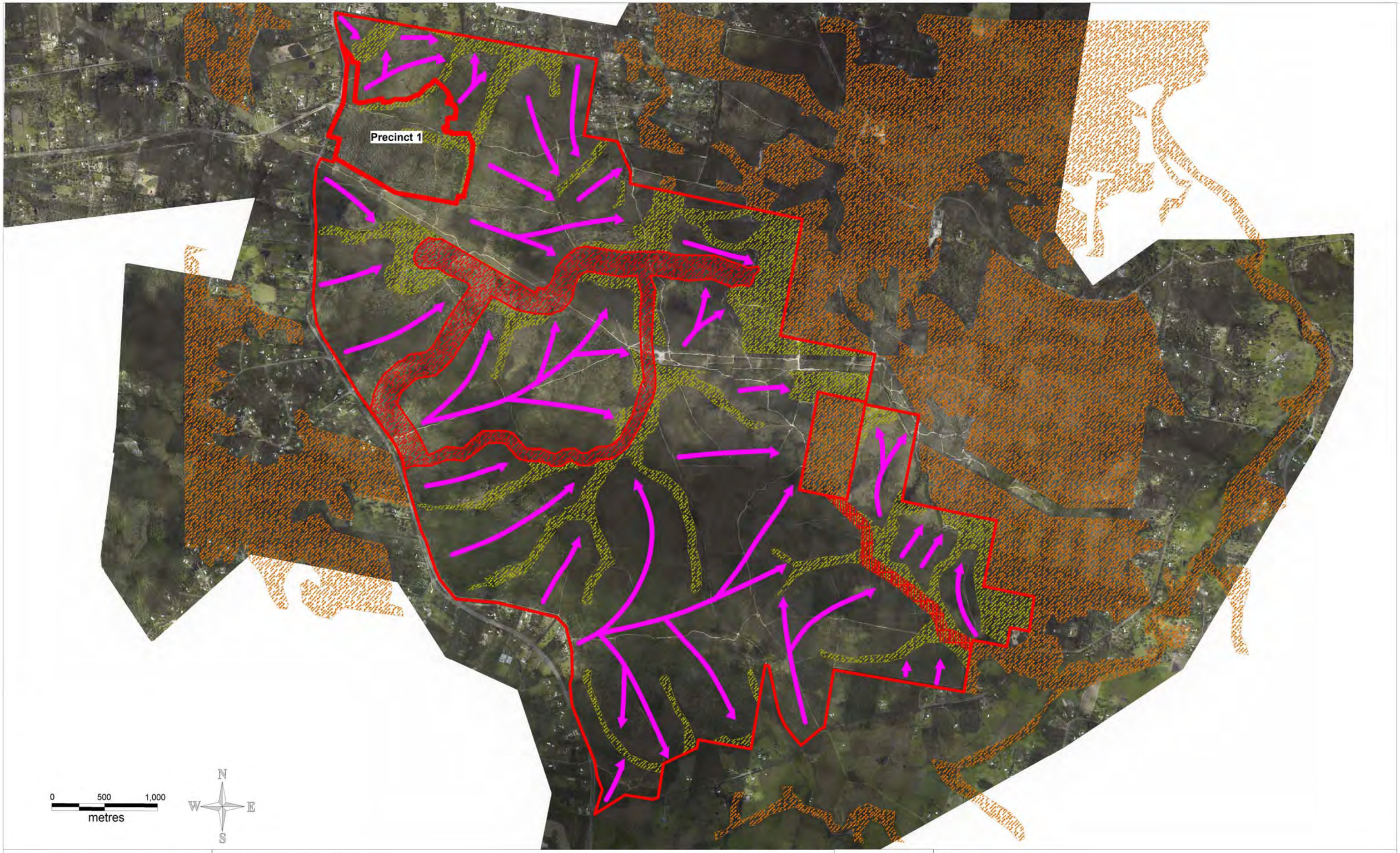

Figure 4: Direction of Clearing

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Client: Lend Lease	Checked: K.R	Paper: A3

Legend

- Site Boundary
- Fauna Corridor
- Green Space Corridor
- Regional Ecosystem Off Site
- Direction of Clearing

4.3 Corridors

In line with ULDA guidelines, fauna corridors will be wooded. Uses will be limited to low scale pedestrian paths, generally located on outer edges to limit impacts with occasional crossings for roads. Some locations may have water quality management but these will be located within areas of poorer quality vegetation that will be rehabilitated/planted with native stems. Dedicated fauna corridors will not be impacted.

4.3.1 Protection of corridors

Through innovative planning, impacts on areas of high biological diversity will be reduced. Minimising clearing of remnant vegetation, high value regrowth and significant habitat trees and the provision of the maximum width possible for all vegetation buffers will help meet this outcome. In addition, any clearing of remnant vegetation will be offset in accordance with the offset policy under the *Vegetation Management Act, 1999*. Prior to any clearing within the vicinity of the fauna corridors, the following protection guidelines shall be adhered to:

- A protective 10 m wide slashed buffer will be established (within the development footprint) around the outer edge of all corridors. These areas are to be clearly identified and flagged prior to any mega mulching occurring within the zone.
- When mega mulching work is being undertaken in the vicinity of environmental areas or corridors begin work from the slashed edge and work away from the corridor. Operators must be vigilant and continually look out for other corridor networks. It is the operator's responsibility to ensure that no protected vegetation is damaged.
- All rehabilitation treatments within corridors should be implemented as soon as economically feasible. This will speed up the process of regeneration and will significantly enhance the ecological value of the corridors.

4.3.2 Management of corridors

Section 4.1 outlines initial rehabilitation treatments and the ongoing management of various sections of corridor within the site. As stated in section 4.1, a rehabilitation plan will be required for each context stage. Planning will be undertaken at the required level of detail, outlining very prescriptive treatments for each zone and timeframes required to bring each treatment area/zone into a functional state. This will be directly linked with the individual stages of the development (see section 6 and Figure 5 for further details). Also refer to Appendix 4 which depicts priority sections of the open space corridors found throughout the site. Where practical, the order of works in corridors will commence in high priority locations adjacent to the stage of development currently under operational works.

The following management actions will be undertaken:

- Habitat and corridor functionality and connectivity will be maintained and enhanced through the rehabilitation and revegetation of degraded areas. This will be guided through the development of a strategic habitat restoration plan and more detailed context stage plans.
- Habitat will be maximised through the retention of habitat trees wherever possible within parks, landscaping and other appropriate areas. This will be achieved by employing biodiversity friendly planning principles.
- Habitat for threatened fauna and flora will be protected and if or where necessary Threatened species management plan will be developed and implemented

- Implementation of early intervention actions within the habitat and corridor areas will lead to improved environmental outcomes. Ongoing weed management will reduce exotic plant species and improve habitat quality for fauna
- An endorsed fencing plan should be developed to ascertain fencing requirements and to guide the construction of fencing on the interface of corridors and future development stages. Fences must be erected in these locations to protect ecological corridors.

4.3.3 Open space corridors

Open space of any type can where practical, add valuable opportunities for fauna to exploit supplementary feeding opportunities, linkages for dispersal and in some cases extra habitat.

Where possible all parks will retain, within reason native canopy tree species and in some cases clumps and patches of native bushland or regeneration for habitat. All landscaping and rehabilitation opportunities should be thoroughly investigated and where practical should be implemented using selected local endemic species. Particular attention should be paid to selecting known food and shelter species for koalas and birds. Where parks adjoin natural corridors all efforts will be made to establish further linkages and additional buffers on the park-natural area interface.

The Yarrabilba park network will provide valuable additional protection and buffers for fauna movement through its thoughtful planning and provision. Refer to table 4 below for park types and fauna functions which outlines the opportunities for potential fauna movements following onsite rehabilitation, revegetation and landscaping.

4.3.4 Wetlands and waterways

The Yarrabilba development layout has provided for a buffer of 40m to 250m to wetlands and waterways. Government agencies generally require a buffer of 30m to the top of bank, pending the outcomes of an ecological assessment, for natural waterways.

Open space corridors that contain streams, gullies, waterways and bio-retention basins will play a critical role in enhancing the function of fauna corridors. As outlined in table 1 all vegetation each side of 1st and 2nd order streams must be retained, in line with the Regional Vegetation Management Code, 2006. According to Design Flow (July 2012), some of these waterways have high aquatic habitat quality and sections of habitat characterised by high complexity and a diversity of channel forms and submerged woody debris. The fauna corridor will not be encumbered with bio-retention basins. However, where bio-retention basins interface with the fauna corridor, all due consideration must be undertaken to ensure they do not negatively impact on the potential for effective fauna movement.

The following recommendations will assist in protecting and enhancing the wetlands and waterways of the Yarrabilba site:

- Undertake civil works with minimal disturbance to contours and natural drainage channels especially in the vicinity of wetlands and waterways
- Sediment protection is to be installed to relevant Australian Standards prior to disturbance/construction. The civil site contractor is to determine the locations on-site or in accordance with an approved Stormwater Management Plan

- Degraded wetlands and waterways should be restored through assisted regeneration and revegetation in accordance with a habitat restoration plan for the site.

4.3.5 Parks

Parks have been designed and planned with the primary end use in focus. The core use of the various parks listed below (excluding linear parks) is to provide for passive and active forms of recreation. However, there will be opportunities to enhance interface greenspace and fauna corridors in many locations. The Community Greenspace IMP and Guideline no. 12 – Park planning and design should also be referenced with regard to park provision, areas and activation.

Table 4: Park types and fauna functions.

	Park Type	Short Description	Fauna Function
Recreation parks	Linear park	Preferred minimum width of 10-15m. Long narrow park for floodplain management or environmental buffer to waterway or wetland	Linear parks will contain good quality native bushland and regrowth in many places. Through the rehabilitation planning process areas will be identified that can be enhanced for fauna purposes. Linear park linkages will provide: • Cover for fauna movements and dispersal • vegetated buffers to enhance Koala movements • Habitat for birds and smaller ground-dwelling animals • Stop overs or rest points for larger animals.
	Local recreation park	Minimum dimensions for any part should not be less than 10m. Small park for visual amenity or passive recreation. Existing vegetation to be retained.	Small parks that will provide some feeding opportunities and shelter for flying fauna species and small animals. Where these parks adjoin greenspace and fauna corridors they will provide additional habitat and useful extra width to corridors for fauna movements and dispersal.
	Neighbourhood recreation park	Minimum dimensions for any part should not be less than 10m. Moderate sized park for passive and active recreation.	As above, this type of park will provide some feeding opportunities and shelter for flying fauna species and small animals. Where these parks adjoin greenspace and fauna corridors they will provide additional habitat and useful extra width to corridors for fauna movements and dispersal.
	District recreation park	Minimum dimensions for any part should not be less than 10m. A large park for active and passive recreational needs.	The three proposed parks link into greenspace and fauna corridors. As a destination for passive recreation, these areas can be kept in as 'natural' a condition as possible or could have buffer plantings or eco-scaped gardens to transition onto corridors. These parks, through good environmental design can add useful extra width to corridors for habitat and fauna movements and dispersal.
	Major recreation park	Minimum dimensions for any part should not be less than 10m. A very large park to provide for a significant range of active	The central major recreation park is located on and adjacent to an important corridor with dual greenspace and fauna functions.

		and passive recreational opportunities.	
Park Type	**Short Description**	**Fauna Function**	**Park Type**
	Civic park	Minimum dimensions for any part should not be less than 10m. A small park of approximately 500m2 for landscape, amenity and passive recreation.	Generally these are urban parks with few opportunities for large or ground dwelling fauna. Civic parks will provide some feeding opportunities and shelter for flying fauna species.
	District sports park	Regular shaped large park with minimum of any part 25m or wider. Provides space for practising and playing organised sports.	These are purpose built for sports activities, however, where district sports parks are located on corridors they will assist with: • fauna movements and dispersal • nocturnal grazing for macropods • foraging opportunities for ground feeding birds and ground-dwelling animals • Vegetated buffers along waterways will add valuable additional width to habitat.
	Major sports park	Regular shaped very large park with minimum of any part 25m or wider. Provides space for practising and playing organised sports.	These parks are purpose built for sports activities. One of the two major sports park's is located on a fauna and greenspace corridor and will offer additional opportunities for fauna such as: • assist with fauna movements and dispersal through vegetated buffers enhance Koala movements • nocturnal grazing for macropods • foraging opportunities for ground feeding birds and ground-dwelling animals The other park will have minimal benefits to fauna.

Please refer to Appendix 5 for park locations in relation to greenspace and fauna corridors.

4.4 Adjacent land uses

Adjacent land uses and how they appropriately interface with the fauna corridor need to be addressed in detail at each context stage plan. The relevant plan should consider items such as:

- Street lighting
- Residential fences
- Responsible pet ownership
- Responsible gardening and plant selection
- Parkland revegetation types/interface
- Appropriate and inappropriate activities in and around fauna corridors.

Corridors are designated specifically for fauna movement and any pathways etc., through these areas will be designed using Crime Prevention Through Environmental Design (CPTED) principles. For example appropriate types of shrubs and trees planted at high densities can deter people from entering dedicated wildlife corridors. Areas of Open Space Corridor that may incorporate normal parks (i.e. "kick-about" areas) will be designed with recreational use in mind, based on CPTED principles, with fauna use as an additional consideration.

4.5 Bushfire

Fauna corridors will be protected from wildfire with a number of strategies outlined below to ensure that ecological values are not compromised. Actions will include the following:

- Reduce the likelihood, intensity and impacts of unplanned fires through strategic vegetation management of large areas of vegetation located within the development footprint.
- Use mega mulching and slashing to reduce fuel loads within the development footprint area.
- Repair heavily eroded trails or sections of trails to allow safe access for rural fire brigade teams, vegetation management contractors, surveyors, consultants and Lend Lease personnel.
- Manage edge effects where increased sunlight leads to the excess growth of grasses and woody weeds which increase the fuel load and associated fire risk. Undertake regular weed control and/or slashing in these areas to reduce the fuel build up.
- Construct/implement a 10 metre wide landscape buffer with a further 20 metre wide fuel reduced protection zone on boundary interfaces to protect neighbouring properties and corridors from unplanned fire. Refer to cross sections provided in Appendix 6 for bushfire management details.
- Undertake planned burns in designated zones to reduce fuels and lower the likelihood of unplanned fires occurring.
- Eradicate pine trees in all areas where they will not be retained as a resource. Uncontrolled pine growth adds to higher fuel levels, contributing to higher fire intensities and rates of spread (BPS, 2012).

4.6 Significant trees

A number of mature Eucalypt species (greater than 50 cm diameter at breast height), of an age where hollows begin to form, were observed in the dominant vegetation community. Eucalypt trees of this size are generally approximately 100 years old (Ross, 1998), and are of an age where hollows suitable for wildlife habitat are likely to form. Hollows are valuable to a number of species of wildlife including arboreal and terrestrial mammals, birds and microbats (Douglas, 2003).

It is recommended that as many of these trees as possible be retained until such time that clearing works are required. This will ensure longevity of native fauna populations and allow sufficient time for dispersal between clearing events.

4.7 Fauna Management

Fauna assessments in all natural areas and corridors within the site are to be undertaken. The subject site contains approximately 124 hectares of mapped remnant vegetation (shown on Figure 3) in the central and eastern sections of the site which are retained within corridors and greenspace. These areas offer habitat value to a number of fauna species for which appropriate management actions should be developed.

4.7.1 Significant species

An Online database survey (27/4/2012) was undertaken to provide indicative records of the types of native species that potentially occur onsite. The Department of Environment and Resource Management Wildlife Online database was used, which details all confirmed records since 1980 within a 5 kilometre radius of the middle of the site (refer to Appendix 7 for full details). This type of search only provides information on the likely occurrence of listed fauna on the site and is a useful starting point to direct active searches during the field assessment. The data was used to provide guidance for fauna habitat requirements and vegetation treatment types and associated management actions. Significant species that were identified in this search (Table 5) include *Littoria brevipalmata* (Green thighed frog) and *Phascolarctos cinerus* (Koala). The Koala is listed under the *Nature Conservation Act 1992 and EPBC Act 1999* and the Green thighed frog is listed under the Nature Conservation Act 1992.

Table 5: EVNT fauna possibly occurring within the subject site

Scientific Name	Common Name	Status Qld	Status Commonwealth	Likely Occurrence within Yarrabilba
Amphibians				
Littoria brevipalmata	Green thighed frog	*Near threatened*	*Not listed*	P
Birds				
N/A				
Mammals				
Phascolarctos cinerus	Koala	*Vulnerable*	*Vulnerable*	C
Reptiles				
N/A				

Likely Occurrence Codes: NL = Not Likely, P = Possible, L = Likely, HL = Highly Likely, C = Confirmed during site investigations.

To date, the Green thighed frog has not been identified on site. Koalas are the only EVNT species currently confirmed to be onsite through ground truthing. Koalas were initially identified in Yurrah's 2009 Vegetation Management Plan where investigations noted signs of Koalas. The second occurrence was the positive identification of Koala scats at the base of tree 421 (located in protected corridors) in precinct 1 by Fauna specialist spotter/catcher Michael Dickinson during September 2012. More recently (May 2012), ecologists from Natura

Consulting have also recorded koala scats east of precinct 1 and scratching's potentially made by a koala to the north of precinct 1, within corridors areas.

Given the level of protection and 'vulnerable' status under the *EPBC Act*, this fauna species should be retained/protected where possible. A fauna management plan will be required prior to the commencement of onsite works for any Context Plan Area when clearing of native vegetation is to occur. The report shall include sections addressing:

- Comprehensive fauna assessment
- Feral animal monitoring and management
- Koala management
- Kangaroo management strategy and program
- Implement Recovery Actions for any confirmed EVNT species (where applicable).

Detailed guidelines for the development of a fauna management plan are located in section 4.5.2 of this report and shall be used as a standard to develop future fauna management plans.

4.7.2 Fauna Management Plan

A fauna management plan is to be undertaken for each Context Plan Area where native vegetation clearing is to occur, to ensure the long term management of fauna in the corridor. The fauna management plan shall be submitted prior to, or at the time of lodgement of the application, providing details on:

- Description of the development proposal and clearing works
- Site description including plans and supporting text providing a description of vegetation communities to be cleared and retained and fauna habitat values
- Identification of known fauna species
- Fauna known or likely to occur at the site (based on the outcomes of the Ecological Assessment and any additional site inspections) and a brief habitat description/identification of locations that the species are known or likely to occur
- Identification of known and potential habitat trees (displaying values such as hollows, fissures, nests, drays, arboreal termitaria used as nests etc)
- Identification of general fauna habitat (including weed species that may offer fauna habitat, native vegetation, rivers, creeks, ground resources such as boulders and hollow logs)
- Details for demarking areas that are of high habitat value to be disturbed (e.g. habitat trees, disturbance in sensitive areas etc)
- Information on how the clearing will be undertaken including:
    i. Whether the clearing will be undertaken in stages
    ii. Special considerations for clearing (e.g. juvenile vegetation first)
    iii. Time periods between clearing of staged areas (where applicable) or immature vegetation
    iv. Direction of clearing
    v. Staging of infrastructure (for example nest boxes, installation of fauna friendly crossings etc taking into consideration temporary movement corridors based on the impacts of construction works)
    vi. Temporary methods required (e.g. barrier fencing to prevent fauna fleeing to roads)
- Information on how trees are to be inspected for denning or nesting animals including constraints for inspecting trees (to provide acceptable alternative methods)

- Considerations relating to time periods for when fauna is to be removed/flushed prior to clearing
- Methods for moving denning or nesting animals and/or capture or flushing of ground dwelling animals
- Summary of removal and relocation methods for each faunal group (including observed species and species likely to occur in the area to be disturbed). Faunal groups that have specialist habitats that differ from the general faunal group (for example ground dwelling birds) further descriptions are required
- Details of special equipment required (such as chainsaws, cameras etc)
- Identification of general locations that wildlife will be relocated/translocated to if required (based on habitat requirements)
- Detailed methods for the translocation and protection of significant fauna species known and likely to occur at the site and special considerations for nesting times.
- Information on how the animal is to be protected once relocated
- Methods to euthanise injured animals as well as contact details (including telephone number) and location of the closest vets (and others close by).

4.8 Feral animals

A comprehensive strategic feral animal monitoring and management strategy must be implemented if the fauna corridor is to be effective in providing opportunities for movement and dispersal of native fauna. Interim monitoring and control work and incidental sightings have confirmed wild dogs, foxes, pigs, feral cats and hares are present onsite.

In general terms a holistic management strategy will aim to:

- Identify the types and indicative number of pest animal species found in the area. Develop a management strategy and continue monitoring
- Implement the strategy and as a priority eradicate or reduce the numbers of predatory species such as wild dogs and foxes which prey on koalas, wallabies and small ground mammals
- Eradicate or control feral cats and pigs and other species in order of priority
- Through an ongoing program continue to keep feral animal numbers as low as possible (particularly wild dogs and foxes) to reduce pressure on koalas and macropods.

It is envisaged that the program would be rolled out in a three step process as outlined below.

Table 6: Program development and implementation

Stage	Item	Brief Description
1	Monitoring Program	Establish pest animal presence, and an indication of relative abundance through identification of tracks and photo monitoring. Compilation and assessment of data in a report to establish significant threats to Yarrabilba.
2	Development of Pest Animal Management Strategy	Development of a Pest Animal Management Strategy.
3	Implementation of Management Strategy	Implementation of pest animal operation plans to monitor and reduces pest animal numbers.

4.9 Spotter catcher

A qualified spotter catcher with a current license issued by Queensland Parks and Wildlife must be present to inspect trees to be felled immediately prior to clearing. In particular, the spotter catcher is to inspect the trees for Koalas, nesting birds, microbats and species that use hollows. The nominated contractor must have experience in the management of Koalas and will remain onsite for the duration of the vegetation clearing works. The spotter-catcher will be responsible for guaranteeing that clearing is undertaken in accordance with DERM's Tree Clearing and Trimming, Koala Spotter Requirements. The spotter-catcher and vegetation management contractor must liaise and agree on requirements and a suitable approach before clearing commences. If/where conflicts occur the requirements of the spotter-catcher will take precedence over the vegetation management contractor. To improve chances of survival, animals must not be relocated long distances. Koalas cannot be physically removed, but must be left to move of its own accord.

Further requirements:

- Lend Lease shall appoint a qualified ecologist (spotter catcher) to assess fauna habitat and clearly mark any habitat trees prior to any vegetation removal;
- The ecologist (spotter catcher) will identify and remove fauna from site before any habitat disturbance
- Lend Lease shall ensure all contractors have a copy of the Fauna Management Plan
- The ecologist (spotter catcher) shall outline the contractors role and responsibilities to them prior to any vegetation removal;
- Temporary fencing will be established around areas of vegetation to be retained
- Clearing shall be undertaken in a sequential manner, with fauna management works planned prior to machinery arriving on site for the day
- Injured fauna to be placed in an adequately ventilated box in a quiet and shady location and taken to Queensland Parks and Wildlife Service (QPWS)/veterinary surgery or registered wildlife carer for treatment

4.10 Nest boxes

To promote the retention and diversity of arboreal and tree dwelling native fauna, it is recommended that prior to clearing, nest boxes or similar 'hollow log houses', be incorporated into suitable trees within the fauna corridor and park areas.

While many fauna species use nest boxes for shelter and breeding purposes they should not be considered as a complete substitute to retained tree hollows (Franks, 2003).

Nest boxes can be positioned and designed to attract specific fauna such as cockatoos, gliders, lorikeets, micro-bats, possums or rosellas. In residential areas or urban parklands nest boxes will often be utilised by fauna species which are more adaptable to disturbed areas (such as kookaburras, possums, parrots and cockatoos) and exclude less adaptable species (such as tree creepers, kingfishers, micro-bats and gliders) (Franks, 2003).

