PREPARED FOR:

INVESTA RESIDENTIAL GROUP PTY LTD

11 NOVEMBER 2014

OFFSET AREA MANAGEMENT PLAN

LOTS 87 AND 88 ON RP892014
MT FLINDERS RD, PEAK CROSSING QLD

NEWGROUND

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REPORT TITLE	OFFSET AREA MANAGEMENT PLAN
PROJECT	LOTS 87 AND 88 ON RP892014 MT FLINDERS RD, PEAK CROSSING QLD
CLIENT	INVESTA RESIDENTIAL GROUP PTY LTD

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The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

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CONTENTS

TABLES

Chapter 1: INTRODUCTION

1.1 Overview

The purpose of this management plan is to identify the management objectives, actions and outcomes necessary to fulfil a statutory requirement, pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) (**EPBC Act**), for the provision of a koala *(Phascolarctus cinereus)* habitat offset. The subject offset is to contribute to the mitigation of impacts associated with the development of Brentwood Residential Estate (EPBC ref. 2013/7074). This management plan is focussed on the protection and enhancement of the koala habitat values associated with the offset site, which occurs within Lots 87 and 88 on RP892014 (**APPENDIX A**).

The structure of this management plan has been informed by the project-specific requirements of the Department of Environment (DoE), namely the subject development approval conditions as well as technical guidelines including the *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (DoE, 2013) ('Draft Referral Guideline') and the *EPBC Act Environmental Offsets Policy* (DoE, 2012). Given that the offset is to be legally secured under a Voluntary Declaration as an area of High Conservation Value (under section 19F of the Vegetation Management Act 1999) relevant Queensland Government requirements as described by the *Vegetation Management Act 1999*, *Environmental Offsets Act 2014* and *Environmental Offsets Regulation 2014* are also reflected by this management plan in its content.

1.2 Objectives of the Report

The primary objective of this Offset Area Management Plan report is to provide a land management guidance tool which directs adaptive management actions such that a demonstrable increase in koala habitat quality is achieved throughout the offset site.

1.3 Outline of the Report

This report includes the following components:

- Chapter 1: provides an introduction to the report, including a description of the offset site (Departmental reference details) and the technical context around the offset proposition.
- Chapter 2: presents management objectives, actions, performance indicators and reporting requirements for each management measure required to achieve an improvement of koala habitat quality within the offset area over time.
- Chapter 3: report conclusions.

1.4 Offset Proposition Summary

The offset proposition summary details presented by Tables 1.1 and 1.2 have been arranged in general accordance with the proforma set out in the Queensland Department of Natural Resources and Mines (2012) Offset Area Management Plan template. The offset proposition is to be legally secured within 6 months of commencement of works at the impact site.

TABLE 1.1: DEPARTMENTAL REFERENCE DETAILS

DETAILS FOR APPLICATION THAT TRIGGERS OFFSET	
Departmental Reference Number and Case Name:	EPBC 2013/7074
Offset reference number (if applicable):	N/A
Tenure : Freehold	Primary Local Government Area : Ipswich City Council

OFFSET TRIGGERS AND VALUES	
Offset Trigger	Values requiring to be offset
☐ Regional Vegetation Management Code ☐ Part P ☐ Part S ☐ Part Xa ☐ Part Xb ☐ Material Change of Use / Reconfiguration of a lot Policies (Table F1) ☒ EPBC Act	☐ Assessable vegetation adjacent to a wetland, significant wetland ☐ Assessable vegetation adjacent to a watercourse ☐ Connectivity ☐ Endangered regional ecosystem ☐ Of concern regional ecosystem ☐ Threshold regional ecosystem ☐ Critically limited regional ecosystem ☐ Essential habitat ☒ Habitat for koalas in SEQ ☐ Values within a highly vegetated bioregion ☐ Threatened Ecological Community

TABLE 1.2: OFFSET AREA DETAILS

LANDHOLDER DETAILS	
Register Owner/s on Title: Molly Robson, Robert Allan and Graham Marshall as Trustees for Queensland Trust for Nature	
Lessee:	
Business/Company name: Queensland Trust for Nature	
ABN/ACN: ABN 66 583 550 652	
Phone number: 0428 017 611	Mobile phone: 0428 017 611
Facsimile number:	Contact person (if required): Ben O'Hara (CEO)
Email: ben@qtfn.org.au	
Postal Address: GPO Box 162, Brisbane, Qld, 4001	

PROPERTY DETAILS	
Property name: "Peak Crossing"	
Real property description (lot on Plan/s): Lot 87 and 88 on RP892014	
Tenure: Freehold	Primary Local Government Area: Scenic Rim Regional Council
Planning Scheme Zone: Rural B and Rural E	Property area (ha): The total area of Lots 87 and 88 RP892014 is 194.29 ha. The offset area/site accounts for 161.11 ha of this total (**APPENDIX A**). The portion of the subject lots that is not part of the offset area is referred to as the 'balance area' (33.18 ha).

Landzone / geology	Based on the Department of Science, Information Technology, Innovation and the Arts (DSITIA) Pre-clearing Broad Vegetation Grounds of Queensland (EHP, 2012a), the site is shown to consist of land zones 3, 8 and 9-10. The offset area occurs within an area designated as land zones 9-10 (New Ground, 2014). Landzone 9 is described as fine grained sedimentary rocks, generally with little or no deformation and usually forming undulating landscapes. Siltstones, mudstones, shales, calcareous sediments, and labile sandstones are typical rock types although minor interbedded volcanics may occur (EHP, 2012b). Landzone 10 is described as medium to coarse grained sedimentary rocks, with little or no deformation, forming plateaus, benches and scarps. Includes siliceous (quartzose) sandstones, conglomerates and minor interbedded volcanics, and springs associated with these rocks (EHP, 2012b).
Soils	Landzone 9 – Includes a diverse range of fine textured soils of moderate to high fertility, predominantly Vertosols, Sodosols, and Chromosols (EHP 2012b). Landzone 10 – Soils are predominantly shallow Rudosols and Tenosols of low fertility, but include sandy surfaced Kandosols, Kurosols, Sodosols and Chromosols (EHP 2012b).
Pre-clear regional ecosystem (V.)	12.9-10.2/12.9-10.7 (80/20); 12.9-10.2/12.9-10.7/12.9-10.17 (85/10/5)
Existing vegetation in offset area	Regional Ecosystems 12.9-10.2 and 12.9-10.7 (New Ground, 2014)
Estimated age of vegetation	Areas of remnant vegetation are approximately 40 years. Areas of regrowth/regenerating vegetation are approximately 12 years (New Ground, 2014)
Is there a PMAV currently over all or part of the property?	No

LEGALLY BINDING MECHANISM

☒Voluntary Declaration (Vegetation Management Act 1999) Reference Number:	☐Covenant (Land Act 1994/ Land Title Act 1994) Reference Number:
☐Nature Refuge (Nature Conservation Act 1992) Reference Number:	☐Other Reference Number:

1.5 Suitability of offset and nature of impact site

The offset area to which this management plan relates, as presented by **APPENDIX A**, was determined to be suitable for the implementation of a targeted land management approach which is to result in a net gain in koala habitat quality and legal protection of existing koala habitat from incompatible land uses. The suitability of the offset area was determined in consideration of the results of ecological investigations undertaken at both the impact site (Orogen, 2011a; Orogen, 2011b) and over the offset area (New Ground, 2014). A brief outline of the findings of these ecological investigations as presented by the *Koala Offset Assessment Report* (New Ground 2014) (**APPENDIX B**) is presented below to provide context around the offset area and parallels between it and the impact site.

Overview of Impact Area

The koala habitat clearing extent (on the impact site) is 67.14 ha. It is the significant residual impacts of this clearing extent that the offset area is to mitigate. Reviews of previous ecological surveys undertaken on the impact site (Orogen 2011a, Orogen 2011b, New Ground 2013), identified that the disturbance footprint contains a range of remnant forest and woodland communities including REs 12.9-10.12, 12.9-10.15, 12.9-10.3, 12.9-10.2, 12.9-10.7a, and 12.8.16. The disturbance footprint also contains a range of non-remnant vegetation communities.

The remnant communities were identified to be in moderate condition, however, invasive weed species were observed throughout and densities varied between low to high. Other disturbances observed included cleared tracks, erosion, logging and fire. With the exception of RE 12.9-10.15, all the vegetation types within the impact site, contain a variety of food/habitat trees species known to be utilized by the koala. These include eucalypt species such as: *Eucalyptus molucanna, Eucalyptus seeana, Eucalyptus tereticornis, Eucalyptus major, Eucalyptus siderophloia,* and *Eucalyptus crebra*, and non-eucalypt species such as, *Corymbia intermedia, Angophora leiocarpa, Allocasuarina torulosa, Allocasuarina littoralis, Lophostemon suaveolens,* and *Lophostemon confertus*.

The impact area is located at a northern and western terminus of a tract of bushland and was noted to be under pressure as a result of its position at the fringe of existing residential communities to the north, west and south; with future urban development zoned to the east.

Description of Offset Area

The proposed offset area ('offset site'/ 'the site') was subject to an ecological assessment which was concerned with assessment of the suitability of the subject property as a koala habitat offset as documented in *Koala Offset Assessment Report* (**APPENDIX B**). Field surveys were undertaken by New Ground Ecologists from 3 July – 9 July 2014 and included tertiary and quaternary vegetation surveys, fauna habitat assessment surveys, targeted threatened flora and fauna surveys (including active searches for evidence of koala), exotic flora and fauna surveys, disturbance surveys and biocondition surveys in accordance with Eyre et al. (2011).

In summary, the field surveys confirmed that the site contained vegetation communities that contain high habitat value for koalas. The offset area is predominately vegetated by RE 12.9-10.2 and RE 12.9-10.7 which both comprise *Eucalyptus tereticornis, Corymbia citriodora* and *Eucalyptus crebra* (preferred koala feed trees as per ICC (2004)) as dominant canopy and sub-canopy species. Koala shelter trees such as *Lophostemon confertus* are also associated with this vegetation community. Although koala density surveys were not undertaken, koala scats were located and recorded across the entire site indicating a high activity level.

In addition to the onsite quality of koala habitat, the offset site is connected to adjacent areas of koala habitat and corridors. Specifically, the site is adjacent to Flinders-Goolman Conservation Estate on the north east and is located within the Flinders Karawatha corridor, which is the largest remaining continuous stretch of open eucalypt forest in South East Queensland. The offset area provides an opportunity to enhance the protection status and koala habitat quality of a portion of the Flinders Karawatha corridor via the management measures outlined within this plan.

Despite the evidence of site value to koala, a series of threats where noted through the New Ground (2014) study. These included:

- Risk of future clearing due to site planning zonation (as 'Rural B' and 'Rural E') and associated permissible land uses/exempt clearing (refer section 4.1.2 of **APPENDIX B**);
- Weed incursions (and associated threat to existing koala habitat as well as impacts to succession) (section 4.2.4 and table 4.4 of **APPENDIX B**);

- Historic clearing/logging (table 4.4 of **APPENDIX B**);
- Fire (table 4.4 of Appendix B); and
- Feral animals. It is noted that no records of feral animals were collected during the study. However, given that there are records of both foxes (*Vulpes vulpes*) and wild dogs (*Canis familiaris*) in the site's locality (Appendix C of **APPENDIX B**) it is assumed that these pests represent a major threat to koalas that occur in the offset area.

The management actions described in Chapter 2 of this report seek to enhance koala habitat quality via the reduction of the level of threat associated with the threatening processes listed above as well as additional threats cited by the *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (DoE, 2013).

Chapter 2: Management Plan

The management regime proposed for the offset area is to enhance the level of protection afforded to existing koala habitat through exclusion of land management practices that are incompatible to achieving a net gain in koala habitat quality. Further, key threatening processes which could interfere with the recovery of koala as described by the *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (DoE, 2013) are to be actively managed to result in a net gain in koala habitat quality in time as articulated by the *EPBC Act Environmental Offsets Policy* (DoE, 2012) and demonstrated via the *Offsets Assessment Guide* (DoE, 2012).

The sub-headings that comprise this chapter are based on the koala habitat attributes listed by the koala habitat assessment tool as well as the threats to koala recovery listed by the Draft Referral Guidelines (DoE, 2013). Management objective(s), actions, key performance indicators, corrective measures and monitoring/reporting obligations have been tabulated for each koala habitat attribute and threat to recovery. The strategic intent of the management measures presented is to reduce/control risk to koala recovery. Further, it is expected that the concurrent management of each threat/habitat attribute will result in an increase to koala habitat quality within the offset area through the ten (10) year active management period. Post the active management period, that is, at the anticipated end of this management plan, it is the intention of the landowner to secure the amalgamated parcels of land which this offset forms a portion, as a Nature Refuge. The management plan that will be associated with the Nature Refuge will be based on this management plan, thus ensuring the ongoing management of the properties in a manner that supports the desired outcomes. In the event that the offset area is not secured as a Nature Refuge at the cessation of the active management period, the landholder will approach the Department of Environment (DoE) to propose an alternative measure.

2.1 Koala Occurrence

Koala occurrence is a primary koala habitat attribute detailed within the koala habitat assessment tool of the Draft Referral Guidelines (DoE, 2013) and is noted as a key attribute to defining the importance of the habitat where koala occurs. As detailed within the koala habitat assessment tool, the offset area currently archives the highest score (+2) due to '*evidence of one or more koala within the last 2 years'.* As such, an overarching objective for the offset area (to be achieved through the implementation of the OAMP) is to ensure the maintenance of the koala occurrence score over the long term.

It is anticipated that through the management of site's existing threats and improvement to the koala habitat, the level of utilisation by koala within the offset area will increase over time. To measure the overall efficacy of the management measures proposed within the OAMP, dedicated koala density surveys will be undertaken. Details of how the koala occurrence attribute will be addressed as part of the OAMP is present below in **TABLE 2.1**.

TABLE 2.1: OCCURRENCE OF KOALA WITHIN OFFSET AREA

Attribute	Koala Occurrence
Outcome	• Increase koala density within offset area.
Actions	• Baseline koala density survey to be undertaken within the offset area using a methodology suitable for the estimation of koala density (e.g. currently a combination of the Spot Assessment Technique and line transect surveys (Phillips and Callaghan, 2011; Dique et al,. 2003). Methodology is to be peer-reviewed and approved by a relevant expert (e.g. koala expert from academia) prior to implementation. • Replicated koala density/occurrence surveys undertaken within the offset area at years 5 and 10 from the date at which the offset is legally secured. • Koala density surveys to be undertaken by a suitably qualified environmental scientist[1]
Performance Indicators	• Baseline koala density/occurrence survey undertaken and documented. • Koala density/occurrence surveys (years 5 and 10) records an increase in koala density/activity within the offset area. • Offset area is legally secured for conservation purposes.
Monitoring	• Baseline assessment of koala density to be undertaken within 6 months of the offset area being legally secured • Outside of the formal koala density survey event, opportunistic koala sightings to be recorded (location and date) within the Annual Offset Area Assessment Report
Reporting	• Results of pre-survey methodology review is to be documented within Annual Offset Area Report. • Details of expert that undertook the review and the survey study team are also to be included. • The koala density survey results will be incorporated within the relevant Annual Offset Area Assessment Report (years 0, 5 and 10). • Opportunistic koala sightings to be incorporated into the Annual Offset Area Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to PostApproval@environment.gov.au
Corrective Action	• Should koala density be found to significantly reduce (as defined by the applied survey method or koala expert) between survey events; a supplementary assessment will be implemented to review the likely cause of the reduced occurrence of koala within the offset area. The outcomes of the review inform adaptation of the management approach.
Term	• Duration of the active management period (10 years).

[1] For the purposes of this management plan, 'suitably qualified environmental scientist' is defined as an environmental practitioner with an environmental science-related degree and two years relevant professional experience at minimum.

TABLE 2.1: OCCURRENCE OF KOALA WITHIN OFFSET AREA

Responsibility	• Landholder

2.2 Vegetation Composition

Based on the koala habitat assessment tool of the Draft Referral Guidelines (DoE, 2013), the entire offset area supports vegetation that '*Has forest or woodland with 2 or more known koala food tree species in the canopy*'. Accordingly, for 'vegetation composition', the offset area is considered to have a score of 2. The offset area therefore achieves the maximum possible score for this attribute. Given that it is not possible to implement strategies that will improve the score for the Vegetation Composition attribute, management actions will focus on ensuring that the attribute score is maintained over the longer term, as well as strategies to enhance koala habitat values at a finer resolution than contemplated by the draft referral guidelines. These are detailed below in **TABLE 2.2.**

TABLE 2.2: VEGETATION COMPOSITION

Attribute	Vegetation Composition
Outcomes	• Vegetation composition maintains a 'high' score value in relation to habitat that is critical to the survival of the koala. • No significant increase in weed cover for species that could adversely affect the structural composition of vegetation within the offset area in relation to koala habitat value (i.e. weed species that are shrubs, trees or vines). • Retain and enhance the structure and floristic diversity of canopy vegetation. • Retain and enhance the structure and floristic diversity of middle and understorey vegetation. • Ongoing retention and recruitment of koala food trees. • Permanently remove existing threat of habitat degradation associated with clearing, development or other incompatible land uses. • Domestic livestock excluded from offset area (unless controlled grazing required for fire risk management)
Actions	• Monitoring of canopy composition with respect to koala food tree species; adaptive management if required. Monitoring to include representative surveys of all applicable (koala habitat) vegetation communities within the offset area. For example, tertiary-level vegetation surveys in accordance with Neldner *et al* (2012). • Monitoring of weed infestations; adaptive management of shrub, tree and vine weed species if required. • Flora surveys to be undertaken by a suitably qualified environmental scientist. • To remove the risk of habitat degradation associated with clearing, development or other incompatible land uses, the entire 161.11 ha offset area will be managed for conservation purposes. • Given that the subject property boundary is currently fenced in koala-permeable fencing, livestock will be excluded from the offset area through at least one of the following mechanisms:

TABLE 2.2: VEGETATION COMPOSITION

	» Livestock will not be kept within balance areas of Lots 87 or 88 RP892014; or » Koala-friendly fencing will be erected along the northern boundary of the offset area to exclude livestock grazing outside of the offset area yet within the subject property in accordance with a relevant guideline such as *Note G4 – Wildlife Friendly Fencing and Netting* (Land for Wildlife, nd). • Domestic livestock will be only be introduced in the event that a fire risk professional (e.g. representative of Queensland Rural Fire Service) and a suitably qualified environmental scientist deem that conditions are not suitable for an ecological burn and that grazing is appropriate to manage a high level of fire risk. In this event, a maximum of 12 head of domestic livestock may be introduced for no more than a three (3) consecutive week period. Level of risk (and any need to repeat this grazing cycle) is to be re-assessed by the aforementioned professionals following the grazing event. • Vegetation clearing will not be undertaken within the offset area under any circumstances, except the following: » Where necessary for the removal of weeds; » To establish and maintain fencing around the boundary of the offset area; » To establish and maintain firebreaks and fire trails in accordance with an Offset Area Bushfire Management Plan that has been prepared by a suitably qualified professional (minimum two years professional experience in bushfire risk management planning); and » To remove or reduce imminent risk of serious personal injury or damage to infrastructure posed by the vegetation, and only to the extent necessary to mitigate the risk. This action to be undertaken in accordance with the relevant legislative requirements in place at the time of clearing.
Performance Indicators	• Vegetation composition retains structural attributes of forest or woodland, and maintains koala food tree species diversity recorded by baseline survey. • Weed cover (shrub, tree and vine species) does not exceed baseline levels by more than 10%. • Offset area is legally secured as an area of High Conservation Value under section 19F of the *Vegetation Management Act 1999*
Monitoring	• Baseline assessment of koala food tree species richness to be undertaken to be undertaken within 6 months of the offset area being legally secured. • Baseline assessment of offset area weed infestation levels (shrub, tree and vine species) to be undertaken within 6 months of the offset area being legally secured. • Weed assessments and monitoring to be undertaken annually, during spring or summer to optimise detection. • If livestock are kept on the balance of the property, the offset area fencing to be monitored on a monthly basis.
Reporting	• Monitoring results to be recorded in annual Offset Area Assessment Report. • The location, extent and associated purpose for any vegetation clearing undertaken within the offset area will be detailed within the annual Offset Area Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of

TABLE 2.2: VEGETATION COMPOSITION

	the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to PostApproval@environment.gov.au
Corrective Action	• Supplementary planting/assisted natural regeneration of koala food trees to be undertaken where koala food tree species diversity is recorded to have declined from baseline levels. • Weed control to be undertaken in accordance with accepted best practice principles (e.g. currently South East Queensland Ecological Restoration Framework) to reduce weed cover to baseline levels (or better). • If livestock-proof fencing is breached: » Within 7 days: Livestock will be removed from offset area and temporary fencing measures put in place to ensure livestock are excluded and permanent fence repairs can be completed; and » Within 28 days: Repairs to fencing undertaken to achieve a koala-friendly livestock-proof standard.
Term	• Baseline monitoring for koala food tree species richness to be undertaken within 6 months of the offset area becoming legally secured. • Subsequent koala food tree species richness monitoring to be undertaken every 5 years for the life of the offset area. • Baseline monitoring for weed cover (shrub, tree and vine species) to be undertaken within 6 months of the offset area becoming legally secured. • Subsequent weed assessments and monitoring to be undertaken annually during the active management period.
Responsibility	• Landowner

2.3 Habitat Connectivity

Based on the Koala habitat assessment tool of the draft koala referral guidelines (DoE, 2013), the entire offset area conforms to '*Area is part of a contiguous landscape ≥ 500 ha*'. Accordingly, for 'habitat connectivity', the offset area is considered to have a score of 2. The offset area therefore achieves the maximum possible score for this attribute. Given that it is not possible to implement strategies that will improve the score for the 'habitat connectivity' attribute, management actions will focus on ensuring that the attribute score is maintained as well as strategies to enhance koala habitat values at a finer resolution than contemplated by the draft referral guidelines. These are detailed below in **TABLE 2.3.**

TABLE 2.3: HABITAT CONNECTIVITY

Attribute	Habitat Connectivity
Outcomes	• Maintain contiguous landscapes to allow koalas to establish new territories, facilitate gene flow and respond to environmental changes. • Permanently remove existing threat of habitat degradation associated with clearing, development or other incompatible land uses. • Contribute to koala movement and dispersal through the Flinders Karawatha corridor through the establishment of a protected habitat corridor (minimum 700 m width).
Actions	• To remove the risk of habitat degradation associated with clearing, development or other incompatible land uses, the entire 161.11 ha offset area will be managed for conservation purposes. • Vegetation clearing will not be undertaken within the offset area under any circumstances, except the following: » Where necessary for the removal of weeds; » To establish and maintain fencing around the boundary of the offset area in accordance with relevant legislation; » To establish and maintain firebreaks and fire trails in accordance with an Offset Area Bushfire Management Plan that has been prepared by a suitably qualified professional and relevant legislation; and » To remove or reduce imminent risk of serious personal injury or damage to infrastructure posed by the vegetation, and only to the extent necessary to mitigate the risk. This action to be undertaken in accordance with the relevant legislative requirements in place at the time of clearing. • The subject property boundary is currently fenced in koala-permeable fencing. Any new or replacement fencing is to be 'fauna-friendly' in accordance with a relevant guideline such as *Note G4 – Wildlife Friendly Fencing and Netting* (Land for Wildlife, nd).
Performance Indicators	• Offset area is legally secured as an area of High Conservation Value under section 19F of the *Vegetation Management Act 1999*
Monitoring	• Firebreaks and fire control lines to be inspected at a minimum quarterly frequency or after major storm events.
Reporting	• The location, extent and associated purpose for any vegetation clearing undertaken within the offset area will be detailed within the annual Offset Area Assessment Report. • Any change to site connectivity is to be detailed within the annual Offset Area Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to

TABLE 2.3: HABITAT CONNECTIVITY

	PostApproval@environment.gov.au
Corrective Action	• In the event of koala entanglement in fencing, the 'problem area' is to be retro-fitted with an appropriate control measure as per those described in relevant guideline such as *Note G4 – Wildlife Friendly Fencing and Netting* (Land for Wildlife, nd).
Term	• Offset area to be legally secured within six (6) months of the commencement of works at the impact site.
Responsibility	• Landowner

2.4 Key Existing Threats

It is expected that the koala occurring within the offset area will be exposed to a number of the key threatening processes that are acknowledged to have the potential to disrupt the recovery of the species and/or have the potential to cause a decline in the listed population. The proposed offset management plan is cognisant of existing threats and aims to mitigate their impact through the tailored management of the offset area. In addition to the threats outlined by the Draft Referral Guidelines (DoE, 2013) it is acknowledged that predation by non-native fauna is a key potential impact to the offset area and has the potential to impact the sites values in terms of providing secure habitat for koala. As such, the focus of predator management has been expanded for the purposes of the OAMP to also include the control and management of feral cats and foxes. **TABLE 2.4** to **TABLE 2.11** details each of the key threats that are applicable to the offset area and present clear and measurable actions that aim to negate or significantly reduce their impact.

2.4.1 Predator Attack

TABLE 2.4: THREAT TO KOALA FROM DOGS

Attribute / Threat	**Dog attack**
Outcome	Reduction of risk of koala mortality or injury by dog attack within the offset area through reduction in wild dog abundance
Actions	• Initial survey to establish a baseline of wild dog abundance within the offset area. The survey method used for the initial abundance survey will be informed using best practice methodology and applicable guidelines available at the time of survey (e.g. DoE, 2007 and Mitchell and Balogh, 2007) and will be undertaken within 6 months of the offset being legally secured. • Baseline predator abundance survey is to be undertaken by a suitably qualified person (e.g. pest animal control professional or ecologist with at least two years relevant professional experience). • Offset area wide wild dog control program to be undertaken with the aim of removing all wild dogs from the offset area. The specific control method will be informed by the results of the initial wild dog abundance survey. Where practicable and to increase the effectiveness of a control program the landholder will seek to coordinate control programs with comparable activities being undertaken by neighbouring landholders.

TABLE 2.4: THREAT TO KOALA FROM DOGS

	• Post the initial control event, presence/absence surveys for wild dogs to be undertaken each two months by the landholder. • Post initial control event, abundance surveys for wild dogs to be undertaken bi-annually by a suitably qualified person (e.g. pest animal control professional or ecologist with at least two years relevant professional experience). • Where post control surveys indicate there has been a recurrence of wild dogs within the offset area, control measures will be actioned using methods (controlled shooting or baiting) determined by a pest control professional in consideration of monitoring results. • Any injured koala found on site will be sent to a veterinary clinic/wildlife rescue facility for rehabilitation. • Installation of appropriate hazard warning signage indicating the offset area is subject to dog control for the purpose of managing the offset site for the benefit of koala.
Performance Indicators	• Data collected from the initial control action to indicate the successful reduction of wild dog density (based on control method data e.g. bait take rates, successful kills from shooting). • No records of feral dog abundance within the site. • No records of injury and/or death to koala relating to dog attacks recorded from within the offset area.
Monitoring	• Offset area-wide traverse by the landholder each two months to record the presence/absence of signs of wild dogs (including scats). The monitoring will take place along a set route utilising the existing network of tracks within the offsets area (e.g. fire control lines) to allow for replication of the monitoring events. • Bi-annual abundance surveys to be undertaken by a suitably qualified environmental scientist or pest animal control professional with at least two years relevant professional experience. • Opportunistic monitoring of and koala/dog interactions in the form of injured and/or koala mortality records
Reporting	• Wild dog abundance baseline survey results will be incorporated within the initial annual Offset Area Assessment Report. • Results of all presence/absence surveys will be reported upon on an annual basis as a component on the Annual Offset Areas Assessment Report. • All records of koala injury or death resulting from a dog attack are to be reported within the annual Offset Areas Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to PostApproval@environment.gov.au
Corrective Action	• Should the efficacy of the initial and ongoing wild dog control measure not result in a reduction of wild dog numbers (based on initial baseline survey), alternative and/or additional control measures will be implemented and the efficacy evidenced through the ongoing monthly/quarterly monitoring survey results. • Any incidence of koala injury/mortality resulting from a dog attack will initiate supplementary monitoring and control measures in addition to the scheduled monthly and quarterly monitoring.

TABLE 2.4: THREAT TO KOALA FROM DOGS

	• Any required adaptation to wild dog management measures in response to failure to meet the objectives of the OAMP are to be approved by a suitably qualified environmental scientist or a pest animal control professional with at least two years relevant professional experience.
Term	Duration of the active management period (10 years)

TABLE 2.5: THREAT TO KOALA FROM FERAL CATS AND FOXES

Attribute / Threat	**Feral Cat and Fox attack**
Outcome	Reduction of risk of koala mortality or injury by feral cat and/or fox attack within the offset area through reduction in feral cat and fox abundance
Actions	• Initial survey to establish a benchmark of feral cat and fox abundance within the offset area. The surveys method used for the initial abundance survey will be informed using best practice methodology and applicable guidelines available at the time of survey (e.g. DoE, 2007 and Mitchell and Balogh, 2007b, c). Baseline survey to be undertaken within 6 months of offset area being legally secured. • Offset areas feral cat and fox control program to be undertaken with the aim of removing all feral cats and foxes from the offset area. The specific control method will be informed by the results of the initial fox abundance survey. Where practicable and to increase the effectiveness of a control program the landholder will seek to coordinate control programs with comparable activities being undertaken by neighbouring landholders. • Post initial control, presence/absence surveys for fox are to be undertaken by the landholder every two months. • Post initial control, bi-annual abundance surveys for fox to be undertaken by a suitably qualified person (pest animal professional or environmental scientist with at least two years professional experience). • Where post control surveys indicate there has been a recurrence of feral cats and/or foxes within the offset area a control measure will be actioned using an appropriate control method (shooting, trapping or toxic baits). • Any injured koala found on site will be sent to a veterinary clinic/wildlife rescue facility for rehabilitation. • Installation of appropriate public warning signage indicating the offset area is subject to feral cat and fox control for the purpose of managing the offset site for the benefit of koala.
Performance Indicators	• Data collected following the initial control action to indicate the successful reduction in feral cat and /or fox abundance from baseline level (indicators may include control method uptake e.g. trap rates, bait take rates, successful kills from shooting). • No increase in feral cat and/or fox abundance within the site (based on post control action abundance surveys results). • No records of injury and/or death to koala relating to feral cat and/or fox attacks recorded from within the offset area.
Monitoring	• Offset area-wide traverse by the landholder every two months to record the presence/absence of feral cats and foxes. The monitoring will take place along a set route to allow for replication of the monitoring events. • Bi-annual abundance surveys to be undertaken by a suitably qualified person (pest animal professional or environmental scientist with at least

TABLE 2.5: THREAT TO KOALA FROM FERAL CATS AND FOXES

	two years relevant professional experience). • Opportunistic monitoring of and koala/fox interactions in the form injured killed koala records.
Reporting	• Method and results pertaining to initial offset area-wide baseline abundance survey to be documented within initial annual Offset Area Assessment Report. • Results of all presence/absence surveys to be reported upon as a component on the annual Offset Areas Assessment Report. • All records of koala injury or death resulting from feral cat and/or fox attack are to be reported within the relevant annual Offset Areas Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to PostApproval@environment.gov.au
Corrective Action	• Should the efficacy of the initial and ongoing fox control measure not result in a reduction of fox numbers (based on initial baseline survey) alternative and/or additional control measures will be implemented and the efficacy evidenced through the ongoing monthly/quarterly monitoring surveys. • Any incidence of koala injury/mortality resulting from a feral cat or fox attack will initiate supplementary monitoring and adaptation of control measures in addition to the scheduled monthly and quarterly monitoring. • Any required adaptation to feral cat and fox management measures in response to failure to meet the objectives of the OAMP are to be approved by a suitably qualitied pest animal control professional or environmental scientist.
Term	Duration of the active management period (10 years).

2.4.2 Vehicle Strike

TABLE 2.6: THREAT TO KOALA FROM VEHICLE STRIKE

Threat	**Vehicle strike**
Outcome	• Contribute to the reduction of risk of injury or death to koala in relation to vehicle strike both within the offset area and on adjacent roads.
Actions	• Installation of koala awareness signage on the property boundary adjacent to unnamed public road that bisects offset area to alert traffic of the koala offset area and the presence of koalas in the local area* prior to the offset area being legally secured. • Installation of koala awareness signage on the property boundary adjacent to the unnamed public road along the frontage to Lot 89 RP892014 to alert east bound traffic of the presence of koalas in the local area* prior to the offset area being legally secured.

TABLE 2.6: THREAT TO KOALA FROM VEHICLE STRIKE

	• Installation of koala awareness signage on the property boundary adjacent to Mount Flinders Road along the frontage to Lot 86 RP892014 to alert west-bound traffic of the presence of koalas in the local area* within 6 months of offset area being legally secured. • Implementation of a slow speed requirement (40km/h) for vehicles traversing the offset area. • Installation of slow speed signage at the main entry points to the offset area. *Note: Action is subject to approval from Scenic Rim Regional Council.
Performance Indicators	No koala mortalities from vehicle strike within the offset area
Monitoring	Any observed koala injury/mortality on roads/tracks within the offset area or roads that front Lots 86, 87, 88 or 89 RP892014 to be recorded.
Reporting	• Incident to be reported to: » Local Government authority (e.g. currently Beaudesert Regional Council); and » Relevant State Government department (e.g. currently the Department of Environment and Heritage Protection. • Incident to be recorded in annual Offset Area Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to PostApproval@environment.gov.au
Corrective Action	• Injured animals to be transported to a vet, or suitably qualified and experienced wildlife carer as soon as possible. • Capture and method of transport for injured animals will be in accordance with accepted best practice principles at time of incident. For details, refer to: » Relevant Local or State Government websites (e.g. currently Beaudesert Regional Council and the Department of Environment and Heritage Protection); » Non-profit koala organisations (e.g. Australian Koala Foundation).
Term	Duration of the active management period (10 years).
Responsibility	Landowner.

2.4.3 Barriers to Dispersal

TABLE 2.7: THREAT TO KOALA VIA BARRIERS TO DISPERSAL

Threat	Barriers to dispersal
Outcomes	• Maintain and improve contiguous landscapes to allow koalas to establish new territories, facilitate gene flow and respond to environmental changes. • Retain and enhance the structure and floristic diversity of canopy vegetation. • Retain and enhance the structure and floristic diversity of middle and understorey vegetation. • Ongoing retention and recruitment of koala food trees. • Permanently remove existing threat of habitat degradation associated with clearing, development or other incompatible land uses. • Contribute to koala movement and dispersal through the Flinders Karawatha through the establishment of a protected habitat corridor (minimum 700 m width).
Actions	• To remove the risk of habitat degradation associated with clearing, development or other incompatible land uses, the entire 161.11 ha offset area will be legally secured as an area of High Conservation Value under section 19F of the *Vegetation Management Act 1999* • Given that the subject property boundary is currently fenced in koala-permeable fencing, livestock will be excluded from the offset area through at least one of the following mechanisms: » Livestock will not be kept within balance areas of Lots 87 or 88 RP892014; or » Koala-friendly fencing will be erected along the northern boundary of the offset area to exclude livestock grazing outside of the offset area yet within the subject property in accordance with a relevant guideline such as Note G4 – Wildlife Friendly Fencing and Netting (Land for Wildlife, nd). • Domestic livestock will be only be introduced in the event that a fire risk professional (e.g. representative of Queensland Rural Fire Service) and a suitably qualified environmental scientist deem that conditions are not suitable for an ecological burn and that grazing is appropriate to manage a high level of fire risk. In this event, a maximum of 12 head of domestic livestock may be introduced for no more than a three (3) consecutive week period. Level of risk (and any need to repeat this grazing cycle) is to be re-assessed by the aforementioned professionals following the grazing event. • Any fencing installed or replaced within the offset area is to be fauna-friendly in design as per a relevant guideline such as Wildlife Friendly Fencing Project (2014) or Land for Wildlife (nd). • Vegetation clearing will not be undertaken within the offset area under any circumstances, except the following: » Where necessary for the removal of weeds; » To establish and maintain fencing around the boundary of the offset area; or » To establish and maintain firebreaks and fire trails in accordance with an Offset Area Bushfire Management Plan that has been prepared by a suitably qualified professional. » To remove or reduce imminent risk of serious personal injury or damage to infrastructure posed by the vegetation, and only to the extent necessary to mitigate the risk.

TABLE 2.7: THREAT TO KOALA VIA BARRIERS TO DISPERSAL

Performance Indicators	Offset area is legally secured as an area of High Conservation Value under section 19F of the *Vegetation Management Act 1999*
Monitoring	• If livestock are kept on the balance of the property, offset area fencing to be monitored on a monthly basis. • Firebreaks and fire control lines to be inspected at a minimum quarterly frequency and after major storm events
Reporting	• The location, extent and associated purpose for any vegetation clearing or damage through natural disaster within the offset area will be detailed within the annual Offset Area Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to PostApproval@environment.gov.au
Corrective Action	• If livestock are kept on the balance of the property and livestock-proof fencing is breached: » Within 7 days: Livestock will be removed from offset area and temporary fencing measures put in place to ensure livestock are excluded until permanent fence repairs can be completed » Within 28 days: Repairs to fencing undertaken to achieve koala-friendly livestock-proof standard
Term	• Offset area to be legally secured within six (6) months of the commencement of works at the impact site.
Responsibility	Landowner

2.4.4 Degradation of habitat critical to the survival through hydrological change

TABLE 2.8: THREAT TO KOALA HABITAT THROUGH HYDROLOGICAL CHANGE

Attribute/ Threat	**Degradation of habitat critical to the survival of the koala through hydrological change**
Outcome	To ensure the koala habitat within the offset area is maintained and the potential carrying capacity of the area is not reduced due to anthropogenic hydrological change.
Actions	If any actions are proposed that may significantly impact the current (at time of offset area being legally secured) hydrological regime and therefore potentially impact koala habitat within the offset area then the following actions will be required: • Presentation of proposed hydrological change to DoE, detailing the potential impact to koala habitat within the offset area. This will include specialist reports detailing the nature of the hydrological change and the expected impact to the offset areas vegetation communities. • Only DoE approved hydrological change will be permitted within the offset area.
Performance Indicators	The overall performance indicator resulting from the stated actions will be no significant impact to koala habitat as a result of hydrological change within the site.
Monitoring	Where DoE approved hydrological change has occurred within the offset area, monitoring of the impact to the sites vegetation communities will be a component of an annual site assessment.

TABLE 2.8: THREAT TO KOALA HABITAT THROUGH HYDROLOGICAL CHANGE

Reporting	• The annual Offset Area Assessment Report will present details relating to requested hydrological change requests made to DoE. • Assessment of vegetation in relation to potential impacts resulting from hydrological change will be presented within the Annual Offset Area Assessment Report. All annual Offset Area Assessment Reports are to be held by the offset area landholder and made available for inspection by DoE upon request
Corrective Action	Only DoE-approved actions which could potentially significantly impact the hydrological status quo within the offset area are permissible. Should it be determined that there is an impact to koala habitat from hydrological change (as evidenced through annual vegetation assessments) then corrective actions, as determined by a suitably qualified professional within affected areas will occur.
Term	Duration of the active management period (10 years)

2.4.5 Fire

TABLE 2.9: THREAT TO KOALA THROUGH FIRE

Threat	**Fire**
Outcomes	• Minimise the risk of high-intensity fire within the offset area. • Minimise the risk of koala mortality within the offset area due to prescribed burning.
Actions	• A suitably qualified professional will prepare an Offset Area Bushfire Management Plan, detailing: current vegetation condition and fire risk, locations of current and required firebreaks and fire control lines, current fuel loads, recommended actions and timeframes for maintenance of bushfire risk within the context of the adapted Regional Ecosystem Description Database guidelines (refer below) and biodiversity outcomes sought for the offset area. • With the exception of prescribed burning, which will only be undertaken for the purposes of biodiversity enhancement, the offset area is to be managed to avoid the occurrence of fire by: » Maintaining fire control lines relative to the offset area; and » Co-locating fire control lines with existing tracks and fence lines on the property where possible. • Existing fencing, firebreaks and fire control lines are to be kept clear of encroaching vegetation to a width as defined by the Offset Area Bushfire management Plan and in accordance with relevant legislation (e.g. *Sustainable Planning Act 2009*). • Vegetation within the offset area will be managed in accordance with the following specifications, which are adapted from the Regional Ecosystem Description Database fire management guidelines for the two vegetation types that occur within the offset area (RE 12.9-10.2 and RE 12.9-10.7) (Queensland Herbarium, 2014): » SEASON: Summer to winter » INTENSITY: Low to moderate

TABLE 2.9: THREAT TO KOALA THROUGH FIRE

	» INTERVAL: 4-25 years » STRATEGY: 40-60% mosaic burn. Burn with soil moisture and with a spot ignition strategy so that a patchwork of burnt/unburnt country is achieved » ISSUES: The fire regime will maintain a mosaic of grassy and shrubby understoreys. Ground litter and fallen timber habitats will be maintained by burning only with sufficient soil moisture. Burning will produce fine scale mosaics of unburnt areas. Variability in season and fire intensity will occur, as well as spot ignition in cooler or moister periods to encourage mosaics. • The following parameters will be adhered to throughout the planning and implementation of any prescribed burning: » Undertake pre-burn survey to identify areas of high koala activity; » No prescribed burning will be undertaken when female koalas are likely to be carrying dependent young (Note: this management action will take precedence over the fire management guidelines outlined above); » Prescribed burning will be only carried out during appropriate weather conditions (e.g. low temperature, low wind) and good soil moisture conditions; » Post-fire practices will be implemented to mitigate the risk of uncontrolled fire damage (e.g. extinguishing burning of large trees); and » Minimise the extent of burning so that the risk of injury or mortality to koalas is reduced, the risk of canopy scorch is lowered, whilst other biodiversity benefits to other species are achieved. • Prescribed burning will be undertaken in consultation with, and under the guidance of the Queensland Rural Fire Brigade. • Domestic livestock will be only be introduced in the event that a fire risk professional (e.g. representative of Queensland Rural Fire Service) and a suitably qualified environmental scientist deem that conditions are not suitable for an ecological burn and that grazing is appropriate to manage a high level of fire risk. In this event, a maximum of 12 head of domestic livestock may be introduced for no more than a three (3) consecutive week period. Level of risk (and any need to repeat this grazing cycle) is to be re-assessed by the aforementioned professionals following the grazing event.
Performance Indicators	Fuel levels and burning regime maintained in accordance with Offset Area Bushfire Management Plan
Monitoring	To be informed by an Offset Area Bushfire Management Plan
Reporting	• Offset Area Bushfire Management Plan will be prepared within 6 months of the offset area being legally secured. • Monitoring results and maintenance log will be detailed within the annual Offset Area Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to PostApproval@environment.gov.au
Corrective Action	• If a wildfire occurs, the following actions will be taken by the landowner to remedy the situation: » Inspect fencing, undertake any repairs required to ensure livestock-proof standard » Inspect fire control lines, undertake any maintenance required to achieve compliance with Offset Area Bushfire Management Plan

TABLE 2.9: THREAT TO KOALA THROUGH FIRE

	» Removed all livestock from offset area within 7 days of commencing remedial action » Engage suitably qualified professional to assess offset area and update Offset Area Bushfire Management Plan
Term	Offset Area Bushfire Management Plan to be enacted within 6 months of the offset area being legally secured.
Responsibility	Landowner

2.4.6 Facilitating the introduction of spread of disease or pathogens

TABLE 2.10: THREAT TO KOALA AND KOALA HABITAT FROM DISEASE AND PATHOGENS

Attribute/ Threat	**Facilitating the introduction or spread of disease or pathogens**
Outcomes	• Reduce risk of the spread of koala and vegetation diseases within the offset area and adjacent areas of koala habitat. • Third party contractors do not enter site carrying pathogens.
Actions	• Baseline offset area condition survey is to include assessment for signs of *Phytophthora cinnamomi* and Myrtle Rust and is to be undertaken within 6 months of legal securing of offset area. • To reduce the risk of introducing Chlamydia and Koala retrovirus into the resident population; uncontrolled translocation of koala is not permitted within the offset area. • Vegetation management activities which include tree lopping/felling, weed removal, tree planting (including nursery suppliers) are deemed to be high risk in the context of introducing pathogens that may potentially impact koala habitat. As such, any person engaged to undertake these activities must satisfy the landholder that they have undertaken all reasonable steps to prevent the introduction of a pathogen/disease to the site (e.g. vehicle and equipment washdown prior to site entry).
Performance Indicators	<u>Facilitating spread of disease in resident koala populations</u> • In the event that regulator approved translocation of koala is proposed onto the site, the animal(s) is to be assessed by a veterinarian prior to introduction. <u>Facilitating spread of pathogens in koala habitat</u> • Incidence of koala feed trees exhibiting disease does not increase within the offset areas, based on comparison to baseline vegetation health assessment.
Monitoring	• Incidence of koalas exhibiting disease to be recorded if encountered during any monitoring events within the offset area.
Reporting	• Baseline data concerning observations around koala and koala habitat diseases and pathogens is to be documented within initial annual Offset Area Assessment Report. • Confirmation of translocation activity within the offset area is to be included within annual Offset Area Assessment Reports.