The following shall be taken into consideration:

- All possible options to retain a tree with hollows should be taken before considering nest boxes
- Nest boxes shall only be installed in trees by professional arborists who can certify that the nest box is installed in a manner that does not affect the health of the tree

- Nest boxes should be installed high up in the tree to decrease the chances of predation of occupying fauna by cats and goannas.
- The size of the entrance hole of the nest box normally influences the type of fauna using a nest box. Micro-bats and small gliders can enter small holes or gaps (20 – 30mm diametre) while Brushtail possums, some parrots and owls require large entrance holes (100mm diametre)
- The depth of the box is also an important factor; large birds such as owls may require a hollow up to 1m deep. The location and height in the tree where the nest box is positioned should also be considered
- Nest boxes should contain small drainage holes at the base and 20-30mm of hardwood sawdust placed in the box
- A variety of different aspects (north, south, east, and west) should be utilised when siting nest boxes to account for seasons. For example boxes that are placed on the northern side of the tree will generally be warmer in winter and may be used more frequently during cold weather
- Nesting material is not required as this will be brought in by the fauna using the nest box.

4.10.2 Monitoring nest boxes

To ensure the nest boxes are successful, periodic monitoring of the nest boxes is recommended (Franks, 2003). Monitoring on ground can include biannual visitation or installation of video cameras with live feed to publically available web pages. Things to monitor for include:

- Chew marks and scratches around the entrance
- Feral animals
- Damage by storms or falling branches
- Invasion by ant and bee colonies

4.10.3 Deterring introduced species from using nest boxes

All nest boxes should be monitored on a regular basis for habitation by introduced species (Franks, 2003). There are a few actions to keep introduced species out of nest boxes:

- Ensure they are high enough off the ground so they are less likely to be disturbed by dogs, cats and children
- Some nest boxes should be constructed with a baffle in front of the entrance to avoid entry by Mynas and Starlings
- Monitor nest boxes for colonisation by introduced species. Contact a pest controller for eradication if an introduced (feral) species such as bees occupies the nest box.
- Goannas and Diamond Pythons may be attracted to nest boxes, this is a natural process
- Evenly space nest boxes. Don't install them in clusters as this may attract communal species such as Indian Mynas
- Climbing or inspection of the nest box using a ladder for support is not recommended for safety reasons and occupying fauna may also be disturbed by inspections. A more suitable option may be to install a small surveillance camera or undertake external assessments periodically.

4.11 Fauna road crossings

Road mortality has been attributed as a major factor contributing to the decline of many species (van der Ree *et al.* 2008). Overpasses and underpasses can be an effective tool in ensuring safe passage of wildlife between areas of high habitat values, without them succumbing to the effects of traffic pressures. The design of safe passage for fauna will be required for fauna corridor crossings within Yarrabilba. Table 7 provides guidelines for these designs which will be assessed at the Context Plan stage.

Table 7: Summary of Overpasses and Underpasses (adapted from van der Ree et al. 2008)

Title	Description
Overpass*	**Allows passage of animals above the road**
Land bridge	Also known as eco-duct or wildlife bridge. This is a (typically) wide (30 – 70 metres) bridge that extends over the road. The bridge has soil on it, and is planted with vegetation and enhanced with other habitat features (e.g. logs, rocks, water-body etc)
Overpass (small roads)	This bridge above the major linear infrastructure is typically to allow human access across the road. This overpass is typically narrow and not hourglass shaped. The road on the overpass is typically a minor road – it may be unsealed, single lane etc.
Canopy bridge	This is a rope or pole suspended above the traffic, either from vertical poles or from trees. Typically installed for arboreal and scansorial species
Glider pole	These are vertical poles placed in the centre median or on the road verge, and provide species that glide intermediate landing and launch opportunities.
Local traffic management	Devices to reduce the speed or volume of traffic – e.g. road closures, chicanes, crosswalks, lighting, signage
Underpass*	**Allows the passage of animals below the major linear infrastructure**
Culvert	Culverts are typically square, rectangular or half-circle in shape and may be purpose built for fauna passage or water drainage, or a combination of both. They are typically precast concrete cells or arches made of steel. By definition, culverts were originally used to carry water. However, engineers and road designers are familiar with the size and shape of culverts, and hence we suggest the continued use of the term culvert to describe this type of underpass.
Tunnel	Tunnels are typically round pipes of relatively small diameter (e.g. < 1.5 metres diameter). May also be termed 'eco-pipe'.
Bridge	A bridge is a structure that maintains the grade of the road or elevates the traffic above the surrounding land, allowing animals the opportunity to pass under the road. When used to mitigate the barrier effect of linear infrastructure, the primary function is often to facilitate water drainage or the movement of local human traffic, and secondarily to facilitate the passage of wildlife
Non-Structural Mitigation	**This type of mitigation allows for sensitive road designs that facilitate 'natural' permeability**

Title	Description
Canopy connectivity	The width of the linear clearing is kept sufficiently small to allow the tree canopy to remain continuous above the clearing, or where not continuous, sufficiently small to allow gliders (and other volant species) to safely traverse the clearing
At-grade crossings	Vegetation or other habitat features (e.g. rocks, fallen timber) are strategically planted or allowed to regrow such that animals are directed to preferred crossing locations where they are required to cross the linear infrastructure without the aid of any structures (i.e. similar to a pedestrian crossing)
Elevating the linear infrastructure	The road or powerline is elevated above the vegetation to minimise clearing (clearing only required for bridge piers or pylons) and allow natural vegetation to grow under the infrastructure
Corridor plantings	Are strips of vegetation, similar to that on either side of the linear clearing that traverse the clearing and provide corridors for animal movement.

The design of safe fauna passage for fauna will be undertaken across the site to facilitate movement and reduce negative human interactions (i.e. car/animal collisions). The two primary road crossing treatments to be implemented are identified in table 7 and will be located through an assessment process which takes into account corridor type, corridor width topography, connectivity, vegetation cover, potential functionality etc. At this time it is envisaged that suitable under-road large culvert type structures will be used for the main corridor crossings (where roads bisect the primary fauna corridors) at grade crossings would be utilised where roads bisect secondary fauna corridors and these would include slow zone treatments.

In relation to the Waterford-Tamborine Road crossing Lend Lease has committed (although it does not own the land in question), to liaise in good faith with the Department of Transport and Main Roads to provide a suitable outcome for fauna movement.

Photograph 1: Aerial fauna crossing in the Karuah Bypass on the Pacific Highway (Photos courtesy of David Bax, [Thiess Pty Ltd] 2006).

Photograph 3: Culvert facilitating wildlife movement under the East Evelyn Rd in Atherton Tablelands, QLD (Photos courtesy of van der Ree *et al.* 2008).

4.12 Fauna guidance fencing

Fauna exclusion or guidance fencing may be used in specific locations of the site in order to guide fauna to overpasses, underpasses and culverts. By utilising this type of fencing, it will prevent the fauna from gaining access to busy roads on their way to higher habitat areas, and guide them through the overpasses, underpasses and culverts safely. Design of fauna guidance fencing may be required at Yarrabilba and should also consider CPTED principles and aesthetic values. Table 8 provides fauna requirement guidelines for these designs.

Table 8: Fauna guidance fence requirements (adapted from Koala Safety Fencing and Measures Guideline, Queensland Government, 2009)

Option	Fencing requirements	Application of fencing
Option A	Fencing material is unclimbable such as: • brick • metal sheeting • perspex or • timber Fencing must be without gaps between fencing.	Koala exclusion fencing prohibits the movement of Koalas and reduces the permeability of a site or area. It is therefore only to be used where it can be demonstrated that it will prevent Koalas from entering an area that poses a direct threat to their safety. Only the following applications are suitable for the use of Koala exclusion fencing: (1) Fencing is used on domestic dog enclosures within larger properties greater than or equal to 800 m2 (small lot properties should adopt other measures to reduce dog and Koala interactions); or (2) Fencing safeguards Koalas from high speed/high volume roads or train lines by funnelling Koalas to where safe crossing structures (fauna underpasses or overpasses) have been installed; or (3) Pool fencing where pool design is unsafe for Koalas; or (4) Temporary fencing that prohibits access to areas where construction or operational activities may cause harm to Koalas, such as pits/trenches which may trap Koalas.
Option B	Fencing material is: • chain wire with a floppy top that falls in the direction that the Koala will attempt to climb the fence.	
Option C	Fencing material is: • climbable but incorporates smooth sheeting or Perspex of at least 600 mm in width on the top of the fence (including posts and supports)	
Additional Requirements	Additional requirements for Options A-C: (1) Fence bracing/supports are on the inside of the fence; and (2) The top of the unclimbable section of fencing is at least 1.5 m from the ground to prohibit Koalas jumping up from the ground and gripping the top of the fencing; and (3) Fencing has a gap of less than 100 mm between the ground and the fence; and (4) Vegetation adjacent to the fence is maintained to: a. exclude trees and shrubs from within 3 m of the fence; and b. keep canopies of trees trimmed to remove links to tree canopies on the other side of the fence; and c. remove fallen branches and vines growing on the fence to maintain fence effectiveness.	

4.13 Fauna signage, awareness and education

An educational program for residents aimed at minimising their impacts and establishing eco-friendly outdoors environments will include a section with fauna specific information. One of the key themes would be 'responsible pet ownership'. The program could include a brochure/information booklet, regular newsletters, reminders, information sessions, activities and signage.

Lend Lease have rolled out similar responsible pet ownership programs on other development sites, with the protection of environmental values in mind. This type of program would be ideal for Yarrabilba and would contribute to the effective functioning of the fauna corridor. The five point strategy would include:

1. A regular newsletter that reminds pet owners that they need to keep pets within their boundary or on leashes in approved public areas
2. Access to a 'pet community' section of a website portal for Yarrabilba. This online resource reminds people of their legal responsibilities and also has a pet register so that stray animals can be easily identified
3. Owner education sessions that focuses on dog behaviour
4. Allocation of an 'off leash' area for dogs, which helps reinforce the underlying message that animals are required to be under control and on-leash at all other times
5. Interpretative signage will be produced and installed as permanent signs at strategic locations near the pathway entrances to fauna corridors explaining the purpose of these areas and identifying restricted access.

In addition, fauna signage and/or painted 'wildlife crossings' can be utilised where fauna crossings intersect roadways to advise of fauna presence. Reducing speed limits around these areas has also proven to be an effective tool in reducing fauna mortality.

Interpretive signage and fact/awareness newsletters should also be utilised to ensure the community is aware that koalas are present within Yarrabilba. Themes could include koala habitat and food trees, koala threats (dogs and cars) and koala protection status. This information can be a vital aid in educating residents as to the presence of Koalas in their area and what they can do to ensure that they have a sustainable future within their neighbourhood.

4.14 Reporting

For the purpose of addressing specific requirements of the fauna corridors, a number of assessments, plans and reports are required as the development progresses in order to successfully facilitate a fully functional network of fauna corridors throughout the site (Table 9). These include, but are not limited to addressing items highlighted in Section 4 of this report:

Table 9: Reporting requirements for fauna corridor

Item	Reporting requirements*
Nest boxes	• Fauna Management Plan • Nest Box Management and Monitoring Plan
Overpass/underpass/culvert	• Fauna Management Plan • Wildlife Crossing Plan and Monitoring Plan
Rehabilitation of fauna corridors	• Rehabilitation Management Plan • Vegetation Management Plan (Operational works

	level) • Tree Clearing Plan
Spotter catcher	• Spotter catcher assessment • Staged Fauna Management Plan (3 month currency period)
Fauna fencing	• Fauna Management Plan • Fauna Fencing Management and Monitoring Plan
Kangaroo management	• Kangaroo Management Strategy
Koala management	• Koala Management Plan • Offset plan for Koala habitat areas as prescribed within the UDLA Guideline no.17
Significant trees	• Tree Clearing Plan • Vegetation Management Plan (Operational works level)
Feral animals	• Feral Animal Management Plan

*These may be incorporated into the Fauna Management Plan prepared for each Context Plan stage.

5 Monitoring

A monitoring framework sets out the basic requirements of an environmental monitoring program. It will be important to develop a full monitoring program in the fauna corridors and undertake baseline monitoring prior to the vegetation management treatments being applied. This will be critical to ensure that any change, either positive or negative, brought about by the applied treatments can be identified and/or modified.

There are many different types and levels of monitoring that can be used for identifying change in vegetation communities. These include looking at parametres such as presence/absence, growth, percentage of cover, total biomass, species richness etc. For a monitoring program such as this it is best to keep the requirements relatively simple to ensure that it is quick and easy to apply (about 15 -20 minutes for each site) and is not a major economic burden. Therefore, a relatively robust but simple monitoring program, as outlined below, would be sufficient to identify any major changes within treatment zones. Following appropriate monitoring, management prescriptions can be adjusted to bring about any necessary changes (adaptive management).

Pre monitoring design, setup and the capture of baseline information is to occur as follows:

1) Develop a pre-determined data sheet that will allow for the capture of approximately 8 - 15 of the main flora indicator species to be captured along with details about the height and health of the plants. A column should be provided to tally the total number of each species. Other parametres such as leaf litter, weeds and erosion should also be captured.
2) Randomly select a minimum of one site per vegetation type and treatment throughout the property (i.e. 1 x acacia burnt with follow up slashing, 1 x acacia slashed with follow up weed control, 1 x acacia mega-mulched with follow up slashing, etc). Upon completion of this process there may be 30 - 60 sites.
3) Take a GPS point of the location where the quadrat will be set up and capture the general condition of the vegetation within a 5 m x 5 m area to establish the baseline condition.
4) After the initial treatment (e.g. fire, slashing, mega-mulching, etc.) set up one 5 m x 5 m quadrat for each selected site using 4 star pickets to mark out the area (refer to Appendix 2).

The monitoring program is to occur as follows:

1) Monitor twice per year with one visit during winter and one during summer during construction and each year up to five years after construction
2) Take a photograph from a predetermined point that has been set up with a directional arrow to ensure consistency between future photographs
3) On the data sheet record the location, GPS coordinates, the date and photograph number
4) Identify each species and count and measure plant heights
5) Fill in the remainder of the data sheet with the flora information and associated ecological data.

A full monitoring program, based on the monitoring framework provided in this report, is to be developed with monitoring implemented prior to works being undertaken.

6 Development Staging

The Yarrabilba Urban Development is a staged development which will undertaken over approximately thirty years. At each Context Plan stage, appropriate fauna assessment, management and monitoring is to be undertaken, where required, as outlined in this document. Refer to Appendix 4 which depicts priority treatment zones within the corridors.

Figure 5: Yarrabilba Residential Development Staging Plan

YARRABILBA

ZONES

2015-2020 INDICATIVE DEVELOPMENT DATE

NOTE:
This plan illustrates the proposed provision of community greenspace, major roads, public transport and cycle / path infrastructure at Yarrabilba and their indicative locations. The land development rates nominated on this plan correspond with the anticipated 30 year development period for Yarrabilba and the likely timing of provision of the movement network. The final locations of the community greenspaces will be determined in the context area plans to be prepared.

The boundaries shown hereon are subject to detailed engineering design, final survey and approval of subsequent development applications by the relevant authorities.

Yarrabilba
Indicative Staging Plan

0 300 600 900 1200 1500 m

Scale 1:30 000 at A3

North

File No. D3.7

Dgn No. YAR-IA-STG121002

Date 02 OCT 2012

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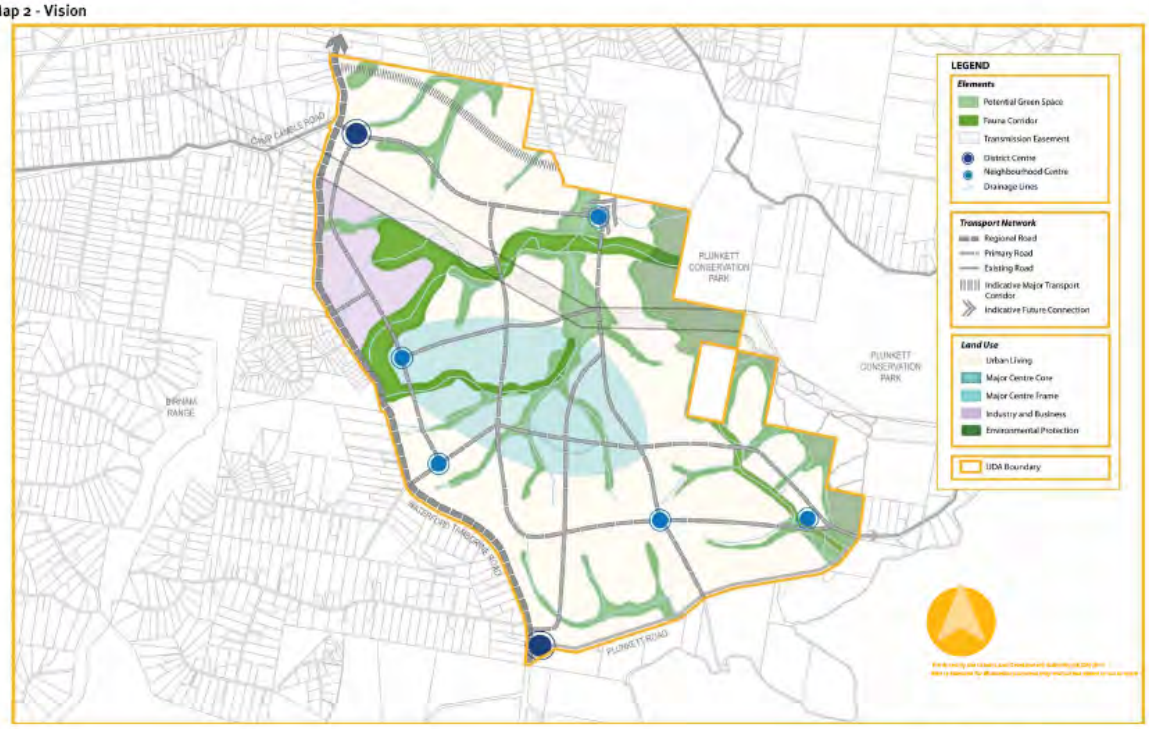
8 Appendices

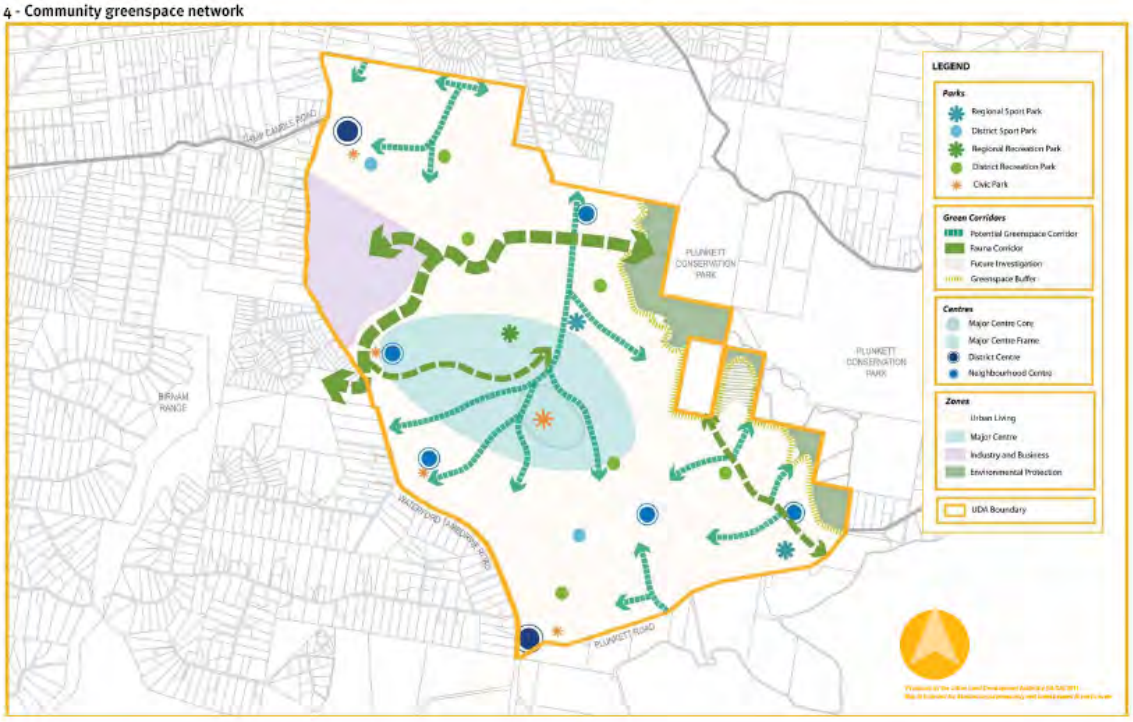
APPENDIX 1 – Map 2 and 4 of the ULDA Development Scheme

Map 2 - Vision



Yarrabilba Urban Development Area Development Scheme

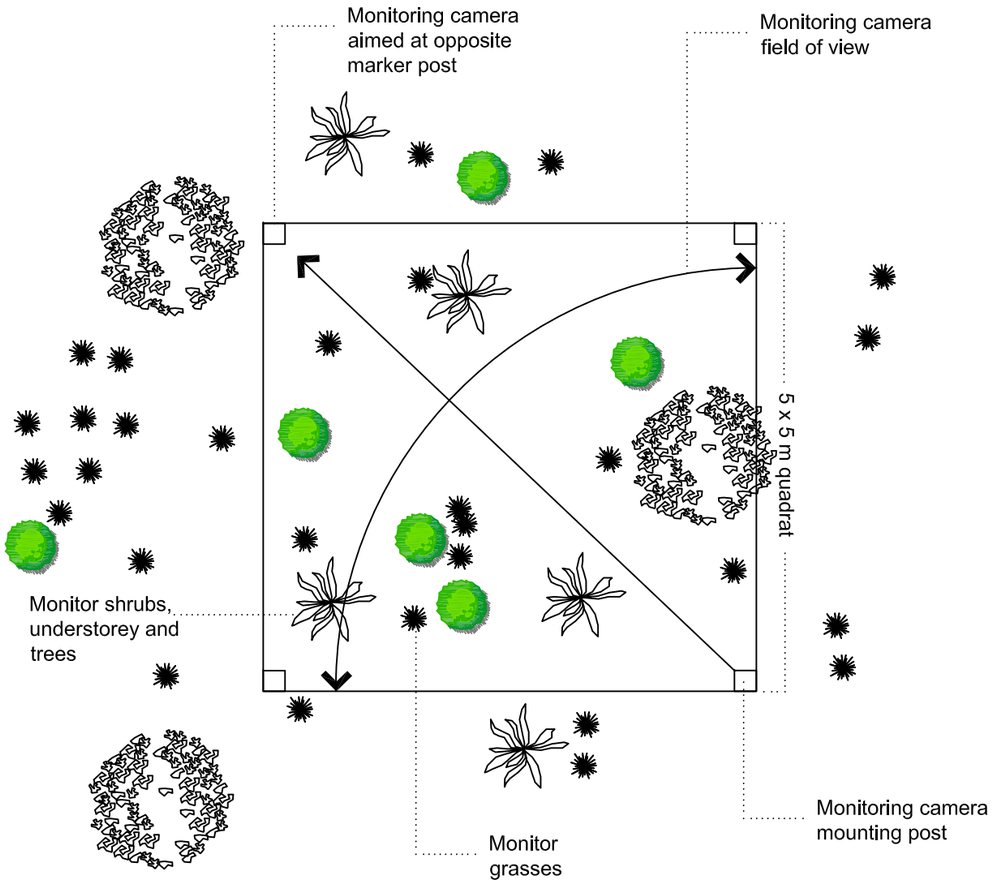
Map 4 - Community greenspace network



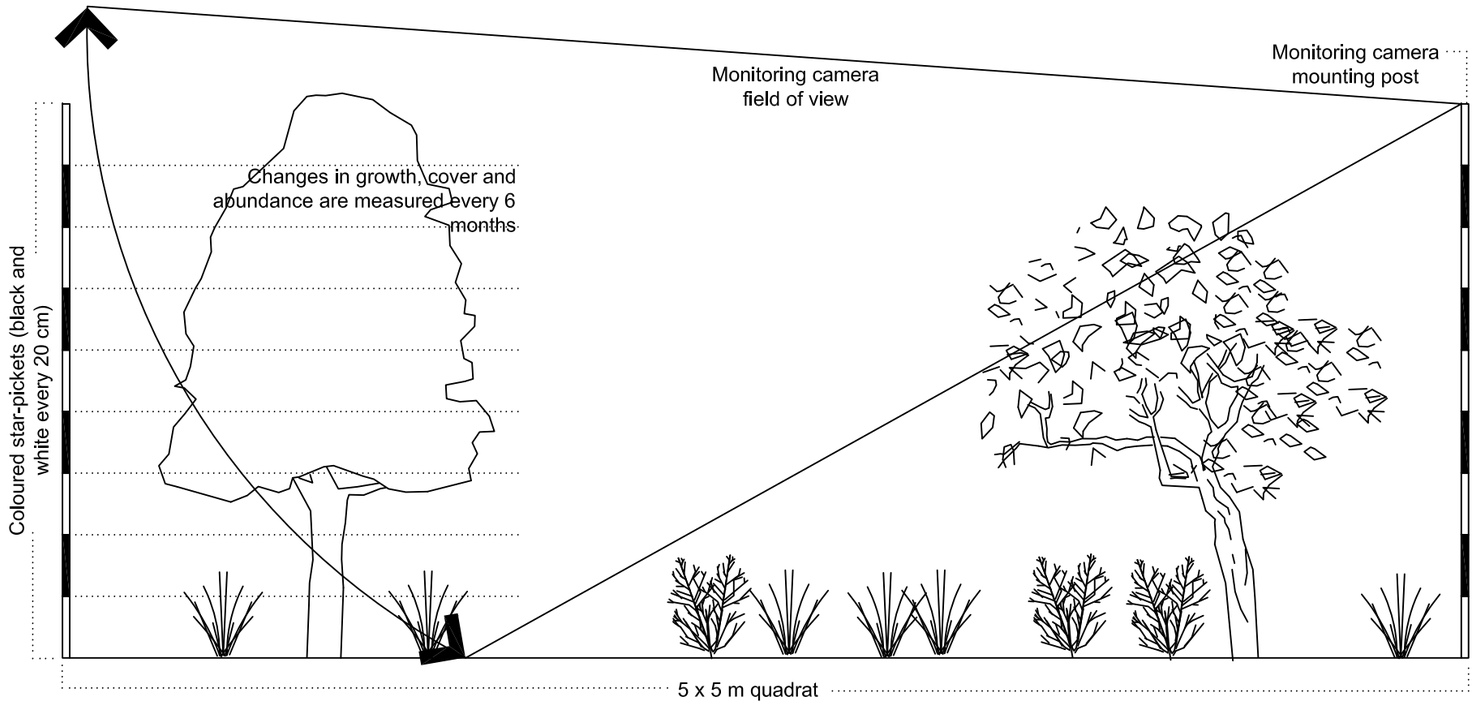
Yarrabilba Urban Development Area Development Scheme

APPENDIX 2 – Monitoring Plan Setup

MONITORING PLOT SET-UP



PLAN VIEW (nts)



SIDE VIEW (nts)

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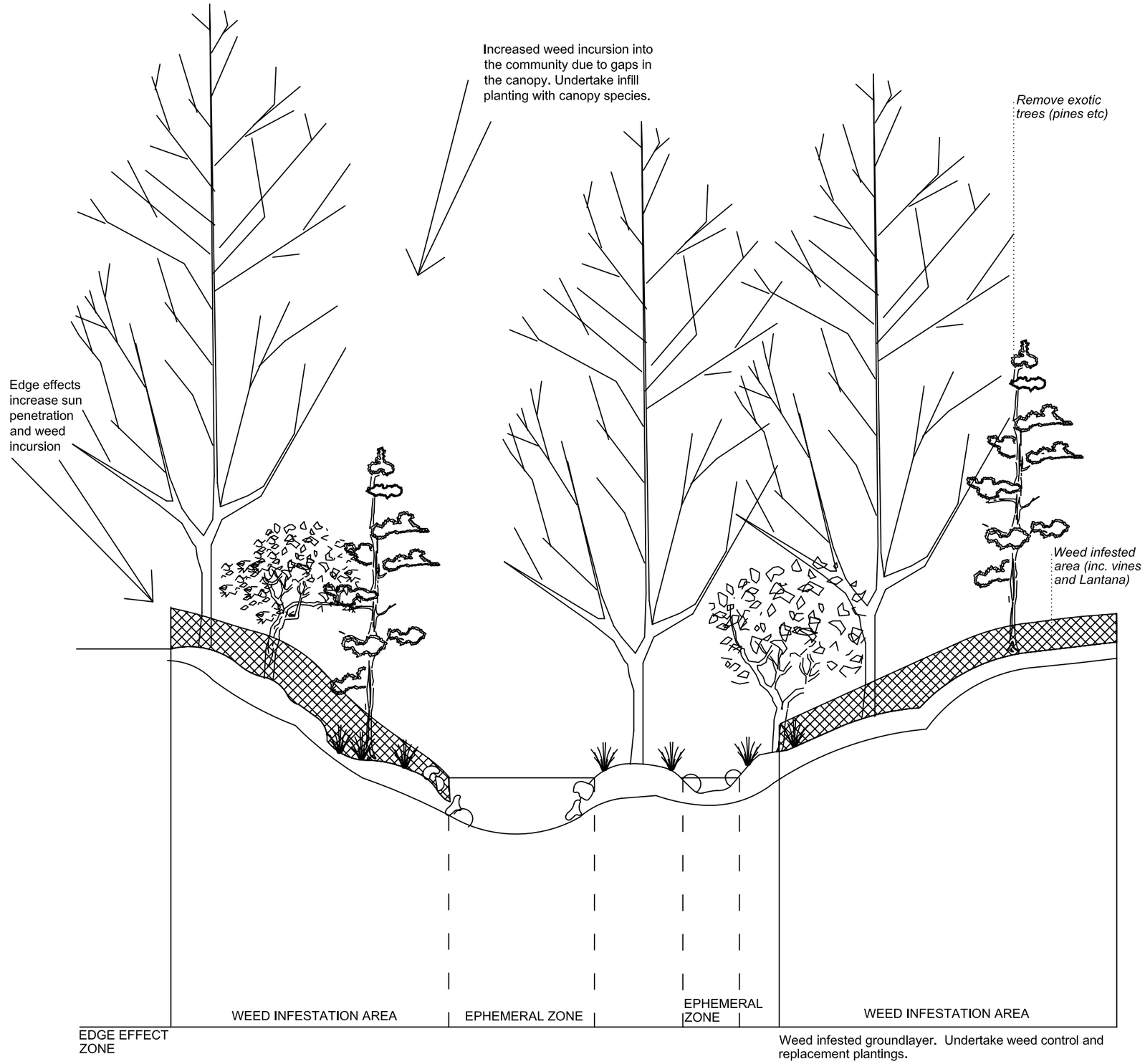
Drawing Title: Monitoring Plan: Quadrat Set-up	Client: Lend Lease		Associated Consultants: Bushcare Services
Project Name: Yarrabilba	Location: Yarrabilba	QA: Drawn by: KR; Checked by: ST; Date: 25 April 2012; Drawing #: NCO110011_MCI-1_03; Amendment #: A	

Concept Only: Not To Scale

APPENDIX 3 – Corridor Cross Sections

PRIOR TO TREATMENT



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Drawing Title: Corridor Pre Rehabilitation

Client: Lend Lease

Associated Consultants: Bushcare Services

Project Name: Yarrabilba

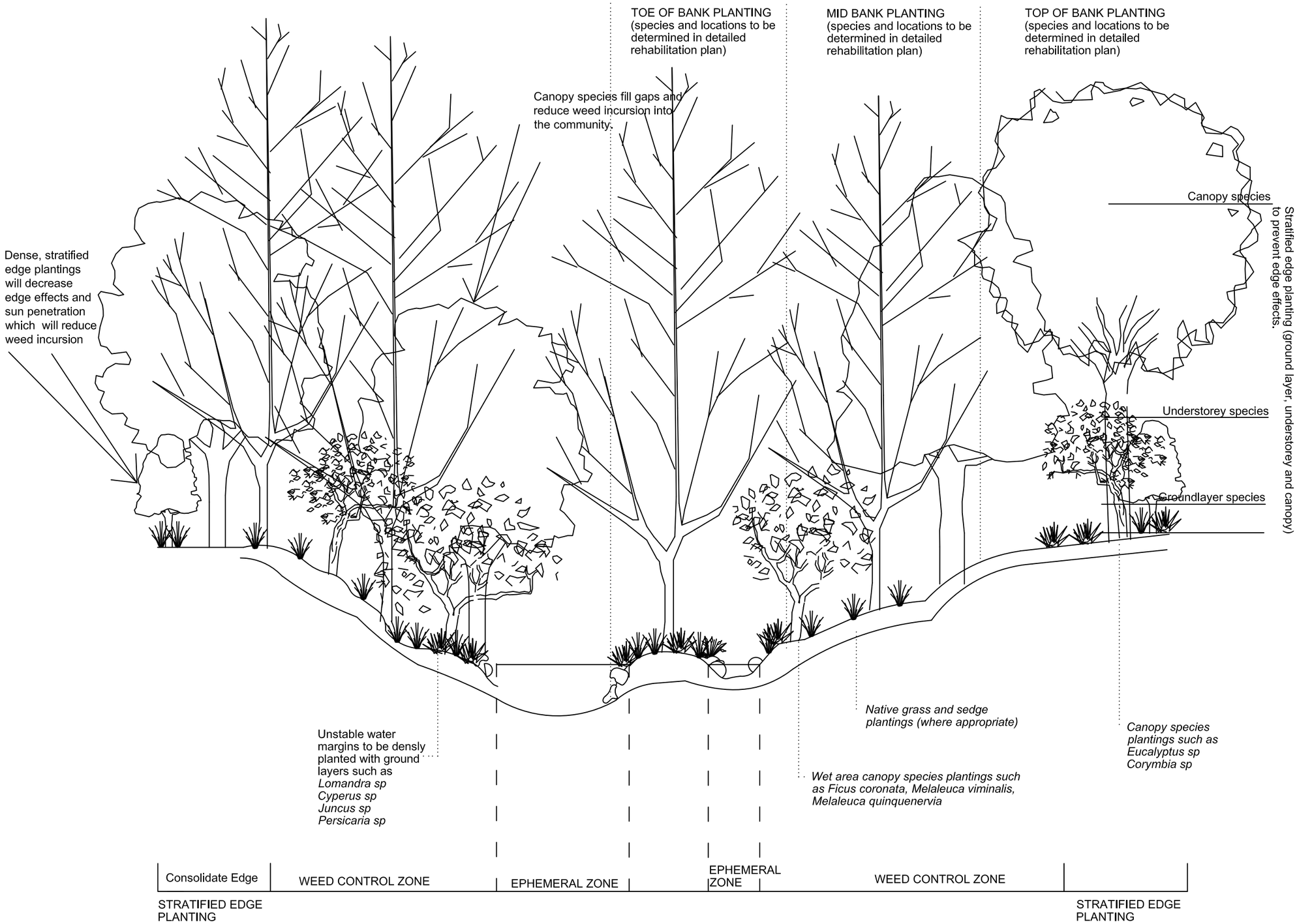
Location: Yarrabilba

QA:

Drawn by: KR
Checked by: ST
Date: 3 June 2012
Drawing #: NCO110011_MCI-Y_01
Amendment #: A

Concept Only: Not To Scale

POST TREATMENT



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Drawing Title: Corridor Post Rehabilitation

Project Name: Yarrabilba

Client: Lend Lease

Location: Yarrabilba

QA:

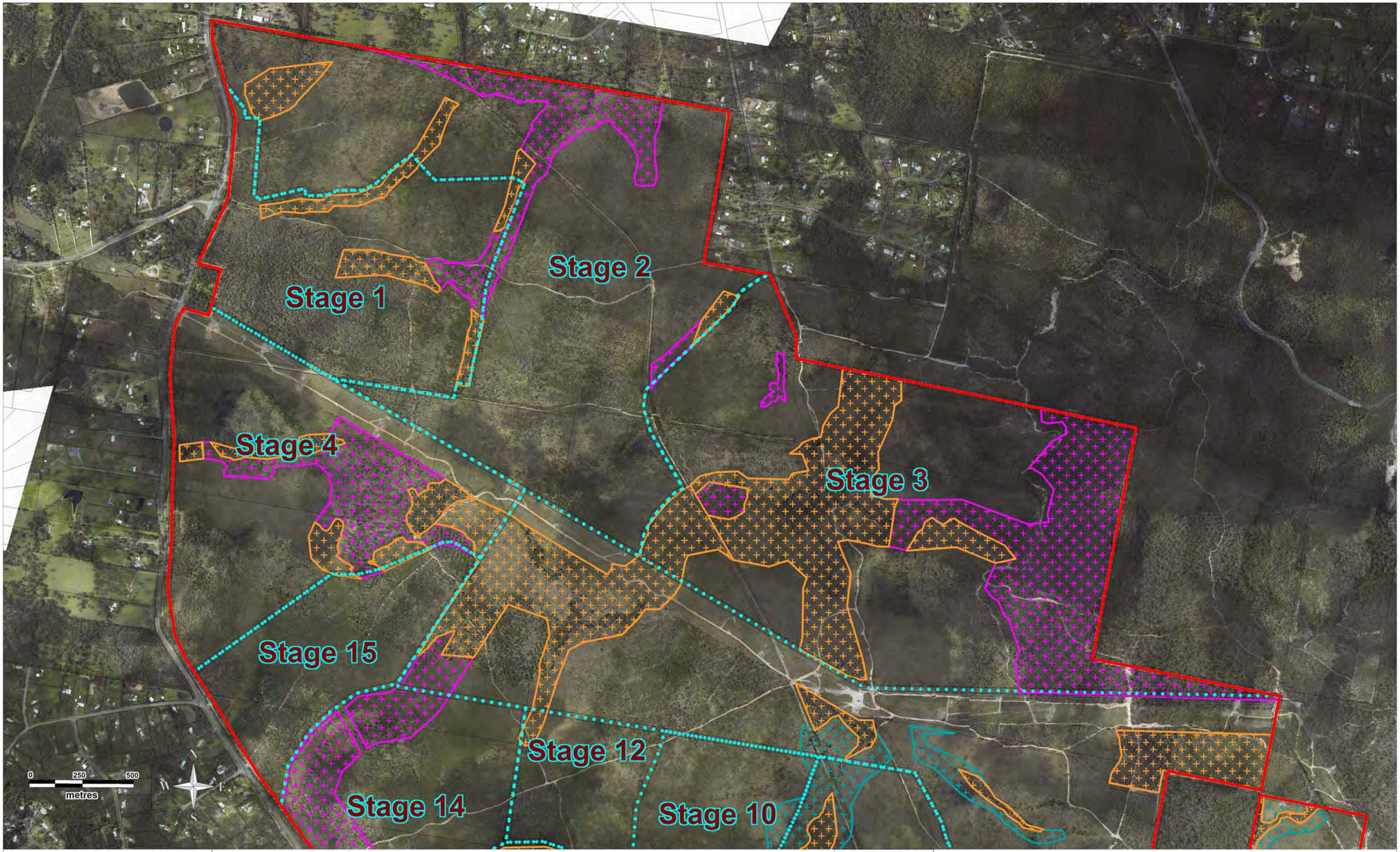
Drawn by: KR
Checked by: ST
Date: 18 May 2012
Drawing #: NC0110011_MCU-X_02
Amendment #: A

Associated Consultants:

Bushcare Services

Concept Only: Not To Scale

APPENDIX 4 - Priority Sections of Greenspace Corridors



NATURA CONSULTING

CorridorTreatment Priority (North)

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Job Number: NCO11-0011	Drawn: M.B	Date: 06-09-2012
Client: Lend Lease	Checked: K.R	Paper: A3

Legend

- Site Boundary
- Staging Plan Boundary
- Low Priority (Corridor)
- Medium Priority (Corridor)
- High Priority (Corridor)

CorridorTreatment Priority (South)

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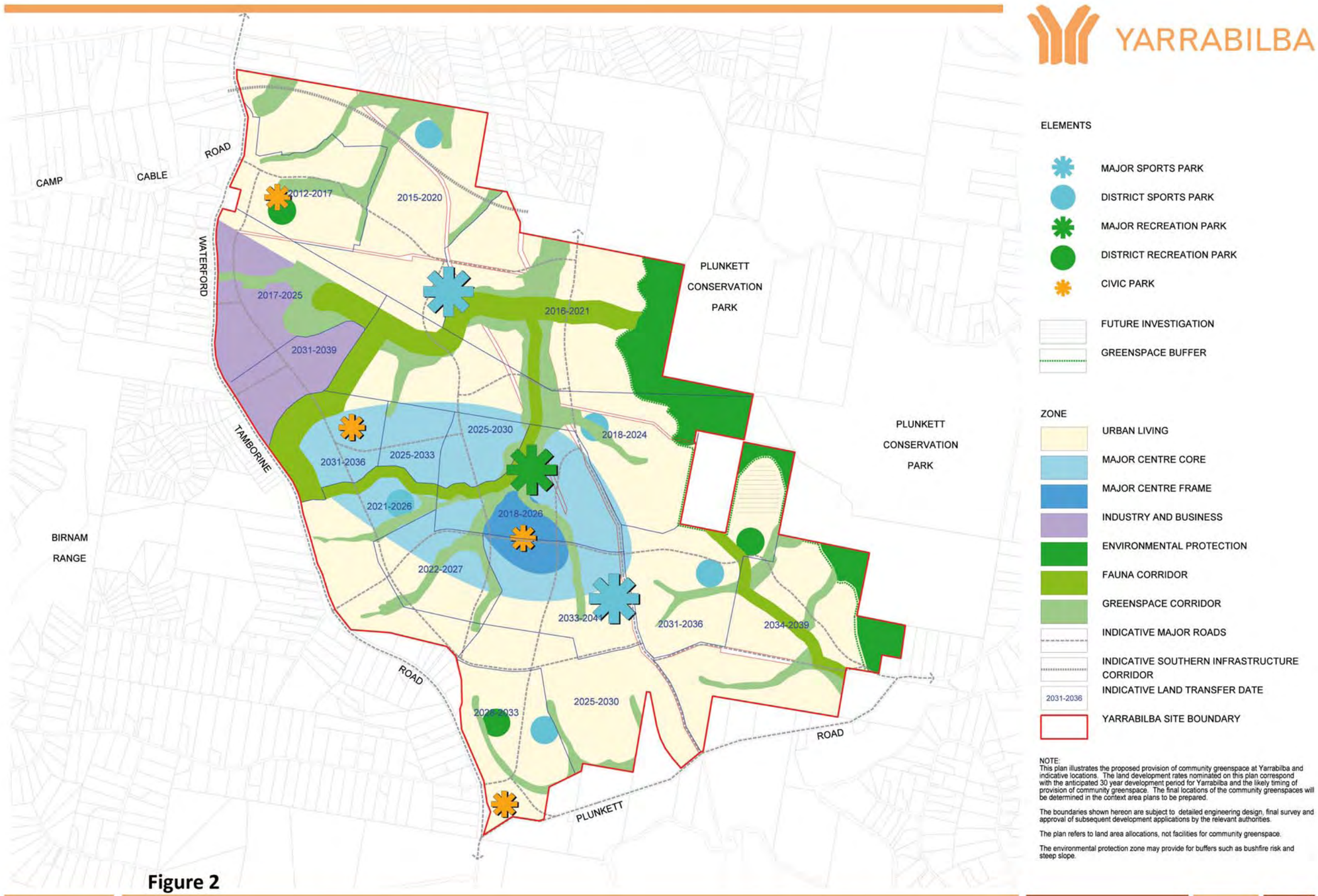
Job Number: NCO11-0011	Drawn: M.B	Date: 06-09-2012
Client: Lend Lease	Checked: K.R	Paper: A3

Legend

- Site Boundary
- Staging Plan Boundary
- Low Priority (Corridor)
- Medium Priority (Corridor)
- High Priority (Corridor)

APPENDIX 5 – Park Locations in Relation to Greenspace and Fauna Corridors

Lend Lease



YARRABILBA

ELEMENTS

- MAJOR SPORTS PARK
- DISTRICT SPORTS PARK
- MAJOR RECREATION PARK
- DISTRICT RECREATION PARK
- CIVIC PARK
- FUTURE INVESTIGATION
- GREENSPACE BUFFER

ZONE

- URBAN LIVING
- MAJOR CENTRE CORE
- MAJOR CENTRE FRAME
- INDUSTRY AND BUSINESS
- ENVIRONMENTAL PROTECTION
- FAUNA CORRIDOR
- GREENSPACE CORRIDOR
- INDICATIVE MAJOR ROADS
- INDICATIVE SOUTHERN INFRASTRUCTURE CORRIDOR
- 2031-2036 INDICATIVE LAND TRANSFER DATE
- YARRABILBA SITE BOUNDARY

NOTE:
This plan illustrates the proposed provision of community greenspace at Yarrabilba and indicative locations. The land development rates nominated on this plan correspond with the anticipated 30 year development period for Yarrabilba and the likely timing of provision of community greenspace. The final locations of the community greenspaces will be determined in the context area plans to be prepared.

The boundaries shown hereon are subject to detailed engineering design, final survey and approval of subsequent development applications by the relevant authorities.

The plan refers to land area allocations, not facilities for community greenspace.

The environmental protection zone may provide for buffers such as bushfire risk and steep slope.