TABLE 2.10: THREAT TO KOALA AND KOALA HABITAT FROM DISEASE AND PATHOGENS

	• Incidence of koalas exhibiting symptoms of disease to be reported within annual Offset Area Assessment Report. • All annual Offset Area Assessment Reports are to be submitted to DoE on an annual basis within three months of the anniversary of the completion of the initial baseline survey. • All annual Offset Area Assessment Reports and any records of non-compliance are to be submitted to DoE via email to PostApproval@environment.gov.au
Corrective Action	Should there be an increase in trees exhibiting disease symptoms and/or evidence of vegetation dieback (as noted during annual offset area assessments) the following corrective actions will take place • Review of the efficacy of current biosecurity measures; • Review of plant stock/management services suppliers (if applicable) should it be suspected plant pathogens have been introduced via external sources.
Term	Duration of the active management period (10 years).
Responsibility	Landholder

2.5 Recovery Value

The 'recovery value' attribute detailed in the Koala habitat assessment tool of Draft Referral Guidelines (DoE, 2013) is based on the following interim recovery objectives:

"*Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are:*

- genetically diverse/distinct; or
- free of disease or have a very low incidence of disease; or
- breeding (i.e. presence of back young or juveniles)." (DoE, 2013).

The entire offset area (as well as balance areas of the site and the broader locality) forms part of the Flinders-Karawatha Corridor, which is the largest remaining continuous stretch of open eucalypt forest in south-east Queensland. The corridor extends from the 1,200 ha Karawatha Forest on the southern edge of Brisbane City, along Oxley Creek, through the Greenbank Military Training Area and south along the Teviot Range to Flinders Peak, Mt Joyce and Wyaralong Dam, north-east of Boonah.

The Queensland State Government recognises that the Flinders-Karawatha Corridor is one of south-east Queensland's most important biodiversity corridors, providing habitat and movement opportunities for a range of species that are of state, regional and local significance (including the koala) (DEHP, 2014). The Flinders Karawatha Corridor Management Strategy identifies that private landholders manage the majority of land within the corridor, and states that a priority of the strategy is to enhance and maintain the capacity of landholders to engage in local actions to achieve positive environmental outcomes (DEHP, 2014).

Based on the site being located within the Flinders-Karawatha corridor, it is considered that the offset area is strongly aligned with the interim recovery outcomes for the koala, as outlined within the Draft Referral Guidelines (DoE, 2013). Protection and enhancement of the 'recovery value' of the site as it relates to its position within the Flinders-Karrawatha corridor will be achieved by implementing management strategies that remove the threat of habitat loss within the offset area by legally securing a

conservation land use of the offset area, which also contributes to achieving the biodiversity outcomes sought by the Flinders Karawatha Corridor Management Strategy (DEHP, 2014). These management strategies are detailed below in **TABLE 2.11.**

TABLE 2.11: MANAGEMENT STRATEGIES AND OUTCOMES FOR RECOVERY VALUE

Attribute	Recovery value
Outcomes	• Maintain contiguous landscapes to allow koalas to establish new territories, facilitate gene flow and respond to environmental changes. • Permanently remove existing threat of habitat degradation associated with clearing, development or other incompatible land uses. • Contribute to koala movement and dispersal through the Flinders Karawatha through the establishment of a habitat corridor (minimum 700 m width). • Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are: » genetically diverse/distinct; or » free of disease or have a very low incidence of disease; or » breeding (i.e. presence of back young or juveniles).
Actions	• To remove the risk of habitat degradation associated with clearing, development or other incompatible land uses, the entire offset area will be managed for conservation purposes. • Vegetation clearing will not be undertaken within the offset area under any circumstances, except the following: » Where necessary for the removal of weeds; » To establish and maintain fencing around the boundary of the offset area; and » To establish and maintain firebreaks and fire trails in accordance with an Offset Area Bushfire Management Plan that has been prepared by a suitably qualified professional. • Any fencing installed within the offset area is to be fauna-friendly in design (Wildlife Friendly Fencing Project, 2014). • To remove or reduce imminent risk of serious personal injury or damage to infrastructure posed by the vegetation, and only to the extent necessary to mitigate the risk.
Performance Indicators	Offset area is legally secured as an area of High Conservation Value under section 19F of the *Vegetation Management Act 1999*
Monitoring	Firebreaks and fire trails to be inspected at a minimum frequency of annually, and after major storm events.
Reporting	The location, extent and associated purpose for any vegetation clearing undertaken within the offset area will be detailed within the annual Offset Area Assessment Report and will be accordance with the relevant legislative requirements at the time of proposed vegetation clearance.
Corrective Action	Not applicable.
Term	Offset area to be legally secured within six (6) months of the commencement of works at the impact site.
Responsibility	Landowner

Chapter 3: CONCLUSION

Adherence to this management plan will result in a demonstrable increase in koala habitat quality within the offset area. Further, the data set that will be compiled via monitoring works throughout the active management period will form a technically rigorous platform to inform adaptation of the management actions presented herein such that management objectives may be realised. It is noted that, while the active management period is ten (10) years in duration, land management initiatives across the offset site will be tailored toward meeting the objectives of this management plan following the active management period.

In conclusion, this management plan is focussed on attaining defined management objectives within the offset area. This approach allows for an adaptive style of management within the offset area which manages risk of non-conformance as a result of unforeseen events such as failure of a given action to perform as intended or force majeure happenings.

Chapter 4: Consent

4.1 Administering authority

SIGNED by the Queensland Department of Natural Resources and Mines to indicate approval of the offset area management plan.

Name:……. Signature:……..

Witness name:…… Signature:……..

Date…….....

4.2 Landholder

The landowner agrees:

1. Any non-compliance with the requirements of this offset area management plan shall constitute a breach of the terms and conditions of the legally binding mechanism entered into.
2. To notify the State in writing of an Event, or the likelihood of the occurrence of an Event. Event means any agreement or understanding entered into or accepted by and or circumstance permitted or suffered by the landholder which effects a change of ownership, control or use of the offset area, the exercise of power of sale under any Mortgage, the granting of a Mortgage, the appointment of a receiver, the death of a landholder or any other circumstance which may allow or permit a person, other than the Landholder to own, control or use the offset area. In notifying the State of an Event, the landholder will notify the State of the nature of the change, or potential change of ownership, control or use result from the Event, and the name and address of any person who may own, control or use the offset area as a result of the Event.
3. That if, at the time of execution of this offset area management plan, there exists a Property Map of Assessable Vegetation (PMAV) over the offset area or a part of it, the landholder hereby agrees, where the management plan area is identified as Category X on the PMAV, to the replacement of the PMAV by the State to reflect the offset area as Category A.
4. To take all necessary steps as may be required to accomplish the obligations contained in this offset area management plan.

The landowner acknowledges:

5. That before the State will agree to the release this offset area management plan the State must be satisfied that the objectives and activities contained in the offset area management plan have been achieved.

The landowner notes:

6. All reports, notices or requests for amendment in relation to this offset area management plan must be in writing and delivered to the administering authority at the following address:

   DoE
   GPO Box 787
   Canberra ACT 2601
   Australia
   Switchboard +61 2 6274 1111

SIGNED by Molly Robson, Robert Allan and Graham Marshall, as Trustees for the Queensland Trust for Nature, being the current owner of the abovementioned property to indicate that the terms of this offset area management plan including responsibilities under the offset area management plan, have been read, understood and accepted.

Trustee: Molly Robson Signature:……..

Trustee: Robert Allan Signature:…….

Trustee: Graham Marshall Signature:……..

Date…….....

References

DEHP (2014) *Flinders Karawatha Corridor Management Strategy 2014–2019 A five year plan*. Department of Environment and Heritage, Qld.

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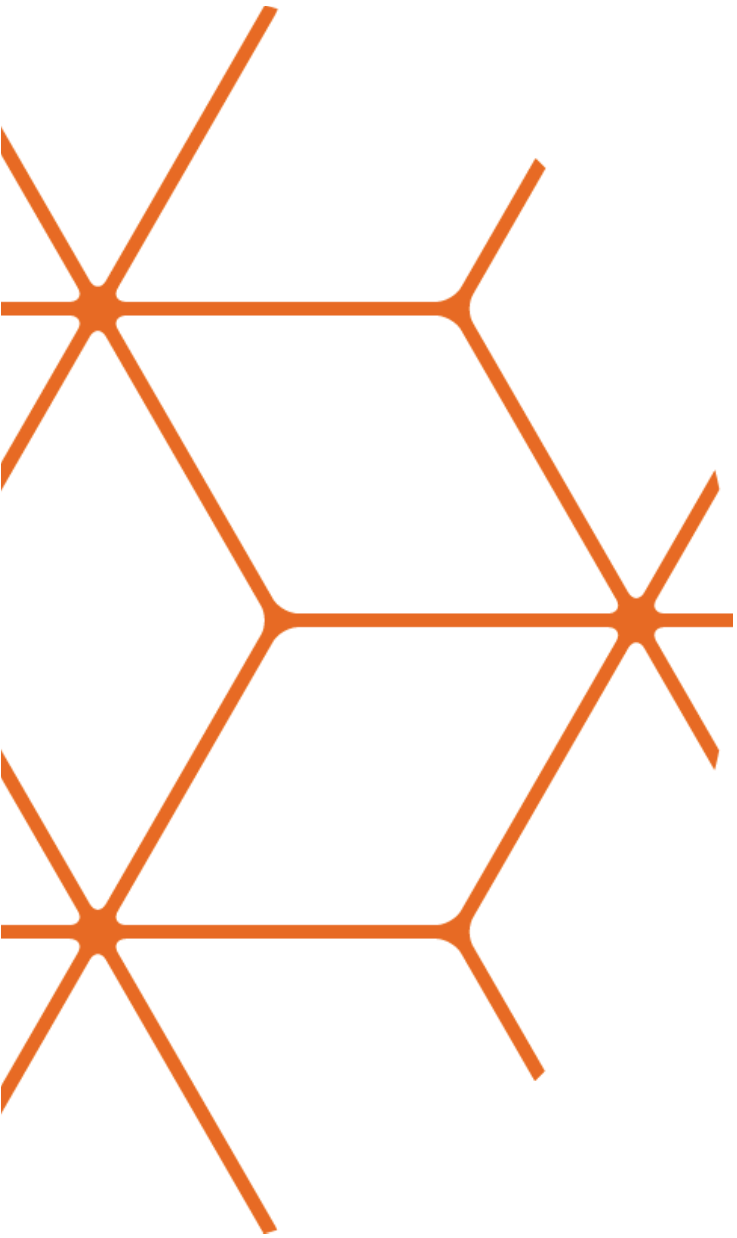
APPENDIX A

Proposed Offset Area Plan & Offset Area Boundary Co-ordinates



APPENDIX A: PROPOSED OFFSET AREA PLAN

0 200 400 600 800 1,000 Metres

A3 Scale 1:10,000

File: 2166-KOAR-R-01-AA-141105
Date: 5/11/2014

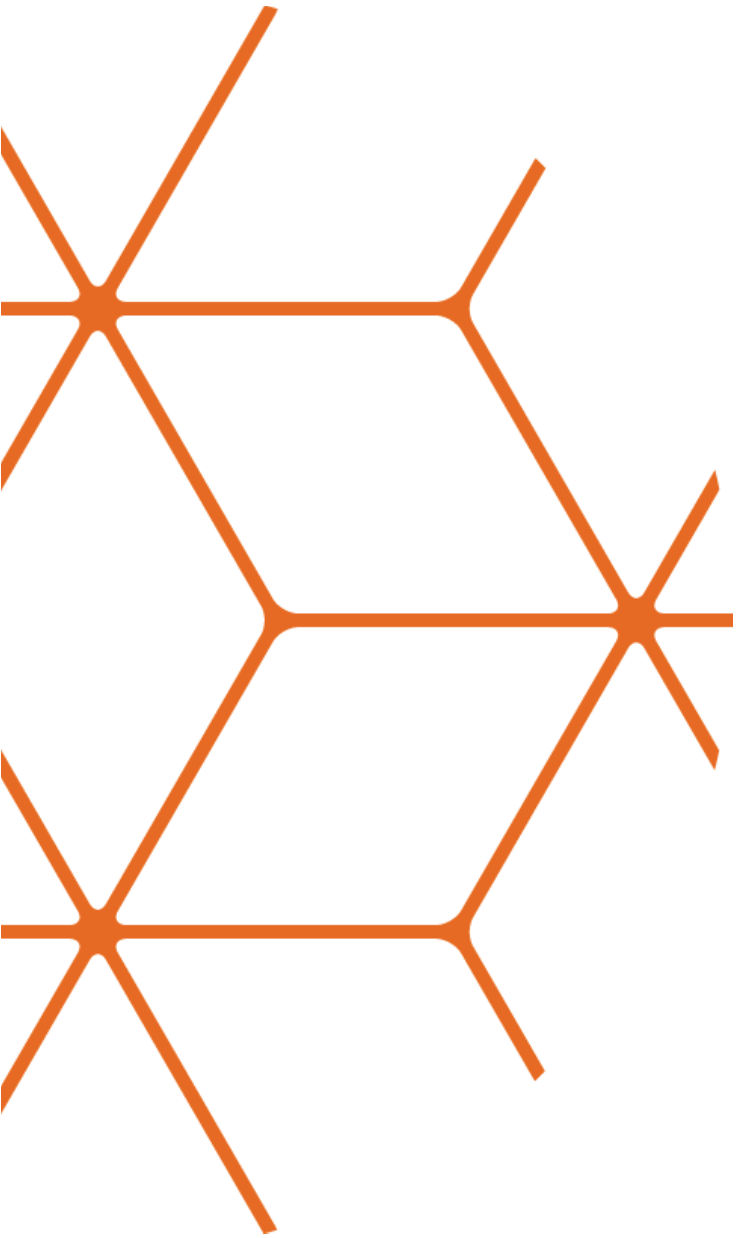
Source:
Cadastral Boundaries & Easements: State of Queensland (Department of Natural Resources and Mines) 2014
Proposed Offset Area: NewGround Environmental 2014

MAPPING COORDINATES

ID	Easting	Northing	ID	Easting	Northing	ID	Easting	Northing	ID	Easting	Northing
1	478,774.11	6,924,621.01	21	476,791.58	6,925,152.05	41	478,088.41	6,924,671.16	61	476,657.60	6,924,472.55
2	478,693.68	6,924,090.37	22	476,791.46	6,925,152.29	42	478,114.98	6,924,664.27	62	476,667.51	6,924,539.48
3	478,485.40	6,924,121.80	23	477,046.75	6,925,115.45	43	478,137.61	6,924,657.38	63	476,698.92	6,924,751.89
4	478,433.38	6,924,189.61	24	477,046.30	6,925,115.29	44	478,156.31	6,924,646.56	64	476,717.88	6,924,880.20
5	478,385.71	6,924,296.30	25	477,059.60	6,925,113.49	45	478,169.33	6,924,646.41	65	476,758.82	6,925,156.87
6	478,329.35	6,924,363.45	26	477,059.12	6,925,112.78	46	478,170.61	6,924,587.14			
7	478,286.13	6,924,459.41	27	478,057.97	6,924,965.89	47	478,177.67	6,924,575.08			
8	478,229.26	6,924,529.76	28	478,057.07	6,924,921.81	48	478,212.93	6,924,518.21			
9	478,191.13	6,924,591.39	29	478,110.93	6,924,815.04	49	478,268.91	6,924,448.74			
10	478,189.43	6,924,663.39	30	478,171.07	6,924,801.05	50	478,312.23	6,924,352.67			
11	478,200.79	6,924,756.68	31	478,177.96	6,924,765.63	51	478,368.59	6,924,285.64			
12	478,189.44	6,924,819.02	32	478,163.20	6,924,764.64	52	478,416.06	6,924,179.28			
13	478,124.80	6,924,831.98	33	478,124.82	6,924,760.71	53	478,456.93	6,924,126.18			
14	478,077.25	6,924,926.39	34	478,085.46	6,924,759.72	54	478,200.77	6,924,164.49			
15	478,078.87	6,925,010.24	35	478,074.64	6,924,749.88	55	478,151.11	6,924,173.04			
16	478,832.34	6,925,008.04	36	478,060.86	6,924,736.11	56	478,151.50	6,924,173.93			
17	478,809.55	6,924,854.58	37	478,047.08	6,924,716.42	57	478,152.14	6,924,174.29			
18	478,777.22	6,924,641.28	38	478,047.08	6,924,693.79	58	477,200.98	6,924,337.41			
19	478,774.11	6,924,621.01	39	478,052.99	6,924,680.02	59	477,200.96	6,924,337.65			
20	476,758.82	6,925,156.87	40	478,064.79	6,924,676.08	60	476,651.76	6,924,432.77			

APPENDIX B

Koala Offset Assessment Report



PREPARED FOR:

INVESTA RESIDENTIAL GROUP PTY LTD

11 AUGUST 2014

KOALA OFFSET ASSESSMENT REPORT

PEAK CROSSING (LOT 86 RP892014, 87 RP892014, 88 RP892014 AND 89 RP892014)

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REPORT TITLE	KOALA OFFSET ASSESSMENT REPORT
PROJECT	PEAK CROSSING (LOT 86 RP892014, 87 RP892014, 88 RP892014 AND 89 RP892014)
CLIENT	INVESTA RESIDENTIAL GROUP PTY LTD

New Ground Environmental Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by Investa Residential Group Pty Ltd and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information within this report is prepared for the exclusive use of Investa Residential Group Pty Ltd to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

New Ground Environmental Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

REVIEWED BY	NELSON WILLS
POSITION	PROJECT DIRECTOR
SIGNED	
DATE	11/08/2014

PREPARED BY	SALIKA KHADKA
POSITION	ECOLOGIST
SIGNED	
DATE	28/07/2014

DOCUMENT DISTRIBUTION: 2166-KOAR-R-01

VERSION	FORMAT	ISSUED TO	DATE
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2	PDF	Investa Residential Group c/- Mr. Peter Macleod	29/07/2014
3	PDF	Investa Residential Group c/- Mr. Peter Macleod	11/08/2014

CONTENTS

TABLES

Abbreviations

BoM	Bureau of Meteorology
DNRM	Department of Natural Resources and Mines
DoE	Commonwealth Department of the Environment
DSITA	Department of Science, Information Technology, Innovation and the Arts
e.g.	For example
EH	Essential Habitat as defined by the VM Act
EP Reg	*Environmental Protection Regulation 2008 (Qld)*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*
etc.	etcetera
EVNT	Endangered, Vulnerable, Near Threatened as listed under the *NC Reg*
GTRE	Ground-truthed Regional Ecosystem
ha	Hectares
HSSE	Health, Safety Security and Environment
HVR	High Value Regrowth
i.e.	That is
km	Kilometres
LGA	Local Government Area
LP Act	*Land Protection (Pest and Stock Route Management) Act 2002 (Qld)*
LP Reg	*Land Protection (Pest and Stock Route Management) Regulation 2003 (Qld)*
m	Metres
mm	Millimetres
MNES	Matters of National Environmental Significance
NC Act	*Nature Conservation Act 1992*
NC (Wildlife) Reg	*Nature Conservation (Wildlife) Regulation 2006 (Qld)*
PMST	Protected Matters Search Tool
RE	Regional Ecosystem
SEQ	South East Queensland
TEC	Threatened Ecological Community
VM Act	*Vegetation Management Act 1999*
VM Reg	*Vegetation Management Regulation 2012*
WoNS	Weed of National Significance

Chapter 1: INTRODUCTION

1.1 Background

New Ground Environmental Pty Ltd (New Ground) was engaged by Investa Residential Group Pty Ltd ('the client'/'Investa') to undertake an assessment of the suitability of the site (Lots 86 RP892014, 87 RP892014, 88 RP892014 and 89 RP892014) to provide a koala habitat offset (**APPENDIX A**). The site is situated at 569 Mount Flinders Road, Peak Crossing and is owned by Queensland Trust for Nature, a non-profit organisation.

The study presented herein was focussed on the evaluation of the suitability of the site to host an environmental offset area. In particular, the establishment of an 'offset area' on the site has been investigated as a resolution to the requirement of the Department of Environment (DoE) for Investa to mitigate residual impacts of the necessary clearing of koala habitat for the development of Brentwood Estate. The Brentwood Estate development was deemed a Controlled Action on 7 January 2014 (DoE ref.: 2013/7074). Further to this, the comments provided to Investa on the Draft Preliminary Documentation submitted to DoE and subsequent DoE requests for additional information (dated 14 March 2014) have been considered in the evaluation of the site. The ecological context of the koala habitat which is proposed to be cleared as a consequence of the development of Brentwood Estate has been documented by numerous studies (Orogen 2011a, Orogen 2011b, New Ground 2013) and is used as a technical foundation in the assessment of the suitability of the subject site as an offset area.

1.2 Objectives of the Study

The primary objective of this study is to identify and map the site's ecological values with particular consideration to suitable koala habitat. The purpose of this is to gain an understanding of ecological values present on site in relation to the use of the site as a koala offset area. Ultimately, it is intended that this report will contribute towards the documentation Investa will require as part of the actions necessary to fulfil a statutory requirement for the provision of an offset for a Controlled Action (EPBC 2013/7074) under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*).

1.3 Outline of the Report

This report presents the findings of the desktop review and the field survey, and includes the following components:

- Chapter 1: provides an introduction to the report, including background information and objectives of the study.
- Chapter 2: details site context including a site description and information regarding climate, topography, soils and geography of the site.
- Chapter 3: outlines the methodology used to conduct the initial desktop assessment and subsequent field surveys.
- Chapter 4: presents the results of the desktop review and field survey, and provides a discussion of the findings.
- Chapter 5: incorporates the report conclusions and provides recommendations of the quality of the ecological values of the site in relation to the koala offset requirements.