Figure 2

Community Greenspace Infrastructure Master Plan

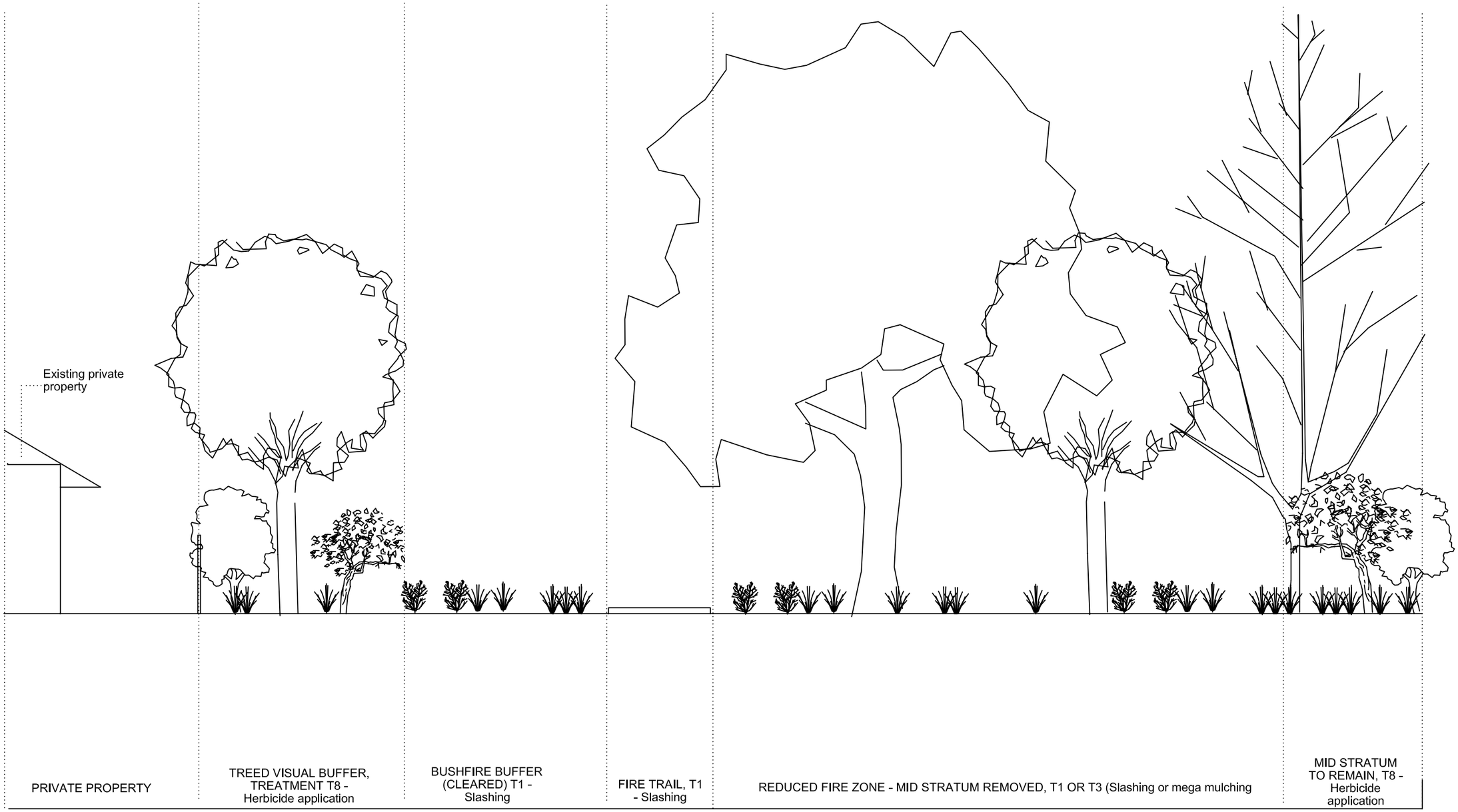
File No. D3.7

Dgn No. YAR-IA-OS120703

Date 05 JUL 2012

APPENDIX 6 - Bushfire Management Details

POST TREATMENT



CONCEPT DRAWINGS ONLY. REFER TO BUSHFIRE MANAGEMENT PLAN FOR FINAL / APPROVED DRAWINGS.

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Drawing Title: Fire Buffer Treatment: Visual Buffer

Client: Lend Lease

Project Name: Yarrabilba

Location: Yarrabilba

QA:
Drawn by: KR
Checked by: ST
Date: 16 May 2012
Drawing #: NC0110011_VMS-V_01
Amendment #: B

Associated Consultants:

Bushcare Services
and
Bushland Protections Systems

Concept Only: Not To Scale

APPENDIX 7 – Wildlife Online Database Results

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: 27.8206
Longitude: 153.1247
Distance: 5
Email: michael.brett@natura-pacific.com
Date submitted: Thursday 22 Mar 2012 11:08:58
Date extracted: Thursday 22 Mar 2012 11:10:10

The number of records retrieved = 436

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			11
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		7
animals	amphibians	Hylidae	*Litoria dentata*	bleating treefrog		C		2
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		2
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		4
animals	amphibians	Hylidae	*Litoria brevipalmata*	green thighed frog		NT		2
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		4
animals	amphibians	Hylidae	*Litoria gracilenta*	graceful treefrog		C		3
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		2
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		9
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		5
animals	amphibians	Myobatrachidae	*Crinia signifera*	clicking froglet		C		1
animals	amphibians	Myobatrachidae	*Pseudophryne raveni*	copper backed broodfrog		C		6/4
animals	amphibians	Myobatrachidae	*Crinia parinsignifera*	beeping froglet		C		1
animals	amphibians	Myobatrachidae	*Mixophyes fasciolatus*	great barred frog		C		1
animals	amphibians	Myobatrachidae	*Pseudophryne coriacea*	red backed broodfrog		C		6
animals	amphibians	Myobatrachidae	*Pseudophryne major*	great brown broodfrog		C		1
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		3
animals	birds	Acanthizidae	*Gerygone mouki*	brown gerygone		C		1
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		8
animals	birds	Acanthizidae	*Sericornis magnirostra*	large-billed scrubwren		C		1
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		1
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		3
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		1
animals	birds	Acanthizidae	*Chthonicola sagittata*	speckled warbler		C		3
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		1
animals	birds	Acanthizidae	*Gerygone albogularis*	white-throated gerygone		C		6
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		4
animals	birds	Accipitridae	*Pandion cristatus*	eastern osprey		C		1
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		2
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		2
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		1
animals	birds	Accipitridae	*Hieraaetus morphnoides*	little eagle		C		1
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		2
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		1
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		2
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		1
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		1
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		1
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		7
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		8
animals	birds	Anatidae	*Anas rhynchotis*	Australasian shoveler		C		1
animals	birds	Anatidae	*Anas castanea*	chestnut teal		C		2
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		3
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		3
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		C		1
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		C		1
animals	birds	Ardeidae	*Ardea ibis*	cattle egret		C		3
animals	birds	Ardeidae	*Ardea modesta*	eastern great egret		C		2
animals	birds	Ardeidae	*Egretta sacra*	eastern reef egret		C		1
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		3
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		2
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		4
animals	birds	Artamidae	*Cracticus tibicen*	Australian magpie		C		15
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		8
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		13
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		10
animals	birds	Artamidae	*Artamus cyanopterus*	dusky woodswallow		C		1
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		5
animals	birds	Cacatuidae	*Calyptorhynchus funereus*	yellow-tailed black-cockatoo		C		1
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		2
animals	birds	Cacatuidae	*Eolophus roseicapillus*	galah		C		5
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		1
animals	birds	Campephagidae	*Coracina tenuirostris*	cicadabird		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		17
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		1
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		4
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		2
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		NT		1
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		2
animals	birds	Climacteridae	*Cormobates leucophaea*	white-throated treecreeper		C		5
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		5
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		2
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		6
animals	birds	Columbidae	*Streptopelia chinensis*	spotted dove	Y			2
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		5
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		4
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		26
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		1
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		2
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		2
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		1
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		3
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		4
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		4
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		3
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		5
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		3
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		2
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		1
animals	birds	Haematopodidae	*Haematopus fuliginosus*	sooty oystercatcher		NT		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		15
animals	birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher		C		1
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		4
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		6
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		3
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		2
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		1
animals	birds	Laridae	*Thalasseus bergii*	crested tern		C		1
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		9
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		6
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		4
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		2
animals	birds	Meliphagidae	*Ptilotula fuscus*	fuscous honeyeater		C		5
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		8
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		7
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		14
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		8
animals	birds	Meliphagidae	*Nesoptilotis leucotis*	white-eared honeyeater		C		1
animals	birds	Meliphagidae	*Acanthorhynchus tenuirostris*	eastern spinebill		C		4
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		2
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		15
animals	birds	Meliphagidae	*Anthochaera chrysoptera*	little wattlebird		C		3
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		3
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		14
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		12
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		20
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		1
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		2
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		3
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		10
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		1
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		5
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		7
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		9
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		4
animals	birds	Pachycephalidae	*Falcunculus frontatus*	crested shrike-tit		C		1
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		4
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		16
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		13
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		19
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		9
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			1
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		1
animals	birds	Petroicidae	*Petroica rosea*	rose robin		C		7
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		1
animals	birds	Petroicidae	*Petroica boodang*	scarlet robin		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		6
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		1
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		2
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		1
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		3
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		3
animals	birds	Psittacidae	*Platycercus eximius*	eastern rosella		C		1
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		17
animals	birds	Psittacidae	*Glossopsitta pusilla*	little lorikeet		C		11
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		10
animals	birds	Psittacidae	*Alisterus scapularis*	Australian king-parrot		C		1
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		7
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		3
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		1
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		3
animals	birds	Rallidae	*Porphyrio porphyrio*	purple swamphen		C		5
animals	birds	Recurvirostridae	*Himantopus himantopus*	black-winged stilt		C		1
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		15
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		15
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		2
animals	birds	Sturnidae	*Sturnus tristis*	common myna	Y			1
animals	birds	Sturnidae	*Sturnus vulgaris*	common starling	Y			1
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		2
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		4
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		5
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		10
animals	birds	Turnicidae	*Turnix varius*	painted button-quail		C		1
animals	bony fish	Ceratodontidae	*Neoceratodus forsteri*	Australian lungfish			V	1
animals	insects	Nymphalidae	*Danaus plexippus plexippus*	monarch				2
animals	mammals	Canidae	*Vulpes vulpes*	red fox	Y			2
animals	mammals	Leporidae	*Lepus capensis*	brown hare	Y			3
animals	mammals	Macropodidae	*Macropus parryi*	whiptail wallaby		C		2
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		2/1
animals	mammals	Macropodidae	*Macropus dorsalis*	black-striped wallaby		C		7/6
animals	mammals	Macropodidae	*Macropus rufogriseus*	red-necked wallaby		C		23/20
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		4
animals	mammals	Molossidae	*Tadarida australis*	white-striped freetail bat		C		1
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		1
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		2
animals	mammals	Phascolarctidae	*Phascolarctos cinereus (southeast Queensland bioregion)*	koala (southeast Queensland bioregion)		V		56
animals	mammals	Pseudocheiridae	*Petauroides volans*	greater glider		C		1
animals	mammals	Pseudocheiridae	*Pseudocheirus peregrinus*	common ringtail possum		C		1
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		3
animals	reptiles	Diplodactylidae	*Oedura lesueurii*	Lesueur's velvet gecko		C		1
animals	reptiles	Elapidae	*Vermicella annulata*	bandy-bandy		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Elapidae	*Cryptophis nigrescens*	eastern small-eyed snake		C		1
animals	reptiles	Scincidae	*Anomalopus verreauxii*			C		1/1
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		2
animals	reptiles	Scincidae	*Eulamprus tenuis*			C		1
animals	reptiles	Scincidae	*Lygisaurus foliorum*			C		2
fungi	club fungi	Basidiomycota	*Hydnum*			C		1/1
fungi	club fungi	Basidiomycota	*Panus fasciatus*			C		1/1
fungi	club fungi	Basidiomycota	*Boletus*			C		1/1
fungi	sac fungi	Cladiaceae	*Cladia aggregata*			C		1/1
plants	conifers	Pinaceae	*Pinus elliottii*	slash pine	Y			1/1
plants	conifers	Podocarpaceae	*Podocarpus spinulosus*	dwarf plum-pine		C		3/2
plants	ferns	Adiantaceae	*Adiantum hispidulum*			C		1
plants	ferns	Adiantaceae	*Cheilanthes distans*	bristly cloak fern		C		1
plants	ferns	Adiantaceae	*Cheilanthes sieberi*			C		3
plants	ferns	Blechnaceae	*Doodia caudata*			C		1
plants	ferns	Davalliaceae	*Davallia pyxidata*			C		1
plants	ferns	Dennstaedtiaceae	*Pteridium esculentum*	common bracken		C		2
plants	ferns	Lindsaeaceae	*Lindsaea microphylla*	lacy wedge fern		C		1
plants	ferns	Polypodiaceae	*Drynaria rigidula*			C		3
plants	ferns	Schizaeaceae	*Schizaea bifida*	forked comb fern		C		2
plants	higher dicots	Acanthaceae	*Brunoniella australis*	blue trumpet		C		2
plants	higher dicots	Acanthaceae	*Hygrophila angustifolia*			C		1/1
plants	higher dicots	Acanthaceae	*Pseuderanthemum variabile*	pastel flower		C		3
plants	higher dicots	Apiaceae	*Platysace ericoides*	heath platysace		C		8/2
plants	higher dicots	Apocynaceae	*Parsonsia straminea*	monkey rope		C		1
plants	higher dicots	Apocynaceae	*Hoya australis subsp. australis*			C		1
plants	higher dicots	Araliaceae	*Astrotricha longifolia*	star hair bush		C		4
plants	higher dicots	Asteraceae	*Epaltes australis*	spreading nutheads		C		1
plants	higher dicots	Asteraceae	*Cyanthillium cinereum*			C		1
plants	higher dicots	Asteraceae	*Brachyscome microcarpa*			C		1/1
plants	higher dicots	Asteraceae	*Sigesbeckia orientalis*	Indian weed		C		1
plants	higher dicots	Asteraceae	*Ozothamnus diosmifolius*	white dogwood		C		3/1
plants	higher dicots	Asteraceae	*Chrysocephalum apiculatum*	yellow buttons		C		2
plants	higher dicots	Asteraceae	*Gymnocoronis spilanthoides*		Y			1/1
plants	higher dicots	Campanulaceae	*Lobelia purpurascens*	white root		C		1
plants	higher dicots	Campanulaceae	*Wahlenbergia communis*	tufted bluebell		C		1
plants	higher dicots	Casuarinaceae	*Allocasuarina torulosa*			C		2
plants	higher dicots	Casuarinaceae	*Allocasuarina littoralis*			C		6/1
plants	higher dicots	Clusiaceae	*Hypericum gramineum*			C		2
plants	higher dicots	Crassulaceae	*Bryophyllum pinnatum*	resurrection plant	Y			1/1
plants	higher dicots	Dilleniaceae	*Hibbertia aspera*			C		1
plants	higher dicots	Dilleniaceae	*Hibbertia stricta*			C		6/1
plants	higher dicots	Dilleniaceae	*Hibbertia linearis var. obtusifolia*			C		1
plants	higher dicots	Droseraceae	*Drosera peltata*	pale sundew		C		1/1
plants	higher dicots	Ericaceae	*Monotoca scoparia*	prickly broom heath		C		6/1
plants	higher dicots	Ericaceae	*Melichrus adpressus*			C		12/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Ericaceae	*Brachyloma daphnoides*			C		1
plants	higher dicots	Ericaceae	*Leucopogon leptospermoides*			C		3/1
plants	higher dicots	Ericaceae	*Leucopogon recurvisepalus*			E		13/10
plants	higher dicots	Ericaceae	*Acrotriche aggregata*	red cluster heath		C		10/1
plants	higher dicots	Ericaceae	*Leucopogon biflorus*			C		3/1
plants	higher dicots	Ericaceae	*Leucopogon muticus*			C		3/1
plants	higher dicots	Fabaceae	*Hovea linearis*	erect hovea		C		1
plants	higher dicots	Fabaceae	*Hovea ramulosa*			C		3/3
plants	higher dicots	Fabaceae	*Glycine tabacina*	glycine pea		C		1
plants	higher dicots	Fabaceae	*Pultenaea euchila*	orange pultenaea		C		3
plants	higher dicots	Fabaceae	*Podolobium scandens*			C		1/1
plants	higher dicots	Fabaceae	*Daviesia ulicifolia*	native gorse		C		1/1
plants	higher dicots	Fabaceae	*Pultenaea flexilis*			C		2
plants	higher dicots	Fabaceae	*Jacksonia scoparia*			C		4
plants	higher dicots	Fabaceae	*Glycine tomentella*	woolly glycine		C		1/1
plants	higher dicots	Fabaceae	*Daviesia wyattiana*	long-leaved bitter pea		C		7/4
plants	higher dicots	Fabaceae	*Daviesia villifera*	prickly daviesia		C		1
plants	higher dicots	Fabaceae	*Pultenaea villosa*	hairy bush pea		C		5
plants	higher dicots	Fabaceae	*Pultenaea spinosa*			C		2
plants	higher dicots	Fabaceae	*Pultenaea cunninghamii*	prickly pea		C		1/1
plants	higher dicots	Fabaceae	*Swainsona brachycarpa*			C		1/1
plants	higher dicots	Fabaceae	*Hardenbergia violacea*			C		2
plants	higher dicots	Fabaceae	*Gompholobium virgatum*			C		4
plants	higher dicots	Fabaceae	*Gompholobium pinnatum*	poor mans gold		C		5
plants	higher dicots	Fabaceae	*Pultenaea petiolaris*			C		2
plants	higher dicots	Fabaceae	*Phyllota phylicoides*	yellow peabush		C		3
plants	higher dicots	Fabaceae	*Daviesia umbellulata*			C		1/1
plants	higher dicots	Fabaceae	*Tephrosia bidwillii*			C		2/2
plants	higher dicots	Fabaceae	*Desmodium rhytidophyllum*			C		1
plants	higher dicots	Fabaceae	*Dillwynia retorta*			C		6/1
plants	higher dicots	Goodeniaceae	*Goodenia gracilis*			C		1
plants	higher dicots	Goodeniaceae	*Goodenia rotundifolia*			C		3
plants	higher dicots	Haloragaceae	*Gonocarpus micranthus*			C		1
plants	higher dicots	Lamiaceae	*Plectranthus parviflorus*			C		1
plants	higher dicots	Loganiaceae	*Mitrasacme paludosa*			C		1
plants	higher dicots	Loranthaceae	*Amyema bifurcata*			C		4
plants	higher dicots	Loranthaceae	*Dendrophthoe vitellina*	long-flowered mistletoe		C		4
plants	higher dicots	Malvaceae	*Pavonia hastata*	pink pavonia	Y			1/1
plants	higher dicots	Malvaceae	*Sida cordifolia*		Y			1
plants	higher dicots	Mimosaceae	*Acacia falcata*	sickle wattle		C		2
plants	higher dicots	Mimosaceae	*Acacia implexa*	lightwood		C		2
plants	higher dicots	Mimosaceae	*Acacia maidenii*	Maiden's wattle		C		2
plants	higher dicots	Mimosaceae	*Acacia amblygona*	fan-leaf wattle		C		6
plants	higher dicots	Mimosaceae	*Acacia fimbriata*	Brisbane golden wattle		C		2/2
plants	higher dicots	Mimosaceae	*Acacia granitica*			C		2/1
plants	higher dicots	Mimosaceae	*Acacia hispidula*			C		7/3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Mimosaceae	*Acacia leiocalyx*			C		4
plants	higher dicots	Mimosaceae	*Acacia concurrens*			C		2
plants	higher dicots	Mimosaceae	*Acacia disparrima*			C		2
plants	higher dicots	Mimosaceae	*Acacia juncifolia*			C		2/1
plants	higher dicots	Mimosaceae	*Acacia ulicifolia*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia aulacocarpa*			C		8/1
plants	higher dicots	Mimosaceae	*Acacia baeuerlenii*			C		6/2
plants	higher dicots	Mimosaceae	*Acacia quadrilateralis*			C		13/4
plants	higher dicots	Moraceae	*Ficus obliqua*			C		1
plants	higher dicots	Myoporaceae	*Eremophila debilis*	winter apple		C		1
plants	higher dicots	Myrtaceae	*Corymbia henryi*	large-leaved spotted gum		C		3/2
plants	higher dicots	Myrtaceae	*Eucalyptus carnea*			C		7/1
plants	higher dicots	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		2/1
plants	higher dicots	Myrtaceae	*Kunzea flavescens*			NT		2/2
plants	higher dicots	Myrtaceae	*Melaleuca sieberi*			C		2
plants	higher dicots	Myrtaceae	*Calytrix tetragona*	fringe myrtle		C		4
plants	higher dicots	Myrtaceae	*Eucalyptus fibrosa*			C		3
plants	higher dicots	Myrtaceae	*Angophora woodsiana*	smudgee		C		10/1
plants	higher dicots	Myrtaceae	*Eucalyptus microcorys*			C		1
plants	higher dicots	Myrtaceae	*Corymbia trachyphloia*			C		8
plants	higher dicots	Myrtaceae	*Angophora subvelutina*			C		1
plants	higher dicots	Myrtaceae	*Eucalyptus tindaliae*	Queensland white stringybark		C		7/1
plants	higher dicots	Myrtaceae	*Eucalyptus propinqua*	small-fruited grey gum		C		2
plants	higher dicots	Myrtaceae	*Eucalyptus moluccana*	gum-topped box		C		1
plants	higher dicots	Myrtaceae	*Corymbia tessellaris*	Moreton Bay ash		C		3
plants	higher dicots	Myrtaceae	*Eucalyptus curtisii*	Plunkett mallee		NT		11/7
plants	higher dicots	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		2
plants	higher dicots	Myrtaceae	*Leptospermum microcarpum*	small-fruited tea-tree		C		4
plants	higher dicots	Myrtaceae	*Leptospermum trinervium*	woolly tea-tree		C		6
plants	higher dicots	Myrtaceae	*Eucalyptus tereticornis*			C		2/1
plants	higher dicots	Myrtaceae	*Eucalyptus siderophloia*			C		2/1
plants	higher dicots	Myrtaceae	*Eucalyptus planchoniana*			C		9/2
plants	higher dicots	Myrtaceae	*Melaleuca linariifolia*	snow-in summer		C		1/1
plants	higher dicots	Myrtaceae	*Lophostemon suaveolens*	swamp box		C		3
plants	higher dicots	Myrtaceae	*Lophostemon confertus*	brush box		C		7
plants	higher dicots	Myrtaceae	*Eucalyptus resinifera*	red mahogany		C		2/1
plants	higher dicots	Myrtaceae	*Eucalyptus racemosa subsp. racemosa*	scribbly gum		C		1/1
plants	higher dicots	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		7/1
plants	higher dicots	Myrtaceae	*Angophora leiocarpa*	rusty gum		C		1
plants	higher dicots	Myrtaceae	*Corymbia gummifera*	red bloodwood		C		3/1
plants	higher dicots	Myrtaceae	*Baeckea frutescens*			C		1
plants	higher dicots	Myrtaceae	*Melaleuca irbyana*			E		2/2
plants	higher dicots	Myrtaceae	*Eucalyptus seeana*	narrow-leaved red gum		C		2/1
plants	higher dicots	Myrtaceae	*Eucalyptus dura*			C		6/3
plants	higher dicots	Ochnaceae	*Ochna serrulata*	ochna	Y			1/1
plants	higher dicots	Oleaceae	*Notelaea ovata*	forest olive		C		8

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Passifloraceae	*Passiflora suberosa*	corky passion flower	Y			2/1
plants	higher dicots	Phyllanthaceae	*Sauropus hirtellus*			C		1/1
plants	higher dicots	Phyllanthaceae	*Phyllanthus triandrus subsp. (Mt May P.I.Forster+ PIF11778)*			C		1/1
plants	higher dicots	Phyllanthaceae	*Phyllanthus hirtellus*			C		3
plants	higher dicots	Picrodendraceae	*Petalostigma pubescens*	quinine tree		C		1
plants	higher dicots	Picrodendraceae	*Petalostigma triloculare*	forest quinine		C		2
plants	higher dicots	Pittosporaceae	*Bursaria incana*			C		1
plants	higher dicots	Polygalaceae	*Comesperma hispidulum*			C		1/1
plants	higher dicots	Polygalaceae	*Comesperma sphaerocarpum*			C		1
plants	higher dicots	Polygonaceae	*Persicaria praetermissa*			C		1/1
plants	higher dicots	Proteaceae	*Hakea florulenta*	three-nerved willow hakea		C		4/2
plants	higher dicots	Proteaceae	*Persoonia sericea*	silky geebung		C		5/1
plants	higher dicots	Proteaceae	*Persoonia tenuifolia*			C		11/1
plants	higher dicots	Proteaceae	*Banksia spinulosa var. collina*			C		2/1
plants	higher dicots	Proteaceae	*Banksia spinulosa var. spinulosa*			C		3
plants	higher dicots	Proteaceae	*Persoonia sericea x P.tenuifolia*			C		5/2
plants	higher dicots	Proteaceae	*Persoonia stradbrokensis - P.tenuifolia*			C		1/1
plants	higher dicots	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		10
plants	higher dicots	Rhamnaceae	*Cryptandra propinqua subsp. propinqua*			C		1/1
plants	higher dicots	Rubiaceae	*Pomax umbellata*			C		4/1
plants	higher dicots	Rubiaceae	*Opercularia diphylla*			C		1
plants	higher dicots	Rutaceae	*Zieria laxiflora*	wallum zieria		C		1
plants	higher dicots	Santalaceae	*Exocarpos cupressiformis*	native cherry		C		1
plants	higher dicots	Sapindaceae	*Dodonaea triquetra*	large-leaved hop bush		C		1
plants	higher dicots	Scrophulariaceae	*Nuttallanthus canadensis*		Y			1/1
plants	higher dicots	Sterculiaceae	*Brachychiton populneus*			C		1
plants	higher dicots	Stylidiaceae	*Stylidium debile*	frail trigger plant		C		1/1
plants	higher dicots	Stylidiaceae	*Stylidium graminifolium*	grassy-leaved trigger-flower		C		1
plants	higher dicots	Thymelaeaceae	*Pimelea linifolia*			C		8
plants	higher dicots	Verbenaceae	*Lantana camara*		Y			2
plants	higher dicots	Verbenaceae	*Verbena aristigera*	Mayne's pest	Y			1/1
plants	higher dicots	Verbenaceae	*Lantana montevidensis*	creeping lantana	Y			2
plants	higher dicots	Violaceae	*Hybanthus stellarioides*			C		1
plants	higher dicots	Viscaceae	*Viscum articulatum*	flat mistletoe		C		3/1
plants	higher dicots	Viscaceae	*Notothixos subaureus*	golden mistletoe		C		1
plants	higher dicots	Vitaceae	*Clematicissus opaca*			C		2
plants	lower dicots	Lauraceae	*Cassytha*			C		1
plants	lower dicots	Lauraceae	*Cassytha glabella forma glabella*			C		9/3
plants	lower dicots	Lauraceae	*Cassytha muelleri*			C		5/5
plants	monocots	Alismataceae	*Damasonium minus*	starfruit		C		1/1
plants	monocots	Anthericaceae	*Chlorophytum comosum*		Y			1/1
plants	monocots	Colchicaceae	*Iphigenia indica*			C		1
plants	monocots	Cyperaceae	*Scleria*			C		1
plants	monocots	Cyperaceae	*Gahnia aspera*			C		1
plants	monocots	Cyperaceae	*Bulbostylis barbata*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Cyperaceae	*Lepidosperma laterale*			C		9
plants	monocots	Cyperaceae	*Cyperus polystachyos*			C		1
plants	monocots	Cyperaceae	*Schoenus ericetorum*			C		2/2
plants	monocots	Cyperaceae	*Ptilothrix deusta*			C		2
plants	monocots	Haemodoraceae	*Haemodorum austroqueenslandicum*			C		2
plants	monocots	Hemerocallidaceae	*Dianella*			C		1
plants	monocots	Hemerocallidaceae	*Dianella revoluta var. revoluta*			C		2
plants	monocots	Hemerocallidaceae	*Dianella revoluta*			C		5
plants	monocots	Hemerocallidaceae	*Dianella caerulea var. protensa*			C		2
plants	monocots	Hypoxidaceae	*Hypoxis hygrometrica var. villosisepala*			C		1/1
plants	monocots	Iridaceae	*Patersonia glabrata*			C		7
plants	monocots	Johnsoniaceae	*Tricoryne elatior*	yellow autumn lily		C		7
plants	monocots	Juncaceae	*Juncus continuus*			C		1
plants	monocots	Laxmanniaceae	*Lomandra laxa*	broad-leaved matrush		C		1
plants	monocots	Laxmanniaceae	*Lomandra obliqua*			C		1/1
plants	monocots	Laxmanniaceae	*Lomandra elongata*			C		7
plants	monocots	Laxmanniaceae	*Lomandra filiformis*			C		7
plants	monocots	Laxmanniaceae	*Lomandra confertifolia*			C		4
plants	monocots	Laxmanniaceae	*Lomandra multiflora subsp. multiflora*			C		3
plants	monocots	Laxmanniaceae	*Lomandra confertifolia subsp. pallida*			C		2
plants	monocots	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		4
plants	monocots	Laxmanniaceae	*Laxmannia gracilis*	slender wire lily		C		2
plants	monocots	Orchidaceae	*Pterostylis*			C		1/1
plants	monocots	Orchidaceae	*Acianthus fornicatus*	pixie caps		C		1/1
plants	monocots	Orchidaceae	*Pterostylis nutans*			C		1/1
plants	monocots	Orchidaceae	*Caladenia catenata*			C		1/1
plants	monocots	Orchidaceae	*Dockrillia linguiformis*	tongue orchid		C		2/1
plants	monocots	Orchidaceae	*Chiloglottis sp. (Mango Flat D.L.Jones 2547)*			C		1/1
plants	monocots	Orchidaceae	*Caladenia caerulea var. caerulea*			C		1/1
plants	monocots	Poaceae	*Alloteropsis semialata*	cockatoo grass		C		1
plants	monocots	Poaceae	*Austrodanthonia induta*			C		1
plants	monocots	Poaceae	*Bothriochloa decipiens*			C		1
plants	monocots	Poaceae	*Eragrostis spartinoides*			C		2/1
plants	monocots	Poaceae	*Aristida benthamii var. benthamii*			C		9
plants	monocots	Poaceae	*Eriachne pallescens var. pallescens*			C		1/1
plants	monocots	Poaceae	*Steinchisma hians*		Y			5/5
plants	monocots	Poaceae	*Entolasia stricta*	wiry panic		C		13/1
plants	monocots	Poaceae	*Aristida calycina*			C		2
plants	monocots	Poaceae	*Themeda triandra*	kangaroo grass		C		6
plants	monocots	Poaceae	*Panicum effusum*			C		7
plants	monocots	Poaceae	*Aristida vagans*			C		4
plants	monocots	Poaceae	*Panicum simile*			C		3/2
plants	monocots	Poaceae	*Aristida queenslandica var. queenslandica*			C		3
plants	monocots	Poaceae	*Microlaena stipoides var. stipoides*			C		1/1
plants	monocots	Poaceae	*Sporobolus natalensis*		Y			1/1
plants	monocots	Poaceae	*Pseudoraphis paradoxa*	slender mudgrass		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	*Eremochloa bimaculata*	poverty grass		C		10
plants	monocots	Poaceae	*Digitaria breviglumis*			C		1
plants	monocots	Poaceae	*Austrostipa pubescens*	tall speargrass		C		4/1
plants	monocots	Poaceae	*Rytidosperma tenuius*			C		1/1
plants	monocots	Poaceae	*Digitaria parviflora*			C		1
plants	monocots	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		5
plants	monocots	Poaceae	*Sporobolus fertilis*	giant Parramatta grass	Y			1/1
plants	monocots	Poaceae	*Paspalidium distans*	shotgrass		C		1/1
plants	monocots	Poaceae	*Imperata cylindrica*	blady grass		C		1
plants	monocots	Poaceae	*Eriachne pallescens*			C		7/1
plants	monocots	Poaceae	*Eragrostis mexicana*	Mexican lovegrass	Y			1/1
plants	monocots	Poaceae	*Amphipogon strictus*			C		3/2
plants	monocots	Poaceae	*Eragrostis brownii*	Brown's lovegrass		C		5/1
plants	monocots	Poaceae	*Entolasia whiteana*			C		1
plants	monocots	Poaceae	*Aristida warburgii*			C		6
plants	monocots	Poaceae	*Hymenachne amplexicaulis cv. Olive*		Y			1/1
plants	monocots	Poaceae	*Capillipedium spicigerum*	spicytop		C		1
plants	monocots	Poaceae	*Chrysopogon sylvaticus*			C		1
plants	monocots	Poaceae	*Aristida queenslandica*			C		1
plants	monocots	Smilacaceae	*Smilax australis*	barbed-wire vine		C		2
plants	monocots	Xanthorrhoeaceae	*Xanthorrhoea johnsonii*			C		9
plants	monocots	Xanthorrhoeaceae	*Xanthorrhoea macronema*			C		1
plants	monocots	Xyridaceae	*Xyris complanata*	yellow-eye		C		1
plants	whisk ferns	Psilotaceae	*Psilotum nudum*	skeleton fork fern		C		1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix F – Natural Environment Site Strategy

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22 FEB 2013

Queensland Government

Department of
State Development, Infrastructure and Planning

20 February 2013

Mr Rob Moore
Project Director
Lend Lease Communities (Yarrabilba) Pty Ltd
PO Box 1512
MILTON QLD 4064

Dear Rob

Compliance assessment Fauna corridor infrastructure master plan and Natural environment overarching site strategy

I refer to your correspondence of 4 December 2012 enclosing the Fauna Corridor Infrastructure Master Plan Yarrabilba prepared by Natura Consulting for Lend Lease dated 28 November 2012 (Fauna Corridor Infrastructure Master Plan), and the Natural Environment Overarching Site Strategy Yarrabilba prepared by Natura Consulting prepared for Lend Lease dated 16 July 2012 (Natural Environment Overarching Site Strategy) for compliance assessment in accordance with the requirements set out in the UDA development conditions of the UDA development approval DEV2011/187 on land at Waterford Tamborine Road Yarrabilba.

The Economic Development Queensland (EDQ) has undertaken a compliance assessment of the Fauna Corridor Infrastructure Master Plan in accordance with the requirements set out in the UDA development condition 3 Infrastructure master plan and the UDA development condition 32 Fauna corridor. As a result of this assessment EDQ is satisfied with the information submitted. EDQ is pleased to advise that the Fauna Corridor Infrastructure Master Plan is endorsed and the conditions of approval are determined to have been met. The endorsed Fauna Corridor Infrastructure Master Plan is stamped and enclosed with this correspondence.

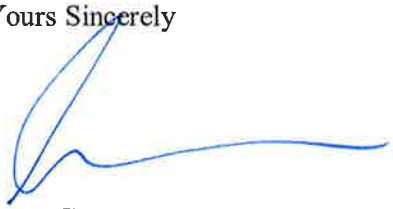
The EDQ has undertaken a compliance assessment of the Natural Environment Overarching Site Strategy in accordance with the requirements set out in condition 5 Overarching site strategy and condition 35 Natural environment. As a result of this assessment EDQ is satisfied with the information submitted. EDQ is pleased to advise that the Natural Environment Overarching Site Strategy is endorsed and the conditions of approval are determined to have been met.

Economic Development Queensland
Level 4, 229 Elizabeth Street Brisbane
GPO Box 2202 Brisbane
Queensland 4001 Australia

Telephone +61 7 3024 4150
Website www.edq.qld.gov.au

The endorsed Natural Environment Overarching Site Strategy is stamped and enclosed with this correspondence. If you have any further questions with regard to this advice, please do not hesitate to contact me on telephone number (07) 3024 4150.

Yours Sincerely



Steve Conner
DIRECTOR – PLANNING

Appendix F – Natural Environment Site Strategy

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Natural Environment Overarching Site Strategy

Yarrabilba

Prepared for: Lend Lease
Prepared by: S. Butler, S. Towner, K. Richardt and M. Brett
Date: 16 July 2012
Job #: NCO11-0011_Yarrabilba

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DISCLAIMER

This report and any files associated with it contain information which is confidential and may also be legally privileged. It is for the exclusive use of the client and its use is entirely limited to the specific purpose of the proposed development as was agreed to under the signing of the contract between the provider (us) and the recipient (you).

All the information contained within this report is provided in good faith in the belief that no information or recommendations made are misleading.

All comments and opinions provided in this report have been based upon a limited survey of the study site and/or on information supplied by the client, their agents and/or third parties.

All the assessments of site biology, ecology and the extent and nature of impacts of and to this study site is limited to the terms of reference stated within this report; and by the limited timeframe of study. Therefore the results presented herein cannot be considered absolute or conclusive without additional long-term follow-up studies.

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1 Introduction

1.1 Background

Natura Consulting was engaged by Lend Lease to respond to Urban Development Area (UDA) Material Change of Use (MCU) Condition 35 of approval for Yarrabilba Residential Development, reference no. DEV2011/187, dated the 4 April 2012.

The Yarrabilba development site is located on the eastern side of Waterford-Tamborine Road and to the south of Logan Village (refer to Figure 1). It is bounded by rural residential areas to the north, Plunkett road to the south and the Plunkett Conservation Park to the east. The site consists of approximately 2012 ha of land which has been historically used as pine forestry, a military training camp in WWII and for grazing, when first cleared. Yarrabilba is predominately vegetated with areas of regrowth native vegetation, regenerating pines and weedy grasslands (refer to Figure 2). Some limited areas of regrowth vegetation exist but they are mostly confined to creeks, drainage channels and wetlands. The site is currently in the early stages of development with the growth of Yarrabilba projected to span approximately 30 years. The Land Holding portion of the urban development area managed by Lend Lease is expected to provide over 17,000 dwellings for a population of around 45,000 residents.

1.2 Objectives of MCU report

The objectives of the MCU report (as per the UDA MCU conditions of approval for Yarrabilba Residential Development, reference no. DEV2011/187, dated the 4 April 2012) are as follows:

a) Submit an overarching site strategy for the management of the natural environment
b) In addition o the requirements set out in UDA Condition 5 of the UDA Decision Notice, the overarching site strategy must:
    i. outline measures to conserve and enhance the sites biodiversity values (areas of ecological significance, waterways and vegetation management) including:
    ii. identify strategies for the protection of remnant endangered vegetation containing endangered regional ecosystems where proven by ground truthing to be viable
    iii. identify management plans to be provided to address the clearing of non-viable remnant vegetation containing endangered regional ecosystems
    iv. identify rehabilitation strategies for any corridors of native vegetation to improve habitat extent and wildlife movement
    v. identify any buffering to area of environmental significance and which have associated conservation, biodiversity, habitat or scenic amenity values
    vi. Identify strategies to prevent land degradation
    vii. Identify strategies to rehabilitate major drainage lines
    viii. Identify strategies for bushfire management
    ix. Identify strategies for pest and weed management
    x. Identify strategies for monitoring vegetation rehabilitation.

Figure 1 Site Location (Google Extract)

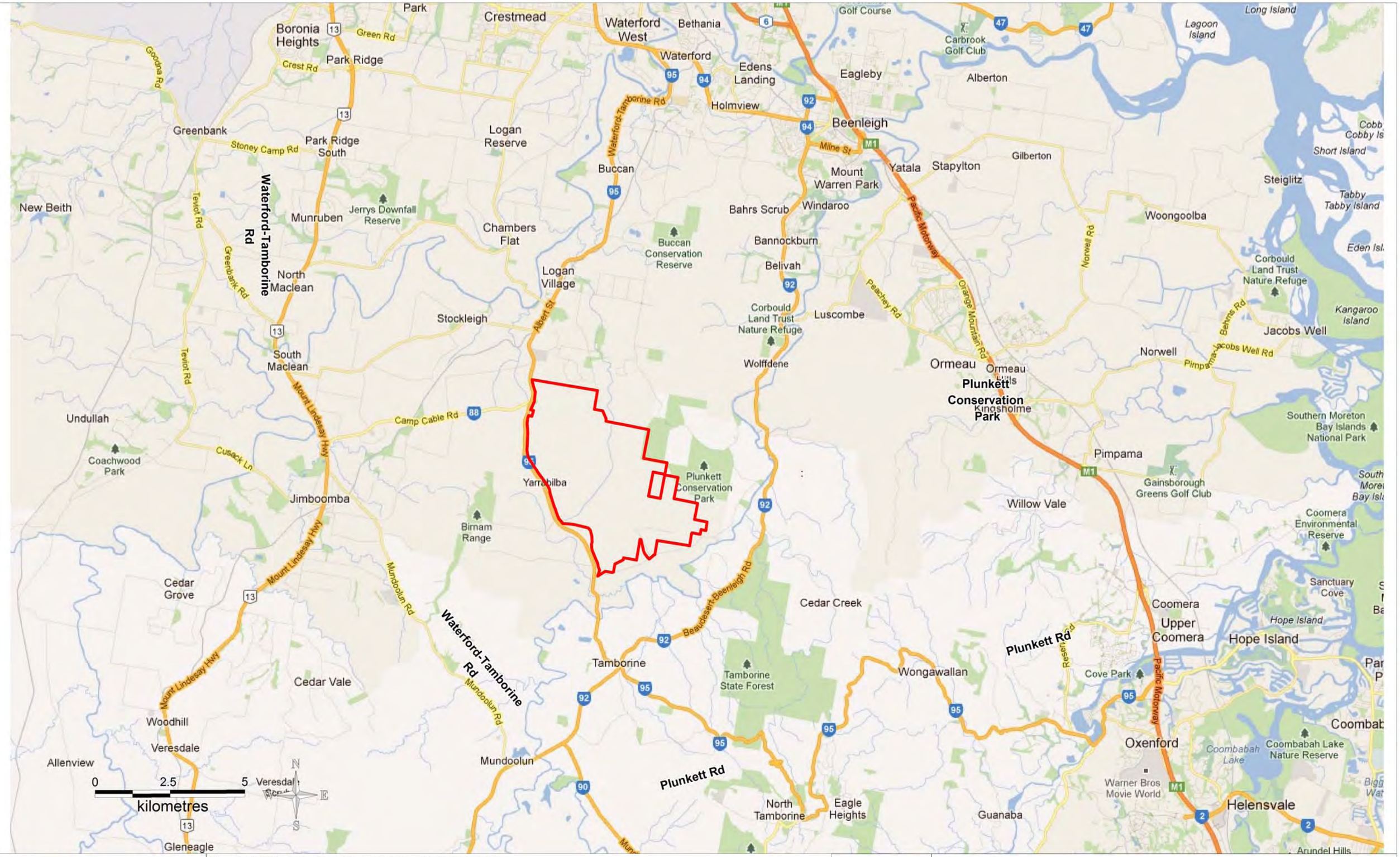

Figure 1: Site Location (Source: Google Maps 2012)

Legend

Site Boundary

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Client: Lend Lease	Checked: K.R	Paper: A3

Figure 2 Aerial image of the subject site (Google Earth Extract)

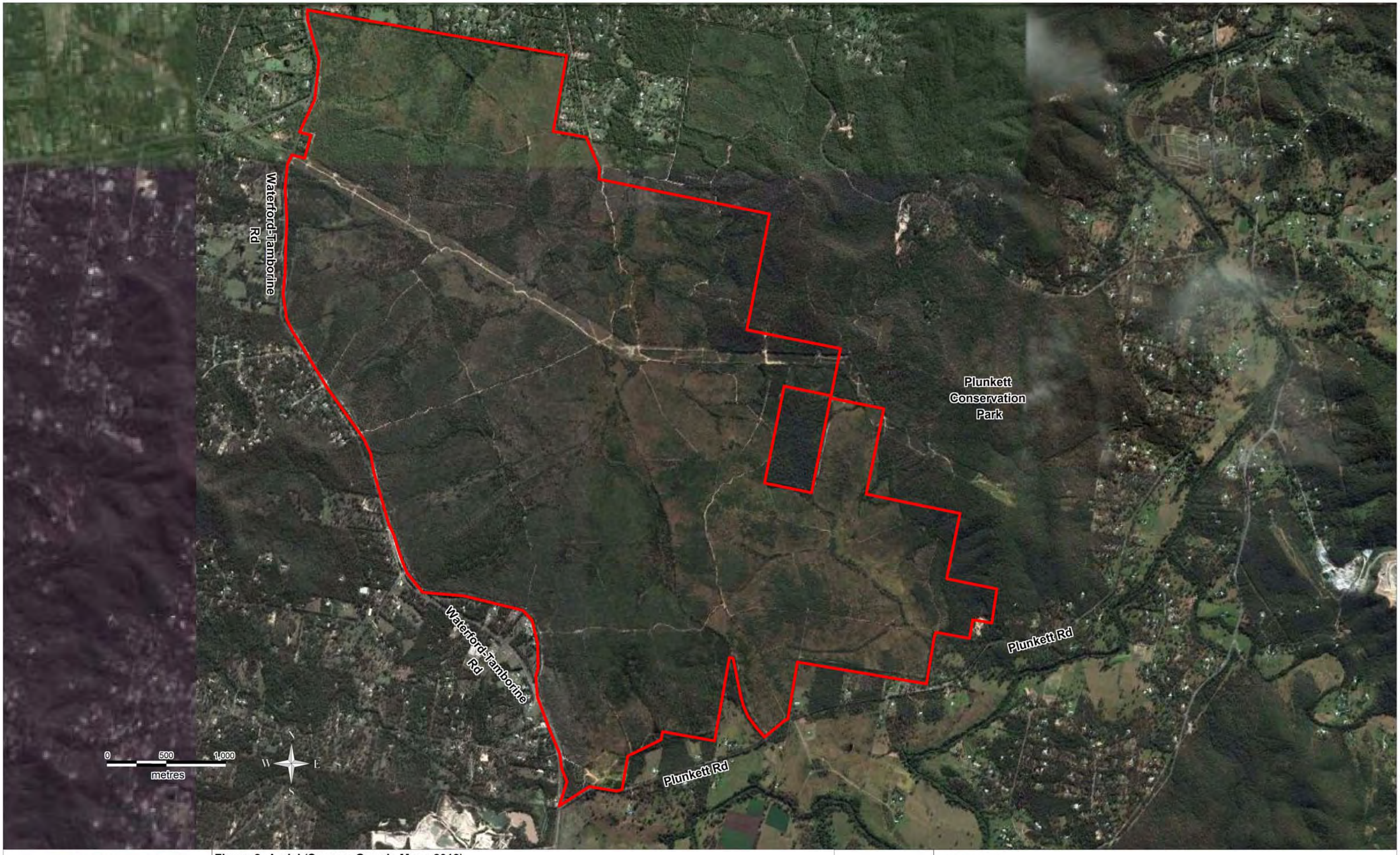

Figure 2: Aerial (Source: Google Maps 2012)

Legend

Site Boundary

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1.3 Review of existing reports, plans and GIS data

The following report was prepared utilising desktop analyses as the primary methodology. All available relevant reports and plans were reviewed to ensure the consistency of proposed management actions. Plans reviewed include:

- Pre-Development Bushfire Mitigation Concept For the Yarrabilba Site (30th January 2012), prepared by Bushland Protection Systems
- Yarrabilba Draft Land Management Plan (February 2011), prepared by Lend Lease
- Yarrabilba Precinct 1 Stormwater Management Plan Draft (February 2011), prepared by Design Flow
- Yarrabilba Urban Development Area Development Scheme (October 2011), prepared by the Urban Land Development Authority
- ULDA Guideline 17 – Remnant Vegetation and Koala Habitat Obligations in Greater Flagstone and Yarrabilba UDA's (November 2011), prepared by the Urban Land Development Authority
- Draft ULDA Guideline 14 – Environment and Natural Resources Sustainability (April 2011), prepared by the Urban Land Development Authority
- Yarrabilba Vegetation Management Plan (December 2009), prepared by Yurrah
- Department of Environment and Resource Management Wildlife Online database survey (April, 2012)
- DERM REDD Database for Regional Ecosystems
- EPBC significant matters search tool
- 2012 Aerial photography provided by RPS Group

The following sections of the report outline management strategies for the natural environment of the site, including:

- Flora and fauna management – Section 2
- Rehabilitation – Section 3
- Bushfire management – Section 4
- General recommendations and monitoring – Section 5
- Strategy timelines – Section 6

2 Environmental values

2.1 Corridors

Ecological corridors throughout the site have been established by the UDA Development Scheme to protect natural and cultural heritage values set out in section 3.0 of the Yarrabilba UDA Development Scheme. This section provides a summary of information relating to these corridors. For full details refer to the Fauna Corridor Infrastructure Master Plan (Natura Consulting, June 2012). These corridors will provide linkage of the best quality vegetation and opportunities for fauna movement, protection and buffering to protect water quality.