Chapter 2: Offset site context

2.1 Site Description and Tenure

The site is located on Mount Flinders Road, Peak Crossing, Queensland, approximately 5 km east of Peak Crossing and 20 km south of Ipswich. The site is identified as Lots 86, 87, 88 and 89 on RP892014 and is approximately 379.12 ha in area. The tenure of the site is freehold and the site is included within the Scenic Rim Regional Council local government area (LGA). The site is situated within the Southeast Queensland Bioregion, which is approximately 62,484.2 km^2 (EHP 2014a). Within this bioregion, the site is located within the Moreton Basin bioregion province, which is approximately 7,849.7 km^2 (EHP 2014b).

The site is currently utilised for agricultural purposes, in particular for grazing.

2.2 Climate

Climate data from Ipswich (Bureau of Meteorology (BoM) site No.: 040101; 27.61 °S, 152.76 °E) presents annual mean maximum and minimum temperatures of 27.3 °C and 13.9 °C respectively, and an annual mean rainfall of 877.8 mm (BoM 2014). On average, the warmest month is January and the coldest month is July. January has mean maximum and minimum temperatures of 32 °C and 20 °C, respectively, and July has mean maximum and minimum temperatures of 21.1 °C and 7 °C, respectively (BoM 2014).

On average, the wettest month is January (mean rainfall of 124.9 mm) and the driest month is August (mean rainfall of 33.6 mm) (BoM 2014).

2.3 Topography, Soils and Geology

The topography of the site is steep on the peaks with undulating and flat areas. The site ranges between approximately 80 m and 210 m Australian height datum. The highest point is at the site's east, at the junction of Lots 86 RP892014 and 87 RP892014 and the lowest point is at the site's north, at the junction of Lots 86 RP892014 and 89 RP892014.

According to the Geological Survey of Queensland 1:100,000 Ipswich Geological Map (DME 2008), the geology of the site consists of:

- Qa- SEQ: Quarternary; Clay, silt, sand, gravel; flood plain alluvium;
- Tit- SEQ: Tertiary; Trachyte (anorthoclase and riebeckite trachyte);
- Jbmk (Koukandowie Formation): Jurassic; Lithofeldspathic labile and sublabile to quartzose sandstone, siltstone, shale, minor coal, ferruginos oolite marker; and
- Jbmg (Gatton Sandstone): Jurassic; Lithic labile and feldspathic labile sandstone.

Based on the Department of Science, Information Technology, Innovation and the Arts (DSITIA) Pre-clearing Broad Vegetation Grounds of Queensland (EHP 2012a), the site is shown to consist of land zones 3, 8 and 9-10.

Landzone 3 is described as *Recent Quaternary alluvial systems, including closed depressions, paleo-estuarine deposits currently under freshwater influence, inland lakes and associated wave built lunettes. Excludes colluvial deposits such as talus slopes and pediments. Includes a diverse range of soils, predominantly Vertosols and Sodosols; also with Dermosols, Kurosols, Chromosols, Kandosols, Tenosols, Rudosols and Hydrosols; and Organosols in high rainfall areas* (EHP 2012b).

Land zone 8 is described as *Cainozoic igneous rocks, predominantly flood basalts forming extensive plains and occasional low scarps. Also includes hills, cones and plugs on trachytes and rhyolites, and associated interbedded sediments, and talus. Excludes deep soils overlying duricrust (land zone 5). Soils include Vertosols, Ferrosols, and shallow Dermosols* (EHP 2012b).

Land zone 9 is described as *Fine grained sedimentary rocks, generally with little or no deformation and usually forming undulating landscapes. Siltstones, mudstones, shales, calcareous sediments, and labile sandstones*

are typical rock types although minor interbedded volcanics may occur. Includes a diverse range of fine textured soils of moderate to high fertility, predominantly Vertosols, Sodosols, and Chromosols (EHP 2012b).

Land zone 10 is described as *Medium to coarse grained sedimentary rocks, with little or no deformation, forming plateaus, benches and scarps. Includes siliceous (quartzose) sandstones, conglomerates and minor interbedded volcanics, and springs associated with these rocks. Excludes overlying Cainozoic sand deposits (land zone 5). Soils are predominantly shallow Rudosols and Tenosols of low fertility, but include sandy surfaced Kandosols, Kurosols, Sodosols and Chromosols* (EHP 2012b).

Chapter 3: METHODOLOGY

3.1 Desktop Review

The sources utilised during the desktop and literature review are detailed below in **TABLE 3.1**.

TABLE 3.1: DESKTOP AND LITERATURE REVIEW SOURCES

DATABASE	COORDINATES OF SEARCH AREA	DATE OF SEARCH	APPENDIX
Environment Protection Biodiversity and Conservation Act 1999 (*EPBC Act*) Protected Matters Search Tool (DoE 2014)	Latitude: -27.7972 Longitude: 152.7747	2 July 2014	**APPENDIX B**
Nature Conservation Act 1992 (*NC Act*) Protected Species Lists Wildlife Online Database (DSITIA 2014)	Latitude: -27.7972 Longitude: 152.7747	2 July 2014	**APPENDIX C**
Department of Natural Resources and Mines (DNRM) Map of Regulated Vegetation Management Maps (DNRM 2014)	Lot 86 RP892014; Lot 87 RP892014; Lot 88 RP892014; and Lot 89 RP892014	2 July 2014	**APPENDIX D**
Department of Environment and Heritage Protection (EHP) Map of Referable Wetlands (EHP 2014c)	Lot 86 RP892014; Lot 87 RP892014; Lot 88 RP892014; and Lot 89 RP892014	2 July 2014	**APPENDIX E**
Queensland Geological Mapping, Ipswich 1:100,000 (DME 2008).	-	12 March 2014	Not presented

Protected Matters (*EPBC Act*) and Wildlife Online (*NC Act*) searches were conducted using a 10 km radial buffer around the central co-ordinates of the property.

3.2 Field Assessment

Field surveys were undertaken by New Ground Ecologists from 3 July – 9 July 2014, using a methodology generally in accordance with:

- *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland Version 3.2* (Neldner *et al*. 2012); and
- *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual (Version 2.1)* (Eyre *et al*. 2011).

3.2.1 Vegetation Community Surveys

The vegetation community surveys were conducted in accordance with industry best practice standards and employed a methodology generally consistent with the established format detailed within *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Version 3.2* (Neldner *et al*. 2012). The survey design emphasised the collection of vegetation community data using tertiary sites, with quaternary sites to provide additional survey resolution and refinements in vegetation community delineation.

Site selection was determined in the field based on aerial photography interpretation (API) of patterns in vegetation composition and in response to variation in vegetation communities encountered during site traverses. Data was collected from two (2) tertiary sites and 31 quaternary sites during the survey. The locations of the vegetation community survey sites are displayed in **APPENDIX F**. The methodology for the tertiary and quaternary surveys is discussed further below.

At each tertiary site, data was collected from a 50 m x 10 m plot which was representative of the surrounding vegetation community. In general accordance with Neldner *et al*. (2012), at a minimum the following data was collected from each tertiary site:

- Date and time;

- Location;
- In-field determination of the remnant status of the vegetation;
- Structural formation class using the modified Specht (1970) classification system (Neldner *et al*. 2012);
- Height range and median height for all vegetation strata;
- Projected foliage cover class (Specht 1970) for all vegetation strata;
- Floristic composition and relative abundance data for all tree and shrub strata;
- Dominant species and life form for the ground stratum;
- Estimated percentage of native biomass in the ground stratum;
- Connectivity to similar or different vegetation communities; and
- Digital photograph and associated direction of capture.

At each quaternary site, data was collected from a plot approximately 25 – 50 m radius of the site location. In general accordance with Neldner *et al*. (2012), at a minimum the following data was collected from each quaternary site:

- Date and time;
- Location;
- In-field determination of the remnant status of the vegetation;
- Structural formation class using the modified Specht (1970) classification system (Neldner *et al*. 2012); and
- Floristic composition and relative abundance data for the predominant species in the T1 and T2 layers.

3.2.2 BioCondition Surveys

BioCondition surveys were undertaken as part of the sites' ecological condition assessment. The intent of the BioCondition surveys is to provide an indication of the current condition of certain vegetation types located within the site. It is expected that the BioCondition sites established during this survey will form the baseline for periodic repeat assessments to provide information on any progressive changes to vegetation condition.

BioCondition surveys were undertaken in accordance with Eyre *et al*. (2011). This methodology employs the use of nested plots (100 m x 50 m, 50 m x 20 m, 50 m x 10 m), a 100 m transect and 1 m x 1 m quadrats to record values for defined ecological attributes. These values are used as indicators to provide a quantitative measure for the performance of ecosystem function within the context of biodiversity conditions. A total of five (5) BioCondition sites were sampled during the survey, the locations of which are presented in **APPENDIX F**. The following data was collected at each site:

- Date and time;
- Location;
- In-field determination of the remnant status and RE type of the vegetation;
- Number of large Eucalypt and non-Eucalypt trees;
- Height range and median height for all vegetation strata in accordance with Eyre *et al*. (2011);
- Canopy cover for woody vegetation strata, ground cover for the ground layer and organic litter cover in accordance with Eyre *et al*. (2011);
- Species richness for all vegetation strata;
- Proportion of dominant canopy species with evidence of recruitment; and
- Total length of coarse woody debris.

3.2.3 Fauna Habitat Assessment

Fauna habitat assessments were undertaken at each tertiary and quaternary survey sites, using a 50 m x 10 m survey plot. A total of 33 formal habitat assessments were undertaken within the site. The locations of the habitat survey sites are presented in **APPENDIX F**. The purpose of the fauna habitat assessment is to assess potential suitable habitat for fauna within the site, with particular attention to koala habitat. At a minimum, the following data was collected from each fauna habitat assessment site:

- Bare ground (estimated % cover);
- Boulders (estimated % cover);
- Fallen bark (estimated % cover);
- Groundcover (estimated % cover);

- Leaf Litter (estimated % cover);
- Embedded rocks (estimated % cover);
- Loose rocks (estimated % cover);
- Shrub layer (estimated % cover);
- Crevices and ledges (abundance);
- Overhangs and caves (abundance);
- Nests (abundance);
- Small logs (abundance);
- Large logs (abundance);
- Logs with hollows (presence & size);
- Termite mounds (abundance);
- Mistletoe (abundance);
- Soil Cracks (presence);
- Water features (type & presence); and
- Other (stags, senescing trees, tree hollows, soil features, etc.) (type & number).

3.2.4 Targeted Threatened Flora and Fauna Surveys

Threatened flora and fauna species are those that are listed under the *EPBC Act* and the *NC Reg*. Targeted flora and fauna searches were undertaken for threatened species identified during the desktop review. Searches were undertaken at tertiary and quaternary vegetation sites, fauna habitat assessment plots and also surrounding areas. Within these areas, search effort was primarily focussed on habitat features that ecologists considered to be of potential value for threatened species, in particular for the koala. Searches for threatened species were also conducted in additional locations based on incidental field observations of potential habitat. At each survey site, specific effort was focused on searching for koalas, and indications of presence of koalas such as koala scats at the base of potential feed and habitat trees and scratch marks on the trunks of potential feed and habitat trees. Threatened species were also recorded opportunistically throughout the entire survey area.

For targeted fauna searches, survey effort was apportioned between the following survey techniques at the discretion of the ecologist:

- Diurnal active search, comprising investigation of potential habitat features (e.g. leaf litter, logs, rocks, peeling bark) and scanning vegetation canopies for fauna and inferential evidence of fauna presence (e.g. scratches, scats, tracks, diggings, shed skins, nests, stick or mud nests and dreys); and
- Diurnal bird survey, with species being identified through either visual observation and/or call recognition.

Any flora specimens and inferential evidence of fauna (i.e. scats) deemed as a potential threatened species were sent to the Queensland Herbarium, or fauna identification (via inferential evidence) experts for species verification.

3.2.5 Exotic Flora and Fauna Surveys

Non-native species were recorded where encountered during the survey (i.e. in survey plots, during targeted searches and opportunistically during site traverses) to produce a cumulative weed list for the site. This included Declared Plants and Animals scheduled under the *Land Protection (Pest and Stock Route Management) Regulation 2003* (LP Reg), as well as Weeds of National Significance (WoNS).

3.2.6 Disturbance Surveys

When encountered, evidence of disturbance, severity and an approximate time of occurrence were recorded at each fauna habitat assessment survey site. Disturbance data was also collected opportunistically when deemed appropriate.

3.2.7 Data Collection Protocol

All positional, quantitative, qualitative and photographic data was recorded using a Trimble® Juno handheld computer enabled with Global Positioning System (GPS). The Trimble® units used were installed with a proprietary data capture system that incorporates electronic forms for the recording of specific ecological data.

3.2.8 Survey Limitations

Whilst a range of variation has been assessed throughout all vegetation communities encountered on-site, the entirety of each community has not been investigated at a fine level of detail. For example, cryptic flora species that occur within the region that may only be detectable during their flowering period may not have been observed during the current survey period. Consequently, whilst a diversity of flora species has been recorded, the inventory of flora species compiled from the survey should not be considered an exhaustive list of flora species within the site.

It should also be noted that the fauna component of the field survey was a rapid assessment that provides a 'snap-shot' of the species present and detectable at the site at the time of survey. The survey period was undertaken during winter 2014 and therefore does not account for the full range of seasonal habitat utilisation by, or detectability of, every fauna species that may utilise the site, nor does it account for the influence of weather during preceding seasons or years upon the presence or detectability of fauna during the survey. In addition, as survey times were restricted to the hours of sunlight, the detectability of koalas through direct observation is substantially minimized, as they are most active in the hours of dawn, dusk and/or night (Crowther *et al*. 2013; DoE 2014).

Chapter 4: RESULTS & DISCUSSION

4.1 Desktop Review – Site Values and Risk Profile

4.1.1 Offset Site Desktop Ecological Designations

Commonwealth Government

The PMST identified various Matters of National Environmental Significance under the *EPBC Act* that may occur on the site (**APPENDIX B**). The results of the PMST are summarised below:

- One (1) wetland of international importance (Moreton Bay);
- Four (4) listed Threatened Ecological Communities;
- A total of 36 threatened species; and
- A total of 12 listed migratory species.

State Government

A review of the Wildlife Online database identified that 21 Endangered, Vulnerable, or Near Threatened species (EVNT) as scheduled under the *Nature Conservation (Wildlife) Regulation 2006* (*NC Reg*) have previously been recorded within the 10 km search area. A copy of the Wildlife Online database search results is provided in **APPENDIX C**.

Local Government

The site is located in the Scenic Rim Regional Council LGA, but development is subject to the provisions of the Ipswich City Council Planning Scheme, henceforth referred to as the 'Planning Scheme'.

The site is shown on the Zoning Map 49 of the Planning Scheme and includes both Rural B (Pastoral) and Rural E (Special Land Management) land use themes (**Figure G1; APPENDIX G**). Land use themes provide a broad indication of the type of activities and development envisaged by the IPS 2006. The intent for each of these themes is detailed in Part 10, Division 5 for Rural B (Pastoral) and Division 8 for Rural E (Special Land Management). In summary, the key outcome that is sought for the Rural B (Pastoral) Zone is commercial pastoral activities. However, the key outcomes for the Rural E (Special Land Management) Zone are aligned with sustainable use and conservation.

Under the Planning Scheme, the site is also designated under a number of the Overlays. Provided below is a list of Overlays which will impact the alignment of the proposed Koala Offset Area, as any potential future development of the site would be required to comply with these Overlay provisions:

- OV01 – Bushfire Risk Areas (11.4.4 – Part 11, Division 4, Chapter 4): The majority of the site is within the bushfire risk area with approximately a third of the area from the north of the site to the centre of the site outside of the bushfire risk area (**Figure G2; APPENDIX G**).
- OV04 – Difficult Topography (11.4.6 – Part 11, Division 4, Chapter 6): The site is located on a mosaic of difficult topography ranging from areas less than 15 % to slopes greater than 25 % (**Figure G3; APPENDIX G**).

The Planning Scheme also includes a number of Key Reference Maps, under which the proposed Koala Offset Area is subject to and would be required to comply with. These are:

- KRM Map 1 – Principle Conservation Areas and Integrated Open Space Network: The majority of the site, specifically the areas within the Rural B zonation, is within the Principle Conservation Area.
- KRM Map 5 – Rural Areas Agricultural Land Classes: The entirety of the site lies within Class C2, which is Native Pastures.
- KRM Map 6 – Designated Water Courses: The site does not contain any designated water courses.

4.1.2 Current Planning Protection Mechanisms

Commonwealth Government

Section 43B of the *EPBC Act* provides for the continuation of existing land uses without the requirement for approval under the Act. Historically the site has been used for rural purposes – including grazing – with the land currently stocked with both cattle and horses. Historical and continuing land uses have resulted in vegetation clearing throughout the flatter areas of the site, with the extent of clearing ranging from moderate to extensive. The field investigation also found historical and recent evidence of clearing as a result of logging and thinning, which was observed within the flatter areas of the site and on the moderate to steeper slopes. Additionally, no exclusion fencing was encountered within the site, resulting in stock having access to the entire property.

On the basis of Section 43B of the *EPBC Act* and the historical and continuing land uses associated with the site, it is considered there is provision for ongoing clearing of koala habitat to be lawful under the Act. Specifically, provided that routine management activities and grazing levels do not exceed historical use patterns, it is understood that ongoing clearing of koala habitat associated with historical land uses would be exempt from requiring approval under the *EPBC Act*.

State Government

According to the DNRM Regulated Vegetation Map (DNRM 2014), site contains areas of Category B (remnant vegetation) and Category X (non-remnant vegetation) areas, with the majority of the site being shown as a Category X area (**APPENDIX D**). Whilst the site is predominantly mapped as non-remnant vegetation field investigations identified that the majority these areas actually conform to the criteria for remnant vegetation. Additionally, the BioCondition surveys found that, with the exception of cleared paddocks, the Category X vegetation exhibits a higher BioCondition score than the Category B vegetation (**TABLE 4.3**).

Under the Queensland *VM Act* framework, Category X vegetation is unregulated within the context of State Government planning instruments. It is important to note that whilst much of the Category X vegetation throughout the site qualifies as remnant vegetation, it must be mapped as Category B vegetation by the State in order to be regulated as such under applicable State legislation. Also of relevance to this matter, under the current legislative framework Category X vegetation can only be re-mapped as Category B vegetation if initiated by the landowner.

On the basis of the above, all vegetation within the site that is currently mapped as Category X is exempt from State government regulation and approval requirements. Within a State legislative context this vegetation is able to be cleared for any purpose at the discretion of the landowner.

Local Government

According to the Planning Scheme, the site is located within the Rural Zone, and contains areas designated as Rural B and Rural E. Based on the Planning Scheme, the existing land use within the site would conform to animal husbandry, which is defined as 'the use of premises for the non-intensive keeping, breeding, grazing and depasturing of animals, if such use does not normally require the importation of feed'. The land use and Planning Scheme zoning are discussed below within the context of Local Government regulation of vegetation clearing.

Within Rural B and Rural E areas animal husbandry is an exempt land use and can therefore be undertaken without the need for Council approval. However, this does not necessarily enable the exempt clearing of vegetation from Local Government regulations. Based on the applicable Planning Scheme provisions, key considerations applicable to the level of protection for koala habitat on site relate to slope and vegetation size (i.e. circumference at 1.2 m above the ground). The Planning Scheme allows for vegetation to be cleared in both the Rural B and E zones on the site without Local Government approval, provided that clearing does not:

- Occur on land with a slope of 15% or more;
- Involve a species that is listed as threatened or near threatened under State or Commonwealth legislation; and
- Involve the removal of trees with a circumference of greater than 50 cm at 1.2 m above the ground.

Within both Rural B and Rural E areas, vegetation that does not meet all of the above criteria may still be cleared. However, in these instances vegetation clearing would be contingent upon an application being made to, and approved by Local Government.

Planning Protection Mechanisms Summary

Based on a review of the Commonwealth, State and Local planning and environmental regulations applicable to the site, it has been found that koala habitat on site is exempt from clearing regulation at all levels of government to the extent that it complies with the following:

1. Clearing is undertaken for the purposes of facilitating the ongoing historical land use of grazing/animal husbandry. This land use may be intensified to the extent that it is consistent with historical use patterns;
2. Clearing is limited to Category X areas, as shown on the DNRM Regulated Vegetation Map; and
3. Clearing does not:
   a) Occur on land with a slope of 15% or more;
   b) Involve removal of a species that is listed as threatened or near threatened under State or Commonwealth legislation; and
   c) Involve the removal of trees with a circumference of greater than 50 cm at 1.2 m above the ground.

Provided that selective clearing is undertaken to ensure compliance with (3c), an analysis of desktop and ground-truthed site values has identified that there are 128.7 ha of koala habitat within the site which are exempt from Commonwealth, State and Local Government clearing regulations.

4.2 Field Survey – Offset Site Values

4.2.1 Vegetation Communities

DNRM's Regulated Vegetation Map (DNRM 2014) presents the distribution and status of regional ecosystems as gazetted under the Qld *Vegetation Management Act 1999* (*VM Act*). The Vegetation Management Status used in this report is based on DNRM's assessment of the pre-clearing and remnant extent of a regional ecosystem and is as per the *Vegetation Management Regulation 2012* (*VM Reg*). DNRM's mapping of the existing remnant REs for the site is demonstrated in **APPENDIX D.**

The *VM Act* defines a community as 'remnant' when the vegetation exhibits more than 50% of the undisturbed predominant canopy, averages more than 70% of the vegetation's undisturbed height and is composed of species characteristic of the undisturbed predominant canopy of the given vegetation community.

The vegetation community surveys identified that the site primarily comprises remnant vegetation which generally correspond to remnant areas mapped by DNRM. However, the field survey identified several inconsistencies with DNRM's mapping. In particular, the majority of the non-remnant areas in DNRM's mapping were found to be of remnant status. Several new polygons of Endangered Dominant RE 12.3.3 were also identified during the field survey. Non-remnant vegetation within the north eastern corner of Lot 89 RP892014 and the western section of Lot 86 RP892014 contain vegetation that is analogous to RE 12.3.3 and with the correct management measures, has the potential to regenerate to remnant RE 12.3.3, which is an endangered RE under the *VM Act*. **TABLE 4.1** provides a summary of the ground-truthed RE (GTRE) verified during the field survey. **APPENDIX H** presents the field validated amendments to the site's RE mapping.