The ecological corridors through the site are primarily for fauna movement and waterway protection. Together with larger patches of vegetation on the eastern boundary and other planned green space areas, they provide a network covering over 500 hectares and provide a connection between the patches of remnant vegetation in the western and central parts of the site. In accordance with the UDA planning scheme and MCU conditions, a Fauna Corridor Master Plan has been formulated reflecting the location and width of fauna and green space corridors, regional ecosystems both on and immediately off the site and drainage lines. These areas are identified on Figure 3 along with the functional fauna corridors as required by the UDA. Following completion of the development, green space corridors will also provide additional opportunity for some species to move throughout and across the site. Outside of the site further large patches, or remnant vegetation with connectivity to the site, can be found to the east, west, and south. The largest patch of remnant vegetation with connectivity to the subject site is located to the east (Plunkett Conservation Reserve), and is identified on Regional Ecosystem mapping as Essential Habitat for the Koala (refer to Figure 4). Some vegetation connectivity also exists to the west of the site, adjacent to Waterford-Tamborine Road, although this is likely to be adversely affected by future road networks.

Photograph 1: The main 200 m wide fauna corridor running from east to west through the site

Figure 3 Ecological corridors through the site

Figure 3: Fauna Corridor Master Plan

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Legend

- Site Boundary
- Fauna Corridor
- Green Space Corridor
- Regional Ecosystem Off Site
- Regional Ecosystem On Site
- Drainage Lines
- Indicative Context Plans
- X m Direction of Clearing

2.2 Essential Habitat

Particular habitats in which endangered, vulnerable, rare or near threatened species may inhabit the site are mapped by the DERM as essential habitat. Habitat requirements are defined by biological and/or non-biological parameters to classify an area as essential habitat including:

- Vegetation
- Regional ecosystem
- Land zone
- Altitude
- Soils
- Position in landscape.

A number of lots within the eastern portion of the subject site (Lot 42 W311428, Lot 11 W311846, Lot 35 W31950, Lot 36 W31950, Lot 41 W311273 and Lot 29 W31919), contain mapped essential habitat (refer to Figure 4) whereby any vegetation clearing will require offsets, subject to approval by DERM.

Photograph 2. Showing areas of mapped essential habitat towards the eastern side of the property.

Figure 4 Mapped essential habitat and remnant vegetation ‘sourced from DERM’

Lot 2
RP138537

Lot 1
RP27552

Lot 3
RP27551

Lot 11
RP311846

Lot 3
RP27535

Lot 42
RP311428

Lot 36
RP31950

Lot 35
RP31950

Lot 41
RP311237

Lot 20
RP31919

0 0.5 1
kilometres

N
S

Figure 4: Regional Ecosystem Mapping
(Source: Department of Environment and Resourse Management 2012)

Legend

- Site Boundary
- Endangered Regional Ecosystem
- Of Concern Regional Ecosystem
- Least Concern Regional Ecosystem
- Lots Containing Regional Ecosystem
- Essential Habitat
- Plantation Forest
- Category X

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2.3 Vegetation

2.3.1 Remnant vegetation

The *Queensland Vegetation Management Act 1999* provides regulation of clearing of Remnant Vegetation and High Value Regrowth in Queensland through the RE vegetation classification system. Clearing is regulated in accordance with the level of significance of the vegetation communities identified under the system.

Remnant vegetation is defined by the Qld Herbarium as:

> *Vegetation that has at least 70% of the height and 50% of the cover of the dominant stratum, relative to the undisturbed height and cover of that stratum, and which is dominated by species characteristic of the vegetation's undisturbed canopy.*
>
> *The definition includes vegetation that has not been cleared, or has been lightly thinned, or vegetation that has been cleared or heavily thinned but substantially regrown (Wilson, Neldner and Accad, 2002). In vegetation with woody or shrubby canopies, the definition does not consider the composition or condition of the ground layer, i.e. the layer usually dominated by grasses and herbs, but is based primarily on the vegetation's canopy (Neldner 2003).*

The site is mapped by the DERM as containing; '*Endangered'*, '*Of Concern'* and '*Least Concern'* Regional Ecosystems with the majority of the site shown as '*category x'*. Figure 4 provides a Regional Ecosystem extract and a description of this RE is provided in Table 1.

Table 1 Regional Ecosystems within site

RE Code	Short Description	Status
12.9-10.4	*Eucalyptus racemosa woodland on sedimentary rocks*	No concern at present
12.9-10.12	*Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa woodland on sedimentary rocks*	Endangered RE
12.11.12	*Araucarian complex microphyll vine forest on metamorphics +/- interbedded volcanics; usually northern half of bioregion*	Of concern RE
12.3.7	*Eucalyptus tereticornis, Callistemon viminalis, Casuarina cunninghamiana fringing forest*	Least concern
12.11.5	*Open forest complex with Corymbia citriodora, Eucalyptus siderophloia, E. major on metamorphics +/- interbedded volcanics*	Least concern
12.9-10.17	*Open forest complex often with Eucalyptus acmenoides, E. major, E. siderophloia +/- Corymbia citriodora on sedimentary rocks*	Least concern
12.9-10.19	*Eucalyptus fibrosa subsp. fibrosa open forest on sedimentary rocks*	Least concern
12.3.11	*Eucalyptus siderophloia, E. tereticornis, Corymbia intermedia open forest on alluvial plains usually near coast*	Of concern RE

All of the mapped remnant vegetation will be protected by major open space/ ecological corridors. Within these areas conservation outcomes include the retention and enhancement of significant areas and the minimisation of further vegetation loss and fragmentation.

2.3.2 Significant flora

Endangered, Vulnerable or Near threatened (EVNT) species that may be present within some areas of the Yarrabilba development site include *Leucopogon recurvisepalus*, *Eucalyptus curtisii* (Plunkett mallee), *Melaleuca irbyana* (Swamp tea-tree) and *Kunzea flavescens* were identified in the Wildnet search (or previous studies) (Table 2) and these are protected under the *Nature Conservation Act 1992* in Queensland.

Table 2EVNT flora possibly occurring within Yarrabilba

Scientific Name	Common Name	Status Qld	Status Commonwealth	Likely Occurrence within Yarrabilba
Flora				
Leucopogon recurvisepalus	N/A	*Endangered*	Not listed	L
Eucalyptus curtisii	Plunkett mallee	*Near threatened*	Not listed	L
Melaleuca irbyana	Swamp tea-tree	*Endangered*	Not listed	P
Kunzea flavescens	N/A	*Near threatened*	Not listed	P

Likely Occurrence Codes: P = Possible, L = Likely

Given the level of protection and status under the above Act, these plant species should be retained/protected wherever possible. If clearing of these species is required, permits from Ecoaccess (DERM) must be sought and remedial actions such as replacement planting undertaken (refer to Recommendations – Section 3 for more details).

2.3.3 Significant sized trees

A number of mature eucalypt trees (greater than 50cm DBH), of an age where hollows begin to form, were observed in several sections of the site. Eucalypt trees of this size are generally approximately 100 years old (Ross, 1998), and are of an age where hollows suitable for wildlife habitat are likely to form. Hollows are valuable to a number of species of wildlife including arboreal and terrestrial mammals, birds and microbats (Douglas, 2003).

2.4 Fauna

The subject site contains more than 500 hectares of corridor and green space areas (shown on Figure 4) in the central and western sections of the site which are supporting a relatively high diversity of fauna species (it is likely further and more detailed assessment of the protected corridor and greenspace areas would identify a higher diversity of amphibians, reptiles and small terrestrial mammals).

2.4.1 Significant fauna

An online database survey (27/4/2012) was undertaken to provide indicative records of the types of native species that might occur onsite. The DERM Online database was used, which details all confirmed records since 1980 within a 5 kilometre radius of the middle of the site (refer to Appendix 1 for full details). This type of search only provides information on the likely occurrence of listed fauna on the site and is a useful starting point to direct active searches. The data was used to provide guidance for fauna management recommendations. Significant species that were identified in this search (Table 3) include *Littoria brevipalmata*

(Green thighed frog) and *Phascolarctos cinerus* (Koala). The Koala is listed under the *Nature Conservation Act 1992 and EPBC Act 1999* and the Green thighed frog is listed under the Nature Conservation Act 1992.

Table 3EVNT fauna possibly occurring within the subject site

Scientific Name	Common Name	Status Qld	Status Commonwealth	Likely Occurrence within Yarrabilba
Amphibians				
Littoria brevipalmata	Green thighed frog	*Near threatened*	*Not listed*	P
Birds				
N/A				
Mammals				
Phascolarctos cinerus	Koala	*Vulnerable*	*Vulnerable*	C
Reptiles				
N/A				

Likely Occurrence Codes: NL = Not Likely, P = Possible, L = Likely, HL = Highly Likely, C = Confirmed during site investigations.

To date, the Green thighed frog has not been identified on site. Koalas are the only EVNT species currently confirmed onsite. Koalas were initially identified in Yurrah's 2009 Vegetation Management Plan where investigations noted signs of Koalas. The second occurrence was the positive identification of Koala scats at the base of tree 421 (located in protected corridors) in precinct 1 by Fauna specialist spotter/catcher Michael Dickinson during September 2011. More recently (May 2012), ecologists from Natura Consulting have also recorded koala scats east of precinct 1 and scratching's potentially made by a koala to the north of precinct 1, within corridors areas.

2.5 Wetlands and drainage lines

The layout has generally provided for a buffer of 40 m to 250 m to wetlands and drainage lines as shown on Figure 5. Government agencies generally require a buffer of 30 m to the top of bank, pending the outcomes of an ecological assessment, for areas identified as a natural waterway.

Several locations along the existing drainage lines were observed to support ecological values and buffers to these areas require rehabilitation to ensure ecological functions are enhanced. Methods for this rehabilitation work is to be documented into Context Plans (refer to Section 4 of this report).

Photograph 2: Wetland within the corridor in the central part of the site

2.6 Soils and sediment

Goescience Australia has mapped the site as three distinct geological types. The majority of the site is mapped as 'Woogaroo Subgroup', with a thin strip through the central portion of the site mapped as 'Qa-SEQ'. A thin section along the eastern portion of the site is mapped as 'Ipswich Coal Measures' and a very small section in the far south eastern area of the site is 'Neranleigh-Fernvale beds'. These rock types identified onsite are defined as:

- Woogaroo Subgroup: From the TRIASSIC – JURASSIC age; 'Quartzose sandstone, siltstone, shale conglomerate, coal'
- Qa-SEQ: From the Quaternery age; '*Clay, silt, sand, gravel; flood plain alluvium'*.
- Ipswich Coal Measures: From the TRIASSIC age; '*Shale, conglomerate, sandstone, coal, siltstone, basalt, tuff'*.
- Neranleigh-Fernvale beds: From the DEVONIAN – CARBONIFEROUS age; 'Mudstone, shale, arenite, chert, jasper, basic metavolcanics, pillow lava, conglomerate'.

Figure 5 Waterways and drainage lines within the site

0 500 1,000
metres

N
W E
S

Figure 5: Waterways and Drainage Lines within Site

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Legend

- Site Boundary
- Fauna Corridors
- Green Space Corridors
- Drainage Lines

3 Strategy

The following section is provided to assist with the management of the natural environment for the site, with specific reference to the conditions set out in the UDA MCU conditions of approval for Yarrabilba Residential Development, reference no. DEV2011/187, dated the 4 April 2012.

3.1 Habitat and corridors

3.1.1 Enhancing habitat and corridors

Habitat and corridor functionality and connectivity will be maintained and enhanced through the rehabilitation and revegetation of degraded areas. This will be guided through the development of a habitat restoration plan. Habitat will be maximised through the retention of habitat trees wherever possible within parks, landscaping and other appropriate areas outside of corridors. This will be achieved by employing biodiversity friendly planning principles. Habitat for threatened fauna and flora will be protected and if or where necessary threatened species management plan will be implemented.

3.1.2 Protection of all significant environmental areas

Impacts on areas of high biological diversity will be reduced by:

1) Minimising clearing of remnant vegetation, high value regrowth and significant habitat trees and providing vegetation buffers. In addition any clearing of remnant vegetation will be offset in accordance with the offset policy under the Vegetation Management Act, 1999.

2) Implement all recommendations from the Vegetation Management Strategy (VMS) by Natura Consulting June 2012 and from the Pre-Development Bushfire Mitigation Concept for the Yarrabilba Site (30th January 2012), prepared by Bushland Protection Systems. This will protect the core ecological values of the retained habitat and corridors from uncontrolled wild fire.

3) As per the VMS, a protective 10 m wide slashed buffer zone within the development footprint will be provided around the outer edge of all corridors and environmental areas. These areas are to be clearly identified and flagged prior to any mega-mulching occurring within the zone. When clearing/mega-mulching work is being undertaken in the vicinity of environmental areas or corridors, operators will begin work from the slashed edge and work away from the corridor. Operators must be vigilant and continually look out for other corridor networks. It is the operator's responsibility to ensure that no protected vegetation is damaged. A spotter catcher must be present to guide the clearing works.

4) Early intervention actions within the habitat and corridor areas will lead to improved environmental outcomes. Implement appropriate restoration treatments within corridors (including follow up weed control). This will also reduce the overall total cost of restoration activities over the life of the project.

5) In the event that stock are introduced to the site as part of an interim land use strategy, fences must be erected to protect ecological corridors prior to stock arrival. An endorsed

fencing plan should be developed in each restoration plan to ascertain fencing requirements and to guide the construction of fencing.

3.2 Vegetation

3.2.1 Initial weed control and revegetation

Weed control should focus on high priority zones that require an initial weed control treatment. Next, all declared weeds remaining within the development footprint must be controlled. The third step would involve identifying and treating the most severe infestations within the protected corridors and environmental zones. Further weed control should be guided by the habitat restoration management plan at the context plan stage.

Revegetation should only be undertaken where ecological impacts are significant and where the vegetation would not recover effectively from assisted regeneration (ecological restoration through weed control).

3.2.2 Significant trees

A number of mature Eucalypt species (greater than 50 cm diameter at breast height), of an age where hollows begin to form, were observed in the dominant vegetation communities on parts of the site. It is recommended that as many of these trees as possible be retained until such time that clearing works are required. This will ensure longevity of native fauna populations and allow sufficient time for dispersal between clearing events.

The majority of these trees are being retained within the mapped corridor areas. A consulting arborist is required to assess trees in close proximity to earthworks areas to ensure their longevity is maintained with regards to potential impacts including from future development.

3.2.3 Vegetation management within development areas

Vegetation management within the development footprint areas will prepare the site for possible interim land uses, reduce the risk of uncontrolled wildfire and help protect core environmental values. Keys issues include:

- Project managers are to become familiar with the VMS and provide guidance to on-ground contractors.
- Implement all VMS high priority treatments within the development areas, starting from fire fuel reduction zones on boundary perimeters, zones adjoining boundaries (fire hazard zones) and areas north of the power line easement. Next radiate outwards to include all of the high priority zones before beginning the medium priority zones.
- Initial treatments should consist of slashing all of the designated areas. Mega-mulching or clearing should not occur in an area prior to the slashing and flagging of a 10m wide buffer on the interface of the environmental corridor, and all possible vegetation that can be slashed has been completed. Mega-mulching can then begin in the high priority areas and continue (if economically feasible) through to the medium priority areas. A spotter catcher must be present to guide the clearing works.
- After slashing and/or mega-mulching within the development areas, there is likely to be scattered trees and occasional copses which were not suitable for machine removal. In these circumstances teams can manually fell selected trees to ensure that the desired vegetation management outcome is achieved.

Vegetation protection/safety fencing or similar is to be erected around any significant trees or significant species that are to be retained immediately adjacent to earthworks areas. Vegetation protection fencing is to be erected at the outer drip line (or in instances where the drip line will be impacted, to the edge of proposed works), where it shall remain before and during construction to prevent disturbance of or damage to the retained vegetation, under-storey and root zones. Fencing must be installed by the civil works contractor and inspected by site supervisor prior to commencement of any works on the subject site. In summary:

- Tree protection/safety fencing must be installed prior to all construction works and must be retained in place during the construction period
- Tree protection/safety fencing will be 1.2 m high (in accordance with AS 4970-2009) and installed to the limit of the canopy drip-line or the boarder of proposed works
- With few exceptions, work is not permitted within the drip zones of protected vegetation to reduce impacts on surface and feeder roots
- A 'duty of care' is applied to all contractors and sub-contractors in regard to the protection and retention of indicated trees as noted within this plan
- The Civil Contractor is to obtain a copy of approval prior to any construction.

3.2.4 Reporting

The following assessments and action plans are required to be addressed in each of the Context Area Plans in relation to remnant and protected vegetation:

- Undertake a flora survey to indentify the presence or otherwise of EVNT listed species
- Lodge a tree clearing application for each phase of works (if required, clearing is exempt in Urban Living Zone)
- Implement management and species recovery actions, or provide protection for endangered/rare species if found

3.3 Fauna

Fauna populations will be protected via a number of strategies which will help mitigate avoidable impacts. Several strategies, management plans and programs will be required to produce the desired management outcomes and the following list outlines the critical factors for fauna management:

- Corridors are developed and/or enhanced with functionality and connectivity as key principles
- Fauna friendly design aspects such as using food and shelter trees in parks and street scaping, use of fauna friendly fencing, fauna crossings and fauna underpasses are incorporated into the development
- Koala management guidelines should be incorporated into any fauna management reporting and should be in accordance with EPBC Act guidelines
- Rehabilitation of critical habitat is undertaken to help sustain EVNT fauna populations
- Threatened species management plans should be implemented where/when EVNT species are identified on site
- Management of pest animals is undertaken to reduce the impacts of competition, disease and predation on native species.

3.3.1 Spotter catcher

A qualified spotter catcher with a current license issued by Queensland Parks and Wildlife must be present to inspect vegetation to be felled immediately prior to any clearing works. In particular, the spotter catcher is to inspect the trees for Koalas, nesting birds, microbats and species that use hollows. The nominated contractor must have experience in the management of Koalas and will remain onsite for the duration of the vegetation clearing works. The spotter-catcher will be responsible for guaranteeing that clearing is undertaken in accordance with DERM's *Tree Clearing and Trimming, Koala Spotter Requirements*. The spotter-catcher and vegetation management contractor must liaise and agree on requirements and a suitable approach before clearing commences. If/where conflicts occur the requirements of the spotter-catcher will take precedence over the vegetation management contractor.

3.3.2 Reporting

A fauna management plan will be required prior to the commencement of onsite works for any context plan area when clearing for native vegetation is to occur. The report shall include sections addressing:

- Comprehensive fauna assessment
- Feral animal monitoring and management
- Koala management
- Kangaroo management strategy and program
- Implement Recovery Actions for any confirmed EVNT species (where applicable).

Detailed guidelines for the development of a fauna management plan have also been provided in the Fauna Corridor Master Plan and shall be used as a standard to develop future fauna management plans.

3.4 Wetlands and drainage lines

The following recommendations will assist in protecting and enhancing the wetlands and waterways of the Yarrabilba site:

- Undertake civil works with minimal disturbance to contours and natural drainage channels especially in the vicinity of wetlands and waterways
- Mega-mulching or clearing should not occur in an area prior to the slashing and flagging of a 10 m wide buffer on the interface of the environmental wetland or waterway, and all possible vegetation that can be slashed has been completed. Mega-mulching can then begin in the high priority areas, working outwards from the wetland and continue (if economically feasible) through to the medium priority areas. A spotter catcher must be present to guide the clearing works
- Sediment protection is to be installed to relevant Australian Standards prior to disturbance/construction. The civil site contractor is to determine the locations on-site or in accordance with an approved Stormwater Management Plan
- Degraded wetlands and waterways should be restored through assisted regeneration and revegetation in accordance with a habitat restoration plan for the site.

3.5 Soil and sediment control

The soils of the site tend to be poor, sandy and of an erodible nature. To ensure that sediment runoff does not impact any retained vegetation or impact water quality in the waterways, particularly along the eastern boundary line, mulch bunds, sediment fences or similar are to

be installed down-slope of the proposed works hardstand areas and denuded or topsoil areas (i.e. turfed areas). Sediment protection is to be installed to relevant Australian Standards prior to disturbance/construction. The civil site contractor is to determine the locations on-site or in accordance with an approved Stormwater Management Plan.

3.6 Land uses

Through a guided vegetation management strategy (VMS) the site will undergo a transition from a largely vegetated area through to being prepared and able to undertake interim activities that may include grazing and turf farming. For further information refer to the following:

- Vegetation Management Strategy for Yarrabilba, June 2012 (Natura Consulting)
- Yarrabilba FInal Land Management Plan, February 2011 (Lend Lease)
- Interim Land Management Plan, Yarrabilba Stage 2: Business Plan Draft, December 2011 (Agricultural Management Company)

3.7 Boundary security and site management

Unauthorised and incompatible uses can lead to degradation of the natural environment and have serious consequences from a land management perspective and attempts to restrict unauthorised uses and access should be undertaken where practical.

3.8 Monitoring - Vegetation Rehabilitation

A monitoring framework sets out the basic requirements of a vegetation rehabilitation monitoring program. It will be important to develop a full monitoring program and undertake baseline monitoring prior to the vegetation management treatments being applied. This will be critical to ensure that any change, either positive or negative, brought about by the applied treatments can be identified and/or modified.

There are many different types and levels of monitoring that can be used for identifying change in vegetation communities. These include looking at parameters such as presence/absence, growth, percentage of cover, total biomass, species richness etc. For a monitoring program such as this it is best to keep the requirements relatively simple to ensure that it is quick and easy to apply (about 15 -20 minutes for each site) and is not a major economic burden. Therefore, a relatively robust but simple monitoring program, as outlined below, would be sufficient to identify any major changes within treatment zones. Following appropriate monitoring, management prescriptions can be adjusted to bring about any necessary changes (adaptive management).

Pre monitoring design, setup and the capture of baseline information is to occur as follows:

1) Develop a pre-determined data sheet that will allow for the capture of approximately 8 - 15 of the main flora indicator species to be captured along with details about the height and health of the plants. A column should be provided to tally the total number of each species. Other parameters such as leaf litter, weeds and erosion should also be captured.
2) Randomly select a minimum of one site per vegetation type and treatment throughout the property (i.e. 1 x acacia burnt with follow up slashing, 1 x acacia slashed with follow up weed control, 1 x acacia mega-mulched with follow up slashing, etc). Upon completion of this process there may be 30 - 60 sites.

3) Take a GPS point of the location where the quadrat will be set up and capture the general condition of the vegetation within a 5 m x 5 m area to establish the baseline condition.
4) After the initial treatment (e.g. fire, slashing, mega-mulching, etc.) set up one 5 m x 5 m quadrat for each selected site using 4 star pickets to mark out the area (refer to Appendix 2).

The monitoring program is to occur as follows:

1) Monitor twice per year with one visit during winter and one during summer
2) Take a photograph from a predetermined point that has been set up with a directional arrow to ensure consistency between future photographs
3) On the data sheet record the location, GPS coordinates, the date and photograph number
4) Identify each species and count and measure plant heights
5) Fill in the remainder of the data sheet with the flora information and associated ecological data.

A full monitoring program, based on the monitoring framework provided in this report, is to be developed with monitoring implemented prior to treatments being undertaken.

4 Rehabilitation

To address the UDA conditions, rehabilitation will be undertaken within ecological corridors to improve habitat extent and wildlife movement. Initially, corridors will be identified through surveys and pegged. A slashed boundary will be established and fencing will be erected to protect areas from degradation during the interim use period.

4.1 Rehabilitation planning

The following assessment and action plans are required to address rehabilitation items:

- A full site assessment and a strategic rehabilitation plan for ecological corridors
- A vegetation management plan (VMP) detailing protection measures and rehabilitation management actions for each Context Plan Area where required (i.e. fauna corridors and environmental protection areas).

These plans will identify areas of high significance, determine restoration strategies and balance other interim land management uses with proposed conservation outcomes. A strategic rehabilitation management plan should, at a minimum, contain the following sections:

PART 1: INTRODUCTION

- Background
- Aims and Objectives
- Regional Setting
- Site Description
- Conservation Values

PART 2: ASSESSMENT METHODS

- Desktop Data Searches and Literature Review
- Review of Fauna Assessment
- Review of Vegetation Assessment
- Review of State Vegetation Types
- Regional Ecosystems Review
- Site Assessment and Findings
- Environmental and Declared Weeds

PART 3: VEGETATION MANAGEMENT ISSUES AND ACTIONS

- Controlling Weeds of Special Significance
- Civil Works Associated with the Development
- Historical Uses
- Soil Stability, Soil Microclimate and Erosion
- Bushfire Management
- Protection of Threatened Plant Species
- Weed Species
- Protection of Fauna and Habitat (possibly including weedy areas)
- Demarcation and protection of Natural Areas

PART 4: RESTORATION STRATEGY

- Restoration of native plant communities
- Restoration Models for the site
- Assisted regeneration: strategic management
    - Strategy for Ecological Restoration

  - Assisted Regeneration Zones
  - Assisted Regeneration Actions
- Revegetation: reconstruction and fabrication
  - Revegetation Objectives
  - Site Preparation
  - Revegetation Species List
  - Revegetation Actions
  - Plant Establishment
- Scheduled maintenance
  - Revegetation and Plant Establishment Period
- Monitoring
  - Monitoring and Recording Process
- Native seed provenance

4.2 Restoration Approach

A number of integrated approaches will help to achieve rehabilitation by streamlining works and management, implementing and documenting ecological changes and basing well founded principles to on-ground works. The size of the site presents a number of logistical issues with the delivery of implementing a practical restoration strategy. The restoration of native plant communities can involve four main approaches. Restoration may incorporate one or more of the following approaches:

1. **Natural regeneration** – this applies to relatively intact plant communities where recovery is automatic with the removal of the cause of the damage or disturbance e.g. after cyclonic events, bushfires etc. (i.e. usually no human intervention is required).
2. **Assisted regeneration** – this approach is appropriate in relatively intact native plant communities where limited intervention such as weed control, track closure, erection of fencing, etc. is sufficient to restore the native vegetation through natural regeneration and successional processes.
3. **Reconstruction** – this approach is required in highly disturbed, modified and degraded areas where the potential for native plant regeneration is considered to be limited, such as heavily disturbed ecosystems. In these situations, native species are unlikely to return to the site without greater intervention, such as replanting, large scale weed control, restoration of drains etc.
4. **Fabrication** (type conversion) – this approach is required where conditions are permanently changed and better adapted local systems can be constructed to restore integrity to the landscape (McDonald 1996).

The site requires rehabilitation techniques that use a combination of the above approaches. The approaches undertaken depend on the exact locality and the degree of modification to the environment (Hobbs and Cramer, 2008), such as the installation of water treatment devices or artificial wetlands within riparian communities. Therefore detailed site assessments will be required, on a Context Plan by Context Plan basis, to determine the site specific approach required.

4.3 Strategies for weed management

A rehabilitation management plan should identify areas where weed control is required and the following guidelines are to be followed for their removal (Table 4). These guidelines provide a methodology for weed control according to growth form, and include weeds with

woody stems. A detailed site assessment is required to determine the location and severity of weed incursion, which will influence the approach taken and exact methods used.

Table 4 General weed removal/control methods within the protected areas

Growth Form	Removal Techniques
Woody Stems e.g. Lantana, Camphor Laurel	<u>Manual</u> Small plants can be removed by hand using Soft Weed methodology. Exposure of rootstock to air is necessary to ensure full eradication. Failure to remove ALL of roots will result in regrowth. <u>Herbicide</u> *Up to 10cm basal diameter* 1. Apply the cut, scrape and paint method using Glyphosate at a ratio of 1:1 to minimise erosion. Lop into 50cm pieces, leaving these on the ground to act as mulch. Regrowth of woody weeds shall be spot sprayed. *Greater than 10cm basal diameter and inaccessible sites* Stem Injection Use stem injection method - at tree base drill holes at a 45 degree angle into the sapwood at 5 cm intervals. Inject herbicide into holes immediately before the plant cells close and translocation of herbicide ceases. Frill or Chip Cut into the sapwood with a chisel or axe. Fill cut with herbicide immediately with Glyphosate at a rate of 1:1 Repeat the process at 5cm intervals around the tree. * For *Cinamomum camphora* cuts must overlap with no gaps in order to kill the hardwood. * Plants to be treated with herbicide should be healthy and actively growing. * Deciduous plants should be treated in Spring and Autumn when leaves are fully formed. * Multi-stemmed plants require injection below the lowest branch or treat each stem individually.
Bulbs, Corms or Tubers e.g. Ground Asparagus, Watsonia	<u>Manual</u> Dig down next to the stem until the bulb or tuber is reached. Remove plant and carefully bag the bulb or tuber. <u>Herbicide</u> Remove any seed or fruit and place in bag. With an herbicide applicator, apply to the stems and leaves using brush-off.

Growth Form	Removal Techniques
Soft Stems (no underground reproductive parts) e.g. Blue Billy-goat Weed, Lantana seedlings	<u>Manual</u> Gently remove any seeds or fruits and carefully place into a bag. Grasp stem at ground level. Rock plant backwards and forwards to loosen roots and pull out gently. Tap the roots to dislodge soil. <u>Herbicide</u> Directly apply to suitable species. Should only be used where plants are actively growing.
Underground Reproductive Structures -Taproots	<u>Manual</u> Gently remove and bag seeds or fruit. Loosen soil around taproot with suitable implement. Grasp stem at ground level and gently pull out plant. Tap the roots to dislodge soil. * Not suitable for Paddy's Lucerne or *Ochna serrulata* and many others - use with caution.
Vines, Runners and Scramblers	<u>Manual</u> Locate a runner; gently pull it along the ground. Roll the runners up for easy removal. Continue doing this until all the runners have been rolled up. Small fibrous roots growing from the runners can be cut with a knife. Locate the main root system whilst removing the runners. Remove it manually. Do not leave any bits of stem or large roots, as these may re-shoot. Bag or compost the runners/roots and any other reproductive parts. <u>Herbicide</u> With a knife, scrape 15 to 30cm of the stem to reach the layer below the bark/outer layer. A maximum of half the stem diameter should be scraped. Large stems (>1cm) will require two scrapes opposite each other. Immediately apply herbicide along the length of the scrape. Vines can be left hanging in trees after treatment.

Growth Form	Removal Techniques
Rhizomes e.g. Asparagus Fern	<u>Manual</u> Remove and bag stems with seeds and fruit. Grasp the leaves or stems together so that the base of the plant is visible. Insert a knife at an angle close to the crown and cut through all the roots around the crown. All vegetative materials shall be left in situ.

Notes:

- Hand removal is recommended where possible and practical except where it may lead to soil destabilisation along creeks and drainage lines.
- Non-herbicide removal should be used where possible adjacent to native species to minimise damage. Suitable methods including digging, crowning or hand pulling.
- Where herbicide application is required:
  1. Broad-scale application is not permitted within drainage lines;
  2. Glyphosate Bioactive or equivalent is to be used within 30 m of water bodies as it is identified as more "frog friendly" than other herbicides;
  3. Quantities of herbicide need to be controlled and all care be taken to prevent runoff or excess use;
  4. Always read the lab to ensure the herbicide is used safely and no certificate is required for use; and
  5. Herbicides use should be undertaken during periods of weed growth or as per manufactures specifications.
- Herbicide use is **not permitted**
  1. During windy periods;
  2. Prior to rain forecast or 6 hours after rain,
  3. Broadly/recklessly in areas where native vegetation dominants.
- If in doubt whether plants are weed or native, confirmation prior to conducting weed removal is required e.g. from *Environmental Weed Guide* (free from GCCC), Department of Natural Resources Pest Fact Sheets and *Common Weeds of Northern NSW Rainforest* (The Big Scrub Rainforest Landcare Group, 1998).

4.4 Plantings

Where revegetation is to take place in areas when a reconstruction or fabrication approach is required, plantings are to be of local provenance and significant species should be included in the planting matrix. General steps to be undertaken for successful revegetation are outlined in Table 5 and must be adhered to during rehabilitation works. These steps will enhance the success of revegetation and will promote the objectives of rehabilitation.

Although the following provides a general guideline it should be noted that a detailed rehabilitation plan is required to determine the location, density and species matrix required.

Table 5 Steps for revegetation within corridors and dedicated conservation areas

Steps	Revegetation Works
1	Control weeds and prepare the site for planting. Suitable planting medium may need to be provided in some circumstances such as denuded or eroded areas.
2	Acquire native species or seeds from local nursery where plant stock is sourced from the local area
3	Prepare soil by loosening dirt at the planting rates outlined in the Rehabilitation Plan. Water needs to be added to the holes prior to planting
4	If the soil is poor and not suitable for the species to be planted, supplementation with good quality soils may be necessary. A long-term slow release fertiliser such as Osmocote native must be used for all plantings
5	After planting, the top soil needs to be watered. Forest-blend mulch is then to be spread around the plants carefully not to place any mulch directly against the stem
6	The plantings need to be rewatered approximately every 3-7 days for a period of 2 months or more if there are signs of wilting. If the soil is still damp from the previous watering activity the frequency of water can be reduced

4.5 Monitoring

A comprehensive monitoring program will be developed and implemented to capture baseline monitoring prior to the vegetation management treatments being applied. Adaptive management strategies will be used and where a treatment does not produce the desired result it can be identified and/or modified. Appendix 2 provides an example of methods for setting up a monitoring plot and Appendix 3 provides standard cross sections of areas pre and post rehabilitation.

5 Bushfire management

Bushfire management will form an essential component of maintaining the natural environment of the site. The Pre-Development Bushfire Mitigation Concept for the Yarrabilba Site (30 January 2012), prepared by Bushland Protection Systems will require updating as the development proceeds.

The principle objectives of the current plan are to:

- Protect life and property
- Minimise bushfire risk within the development footprint and neighbouring properties
- Reduce unauthorised activities within the site through good management
- Identify and manage future vegetation areas within the site to improve their ecological diversity and sustainability
- Reduce the considerable incident of unplanned fire on the site by maintaining reduced fuel loads over future development areas within the site.

To achieve the above objectives the following strategies for bushfire management must be implemented:

- Reduce the likelihood, intensity and impacts of unplanned fires through strategic vegetation management of large areas of vegetation located within the development footprint
- Strategically use mega mulching and slashing to reduce fuel loads within the development footprint area
- Slash protective buffers around conservation corridors to protect the natural values of those areas
- Construct new fire trails and repair heavily eroded trails or sections of existing trails to allow safe access for rural fire brigade teams, vegetation management contractors, surveyors, consultants and Lend Lease personnel
- Manage edge effects where increased sunlight leads to the excess growth of grasses and woody weeds which increase the fuel load and associated fire risk. Undertake regular weed control and/or slashing in these areas to reduce the fuel build up
- Construct/implement a 10 metre wide landscape buffer with a further 20 metre wide fuel reduced protection zone on boundary interfaces to protect neighbouring properties from unplanned fire
- Undertake planned burns (Hazard reduction, mosaic burns and strip burns) in designated zones to reduce fuels and lower the likelihood of unplanned fires occurring
- Eradicate pine trees in all areas where they will not be retained as a resource. Uncontrolled pine growth adds to higher fuel levels, contributing to higher fire intensities and rates of spread (BPS, 2012)
- Ensure weed control is regularly undertaken where pines are to be retained as a resource
- Design and implement a fire monitoring program that specifically reviews fire related management practices.

6 Reporting requirements and time lines

6.1 Reporting requirements

In addition to the extensive environmental reporting to date, a number of assessments, plans and reports are required as the development at the site progresses. Required reports are summarised in Table 6.

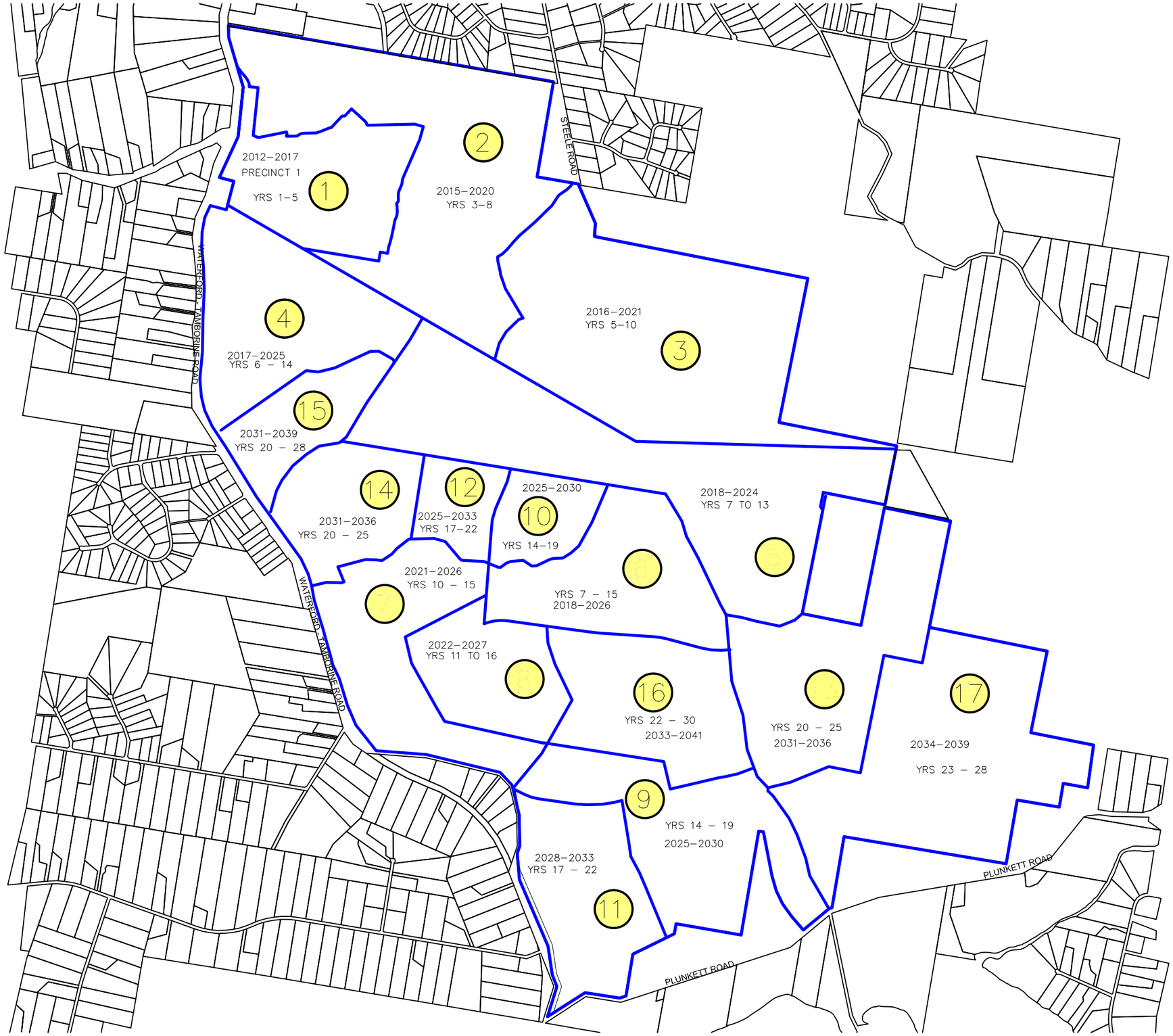
Table 6 Reporting requirements for MCU

Strategy, report or assessment required	Author	Timing
Yarrabilba Vegetation Management Plan	Yurrah	Completed Dec 2009
Yarrabilba Precinct 1 Stormwater Management Plan	Design Flow	Completed Feb 2010
Yarrabilba Draft Land Management Plan	Lend Lease	Completed Feb 2011
Interim Land Management Plan, Yarrabilba Stage 2: Business Plan	Agricultural Management Company	Completed Dec 2011
Pre-Development Bushfire Mitigation Concept For the Yarrabilba Site	Bushland Protection Systems	Completed Jan 2012
Yarrabilba Vegetation Management Strategy	Natura Consulting	Completed June 2012
Fauna Corridor Infrastructure Master Plan	Natura Consulting	Completed June 2012
Natural environment site strategy	Natura Consulting	Completed June 2012
Vegetation Management Strategy Monitoring Plan	To be allocated	Dec 2012
Botanical assessment to list all species found onsite	To be allocated	Per Context Plan stage
Fauna assessment and management plan including sections on: • Comprehensive fauna assessment • Feral animal monitoring and management • Koala management • Kangaroo management strategy and program • Implement Recovery Actions for any confirmed EVNT species (where applicable).	To be allocated	Per Context Plan stage
Detailed rehabilitation plan including the following sections: • Detailed rehabilitation monitoring plan • Strategic habitat restoration plan • Corridor fencing plan	To be allocated	Per Context Plan stage

Ecological equivalence assessment and plan	To be allocated	Per Context Plan stage
Permits from Ecoaccess (DERM) for clearance of threatened flora	To be allocated	Per Context Plan stage
Vegetation management plan (per stage)	To be allocated	Per Context Plan stage
Tree retention and protection plan (per stage)	To be allocated	Per Context Plan stage
Threatened species management plan (if or where required)	To be allocated	N/A

7 Development Staging

The Yarrabilba Residential Development is a staged development which will be undertaken over approximately thirty years (Figure 6). At each Context Plan stage, appropriate fauna assessment, management and monitoring is to be undertaken, where required, as outlined in this document.



NATURA CONSULTING A devision of Natura Pacific Pty Ltd ABN: 80117528748 Natura Pacific Pty Ltd PO Box 2959, Burleigh BC, Qld 4213 Gold Coast, Australia T +(61) 7 5593 4097 F +(61) 7 5593 5875 W www.natura-pacific.com E Info@natura-pacific.com	Drawing Title: Yarrabilba Residential Development Indicative Staging Plan Project Name: Yarrabilba	Client: Lend Lease Location: Yarrabilba QA: Drawn by: Lend Lease Checked by: Date: Drawing #: Amendment #: A	Associated Consultants:

not to scale

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9 Appendices

APPENDIX 1 – Wildlife Online Records

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Status: All
Records: Confirmed
Date: Since 1980
Latitude: 27.8224
Longitude: 153.126
Distance: 5
Email: steve@econetworks.com.au
Date submitted: Friday 27 Apr 2012 09:22:45
Date extracted: Friday 27 Apr 2012 09:30:15