TABLE 4.1: GROUND-TRUTHED REGIONAL ECOSYSTEMS PRESENT ON SITE

STATUS^	RE	GENERAL DESCRIPTION*
Endangered	12.3.3	*Eucalyptus tereticornis* woodland on Quaternary alluvium
Least concern	12.3.7	*Eucalyptus tereticornis, Casuarina cunninghamiana* subsp. *cunninghamiana* +/- *Melaleuca spp.* fringing woodland
Endangered	12.8.24	*Corymbia citriodora* subsp. *variegata* open forest on Cainozoic igneous rocks especially trachyte
Least concern	12.9-10.2	*Corymbia citriodora* subsp. *variegata* +/- *Eucalyptus crebra* open forest on sedimentary rocks
Of concern	12.9-10.7	*Eucalyptus crebra* +/- *E. tereticornis, Corymbia tessellaris, Angophora spp., E. melanophloia* woodland on sedimentary rocks

* Descriptions taken from EHP (2014d)

^ *VM Act* Class

4.2.2 Threatened Species Habitat

DNRM's Essential Habitat mapping under the *VM Act* identified that the site contains essential habitat for one threatened fauna species, the koala. The field survey confirmed that the site contains known habitat for the koala. Koala habitat can be broadly defined as any forest or woodland containing species that are known koala feed trees, or shrubland with emergent food trees (DoE 2014). Koala feed trees are generally defined as trees of the *Corymbia*, *Melaleuca*, *Lophostemon* or *Eucalyptus* genera (DERM 2010). More specifically, within the Ipswich region, Ipswich

City Council has identified the following species as preferred koala food trees to be retained/planted for the koala: *Eucalyptus tereticornis*, *Corymbia citriodora*, *Eucalyptus crebra*, *Eucalyptus grandis*, *Eucalyptus microcorys*, *Eucalyptus moluccana*, *Eucalyptus propinqua*, *Eucalyptus seeana* and *Lophostemon confertus* (ICC 2014a). All REs that were present on the site (RE 12.9-10.2, RE 12.9-10.7 and RE 12.3.3), contain *Eucalyptus tereticornis*, *Corymbia citriodora* and *Eucalyptus crebra* as dominant species within the community. In addition to this, koala scats were located throughout all habitat and vegetation communities within the site, and as a result, the entire site is known koala habitat. **APPENDIX I** presents koala habitat areas and locations of scats recorded across the site.

4.2.3 Threatened Species Records

Threatened Flora

One (1) potential flora species listed as EVNT under the *NC Reg* was recorded on site during the field survey (*Melaleuca irbyana*). *Melaleuca irbyana* is listed as Endangered under the *NC Reg*. Voucher specimens of *Melaleuca irbyana* were sent to the Queensland Herbarium for species verification. A comprehensive inventory of flora species recorded during the survey is provided in **APPENDIX J**.

Threatened Fauna

Evidence of one (1) fauna species listed as EVNT under the *NC Reg* and protected under the *EPBC Act* was recorded on site during the field survey (*Phascolarctos cinereus* – koala). Koala scats were observed consistently across the entire site (**APPENDIX I**). A sample of the koala scats that were found across the site were sent to a scat analysis specialist for species verification. Koala is listed as vulnerable under the *NC Reg* (SE Qld bioregion) and vulnerable under the *EPBC Act* (combined populations of Queensland, New South Wales and the Australian Capital Territory). A comprehensive inventory of fauna species recorded during the survey is provided in **APPENDIX J**.

4.2.4 Weeds and Pest Fauna

During the field survey, five (5) flora species Declared under the *LP Act* and five (5) WoNS species were recorded on site (**TABLE 4.2**). The location of these species is presented in **APPENDIX K**. A cumulative list of non-native flora species recorded on site during the field survey is provided in **APPENDIX J**. A comprehensive inventory of flora species recorded during the survey is provided in **APPENDIX J**.

No pest fauna species were recorded on site during the field survey.

TABLE 4.2: WEEDS PRESENT ON SITE

SCIENTIFIC NAME	COMMON NAME	DECLARED STATUS*	WONS
*Asparagus aethiopicus^*	asparagus fern	Class 3	WoNS
Baccharis halimifolia	groundsel bush	Class 2	-
Lantana camara	lantana	Class 3	WoNS
Lantana motevidensis	creeping lantana	Class 3	-
Opuntia tomentosa	velvety tree pear	Class 2	WoNS
Opuntia stricta	common prickly pear	Class 2	WoNS
Scenecio madagascariensis	fireweed	Class 3	WoNS

* As listed by the *LP Reg*

^ Species recorded opportunistically throughout the site

4.2.5 Other Environmental Values

Habitat Linkages

On a regional scale, the site is positioned within the Flinders Karawatha corridor, which is the largest remaining continuous stretch of open eucalypt forest in South East Queensland (SEQ) (EHP 2014e). The corridor extends from Karawatha Forest on the southern edge of Brisbane City, along Oxley Creek, through the Greenbank Military Training Area and south along the Teviot Range to Flinders Peak, Mt Joyce and Wyaralong Dam, north-east of Boonah (EHP 2014e). The corridor is approximately 56,350 ha in size, and is recognised as one of SEQ's most

important regional biodiversity corridors, providing habitat and movement opportunities for a range of species that have state, regional and local significance (EHP 2014e). The Queensland Government, in partnership with local government and a number of other stakeholders, has developed the Flinders Karawatha Corridor Management Strategy 2014-2019 (FKC Management Strategy) (EHP 2014e), which is a five-year management plan that identifies actions that maintain and enhance the corridor's environmental, recreational and cultural heritage values. All participation by the community and landholders in this program is voluntary. The objective of the FKC Management Strategy with regards to biodiversity, is 'to preserve and enhance remnant, significant and riparian vegetation in viable corridors to enhance biodiversity, and facilitate wildlife movement and gene flow' (EHP 2014e). The Queensland Government also prepared the Flinders Karawatha Corridor Environmental Values and Land Use Data Report 2013 (EHP 2013), which provides a detailed analysis of the biodiversity values of the corridor. Under this report, remnant vegetation on site is identified as having either state, regional or local biodiversity significance.

On a local scale, review of aerial photography indicates that the site is largely surrounded by bushland, with the exception of some minor agricultural clearing to the north and east, and extensive clearing to the removed west of the site for agricultural and urban purposes. The site is directly adjacent to Flinders-Goolman Conservation Estate which is a conservation park that is over 1,900 ha in area supporting extensive forests and rugged volcanic peaks (ICC 2014b). The Flinders-Goolman Conservation Estate links the site to the Flinders Peak Conservation Park to the east, which in turn is linked to the Mount Perry Conservation Park, Spring Mountain Forest Park and White Rock Conservation Park to the north and ultimately Wyaralong Dam to the south. These conservation areas are all located within the Flinders Karawatha Corridor.

Wetlands and Waterways

The site does not contain any Referable Wetlands as defined under the *Environmental Protection Regulation 2008* (EHP 2014c), or any wetlands as mapped by EHP's WetlandMaps (EHP 2014fg). The site also does not contain any Designated Water Courses under the Ipswich Planning Scheme 2006 (ICC 2006) (**Figure G6; APPENDIX G**). However, the site does contain numerous first and second order drainage lines, a third order drainage line and a fourth order drainage line (Sandy Creek), which runs along the site's northern boundary (DNRM 2014) (**APPENDIX E**).

4.2.6 Offset Site Condition

BioCondition surveys are quantitative and repeatable assessment procedures that serve as a vegetation condition assessment tool that describes the functionality of terrestrial ecosystems in terms of biodiversity values at a local scale (Eyre *et al*. 2011). The results of the survey produce a numeric score (0-1) as a condition rating, which describes how the attributes of the vegetation in the survey area differ from the attributes in its reference state, or the BioCondition benchmarks of the relevant RE (Eyre *et al*. 2011). A numeric score of 1 indicates that the condition of the surveyed vegetation matches its reference state. The reference state refers to the natural variability in attributes of an ecosystem relatively unmodified since European settlement, or 'the best on offer' (Eyre *et al*. 2011).

A total of five (5) BioCondition sites were surveyed to assess the condition of the regional ecosystems and vegetation communities present within the site (**APPENDIX F**). **TABLE 4.3** below displays the BioCondition score that was attributed to each of the BioCondition site.

TABLE 4.3: BIOCONDITION SCORE

BIOCONDITION SITE	DNRM MAPPING	GTRE MAPPING	BIOCONDITION SCORE
B1	Non-remnant (Category X)	Remnant 12.9-10.7	0.615
B2	Non-remnant (Category X)	Remnant 12.9-10.2	0.665
B3	Non-remnant (Category X)	Non-remnant 12.3.3	0.3
B4	Non-remnant (Category X)	Remnant 12.3.3	0.66
B5	Remnant 12.9-10.2 (Category B)	Remnant 12.9-10.2	0.575

The BioCondition scores indicate that all the ground-truthed RE mapped Remnant surveys sites (which are in the DNRM mapped Category X vegetation) are in good condition. Moreover, the BioCondition surveys found that with the exception of cleared paddocks, the Category X vegetation (B2 = 0.665; **TABLE 4.3**) exhibits a higher BioCondition score than the Category B vegetation (B5 = 0.575; **TABLE 4.3**).

To further asses the ecological value and condition of the site, disturbance surveys were undertaken alongside vegetation and habitat surveys (**APPENDIX F**). Overall the site was in relatively good condition. The primary disturbance type was weed invasion and infestation, which was present in every disturbance survey site. **TABLE 4.4** below presents an overview of the disturbance recorded on site.

TABLE 4.4: DISTURBANCE TYPE AND SEVERITY OF OCCURRENCE ON SITE

SURVEY SITE	DISTURBANCE TYPE	DISTURBANCE INDEX
H1, H6, H9, H10, H13, H14, H18, H19, H21, H23, H24, H25, H26, H28, H29, H30, HT1	Weed invasion	Mild
H2, H4, H7, H8, H27, HT2	Weed invasion	Moderate
H3	Weed invasion	Very high
H5, H11, H12	Weed invasion	High
H15	Weed invasion/ logging	Moderate/Mild
H16	Weed invasion/logging	Mild/Mild
H17	Weed invasion/ logging/ clearing	Moderate/Mild/Very high
H20, H22	Weed invasion/fire	Mild/Mild
H31	Weed invasion/ clearing	Extremely high/ Extremely high

4.3 Review Against Offset Assessment Guide

The following sections have been taken and modified from *Response to Request for Additional Information – Brentwood Estate Residential Development* (New Ground 2014) and amened following discussions with DoE.

4.3.1 Impact Site Calculations

Step 1: Matter of National Environmental Significance Box

The MNES selected was *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory). This species is scheduled as Vulnerable under the *EPBC Act* and was automatically assigned an Annual Probability of Extinction of 0.2% by the calculator. No other score for this probability provided by the IUCN for the koala was identified.

Step 2 – Relevant Impact Attribute

As the protected matter chosen is a threatened species, 'Area of Habitat' was chosen as the relevant attribute. No other attributes were chosen (i.e. Part B of the calculator) as Area of Habitat is considered to encompass the features required by the koala and to be most relevant in determining the offset. The koala habitat clearing extent is **67.14 ha** as per clearing extents plan K120-AA003895-07 (Hyder, 2014). The calculator automatically rounds this down to 67.1 ha.

Step 3 – Impact Description Column

A detailed discussion regarding potential impacts to the koala and its habitat is provided in the Orogen (2011a) report. A discussion regarding residual impacts after proposed avoidance, minimisation and/or mitigation measures are taken into account, is provided in Part 4 (b and c) in the New Ground (2014) report. In summary, the impact that is being offset is the loss of koala habitat.

Step 4 – Quantum of Impact Column

Based on the proposed vegetation clearance footprint for the site (proposed earthworks), it is identified that the proposal would result in the direct removal of 67.14 ha of suitable koala habitat from the site.

The following provides a discussion regarding the quality of the area of habitat. The previous submission assigned a value for quality for the area of habitat (for impact) a score of five (5). However, in response to feedback provided by DoE, a score of six (6) has been assigned as the value for quality of the impact area of habitat.

Condition

Reviews of previous ecological surveys undertaken on site (Orogen 2011a, Orogen 2011b, New Ground 2013), have identified that the disturbance footprint contains a range of remnant forest and woodland communities including REs 12.9-10.12, 12.9-10.15, 12.9-10.3, 12.9-10.2, 12.9-10.7a, and 12.8.16. The disturbance footprint also contains a range of non-remnant vegetation communities, although, it is noted that the majority of the development footprint comprises remnant vegetation types.

The remnant communities were identified to be in generally moderate condition, however, invasive weed species were observed throughout and densities varied between low to high. Other disturbances observed included cleared tracks, erosion, logging and fire.

With the exception of RE 12.9-10.15, all the vegetation types within the proposed disturbance footprint, including the non-remnant/regrowth vegetation communities contain a variety of food trees species known to be utilized by the koala. These include eucalypt species such as: *Eucalyptus molucanna, Eucalyptus seeana, Eucalyptus tereticornis, Eucalyptus major, Eucalyptus siderophloia,* and *Eucalyptus crebra,* and non-eucalypt species such as, *Corymbia intermedia, Angophora leiocarpa, Allocasuarina torulosa, Allocasuarina littoralis, Lophostemon suaveolens,* and *Lophostemon confertus.*

Site Context – Connectivity

The habitats within the development footprint form part of a larger contiguous area of similar habitat in the locality that is over 500 ha, which generally extends to the east and south of the site (Orogen 2011a). However, as discussed in Part 1 (b) in New Ground (2014), although the habitats within the development footprint are connected to an extensive area of habitat occurring to the east and further south, the site itself is located at a northern and western terminus of bushland occurring in the locality (Orogen 2011a). Consequently, the vegetation within the development footprint itself is not considered to comprise a bottle-neck in terms of providing or maintaining connectivity between any areas of koala habitat in the wider locality.

Site Context – Importance

As demonstrated in Table 1 in New Ground (2014), in using the 'Koala Habitat Assessment Tool' the habitats within the proposed site, including the development footprint are considered to contain *habitat critical to the survival of the koala* in accordance with the Draft *EPBC Act* Referral Guidelines for the Koala.

Site Context – Threats

As demonstrated in Table 1 in New Ground (2014), it was identified that the koalas and koala habitats within the proposed development footprint are currently subject to a moderate level of threat. Key threats include:

- Potential dog attacks;
- Collisions with vehicles;
- Habitat degradation through weed invasion, unauthorized public access and anthropogenic waste; and
- Erosion caused by vehicular access.

Species Stocking Rate

Previous habitat assessment surveys and scat searches (Orogen 2011a) have confirmed that koalas are utilizing various locations throughout the proposed development area. The activity levels identified at a formal koala scat survey site within the development area indicate that the level of use by koalas at the time of the survey was indicative of more sedentary ranging patterns and thus within an area of 'major Koala activity' (Phillips and Callaghan 2011 as cited in Orogen 2011a). The koala population on site is part of the wider Ipswich/Beaudesert koala population, which is deemed to be an *important population* as per the Matters of National Environmental Significance Impact Guidelines 1.1.

Despite the known usage and activity levels, the proposed activity is not expected to *significantly impact* the Ipswich/Beaudesert koala population and is unlikely to affect the survival of the species, in particular the combined population in Queensland, New South Wales and the Australian Capital Territory.

Step 5 – Information source

The information used to determine the scores and relevant discussions is provided in various sections of this report and other sources cited in the reference section at the end of this document.

4.3.2 Offset Site Calculations

Step 6 – Offset calculator

The *total quantum of impact* column in the *offset calculator* is automatically populated from the *impact calculator*.

Step 7 – Offset description

The proposed offset site consists of **161.11 ha** of land within Lots 87 RP892014 and 88 RP892014 (**APPENDIX L**). The offset area is proposed to be managed in accordance with the Offset Area Management Plan prepared by Earthtrade. The management strategies will aim to protect and improve the value of the offset area. This will be primarily achieved through rehabilitation of the offset area (weed control) and implementation of other strategies such as restricting human and livestock access within the offset area.

Step 8 – Time horizon

Time over which loss is averted

The value selected for *time over which loss is averted* was the maximum of 20 years for the offset site. The habitats to be retained and rehabilitated for the offset would be managed in accordance with the Offset Area Management Plan (Earthtrade 2014). This management program will form part of the documentation requirements associated with the proposed ongoing protection of the offset area as a conservation area. This will ensure the ongoing protection and management of the habitats to be retained and rehabilitated.

Time until ecological benefit

The dominant feature regarding ecological benefit within the offset area will be achieved through rehabilitation of the vegetation communities, thereby improving the quality of the habitats provided. It is expected that the ecological benefit of the offset site would be attained within a year and therefore the value selected for *time until ecological benefit* was '1'. This is because as soon as the area is gazetted as an offset site, it will be subject to a targeted management regime including ongoing management of weeds and grazing livestock as well as protection from self-assessable vegetation clearing. As such, considerable ecological benefit is expected to be realised within a year.

Step 9 – Start area and quality

Based on the proposed vegetation clearance footprint for the site (67.14 ha), the DoE has advised that 161.11 ha of offset habitat for the koala would be required from the site as an offset area. The start quality of the impact area has been assigned a value of '6' as described by section 4.3.1.

Step 10 – Future area and quality without offset

Risk of loss (%) Without Offset

A figure of 80 % has been assigned to this value for the proportion of the proposed offset area that is of <15% slope (30.07 ha), while a risk of loss value of 20% has been assigned to the portion of the offset area that is of >15% slope (131.04 ha). The following lists the key factors of risk of loss of this offset area. For details, please see section 4.1.2.

- The steeper areas of the site are deemed less attractive for intensive agricultural use. Notwithstanding, evidence of logging and grazing were observed in steeper areas of the site;
- The offset area includes approximately 43 ha of Category B vegetation to ensure protection of these areas which occur amongst the Category X balance of the offset area;
- The proposed offset area is situated within the Rural E zone;
- Sections of the offset area contain large infestation of weeds which contributes to the degradation of native vegetation and restrict natural regeneration of native vegetation; and
- If left as is, without the protection of an offset site, it is likely that degradation of the site will continue.

Step 11 – Future area and quality with offset

Risk of loss (%) With Offset

A figure of 10% has been assigned to this value. As part an offset site, the habitats would be protected from future development and potential risk as listed above and detailed in section 4.1.2. The value of the habitats within the formal offset area would also be protected and enhanced over time as per the approved Offset Area Management Plan (Earthtrade 2014).

Step 12 – Start quality and future quality without offset

Start Quality

A start quality rating of six (6) was assigned to the proportion of the proposed offset area that is at <15% slope, while a start quality rating of seven (7) was assigned to steeper sections (>15% slope) of the offset area. Start quality ratings are based on the results of biocondition surveys undertaken by New Ground (section 4.2.6).

Future Quality

A score of five (5) has been assigned to the *future quality* value for the entirety of the proposed offset area. As discussed previously in *risk of loss* and section 4.1.2, in the absence of ecologically focused management and through ongoing agricultural use, the existing habitats are likely to become further degraded. Pressures associated with anthropogenic activities occurring as a result of currently exempt clearing and land uses, would largely go unmitigated in the absence of formal management measures that would otherwise be implemented to protect and enhance the existing habitat values.

Step 13 – Future quality (with offset)

A score of eight (8) has been assigned to this value for the proposed offset area. The actions proposed within the Offset Area Management Plan (Earthtrade 2014) are likely to restore the value of the vegetation within the offset area to a higher value as a result of vegetation retention, management of livestock, control of site clearing and weed management.

Upon becoming a formal offset area, the management measures outlined within the Offset Area Management Plan (Earthtrade 2014) would begin to be implemented. The existing habitat values within the offset area would be gradually enhanced overtime through assisted natural regeneration and active weed management. The management of the offset area would further mitigate the impacts and pressures associated with human activity such as prohibiting unauthorised vehicular access and ensuring that any essential management clearing activity was undertaken in line with the environmental conservation management intent for the offset area.

Step 14 – Calculating adjusted gain using confidence in result (%)

Confidence in Result

The confidence in the result with the proposed formal offset area has been assigned 90%. The management of the offset area will be guided by the approved Offset Area Management Plan (Earthtrade 2014).

A score of 100% was not given as it is accepted that there may be a level of risk regarding achieving the management measures. More specifically, there may be a level of risk that the habitat value of the offset area may not reach a level that is above the value assigned to its current state. This level of risk may be attributed to factors such as:

- Non-compliance by third parties (e.g. resulting in continued rubbish dumping, trampling of retained habitats, vandalism of rehabilitation works); and
- Natural events – drought, flooding, severe storm events, pest, disease, latent site conditions.

Step 15 – Net present value (adjusted hectares)

The score of the *net present value* is calculated automatically by the assessment tool.

Step 16 – Percentage of impact offset column

The percentage of impact offset is calculated automatically by the assessment tool. The figure generated by the calculator as a result of above-described steps 1 – 15 is **132.8**%.

4.4 Management of the Offset Site

4.4.1 Legal Protection

All direct offset sites will be secured using one of the legally binding mechanisms on Title that are available to ensure the protection of the offset and implementation of the Offset Area Management Plan (part of the Brentwood Biodiversity Offset Strategy) (Earthtrade 2014). These legally binding mechanisms are:

- An environmental offset protection area under section 30 of the *Environmental Offsets Act 2014*;

- An area declared as an area of high nature conservation value under section 19F of the VM Act, where it is secured for the purposes of an environmental offset;
- An area declared as a nature refuge under section 46 of the *NC Act*, where it is secured for the purposes of an environmental offset;
- An area declared as a protected area under section 29(1) of the *NC Act*, where it is secured for the purposes of an environmental offset; or
- An area secured as a statutory covenant for environmental purposes under the *Land Act 1994* or *Land Title Act 1994*.

The mechanisms adopted to secure offsets will ultimately depend upon the mechanisms available and agreed to by the relevant parties.

In this instance, the offset is proposed to be secured via a Voluntary Declaration as an area of high conservation value under the VM Act. Once this has been registered on the Title, the offset area will be mapped as a Category A area on the Property Map of Assessable Vegetation. A Category A on a PMAV is an "Area subject to compliance notices, offsets and voluntary declarations."

4.4.2 Management Program

The Management Program has been devised by Earthtrade, which will be associated with offset registration on title. Below outlines the management outcomes. For further details, please see the Earthtrade (2014) Biodiversity Offset Strategy.

1. a) The areas will be managed, restored and protected. The areas will be managed to enhance the presence of characteristic vegetation communities; including:

    i. Maintenance and enhancement of natural groundcover

    ii. Stock use for bushfire fuel reduction purposes only

    iii. Control of weed species

    iv. Maintenance and enhancement of natural tree and shrub regeneration

    v. Fire Management

    b) Habitat values associated with the Areas will be maintained or enhanced and protected through management including:

    i. Retention of habitat trees, including dead and fallen timber,

    ii. Application of fire management that does not destroy the vegetation

    iii. Control of pests

2. The areas attain mature koala bushland habitat status. This is expected to occur within less than 10 years.

4.4.3 Monitoring of Success

Ongoing monitoring is required to ensure the Offset Area Management Plan achieves the outcomes identified. There are three parts to the monitoring process of the Offset Area, which include:

- Annual photo monitoring;
- BioCondition site assessments; and
- Landowner records.

For further detail on monitoring requirements and process, please see the Offset Area Management Plan which forms part of the Biodiversity Offset Strategy developed by Earthtrade (2014).

4.5 Offset Delivery Timeline

The area will become a formal offset site when it is registered on title upon DoE's approval of the associated Brentwood EPBC Act development application and Earthtrade's Biodiversity Offset Strategy (2014).

Chapter 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The objective of the proposed koala offset area is to protect and enhance the koala habitat value of the current site. For a site to contain high habitat value for koalas, it is required to incorporate the presence of preferred feed trees, which has been defined by the Ipswich City Council as *Eucalyptus tereticornis*, *Corymbia citriodora*, *Eucalyptus crebra*, *Eucalyptus grandis*, *Eucalyptus microcorys*, *Eucalyptus moluccana*, *Eucalyptus propinqua*, *Eucalyptus seeana* and *Lophostemon confertus* (ICC 2014).

The field surveys confirmed that the site contained vegetation communities, in both Category X and Category B areas,that contain high habitat value for koalas. These vegetation communities include: RE 12.9-10.2, RE 12.9-10.7 and RE 12.3.3 which all comprise *Eucalyptus tereticornis*, *Corymbia citriodora* and *Eucalyptus crebra* as dominant canopy and sub-canopy species. Although no koalas were sighted during the survey period, koala scats were located and recorded across the entire site in both Category B and Category X areas. The scats were situated under *Eucalyptus* and *Corymbia* trees with some of these trees also exhibiting scratch marks along the trunk.

In addition to the onsite quality of koala habitat, it is vital for the site to be linked to other areas of bushland and corridors to encourage koala movement and gene flow. The site is adjacent to Flinders-Goolman Conservation Estate on the north east and is also located within the Flinders Karawatha corridor, which is the largest remaining continuous stretch of open eucalypt forest in South East Queensland. Moreover, the site is largely surrounded by bushland and is highly connected via these habitat linkages. To ensure a suitable offset area, it is vital that these areas of bushland and corridors are ecologically viable and linked to facilitate and encourage koala movement and gene flow. As mentioned previously, a factor for the population growth and progression of this species is the presence of other koalas, and having these corridors and habitat linkages that contain preferred feed trees is vital for this reason. As a result, the site makes for ecologically valuable choice as an offset area due to its connectivity with viable bushland and corridors.

Given data recorded during field surveys and the location of the site, it is evident that the site would be a suitable area to offset the loss of koala habitat due to proposed vegetation clearance as a consequence of the proposed development of Brentwood Estate.

Glossary

Biocondition	A Condition Assessment Framework for Terrestrial Biodiversity in Queensland.
Cryptic flora	Flora species that may be difficult to find due to its ecological lifecycle such as growth stages and flowering period, especially when the perennating organ is underground e.g. ground orchids.
Declared plant or animal	Pest flora or fauna species as defined by the *LP Act* and listed under the schedules of the *LP Reg*.
Proposed disturbance footprint	Proposed disturbance footprint on the "Brentwood Estate" on Part Lot 912 SP257089 and Lot 913 SP257089.
Threatened	Flora or fauna species listed as threatened by the *EPBC Act* and/or the *NC Reg*.
Trimble®	The name used to refer to the data capture and GPS positioning device utilised during the reported ecology survey.
site	Lots 86 RP892014, 87 RP892014, 88 RP892014 and 89 RP892014

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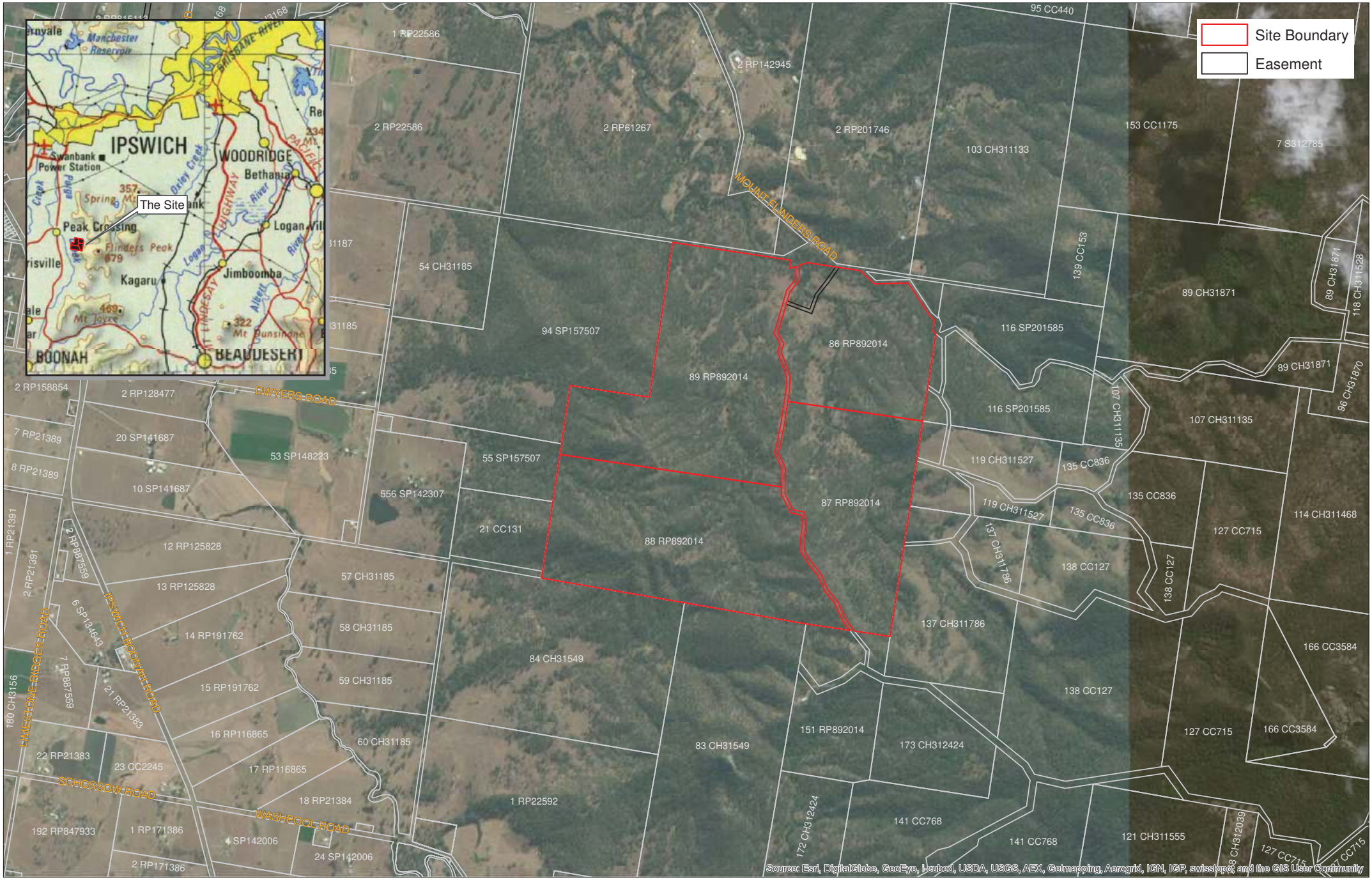
APPENDIX A

Site Locality Plan



APPENDIX A: SITE LOCALITY PLAN

0 500 1,000 1,500 2,000 Metres

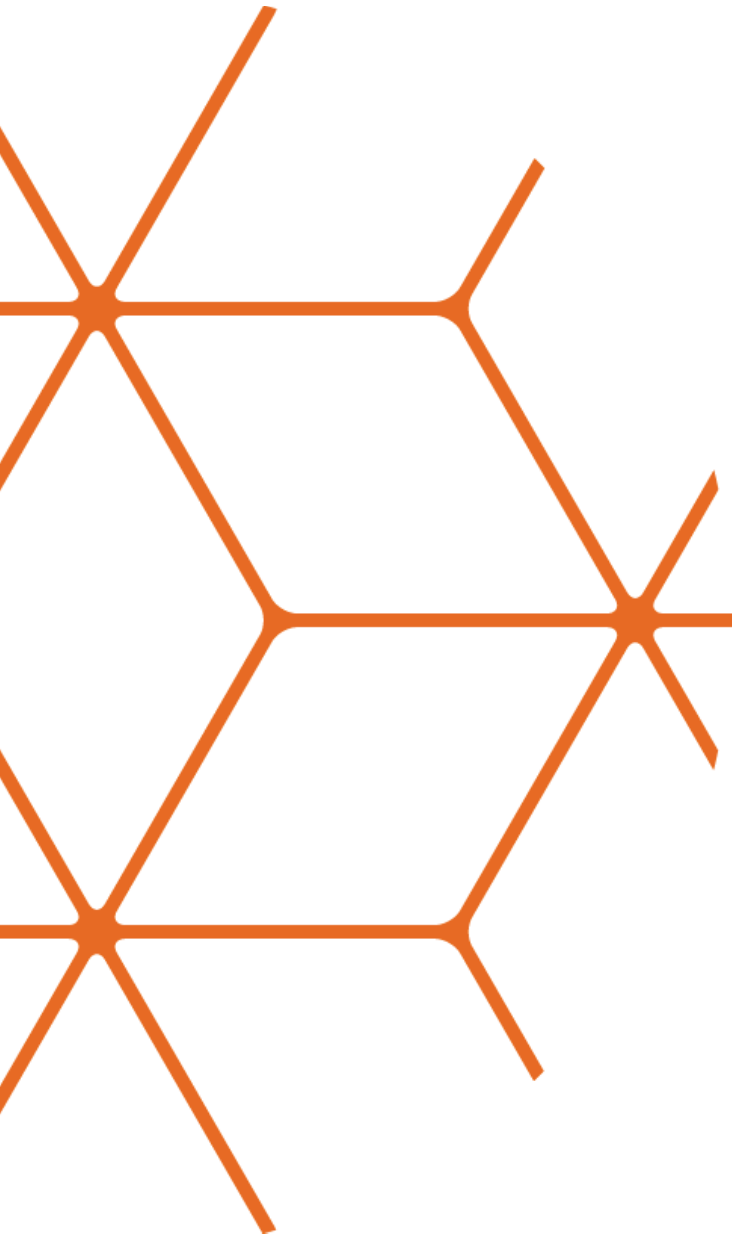
A3 Scale 1:20,000

File: 2166-KOAR-R-01-AA
Date: 28/07/2014

Source:
Cadastral Boundaries: State of Queensland (Department of Natural Resources and Mines) 2012
Roads: Geoscience Australia 2012

APPENDIX B

EPBC Act Protected Matters Search Tool Results



Australian Government
Department of the Environment

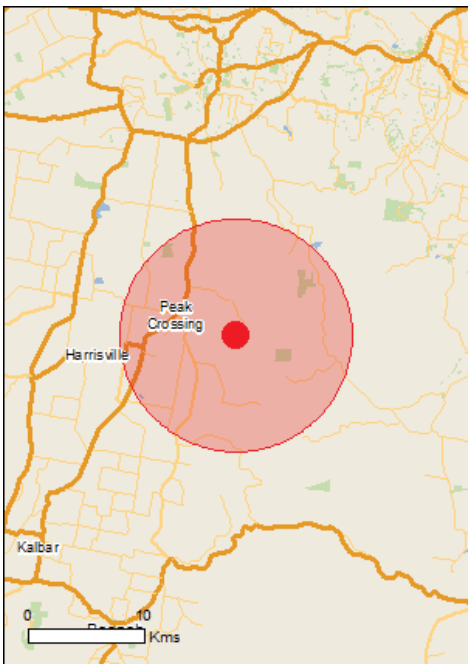
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

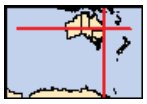
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 02/07/14 11:57:13



Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	36
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	1
State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	36
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (RAMSAR) [Resource Information]

Name	Proximity
Moreton bay	Upstream from Ramsar

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Swamp Tea-tree (Melaleuca irbyana) Forest of South-east Queensland	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta Black-throated Finch (southern) [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Insects		
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus hallucatus Northern Quoll [331]	Endangered	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Other		
Cycas ophiolitica [55797]	Endangered	Species or species habitat may occur within area
Plants		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Bertya ernestiana a shrub [78349]	Vulnerable	Species or species habitat may occur within area
Bosistoa selwynii Heart-leaved Bosistoa [13702]	Vulnerable	Species or species habitat likely to occur within area
Bosistoa transversa Three-leaved Bosistoa [16091]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat likely to occur within area
Cupaniopsis tomentella Boonah Tuckeroo [3322]	Vulnerable	Species or species habitat likely to occur within area
Lepidium peregrinum Wandering Pepper-cress [14035]	Endangered	Species or species habitat may occur within area
Notelaea ipsviciensis Cooneana Olive [81858]	Critically Endangered	Species or species habitat may occur within area
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Species or species habitat likely to occur within area
Phebalium distans Mt Berryman Phebalium [81869]	Critically Endangered	Species or species habitat may occur within area
Planchonella eerwah Shiny-leaved Condoo, Black Plum, Wild Apple [17340]	Endangered	Species or species habitat likely to occur within area
Plectranthus habrophyllus [64589]	Endangered	Species or species habitat likely to occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat may occur within area
Delma torquata Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Defence - AMBERLEY - AP90 SMALL ARMS RANGE (PURGA)

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Flinders Peak - Ivorys Rock Areas	QLD	Registered

State and Territory Reserves [Resource Information]

Name	State
Flinders Peak	QLD
Mount Perry	QLD

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Bufo marinus Cane Toad [1772]		Species or species habitat likely to occur within area
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar		Species or species

Name	Status	Type of Presence
Groundsel [2624]		habitat likely to occur within area
Solanum elaeagnifolium		
Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Coordinates

-27.7972 152.7747

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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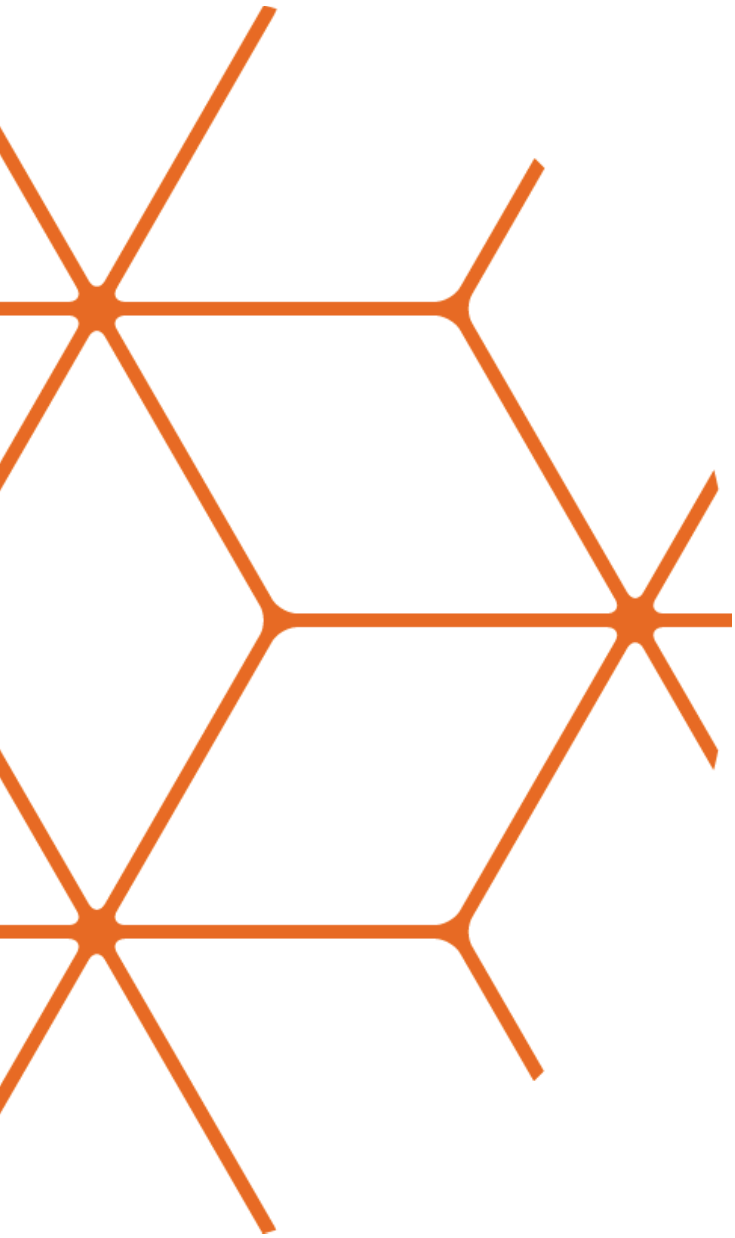
APPENDIX C

Wildlife Online Database Search 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: 27.7972
Longitude: 152.7747
Distance: 10
Email: erutherford@newground.com.au
Date submitted: Wednesday 02 Jul 2014 12:09:14
Date extracted: Wednesday 02 Jul 2014 12:10:09

The number of records retrieved = 759

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			5
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		4
animals	amphibians	Hylidae	*Litoria peronii*	emerald spotted treefrog		C		1
animals	amphibians	Hylidae	*Litoria dentata*	bleating treefrog		C		1
animals	amphibians	Hylidae	*Litoria nasuta*	striped rocketfrog		C		3
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		4
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		2
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		4
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		2
animals	amphibians	Limnodynastidae	*Limnodynastes salmini*	salmon striped frog		C		1
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		2
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		1
animals	amphibians	Myobatrachidae	*Pseudophryne major*	great brown broodfrog		C		1/1
animals	amphibians	Myobatrachidae	*Uperoleia rugosa*	chubby gungan		C		1/1
animals	amphibians	Myobatrachidae	*Pseudophryne raveni*	copper backed broodfrog		C		2
animals	amphibians	Myobatrachidae	*Crinia parinsignifera*	beeping froglet		C		2
animals	amphibians	Myobatrachidae	*Mixophyes fasciolatus*	great barred frog		C		1
animals	birds	Acanthizidae	*Sericornis citreogularis*	yellow-throated scrubwren		C		1
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		6
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		1
animals	birds	Acanthizidae	*Gerygone mouki*	brown gerygone		C		1
animals	birds	Acanthizidae	*Acanthiza lineata*	striated thornbill		C		1
animals	birds	Acanthizidae	*Chthonicola sagittata*	speckled warbler		C		6
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		5
animals	birds	Acanthizidae	*Gerygone albogularis*	white-throated gerygone		C		32
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		5
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		29
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		3
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		20
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		NT		3
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		3
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		2
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		2
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		12
animals	birds	Accipitridae	*Pandion cristatus*	eastern osprey		SL		1
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		9
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		8
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		5
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		3
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		SL		17
animals	birds	Accipitridae	*Hieraaetus morphnoides*	little eagle		C		1
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		SL		28
animals	birds	Alaudidae	*Mirafra javanica*	Horsfield's bushlark		C		9
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		7
animals	birds	Anatidae	*Anas castanea*	chestnut teal		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		22
animals	birds	Anatidae	*Biziura lobata*	musk duck		C		1
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		27
animals	birds	Anatidae	*Anas rhynchotis*	Australasian shoveler		C		7
animals	birds	Anatidae	*Aythya australis*	hardhead		C		14
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		79
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		75
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		16
animals	birds	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck		C		1
animals	birds	Anatidae	*Stictonetta naevosa*	freckled duck		NT		1
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		NT		1
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		6
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		10
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		3
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		SL		1
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		SL		1
animals	birds	Ardeidae	*Egretta sacra*	eastern reef egret		SL		1
animals	birds	Ardeidae	*Ardea modesta*	eastern great egret		SL		25
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		16
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		3
animals	birds	Ardeidae	*Botaurus poiciloptilus*	Australasian bittern		C	E	2
animals	birds	Ardeidae	*Nycticorax caledonicus*	Nankeen night-heron		C		4
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		50
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		9
animals	birds	Ardeidae	*Ardea ibis*	cattle egret		SL		47
animals	birds	Artamidae	*Artamus cyanopterus*	dusky woodswallow		C		1
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		23
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		3
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		73
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		17
animals	birds	Artamidae	*Cracticus tibicen*	Australian magpie		C		105
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		2
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		3
animals	birds	Cacatuidae	*Cacatua tenuirostris*	long-billed corella	Y	C		1
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		14
animals	birds	Cacatuidae	*Calyptorhynchus funereus*	yellow-tailed black-cockatoo		C		2
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		3
animals	birds	Cacatuidae	*Eolophus roseicapillus*	galah		C		72
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		30
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		86
animals	birds	Campephagidae	*Lalage sueurii*	white-winged triller		C		2
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		2
animals	birds	Campephagidae	*Coracina tenuirostris*	cicadabird		SL		11
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		52