The number of records retrieved = 179

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	*Litoria brevipalmata*	green thighed frog		NT		2
animals	amphibians	Hylidae	*Litoria gracilenta*	graceful treefrog		C		1
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		2
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		3
animals	amphibians	Hylidae	*Litoria dentata*	bleating treefrog		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		2
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		3
animals	amphibians	Myobatrachidae	*Pseudophryne major*	great brown broodfrog		C		1
animals	amphibians	Myobatrachidae	*Mixophyes fasciolatus*	great barred frog		C		1
animals	amphibians	Myobatrachidae	*Pseudophryne coriacea*	red backed broodfrog		C		1
animals	amphibians	Myobatrachidae	*Pseudophryne raveni*	copper backed broodfrog		C		6/4
animals	birds	Acanthizidae	*Gerygone albogularis*	white-throated gerygone		C		1
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		1
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		1
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		2
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		1
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		1
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		1
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		1
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		1
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		1
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		1
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		1
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		2
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		1
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		1
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		1
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		2
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		1
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		1
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		1
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		1
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		1
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		2
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		1
animals	birds	Psittacidae	*Glossopsitta pusilla*	little lorikeet		C		1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		1
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		1
animals	mammals	Macropodidae	*Macropus parryi*	whiptail wallaby		C		1
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		1
animals	mammals	Phascolarctidae	*Phascolarctos cinereus (southeast Queensland bioregion)*	koala (southeast Queensland bioregion)		V		44
animals	reptiles	Chelidae	*Chelodina sp.*					1
animals	reptiles	Elapidae	*Cryptophis nigrescens*	eastern small-eyed snake		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
fungi	club fungi	Basidiomycota	*Hydnum*			C		1/1
fungi	club fungi	Basidiomycota	*Panus fasciatus*			C		1/1
fungi	club fungi	Basidiomycota	*Boletus*			C		1/1
fungi	sac fungi	Cladiaceae	*Cladia aggregata*			C		1/1
plants	conifers	Podocarpaceae	*Podocarpus spinulosus*	dwarf plum-pine		C		2/2
plants	ferns	Dennstaedtiaceae	*Pteridium esculentum*	common bracken		C		1
plants	ferns	Lindsaeaceae	*Lindsaea microphylla*	lacy wedge fern		C		1
plants	higher dicots	Acanthaceae	*Hygrophila angustifolia*			C		1/1
plants	higher dicots	Apiaceae	*Platysace ericoides*	heath platysace		C		2/2
plants	higher dicots	Araliaceae	*Astrotricha longifolia*	star hair bush		C		1
plants	higher dicots	Asteraceae	*Ozothamnus diosmifolius*	white dogwood		C		2/1
plants	higher dicots	Asteraceae	*Brachyscome microcarpa*			C		1/1
plants	higher dicots	Asteraceae	*Epaltes australis*	spreading nutheads		C		1
plants	higher dicots	Caesalpiniaceae	*Barklya syringifolia*	golden shower tree		C		1/1
plants	higher dicots	Casuarinaceae	*Allocasuarina littoralis*			C		2/1
plants	higher dicots	Clusiaceae	*Hypericum gramineum*			C		1
plants	higher dicots	Dilleniaceae	*Hibbertia stricta*			C		1/1
plants	higher dicots	Droseraceae	*Drosera peltata*	pale sundew		C		1/1
plants	higher dicots	Ericaceae	*Leucopogon biflorus*			C		1/1
plants	higher dicots	Ericaceae	*Leucopogon leptospermoides*			C		2/1
plants	higher dicots	Ericaceae	*Leucopogon recurvisepalus*			E		9/9
plants	higher dicots	Ericaceae	*Monotoca scoparia*	prickly broom heath		C		1/1
plants	higher dicots	Ericaceae	*Melichrus adpressus*			C		2/1
plants	higher dicots	Ericaceae	*Acrotriche aggregata*	red cluster heath		C		2/1
plants	higher dicots	Ericaceae	*Leucopogon muticus*			C		1/1
plants	higher dicots	Fabaceae	*Hovea ramulosa*			C		3/3
plants	higher dicots	Fabaceae	*Dillwynia retorta*			C		2/1
plants	higher dicots	Fabaceae	*Pultenaea euchila*	orange pultenaea		C		1
plants	higher dicots	Fabaceae	*Pultenaea villosa*	hairy bush pea		C		1
plants	higher dicots	Fabaceae	*Daviesia wyattiana*	long-leaved bitter pea		C		1/1
plants	higher dicots	Fabaceae	*Glycine tomentella*	woolly glycine		C		1/1
plants	higher dicots	Fabaceae	*Pultenaea flexilis*			C		1
plants	higher dicots	Fabaceae	*Daviesia ulicifolia*	native gorse		C		1/1
plants	higher dicots	Fabaceae	*Podolobium scandens*			C		1/1
plants	higher dicots	Fabaceae	*Tephrosia bidwillii*			C		2/2
plants	higher dicots	Fabaceae	*Daviesia umbellulata*			C		1/1
plants	higher dicots	Fabaceae	*Pultenaea petiolaris*			C		1
plants	higher dicots	Fabaceae	*Gompholobium pinnatum*	poor mans gold		C		1
plants	higher dicots	Fabaceae	*Gompholobium virgatum*			C		1
plants	higher dicots	Fabaceae	*Pultenaea cunninghamii*	prickly pea		C		1/1
plants	higher dicots	Fabaceae	*Glycine clandestina var. clandestina*			C		1/1
plants	higher dicots	Goodeniaceae	*Goodenia gracilis*			C		1
plants	higher dicots	Goodeniaceae	*Goodenia rotundifolia*			C		1
plants	higher dicots	Haloragaceae	*Gonocarpus micranthus*			C		1
plants	higher dicots	Loganiaceae	*Mitrasacme paludosa*			C		1
plants	higher dicots	Mimosaceae	*Acacia quadrilateralis*			C		5/4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Mimosaceae	*Acacia baeuerlenii*			C		2/2
plants	higher dicots	Mimosaceae	*Acacia aulacocarpa*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia ulicifolia*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia juncifolia*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia concurrens*			C		1
plants	higher dicots	Mimosaceae	*Acacia hispidula*			C		3/3
plants	higher dicots	Mimosaceae	*Acacia granitica*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia fimbriata*	Brisbane golden wattle		C		2/2
plants	higher dicots	Myrtaceae	*Eucalyptus curtisii*	Plunkett mallee		NT		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus carnea*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus resinifera*	red mahogany		C		1/1
plants	higher dicots	Myrtaceae	*Lophostemon suaveolens*	swamp box		C		1
plants	higher dicots	Myrtaceae	*Melaleuca linariifolia*	snow-in summer		C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus siderophloia*			C		1/1
plants	higher dicots	Myrtaceae	*Leptospermum trinervium*	woolly tea-tree		C		1
plants	higher dicots	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		2/1
plants	higher dicots	Myrtaceae	*Eucalyptus racemosa subsp. racemosa*	scribbly gum		C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus tereticornis subsp. (Bunya Mountains P.V.Holzworth AQ397993)*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus dura*			C		3/3
plants	higher dicots	Myrtaceae	*Corymbia henryi*	large-leaved spotted gum		C		2/2
plants	higher dicots	Myrtaceae	*Eucalyptus microcorys*			C		1
plants	higher dicots	Myrtaceae	*Angophora woodsiana*	smudgee		C		1
plants	higher dicots	Myrtaceae	*Corymbia gummifera*	red bloodwood		C		1
plants	higher dicots	Myrtaceae	*Baeckea frutescens*			C		1
plants	higher dicots	Myrtaceae	*Melaleuca sieberi*			C		1
plants	higher dicots	Myrtaceae	*Melaleuca irbyana*			E		2/2
plants	higher dicots	Myrtaceae	*Kunzea flavescens*			NT		2/2
plants	higher dicots	Myrtaceae	*Eucalyptus seeana*	narrow-leaved red gum		C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		1/1
plants	higher dicots	Oleaceae	*Notelaea ovata*	forest olive		C		1
plants	higher dicots	Phyllanthaceae	*Sauropus hirtellus*			C		1/1
plants	higher dicots	Phyllanthaceae	*Phyllanthus triandrus subsp. (Mt May P.I.Forster+ PIF11778)*			C		1/1
plants	higher dicots	Polygalaceae	*Comesperma hispidulum*			C		1/1
plants	higher dicots	Polygalaceae	*Comesperma sphaerocarpum*			C		1
plants	higher dicots	Polygonaceae	*Persicaria strigosa*			C		1/1
plants	higher dicots	Polygonaceae	*Persicaria praetermissa*			C		1/1
plants	higher dicots	Polygonaceae	*Persicaria decipiens*	slender knotweed		C		1/1
plants	higher dicots	Proteaceae	*Hakea florulenta*	three-nerved willow hakea		C		2/2
plants	higher dicots	Proteaceae	*Persoonia stradbrokensis - P.tenuifolia*			C		1/1
plants	higher dicots	Proteaceae	*Persoonia sericea*	silky geebung		C		2/1
plants	higher dicots	Proteaceae	*Banksia spinulosa var. collina*			C		2/1
plants	higher dicots	Proteaceae	*Persoonia sericea x P.tenuifolia*			C		2/2
plants	higher dicots	Proteaceae	*Persoonia tenuifolia*			C		2/1
plants	higher dicots	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Rhamnaceae	*Cryptandra propinqua subsp. propinqua*			C		1/1
plants	higher dicots	Rubiaceae	*Pomax umbellata*			C		2/1
plants	higher dicots	Rutaceae	*Zieria laxiflora*	wallum zieria		C		1
plants	higher dicots	Santalaceae	*Exocarpos cupressiformis*	native cherry		C		1
plants	higher dicots	Sapindaceae	*Dodonaea triquetra*	large-leaved hop bush		C		1
plants	higher dicots	Stylidiaceae	*Stylidium debile*	frail trigger plant		C		1/1
plants	higher dicots	Thymelaeaceae	*Pimelea linifolia*			C		1
plants	higher dicots	Viscaceae	*Viscum articulatum*	flat mistletoe		C		1/1
plants	lower dicots	Lauraceae	*Cassytha*			C		1
plants	lower dicots	Lauraceae	*Cryptocarya triplinervis var. triplinervis*			C		1/1
plants	lower dicots	Lauraceae	*Cassytha glabella forma glabella*			C		3/3
plants	lower dicots	Lauraceae	*Cassytha muelleri*			C		5/5
plants	monocots	Alismataceae	*Damasonium minus*	starfruit		C		1/1
plants	monocots	Cyperaceae	*Cyperus polystachyos*			C		1
plants	monocots	Cyperaceae	*Bulbostylis barbata*			C		1/1
plants	monocots	Cyperaceae	*Schoenus ericetorum*			C		2/2
plants	monocots	Cyperaceae	*Gahnia aspera*			C		1
plants	monocots	Cyperaceae	*Lepidosperma laterale*			C		1
plants	monocots	Hemerocallidaceae	*Dianella*			C		1
plants	monocots	Hypoxidaceae	*Hypoxis hygrometrica var. villosisepala*			C		1/1
plants	monocots	Iridaceae	*Patersonia glabrata*			C		1
plants	monocots	Johnsoniaceae	*Tricoryne elatior*	yellow autumn lily		C		1
plants	monocots	Juncaceae	*Juncus continuus*			C		1
plants	monocots	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		1
plants	monocots	Laxmanniaceae	*Lomandra confertifolia subsp. pallida*			C		1
plants	monocots	Laxmanniaceae	*Lomandra obliqua*			C		1/1
plants	monocots	Orchidaceae	*Chiloglottis sp. (Mango Flat D.L.Jones 2547)*			C		1/1
plants	monocots	Orchidaceae	*Caladenia caerulea var. caerulea*			C		1/1
plants	monocots	Orchidaceae	*Pterostylis*			C		1/1
plants	monocots	Orchidaceae	*Caladenia catenata*			C		1/1
plants	monocots	Orchidaceae	*Pterostylis nutans*			C		1/1
plants	monocots	Orchidaceae	*Acianthus fornicatus*	pixie caps		C		1/1
plants	monocots	Orchidaceae	*Dockrillia linguiformis*	tongue orchid		C		1/1
plants	monocots	Poaceae	*Eriachne pallescens var. pallescens*			C		1/1
plants	monocots	Poaceae	*Eriachne pallescens*			C		1/1
plants	monocots	Poaceae	*Amphipogon strictus*			C		2/2
plants	monocots	Poaceae	*Eragrostis brownii*	Brown's lovegrass		C		1/1
plants	monocots	Poaceae	*Entolasia stricta*	wiry panic		C		2/1
plants	monocots	Poaceae	*Panicum simile*			C		1/1
plants	monocots	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		1
plants	monocots	Poaceae	*Pseudoraphis paradoxa*	slender mudgrass		C		1/1
plants	monocots	Smilacaceae	*Smilax australis*	barbed-wire vine		C		1
plants	monocots	Xanthorrhoeaceae	*Xanthorrhoea johnsonii*			C		1
plants	monocots	Xyridaceae	*Xyris complanata*	yellow-eye		C		1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

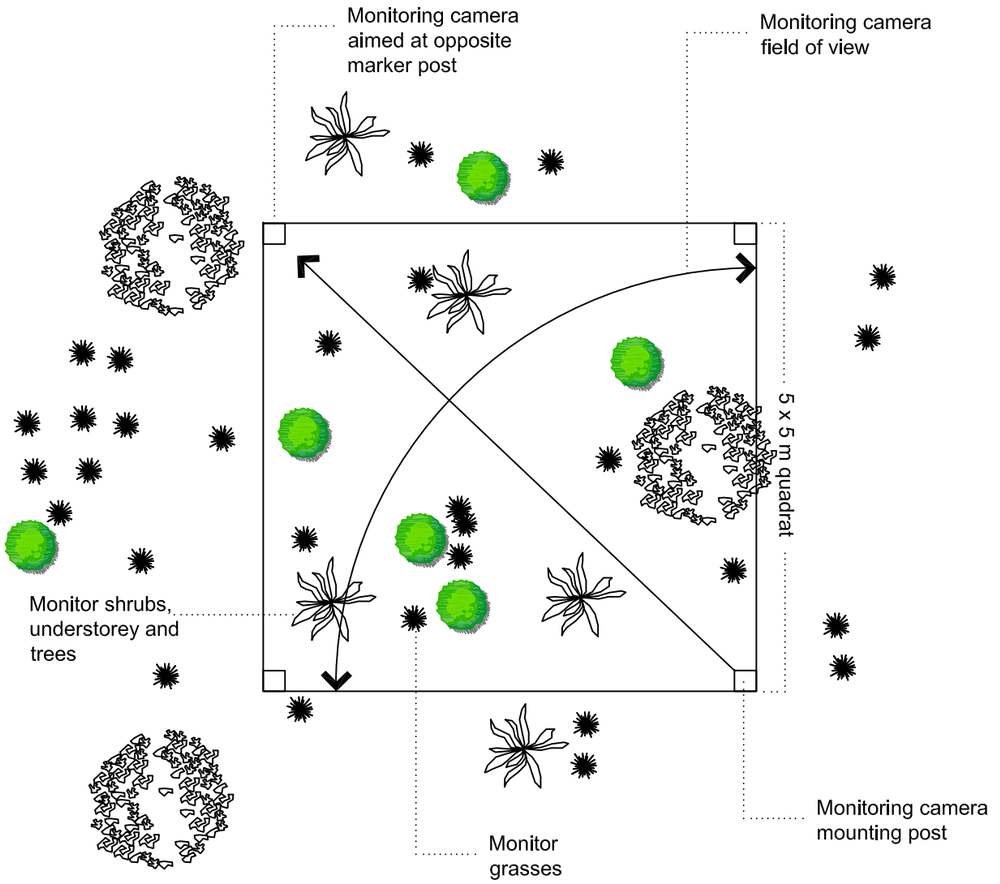
Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

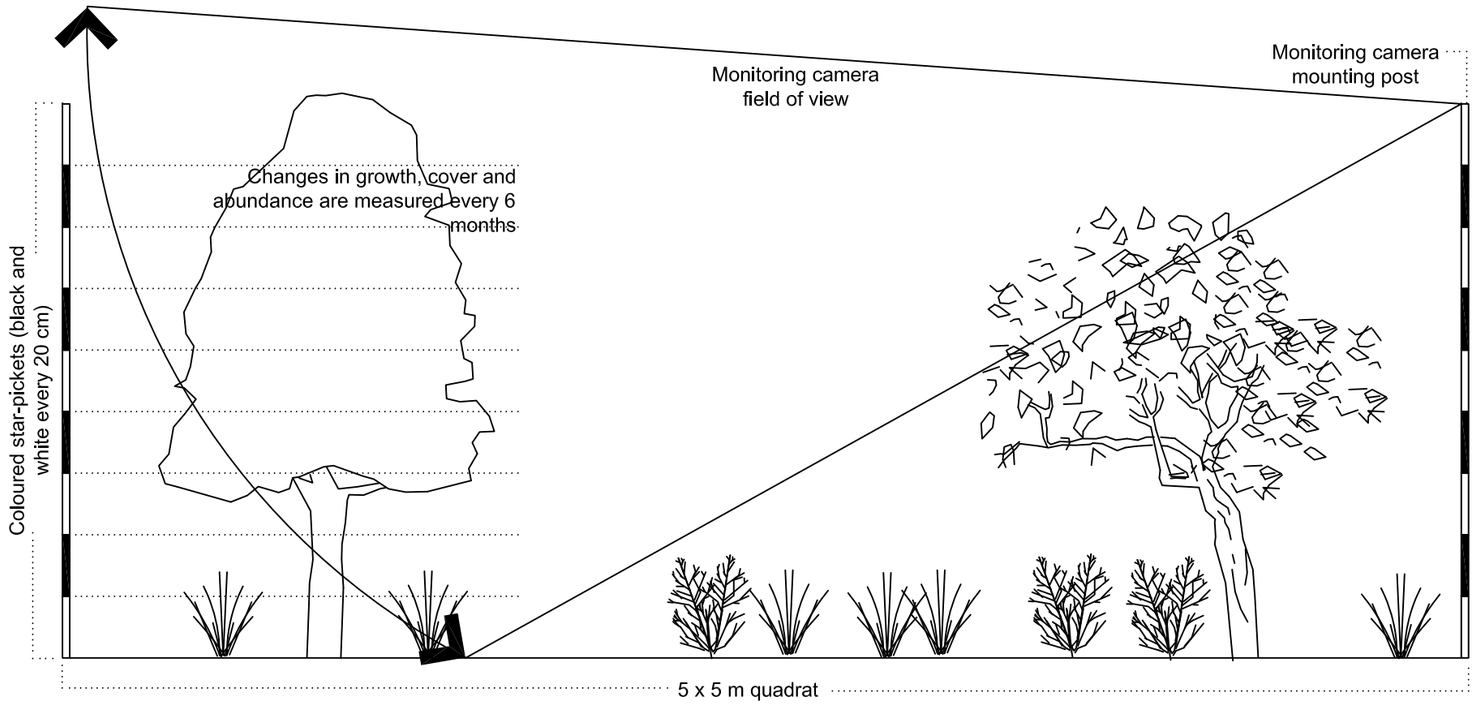
Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

APPENDIX 2 – Monitoring Plan Setup

MONITORING PLOT SET-UP



PLAN VIEW (nts)



SIDE VIEW (nts)

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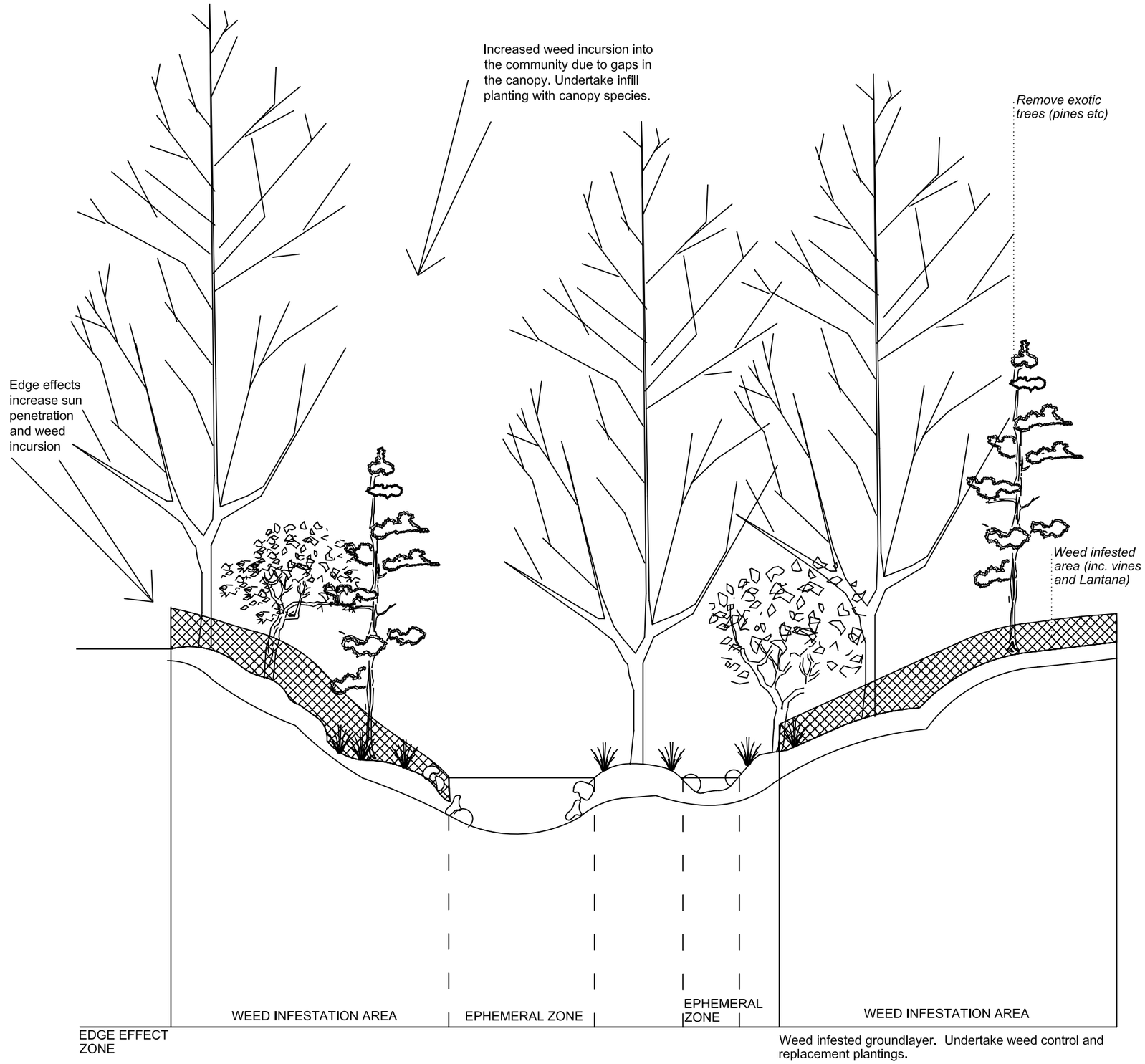
Drawing Title: Monitoring Plan: Quadrat Set-up	Client: Lend Lease		Associated Consultants: Bushcare Services
Project Name: Yarrabilba	Location: Yarrabilba	QA: Drawn by: KR; Checked by: ST; Date: 25 April 2012; Drawing #: NCO110011_MCI-1_03; Amendment #: A	

Concept Only: Not To Scale

APPENDIX 3 – Corridor Cross Sections

PRIOR TO TREATMENT



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Drawing Title: Corridor Pre Rehabilitation

Client: Lend Lease

Associated Consultants: Bushcare Services

Project Name: Yarrabilba

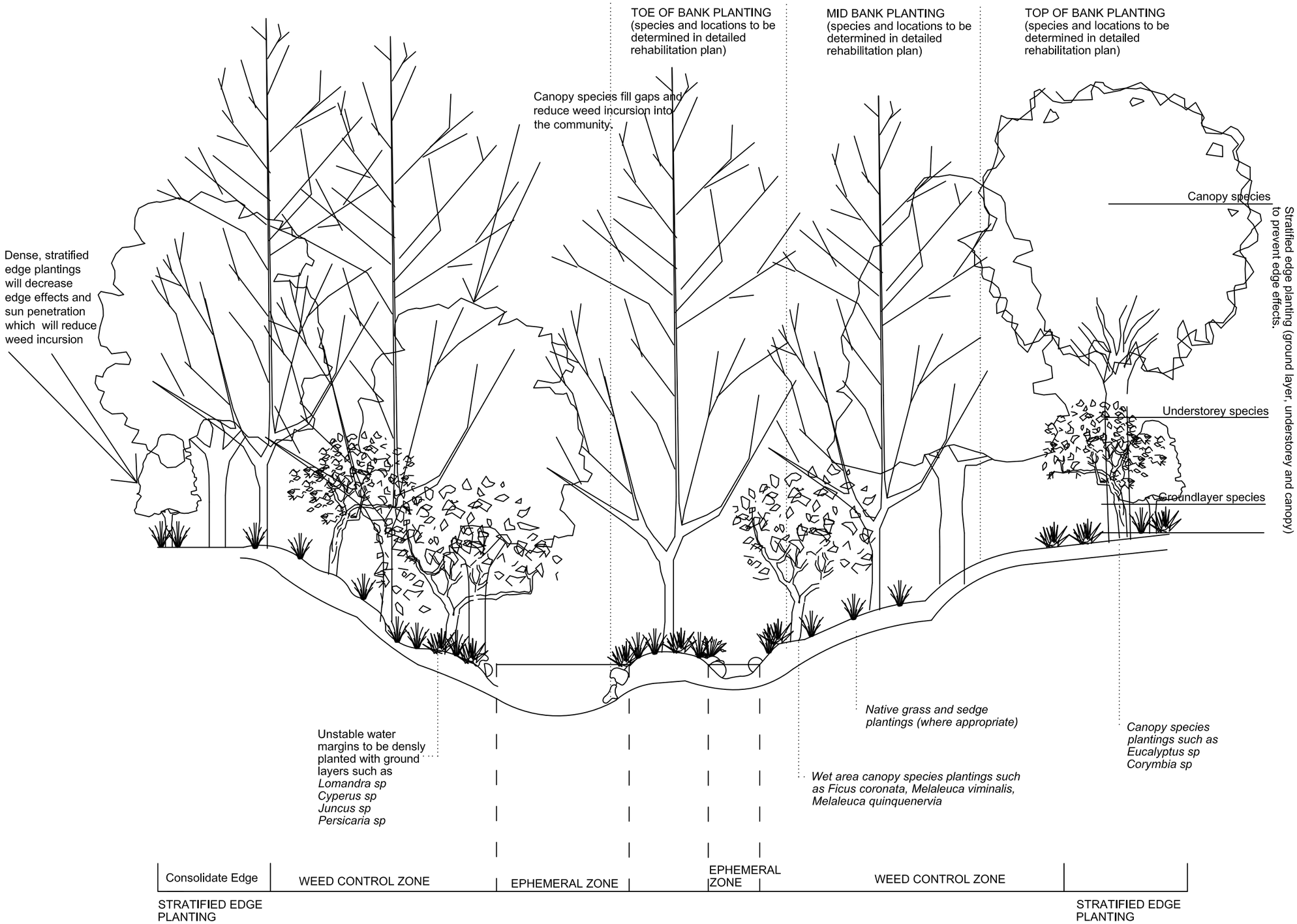
Location: Yarrabilba

QA:

Drawn by: KR
Checked by: ST
Date: 3 June 2012
Drawing #: NCO110011_MCI-Y_01
Amendment #: A

Concept Only: Not To Scale

POST TREATMENT



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Drawing Title: Corridor Post Rehabilitation

Project Name: Yarrabilba

Client: Lend Lease

Location: Yarrabilba

QA:

Drawn by: KR
Checked by: ST
Date: 18 May 2012
Drawing #: NC0110011_MCU-X_02
Amendment #: A

Associated Consultants:

Bushcare Services

Concept Only: Not To Scale