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Charadriidae	*Erythrogonys cinctus*	red-kneed dotterel		C		2
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		7
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		5
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		NT		12
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		42
animals	birds	Climacteridae	*Cormobates leucophaea*	white-throated treecreeper		C		1
animals	birds	Climacteridae	*Climacteris erythrops*	red-browed treecreeper		NT		1
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		2
animals	birds	Columbidae	*Columba livia*	rock dove	Y			20
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		13
animals	birds	Columbidae	*Columba leucomela*	white-headed pigeon		C		1
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		78
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		7
animals	birds	Columbidae	*Chalcophaps indica*	emerald dove		C		1
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		5
animals	birds	Columbidae	*Leucosarcia picata*	wonga pigeon		C		5
animals	birds	Columbidae	*Ptilinopus magnificus*	wompoo fruit-dove		C		1
animals	birds	Columbidae	*Macropygia amboinensis*	brown cuckoo-dove		C		5
animals	birds	Columbidae	*Streptopelia chinensis*	spotted dove	Y			44
animals	birds	Columbidae	*Lopholaimus antarcticus*	topknot pigeon		C		2
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		22
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		101
animals	birds	Cuculidae	*Chalcites minutillus minutillus*	little bronze-cuckoo		C		2
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		13
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		17
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		4
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		11
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		3
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		1
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		4
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		8
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		53
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		12
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		17
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		1
animals	birds	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar		C		3
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		5
animals	birds	Falconidae	*Falco peregrinus*	peregrine falcon		C		2
animals	birds	Falconidae	*Falco cenchroides*	Nankeen kestrel		C		72
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		10
animals	birds	Gruidae	*Grus rubicunda*	brolga		C		1
animals	birds	Halcyonidae	*Todiramphus chloris*	collared kingfisher		C		1
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		37
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		46
animals	birds	Halcyonidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher		C		5
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		33
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		48
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		13
animals	birds	Hirundinidae	*Cheramoeca leucosterna*	white-backed swallow		C		1
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		13
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		13
animals	birds	Laridae	*Chlidonias hybrida*	whiskered tern		C		2
animals	birds	Laridae	*Gelochelidon nilotica*	gull-billed tern		C		1
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		SL		1
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		53
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		2
animals	birds	Maluridae	*Stipiturus malachurus*	southern emu-wren		V		1
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		35
animals	birds	Megaluridae	*Cincloramphus mathewsi*	rufous songlark		C		2
animals	birds	Megaluridae	*Megalurus timoriensis*	tawny grassbird		C		1
animals	birds	Megaluridae	*Cincloramphus cruralis*	brown songlark		C		4
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		2
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		42
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		16
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		16
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		16
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		10
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		41
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		14
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		5
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		9
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		18
animals	birds	Meliphagidae	*Melithreptus gularis*	black-chinned honeyeater		NT		5
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		2
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		SL		25
animals	birds	Monarchidae	*Symposiarchus trivirgatus*	spectacled monarch		SL		2
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		1
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		88
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		3
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		8
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		17
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		16
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		5
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		9
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		15
animals	birds	Orthonychidae	*Orthonyx temminckii*	Australian logrunner		C		2
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		1
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		21
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		8
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		7

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Pachycephalidae	*Falcunculus frontatus*	crested shrike-tit		C		1
animals	birds	Paradisaeidae	*Ptiloris paradiseus*	paradise riflebird		C		1
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		67
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		8
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			3
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		26
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		3
animals	birds	Petroicidae	*Petroica goodenovii*	red-capped robin		C		3
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		7
animals	birds	Petroicidae	*Tregellasia capito*	pale-yellow robin		C		1
animals	birds	Petroicidae	*Petroica rosea*	rose robin		C		7
animals	birds	Phalacrocoracidae	*Phalacrocorax sp.*					1
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		6
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		2
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		18
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		35
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		30/1
animals	birds	Phasianidae	*Excalfactoria chinensis*	king quail		C		1
animals	birds	Phasianidae	*Coturnix pectoralis*	stubble quail		C		3
animals	birds	Pittidae	*Pitta versicolor*	noisy pitta		C		1
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		9
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		30
animals	birds	Podicipedidae	*Poliocephalus poliocephalus*	hoary-headed grebe		C		3
animals	birds	Podicipedidae	*Podiceps cristatus*	great crested grebe		C		2
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		6
animals	birds	Psittacidae	*Platycercus elegans*	crimson rosella		C		3
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		40
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		47
animals	birds	Psittacidae	*Psephotus haematonotus*	red-rumped parrot		C		1
animals	birds	Psittacidae	*Glossopsitta concinna*	musk lorikeet		C		5
animals	birds	Psittacidae	*Platycercus eximius*	eastern rosella		C		11
animals	birds	Psittacidae	*Alisterus scapularis*	Australian king-parrot		C		11
animals	birds	Psittacidae	*Glossopsitta pusilla*	little lorikeet		C		7
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		86
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		7
animals	birds	Ptilonorhynchidae	*Ailuroedus crassirostris*	green catbird		C		1
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus violaceus*	satin bowerbird		C		2
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus maculatus*	spotted bowerbird		C		3
animals	birds	Ptilonorhynchidae	*Sericulus chrysocephalus*	regent bowerbird		C		4
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		5
animals	birds	Rallidae	*Porzana pusilla*	Baillon's crake		C		1
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		39
animals	birds	Rallidae	*Porphyrio porphyrio*	purple swamphen		C		29
animals	birds	Rallidae	*Gallirallus philippensis*	buff-banded rail		C		3
animals	birds	Recurvirostridae	*Himantopus himantopus*	black-winged stilt		C		20
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		17

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		4
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		91
animals	birds	Rostratulidae	*Rostratula australis*	Australian painted snipe		V	E	1
animals	birds	Scolopacidae	*Limosa lapponica*	bar-tailed godwit		SL		1
animals	birds	Scolopacidae	*Tringa stagnatilis*	marsh sandpiper		SL		1
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		SL		1
animals	birds	Scolopacidae	*Tringa nebularia*	common greenshank		SL		2
animals	birds	Scolopacidae	*Tringa glareola*	wood sandpiper		SL		1
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		SL		2
animals	birds	Scolopacidae	*Numenius minutus*	little curlew		SL		1
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		4
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		9
animals	birds	Sturnidae	*Sturnus vulgaris*	common starling	Y			58
animals	birds	Sturnidae	*Sturnus tristis*	common myna	Y			50
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		33
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		5
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		14
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		44
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		34
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		13
animals	birds	Turdidae	*Zoothera heinei*	russet-tailed thrush		C		1
animals	birds	Turnicidae	*Turnix varius*	painted button-quail		C		1
animals	birds	Turnicidae	*Turnix melanogaster*	black-breasted button-quail		V	V	1
animals	birds	Tytonidae	*Tyto javanica*	eastern barn owl		C		1
animals	insects	Hesperiidae	*Hesperilla sarnia*	swift sedge-skipper				1
animals	insects	Hesperiidae	*Toxidia parvulus*	banded grass-skipper				1
animals	insects	Hesperiidae	*Toxidia peron*	dingy skipper				1
animals	insects	Hesperiidae	*Neohesperilla xanthomera*	yellow grass-skipper				1
animals	insects	Hesperiidae	*Netrocoryne repanda repanda*	bronze flat (southern subspecies)				1
animals	insects	Hesperiidae	*Hesperilla crypsigramma*	wide-brand sedge-skipper				4
animals	insects	Lycaenidae	*Acrodipsas brisbanensis brisbanensis*	bronze ant-blue				3
animals	insects	Lycaenidae	*Ogyris zosine zosine*	northern purple azure (southern subspecies)				1
animals	insects	Lycaenidae	*Ogyris olane ocela*	dull-purple azure (coastal subspecies)				1
animals	insects	Lycaenidae	*Acrodipsas cuprea*	copper ant-blue				1
animals	insects	Lycaenidae	*Hypochrysops delicia delicia*	moonlight jewel (eastern subspecies)				1
animals	insects	Nymphalidae	*Acraea andromacha andromacha*	glasswing				2
animals	insects	Nymphalidae	*Polyura sempronius sempronius*	tailed emperor				1
animals	insects	Nymphalidae	*Vanessa kershawi*	Australian painted lady				2
animals	insects	Nymphalidae	*Melanitis leda bankia*	common evening-brown				1
animals	insects	Nymphalidae	*Tirumala hamata hamata*	blue tiger				1
animals	insects	Nymphalidae	*Tisiphone abeona rawnsleyi*	varied sword-grass brown (Queensland subspecies)				1
animals	insects	Pieridae	*Delias nigrina*	black jezebel				1
animals	insects	Pieridae	*Eurema hecabe phoebus*	large grass-yellow				1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Bovidae	*Bos taurus*	European cattle	Y			1
animals	mammals	Bovidae	*Capra hircus*	goat	Y			1
animals	mammals	Canidae	*Vulpes vulpes*	red fox	Y			6
animals	mammals	Canidae	*Canis lupus familiaris*	dog	Y			1
animals	mammals	Dasyuridae	*Sminthopsis murina*	common dunnart		C		1
animals	mammals	Dasyuridae	*Dasyurus maculatus maculatus*	spotted-tailed quoll (southern subspecies)		V	E	1
animals	mammals	Dasyuridae	*Antechinus flavipes flavipes*	yellow-footed antechinus (south-east Queensland)		C		1
animals	mammals	Dasyuridae	*Phascogale tapoatafa*	brush-tailed phascogale		C		3
animals	mammals	Dasyuridae	*Planigale maculata*	common planigale		C		1
animals	mammals	Leporidae	*Lepus europaeus*	European brown hare	Y			2
animals	mammals	Macropodidae	*Macropus rufogriseus*	red-necked wallaby		C		8
animals	mammals	Macropodidae	*Macropus parryi*	whiptail wallaby		C		6
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		6
animals	mammals	Macropodidae	*Macropus dorsalis*	black-striped wallaby		C		1
animals	mammals	Macropodidae	*Petrogale penicillata*	brush-tailed rock-wallaby		V	V	26
animals	mammals	Molossidae	*Tadarida australis*	white-striped freetail bat		C		2
animals	mammals	Muridae	*Rattus rattus*	black rat	Y			1
animals	mammals	Muridae	*Mus musculus*	house mouse	Y			1
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		2
animals	mammals	Petauridae	*Petaurus breviceps*	sugar glider		C		7
animals	mammals	Phalangeridae	*Trichosurus caninus*	short-eared possum		C		1
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		4
animals	mammals	Phascolarctidae	*Phascolarctos cinereus (southeast Queensland bioregion)*	koala (southeast Queensland bioregion)		V	V	264
animals	mammals	Potoroidae	*Aepyprymnus rufescens*	rufous bettong		C		4
animals	mammals	Pseudocheiridae	*Petauroides volans*	greater glider		C		3
animals	mammals	Pteropodidae	*Pteropus poliocephalus*	grey-headed flying-fox		C	V	1
animals	mammals	Suidae	*Sus scrofa*	pig	Y			1
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		3
animals	ray-finned fishes	Ambassidae	*Ambassis agassizii*	Agassiz's glassfish				1
animals	ray-finned fishes	Anguillidae	*Anguilla reinhardtii*	longfin eel				1
animals	ray-finned fishes	Eleotridae	*Mogurnda adspersa*	southern purplespotted gudgeon				1
animals	ray-finned fishes	Eleotridae	*Hypseleotris galii*	firetail gudgeon				3
animals	ray-finned fishes	Poeciliidae	*Gambusia holbrooki*	mosquitofish	Y			3
animals	reptiles	Agamidae	*Intellagama lesueurii*	eastern water dragon		C		1
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		5
animals	reptiles	Agamidae	*Diporiphora australis*			C		1/1
animals	reptiles	Boidae	*Morelia spilota*	carpet python		C		1
animals	reptiles	Chelidae	*Chelodina longicollis*	eastern snake-necked turtle		C		1
animals	reptiles	Colubridae	*Dendrelaphis punctulatus*	green tree snake		C		6
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		1
animals	reptiles	Diplodactylidae	*Nebulifera robusta*	robust velvet gecko		C		1
animals	reptiles	Diplodactylidae	*Diplodactylus vittatus*	wood gecko		C		1
animals	reptiles	Diplodactylidae	*Oedura tryoni*	southern spotted velvet gecko		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		1
animals	reptiles	Elapidae	*Pseudechis porphyriacus*	red-bellied black snake		C		3
animals	reptiles	Elapidae	*Demansia psammophis*	yellow-faced whip snake		C		1
animals	reptiles	Elapidae	*Cryptophis nigrescens*	eastern small-eyed snake		C		2
animals	reptiles	Gekkonidae	*Gehyra dubia*			C		1
animals	reptiles	Gekkonidae	*Hemidactylus frenatus*	house gecko	Y			1
animals	reptiles	Pygopodidae	*Delma plebeia*	common delma		C		2
animals	reptiles	Scincidae	*Lygisaurus foliorum*			C		1
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		6
animals	reptiles	Scincidae	*Carlia vivax*			C		2
animals	reptiles	Scincidae	*Ctenotus spaldingi*			C		1
animals	reptiles	Scincidae	*Calyptotis scutirostrum*			C		2
animals	reptiles	Scincidae	*Lampropholis delicata*			C		2
animals	reptiles	Scincidae	*Anomalopus verreauxii*			C		2/1
animals	reptiles	Typhlopidae	*Ramphotyphlops wiedii*			C		1
animals	reptiles	Varanidae	*Varanus varius*	lace monitor		C		3
fungi	club fungi	Basidiomycota	*Inocybe*			C		3/3
fungi	club fungi	Basidiomycota	*Amanita sp. 10b*			C		1/1
fungi	sac fungi	Parmeliaceae	*Xanthoparmelia subtropica*			C		1/1
fungi	sac fungi	Ramalinaceae	*Ramalina inflata subsp. perpusilla*			C		1/1
fungi	sac fungi	Usneaceae	*Usnea dasaea*			C		3/3
plants	conifers	Araucariaceae	*Araucaria cunninghamii*	hoop pine		C		1
plants	ferns	Adiantaceae	*Pellaea paradoxa*	heart fern		C		1
plants	ferns	Adiantaceae	*Adiantum hispidulum*			C		1
plants	ferns	Adiantaceae	*Cheilanthes distans*	bristly cloak fern		C		1
plants	ferns	Adiantaceae	*Cheilanthes sieberi*			C		2
plants	ferns	Adiantaceae	*Adiantum hispidulum var. minus*			C		1/1
plants	ferns	Adiantaceae	*Pellaea falcata*			C		1
plants	ferns	Adiantaceae	*Adiantum aethiopicum*			C		1
plants	ferns	Aspleniaceae	*Asplenium australasicum*			C		1
plants	ferns	Blechnaceae	*Doodia caudata*			C		1
plants	ferns	Blechnaceae	*Doodia aspera*	prickly rasp fern		C		1
plants	ferns	Davalliaceae	*Davallia pyxidata*			C		1
plants	ferns	Dennstaedtiaceae	*Pteridium esculentum*	common bracken		C		1
plants	ferns	Dryopteridaceae	*Lastreopsis munita*			C		2/1
plants	ferns	Dryopteridaceae	*Lastreopsis microsora*			C		1
plants	ferns	Marsileaceae	*Marsilea mutica*	shiny nardoo		C		1
plants	ferns	Polypodiaceae	*Platycerium bifurcatum*			C		1
plants	ferns	Polypodiaceae	*Pyrrosia rupestris*	rock felt fern		C		2/1
plants	ferns	Polypodiaceae	*Drynaria rigidula*			C		1
plants	ferns	Polypodiaceae	*Platycerium superbum*	staghorn fern		C		1
plants	higher dicots	Acanthaceae	*Pseuderanthemum variabile*	pastel flower		C		1
plants	higher dicots	Acanthaceae	*Brunoniella australis*	blue trumpet		C		2/1
plants	higher dicots	Amaranthaceae	*Guilleminea densa*	small matweed	Y			1/1
plants	higher dicots	Amaranthaceae	*Achyranthes aspera*			C		2/1
plants	higher dicots	Amaranthaceae	*Gomphrena celosioides*	gomphrena weed	Y			1

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plants	higher dicots	Amaranthaceae	*Deeringia arborescens*	climbing deeringia		C		1
plants	higher dicots	Amaranthaceae	*Nyssanthes diffusa*	barbed-wire weed		C		1
plants	higher dicots	Aphanopetalaceae	*Aphanopetalum resinosum*	gumvine		C		3/2
plants	higher dicots	Apiaceae	*Centella asiatica*			C		1
plants	higher dicots	Apiaceae	*Cyclospermum leptophyllum*		Y			1/1
plants	higher dicots	Apocynaceae	*Parsonsia lanceolata*	northern silkpod		C		3/2
plants	higher dicots	Apocynaceae	*Marsdenia micradenia*	gymnema		C		2/2
plants	higher dicots	Apocynaceae	*Parsonsia straminea*	monkey rope		C		2
plants	higher dicots	Apocynaceae	*Alstonia constricta*	bitterbark		C		1
plants	higher dicots	Apocynaceae	*Secamone elliptica*			C		4/3
plants	higher dicots	Apocynaceae	*Marsdenia rostrata*			C		2/2
plants	higher dicots	Apocynaceae	*Marsdenia coronata*	slender milkvine		V		6/4
plants	higher dicots	Apocynaceae	*Cynanchum bowmanii*	bowman's milkvine		C		4/3
plants	higher dicots	Apocynaceae	*Alyxia ruscifolia*			C		6/4
plants	higher dicots	Apocynaceae	*Hoya australis*			C		1
plants	higher dicots	Apocynaceae	*Gomphocarpus physocarpus*	balloon cottonbush	Y			2/1
plants	higher dicots	Apocynaceae	*Hoya australis subsp. australis*			C		5/5
plants	higher dicots	Apocynaceae	*Sarcostemma viminale subsp. brunonianum*			C		3/3
plants	higher dicots	Apocynaceae	*Sarcostemma viminale subsp. australe*			C		1
plants	higher dicots	Araliaceae	*Hydrocotyle laxiflora*	stinking pennywort		C		1/1
plants	higher dicots	Araliaceae	*Trachymene procumbens*	creeping wild parsnip		C		4/3
plants	higher dicots	Araliaceae	*Polyscias elegans*	celery wood		C		1
plants	higher dicots	Araliaceae	*Astrotricha latifolia*			C		2/2
plants	higher dicots	Asteraceae	*Zinnia peruviana*	wild zinnia	Y			1/1
plants	higher dicots	Asteraceae	*Camptacra barbata*			C		1
plants	higher dicots	Asteraceae	*Carthamus lanatus*	saffron thistle	Y			1/1
plants	higher dicots	Asteraceae	*Cichorium intybus*	chicory	Y			1/1
plants	higher dicots	Asteraceae	*Schkuhria pinnata*		Y			1/1
plants	higher dicots	Asteraceae	*Calotis lappulacea*	yellow burr daisy		C		1/1
plants	higher dicots	Asteraceae	*Conyza bonariensis*		Y			1
plants	higher dicots	Asteraceae	*Podolepis neglecta*			C		2/2
plants	higher dicots	Asteraceae	*Vittadinia sulcata*	native daisy		C		1/1
plants	higher dicots	Asteraceae	*Bidens pilosa*		Y			1
plants	higher dicots	Asteraceae	*Calotis dentex*	white burr daisy		C		1/1
plants	higher dicots	Asteraceae	*Cassinia laevis*			C		1
plants	higher dicots	Asteraceae	*Cirsium vulgare*	spear thistle	Y			1
plants	higher dicots	Asteraceae	*Olearia nernstii*	Ipswich daisy		C		1
plants	higher dicots	Asteraceae	*Cassinia subtropica*			C		2/2
plants	higher dicots	Asteraceae	*Eclipta platyglossa*			C		1
plants	higher dicots	Asteraceae	*Glossocardia bidens*	native cobbler's pegs		C		1
plants	higher dicots	Asteraceae	*Senecio tenuiflorus*			C		1/1
plants	higher dicots	Asteraceae	*Lagenophora gracilis*			C		1
plants	higher dicots	Asteraceae	*Xanthium occidentale*		Y			1
plants	higher dicots	Asteraceae	*Baccharis halimifolia*	groundsel bush	Y			1
plants	higher dicots	Asteraceae	*Centratherum riparium*			C		2/2
plants	higher dicots	Asteraceae	*Cyanthillium cinereum*			C		2

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plants	higher dicots	Asteraceae	*Rhodanthe anthemoides*	white paper daisy		C		1/1
plants	higher dicots	Asteraceae	*Senecio bathurstianus*			C		2/2
plants	higher dicots	Asteraceae	*Wedelia spilanthoides*			C		1
plants	higher dicots	Asteraceae	*Centratherum punctatum*		Y			1
plants	higher dicots	Asteraceae	*Senecio amygdalifolius*			C		1
plants	higher dicots	Asteraceae	*Xerochrysum bracteatum*	golden everlasting daisy		C		1/1
plants	higher dicots	Asteraceae	*Ozothamnus diosmifolius*	white dogwood		C		1
plants	higher dicots	Asteraceae	*Senecio madagascariensis*	fireweed	Y			2/2
plants	higher dicots	Asteraceae	*Chrysocephalum apiculatum*	yellow buttons		C		2
plants	higher dicots	Asteraceae	*Apowollastonia spilanthoides*			C		1/1
plants	higher dicots	Asteraceae	*Vittadinia dissecta var. hirta*			C		1
plants	higher dicots	Asteraceae	*Peripleura hispidula var. setosa*			C		1/1
plants	higher dicots	Asteraceae	*Gynura drymophila var. drymophila*			C		2/2
plants	higher dicots	Asteraceae	*Gynura drymophila var. glabrifolia*			C		2/2
plants	higher dicots	Asteraceae	*Acmella grandiflora var. brachyglossa*			C		1
plants	higher dicots	Asteraceae	*Senecio pinnatifolius var. pinnatifolius*			C		3/3
plants	higher dicots	Bignoniaceae	*Pandorea pandorana*	wonga vine		C		7/4
plants	higher dicots	Bignoniaceae	*Pandorea jasminoides*			C		1
plants	higher dicots	Boraginaceae	*Ehretia membranifolia*	weeping koda		C		1/1
plants	higher dicots	Cactaceae	*Opuntia tomentosa*	velvety tree pear	Y			1
plants	higher dicots	Caesalpiniaceae	*Barklya syringifolia*	golden shower tree		C		1/1
plants	higher dicots	Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell		C		2/1
plants	higher dicots	Campanulaceae	*Wahlenbergia communis*	tufted bluebell		C		1
plants	higher dicots	Campanulaceae	*Lobelia purpurascens*	white root		C		1
plants	higher dicots	Campanulaceae	*Lobelia stenophylla*			C		1/1
plants	higher dicots	Campanulaceae	*Lobelia concolor*			C		1
plants	higher dicots	Capparaceae	*Capparis arborea*	brush caper berry		C		1
plants	higher dicots	Casuarinaceae	*Allocasuarina littoralis*			C		1
plants	higher dicots	Casuarinaceae	*Allocasuarina torulosa*			C		1
plants	higher dicots	Celastraceae	*Siphonodon australis*	ivorywood		C		1
plants	higher dicots	Celastraceae	*Maytenus bilocularis*			C		2
plants	higher dicots	Celastraceae	*Denhamia silvestris*			C		1/1
plants	higher dicots	Celastraceae	*Celastrus subspicata*	large-leaved staffvine		C		2/1
plants	higher dicots	Chenopodiaceae	*Dysphania carinata*			C		1/1
plants	higher dicots	Chenopodiaceae	*Maireana microphylla*			C		2/1
plants	higher dicots	Chenopodiaceae	*Einadia hastata*			C		1
plants	higher dicots	Clusiaceae	*Hypericum gramineum*			C		1
plants	higher dicots	Convolvulaceae	*Evolvulus alsinoides*			C		2
plants	higher dicots	Convolvulaceae	*Dichondra sp. (Inglewood J.M.Dalby 86/93)*			C		1/1
plants	higher dicots	Convolvulaceae	*Dichondra repens*	kidney weed		C		3/2
plants	higher dicots	Convolvulaceae	*Ipomoea plebeia*	bellvine		C		1/1
plants	higher dicots	Cornaceae	*Alangium villosum*					1
plants	higher dicots	Crassulaceae	*Crassula sieberiana*			C		1
plants	higher dicots	Crassulaceae	*Bryophyllum delagoense*		Y			1
plants	higher dicots	Cucurbitaceae	*Sicyos australis*	star cucumber		C		1/1
plants	higher dicots	Cucurbitaceae	*Diplocyclos palmatus*			C		1

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plants	higher dicots	Cucurbitaceae	*Diplocyclos palmatus subsp. palmatus*			C		1/1
plants	higher dicots	Ebenaceae	*Diospyros australis*	black plum		C		1
plants	higher dicots	Ebenaceae	*Diospyros geminata*	scaly ebony		C		1
plants	higher dicots	Elaeocarpaceae	*Elaeocarpus obovatus*	blueberry ash		C		2/1
plants	higher dicots	Ericaceae	*Melichrus urceolatus*	honey gorse		C		1
plants	higher dicots	Euphorbiaceae	*Alchornea ilicifolia*	native holly		C		1
plants	higher dicots	Euphorbiaceae	*Mallotus philippensis*	red kamala		C		1
plants	higher dicots	Euphorbiaceae	*Homalanthus stillingiifolius*			C		1/1
plants	higher dicots	Euphorbiaceae	*Euphorbia tannensis subsp. eremophila*			C		3/3
plants	higher dicots	Euphorbiaceae	*Croton phebalioides*	narrow-leaved croton		C		1/1
plants	higher dicots	Euphorbiaceae	*Acalypha capillipes*	small-leaved acalypha		C		1/1
plants	higher dicots	Euphorbiaceae	*Baloghia inophylla*	scrub bloodwood		C		1
plants	higher dicots	Euphorbiaceae	*Acalypha eremorum*	soft acalypha		C		2/2
plants	higher dicots	Euphorbiaceae	*Tragia novae-hollandiae*	stinging-vine		C		1/1
plants	higher dicots	Fabaceae	*Glycine*			C		1/1
plants	higher dicots	Fabaceae	*Tephrosia sp. (The Grampians L.H.Bird AQ565381)*			C		5/5
plants	higher dicots	Fabaceae	*Hovea longipes*	brush hovea		C		4/4
plants	higher dicots	Fabaceae	*Derris involuta*	native derris		C		1
plants	higher dicots	Fabaceae	*Hovea planifolia*			C		2/2
plants	higher dicots	Fabaceae	*Lablab purpureus*	lablab	Y			1/1
plants	higher dicots	Fabaceae	*Lespedeza juncea*					2
plants	higher dicots	Fabaceae	*Desmodium varians*	slender tick trefoil		C		1/1
plants	higher dicots	Fabaceae	*Crotalaria montana*			C		1
plants	higher dicots	Fabaceae	*Indigofera baileyi*			C		1/1
plants	higher dicots	Fabaceae	*Indigofera hirsuta*	hairy indigo		C		1/1
plants	higher dicots	Fabaceae	*Indigofera linnaei*	Birdsville indigo		C		1
plants	higher dicots	Fabaceae	*Jacksonia scoparia*			C		1
plants	higher dicots	Fabaceae	*Desmodium triflorum*		Y			2/1
plants	higher dicots	Fabaceae	*Flemingia parviflora*	flemingia		C		1
plants	higher dicots	Fabaceae	*Crotalaria grahamiana*		Y			2/2
plants	higher dicots	Fabaceae	*Desmodium brachypodum*	large ticktrefoil		C		1/1
plants	higher dicots	Fabaceae	*Erythrina vespertilio*			C		1
plants	higher dicots	Fabaceae	*Hardenbergia violacea*			C		2
plants	higher dicots	Fabaceae	*Swainsona brachycarpa*			C		1/1
plants	higher dicots	Fabaceae	*Swainsona galegifolia*	smooth Darling pea		C		1/1
plants	higher dicots	Fabaceae	*Austrosteenisia blackii*	bloodvine		C		1
plants	higher dicots	Fabaceae	*Desmodium rhytidophyllum*			C		3/1
plants	higher dicots	Fabaceae	*Macroptilium lathyroides*		Y			1
plants	higher dicots	Fabaceae	*Neonotonia wightii var. wightii*		Y			1/1
plants	higher dicots	Fabaceae	*Glycine sp. (Marburg K.A.Williams 83006)*			C		2/2
plants	higher dicots	Flacourtiaceae	*Casearia multinervosa*	casearia		C		1/1
plants	higher dicots	Goodeniaceae	*Goodenia hederacea*			C		1
plants	higher dicots	Goodeniaceae	*Goodenia rotundifolia*			C		1
plants	higher dicots	Gyrostemonaceae	*Codonocarpus attenuatus*			C		1
plants	higher dicots	Lamiaceae	*Gmelina leichhardtii*	white beech		C		1
plants	higher dicots	Lamiaceae	*Ajuga australis*	Australian bugle		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Lamiaceae	*Mentha diemenica*	native mint		C		3/3
plants	higher dicots	Lamiaceae	*Mentha satureioides*	native pennyroyal		C		1
plants	higher dicots	Lamiaceae	*Plectranthus habrophyllus*			E	E	2/2
plants	higher dicots	Lamiaceae	*Anisomeles malabarica*			C		1/1
plants	higher dicots	Lamiaceae	*Plectranthus graveolens*	flea bush		C		4/3
plants	higher dicots	Lamiaceae	*Plectranthus parviflorus*			C		1
plants	higher dicots	Lythraceae	*Punica granatum*	pomegranate	Y			1/1
plants	higher dicots	Malvaceae	*Gossypium barbadense*		Y			3/3
plants	higher dicots	Malvaceae	*Sida hackettiana*			C		1
plants	higher dicots	Malvaceae	*Sida rhombifolia*		Y			1
plants	higher dicots	Malvaceae	*Abutilon oxycarpum*			C		1
plants	higher dicots	Malvaceae	*Hibiscus heterophyllus*			C		1
plants	higher dicots	Meliaceae	*Owenia venosa*	crow's apple		C		1/1
plants	higher dicots	Meliaceae	*Melia azedarach*	white cedar		C		1
plants	higher dicots	Meliaceae	*Turraea pubescens*	native honeysuckle		C		1/1
plants	higher dicots	Menyanthaceae	*Nymphoides indica*	water snowflake		C		1
plants	higher dicots	Mimosaceae	*Acacia salicina*	doolan		C		3/2
plants	higher dicots	Mimosaceae	*Acacia concurrens*			C		2
plants	higher dicots	Mimosaceae	*Acacia aulacocarpa*			C		2
plants	higher dicots	Mimosaceae	*Acacia melanoxylon*	blackwood		C		1
plants	higher dicots	Mimosaceae	*Acacia obtusifolia*			C		2/1
plants	higher dicots	Mimosaceae	*Vachellia farnesiana*		Y			1/1
plants	higher dicots	Mimosaceae	*Pararchidendron pruinosum*			C		1
plants	higher dicots	Mimosaceae	*Acacia blakei subsp. blakei*			C		2/2
plants	higher dicots	Mimosaceae	*Acacia irrorata subsp. irrorata*			C		1/1
plants	higher dicots	Mimosaceae	*Neptunia gracilis forma gracilis*			C		1
plants	higher dicots	Mimosaceae	*Acacia maidenii*	Maiden's wattle		C		2
plants	higher dicots	Mimosaceae	*Acacia falcata*	sickle wattle		C		1
plants	higher dicots	Mimosaceae	*Acacia fimbriata*	Brisbane golden wattle		C		3/2
plants	higher dicots	Mimosaceae	*Acacia viscidula*			C		1/1
plants	higher dicots	Moraceae	*Ficus platypoda*			C		2
plants	higher dicots	Moraceae	*Trophis scandens*			C		1
plants	higher dicots	Moraceae	*Ficus opposita*			C		1
plants	higher dicots	Moraceae	*Ficus coronata*	creek sandpaper fig		C		1
plants	higher dicots	Moraceae	*Ficus obliqua*			C		2
plants	higher dicots	Moraceae	*Ficus virens*			C		1
plants	higher dicots	Myrsinaceae	*Myrsine variabilis*			C		3/2
plants	higher dicots	Myrtaceae	*Melaleuca irbyana*			E		6/3
plants	higher dicots	Myrtaceae	*Sannantha collina*			C		2/2
plants	higher dicots	Myrtaceae	*Rhodamnia dumicola*	rib-fruited malletwood		C		1/1
plants	higher dicots	Myrtaceae	*Angophora leiocarpa*	rusty gum		C		2
plants	higher dicots	Myrtaceae	*Corymbia citriodora*	spotted gum		C		1
plants	higher dicots	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		1
plants	higher dicots	Myrtaceae	*Corymbia tessellaris*	Moreton Bay ash		C		3
plants	higher dicots	Myrtaceae	*Angophora subvelutina*			C		2
plants	higher dicots	Myrtaceae	*Corymbia clarksoniana*			C		1

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plants	higher dicots	Myrtaceae	*Eucalyptus acmenoides*			C		1
plants	higher dicots	Myrtaceae	*Eucalyptus microcorys*			C		1
plants	higher dicots	Myrtaceae	*Lophostemon confertus*	brush box		C		1
plants	higher dicots	Myrtaceae	*Leptospermum variabile*			C		8/8
plants	higher dicots	Myrtaceae	*Lophostemon suaveolens*	swamp box		C		2
plants	higher dicots	Myrtaceae	*Melaleuca comboynensis*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus melanophloia*			C		3
plants	higher dicots	Myrtaceae	*Eucalyptus tereticornis*			C		3
plants	higher dicots	Myrtaceae	*Eucalyptus major*	mountain grey gum		C		1
plants	higher dicots	Myrtaceae	*Leptospermum microcarpum*	small-fruited tea-tree		C		2/1
plants	higher dicots	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		1
plants	higher dicots	Myrtaceae	*Triplarina volcanica subsp. volcanica*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus tereticornis subsp. basaltica*			C		2/2
plants	higher dicots	Myrtaceae	*Angophora costata*			C		1
plants	higher dicots	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		3
plants	higher dicots	Nyctaginaceae	*Boerhavia dominii*			C		1/1
plants	higher dicots	Oleaceae	*Olea paniculata*			C		1/1
plants	higher dicots	Oleaceae	*Notelaea longifolia forma glabra*			C		1/1
plants	higher dicots	Oleaceae	*Jasminum dianthifolium*			C		1
plants	higher dicots	Oleaceae	*Notelaea microcarpa*			C		1
plants	higher dicots	Oleaceae	*Notelaea microcarpa var. microcarpa*			C		1/1
plants	higher dicots	Oleaceae	*Notelaea lloydii*	Lloyd's native olive		V	V	3/3
plants	higher dicots	Onagraceae	*Ludwigia peploides subsp. montevidensis*			C		3/2
plants	higher dicots	Onagraceae	*Ludwigia octovalvis*	willow primrose		C		1
plants	higher dicots	Oxalidaceae	*Oxalis corniculata*		Y			1
plants	higher dicots	Oxalidaceae	*Oxalis*			C		1/1
plants	higher dicots	Passifloraceae	*Passiflora suberosa*	corky passion flower	Y			1
plants	higher dicots	Passifloraceae	*Passiflora*			C		1
plants	higher dicots	Passifloraceae	*Passiflora aurantia var. aurantia*			C		2/2
plants	higher dicots	Pentapetaceae	*Melhania oblongifolia*			C		1/1
plants	higher dicots	Phyllanthaceae	*Phyllanthus mitchellii*			C		1/1
plants	higher dicots	Phyllanthaceae	*Cleistanthus cunninghamii*	omega		C		1/1
plants	higher dicots	Phyllanthaceae	*Phyllanthus virgatus*			C		1
plants	higher dicots	Phyllanthaceae	*Bridelia exaltata*			C		1/1
plants	higher dicots	Phyllanthaceae	*Phyllanthus gunnii*			C		2/1
plants	higher dicots	Picrodendraceae	*Petalostigma pubescens*	quinine tree		C		1
plants	higher dicots	Pittosporaceae	*Pittosporum angustifolium*			C		1/1
plants	higher dicots	Plantaginaceae	*Veronica plebeia*	trailing speedwell		C		2/2
plants	higher dicots	Plantaginaceae	*Plantago debilis*	shade plantain		C		1/1
plants	higher dicots	Plantaginaceae	*Scoparia dulcis*	Scoparia	Y			1
plants	higher dicots	Plumbaginaceae	*Plumbago zeylanica*	native plumbago		C		1
plants	higher dicots	Polygalaceae	*Polygala virgata*		Y			1/1
plants	higher dicots	Polygonaceae	*Persicaria lapathifolia*	pale knotweed		C		1/1
plants	higher dicots	Polygonaceae	*Muehlenbeckia rhyticarya*			C		2/2
plants	higher dicots	Polygonaceae	*Persicaria orientalis*	princes feathers		C		1/1
plants	higher dicots	Polygonaceae	*Polygonum plebeium*	small knotweed		C		1/1

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plants	higher dicots	Portulacaceae	*Calandrinia pickeringii*			C		1/1
plants	higher dicots	Portulacaceae	*Grahamia australiana*			C		1/1
plants	higher dicots	Portulacaceae	*Portulaca pilosa*		Y			1
plants	higher dicots	Putranjivaceae	*Drypetes deplanchei*	grey boxwood		C		2/1
plants	higher dicots	Rhamnaceae	*Pomaderris queenslandica*			C		1/1
plants	higher dicots	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		2
plants	higher dicots	Rosaceae	*Rubus parvifolius*	pink-flowered native raspberry		C		1
plants	higher dicots	Rubiaceae	*Psychotria daphnoides*			C		2/1
plants	higher dicots	Rubiaceae	*Spermacoce brachystema*			C		1/1
plants	higher dicots	Rubiaceae	*Spermacoce multicaulis*			C		1
plants	higher dicots	Rubiaceae	*Gynochthodes canthoides*			C		1/1
plants	higher dicots	Rubiaceae	*Psychotria loniceroides*	hairy psychotria		C		1
plants	higher dicots	Rubiaceae	*Cyclophyllum coprosmoides*			C		1
plants	higher dicots	Rubiaceae	*Psydrax odorata forma buxifolia*			C		3/1
plants	higher dicots	Rubiaceae	*Psydrax odorata subsp. australiana*			C		2/2
plants	higher dicots	Rubiaceae	*Everistia vacciniifolia var. nervosa*			C		1
plants	higher dicots	Rubiaceae	*Pavetta australiensis*			C		1
plants	higher dicots	Rubiaceae	*Galium leptogonium*			C		1/1
plants	higher dicots	Rubiaceae	*Pomax umbellata*			C		1
plants	higher dicots	Rubiaceae	*Psydrax odorata*			C		1
plants	higher dicots	Rutaceae	*Citrus x limon*		Y			1
plants	higher dicots	Rutaceae	*Zieria smithii*			C		1
plants	higher dicots	Rutaceae	*Zieria scopulus*			C		6/6
plants	higher dicots	Rutaceae	*Acronychia laevis*	glossy acronychia		C		2/1
plants	higher dicots	Rutaceae	*Flindersia collina*	broad-leaved leopard tree		C		1
plants	higher dicots	Rutaceae	*Coatesia paniculata*			C		1/1
plants	higher dicots	Rutaceae	*Sarcomelicope simplicifolia*			C		1
plants	higher dicots	Rutaceae	*Sarcomelicope simplicifolia subsp. simplicifolia*	yellow aspen		C		1/1
plants	higher dicots	Santalaceae	*Exocarpos cupressiformis*	native cherry		C		1
plants	higher dicots	Sapindaceae	*Alectryon diversifolius*	scrub boonaree		C		1/1
plants	higher dicots	Sapindaceae	*Dodonaea viscosa*			C		1
plants	higher dicots	Sapindaceae	*Guioa semiglauca*	guioa		C		1
plants	higher dicots	Sapindaceae	*Harpullia pendula*			C		1
plants	higher dicots	Sapindaceae	*Jagera pseudorhus*			C		1
plants	higher dicots	Sapindaceae	*Atalaya salicifolia*			C		1
plants	higher dicots	Sapindaceae	*Alectryon tomentosus*			C		1
plants	higher dicots	Sapindaceae	*Dodonaea triangularis*			C		1/1
plants	higher dicots	Sapindaceae	*Cupaniopsis tomentella*	Boonah tuckeroo		V	V	4/3
plants	higher dicots	Sapotaceae	*Planchonella pubescens*			C		1
plants	higher dicots	Sapotaceae	*Planchonella australis*			C		1/1
plants	higher dicots	Sapotaceae	*Planchonella eerwah*			E	E	8/7
plants	higher dicots	Sapotaceae	*Planchonella cotinifolia*			C		1
plants	higher dicots	Scrophulariaceae	*Myoporum acuminatum*	coastal boobialla		C		1/1
plants	higher dicots	Scrophulariaceae	*Eremophila debilis*	winter apple		C		1
plants	higher dicots	Solanaceae	*Solanum nigrum*		Y			1
plants	higher dicots	Solanaceae	*Solanum linnaeanum*	apple of Sodom	Y			1/1

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plants	higher dicots	Solanaceae	*Solanum stelligerum*	devil's needles		C		1
plants	higher dicots	Sparrmanniaceae	*Grewia latifolia*	dysentery plant		C		1/1
plants	higher dicots	Stackhousiaceae	*Stackhousia muricata*			C		1
plants	higher dicots	Sterculiaceae	*Brachychiton discolor*			C		1
plants	higher dicots	Surianaceae	*Guilfoylia monostylis*	guilfoylia		C		1/1
plants	higher dicots	Ulmaceae	*Aphananthe philippinensis*			C		1
plants	higher dicots	Ulmaceae	*Trema tomentosa*			C		1
plants	higher dicots	Urticaceae	*Dendrocnide photinophylla*	shiny-leaved stinging tree		C		1
plants	higher dicots	Urticaceae	*Dendrocnide excelsa*	giant stinging tree		C		1
plants	higher dicots	Verbenaceae	*Verbena rigida*		Y			1
plants	higher dicots	Verbenaceae	*Lantana montevidensis*	creeping lantana	Y			2/1
plants	higher dicots	Verbenaceae	*Glandularia aristigera*		Y			1
plants	higher dicots	Verbenaceae	*Lantana camara*	lantana	Y			2
plants	higher dicots	Violaceae	*Hybanthus stellarioides*			C		1
plants	higher dicots	Violaceae	*Hybanthus enneaspermus*			C		1
plants	higher dicots	Violaceae	*Hybanthus monopetalus*			C		1
plants	higher dicots	Viscaceae	*Notothixos incanus*			C		3/2
plants	higher dicots	Vitaceae	*Cayratia clematidea*	slender grape		C		1
plants	higher dicots	Vitaceae	*Tetrastigma nitens*	shining grape		C		1
plants	higher dicots	Vitaceae	*Cayratia saponaria*			C		1/1
plants	higher dicots	Vitaceae	*Cissus antarctica*			C		1
plants	higher dicots	Vitaceae	*Clematicissus opaca*			C		1
plants	higher dicots	Vitaceae	*Cayratia acris*	hairy grape		C		2/1
plants	lower dicots	Annonaceae	*Melodorum leichhardtii*			C		1
plants	lower dicots	Annonaceae	*Polyalthia nitidissima*	polyalthia		C		1/1
plants	lower dicots	Aristolochiaceae	*Aristolochia meridionalis subsp. meridionalis*			C		1/1
plants	lower dicots	Ceratophyllaceae	*Ceratophyllum demersum*	hornwort		C		1/1
plants	lower dicots	Lauraceae	*Cassytha filiformis*	dodder laurel		C		2/2
plants	lower dicots	Menispermaceae	*Tinospora smilacina*	snakevine		C		1
plants	lower dicots	Menispermaceae	*Legnephora moorei*			C		1
plants	lower dicots	Menispermaceae	*Pleogyne australis*	wiry grape		C		1
plants	lower dicots	Nymphaeaceae	*Nymphaea gigantea*			C		3/3
plants	lower dicots	Piperaceae	*Peperomia blanda var. floribunda*			C		1
plants	lower dicots	Ranunculaceae	*Clematis glycinoides*			C		1
plants	monocots	Araceae	*Typhonium brownii*	black arum lily		C		1/1
plants	monocots	Araceae	*Gymnostachys anceps*	settler's flax		C		3/2
plants	monocots	Commelinaceae	*Commelina diffusa*	wandering jew		C		2
plants	monocots	Cyperaceae	*Bolboschoenus fluviatilis*			C		1
plants	monocots	Cyperaceae	*Schoenoplectus tabernaemontani*			C		1/1
plants	monocots	Cyperaceae	*Carex appressa*			C		1
plants	monocots	Cyperaceae	*Cyperus fulvus*			C		1/1
plants	monocots	Cyperaceae	*Carex breviculmis*			C		1/1
plants	monocots	Cyperaceae	*Cyperus difformis*	rice sedge		C		1/1
plants	monocots	Cyperaceae	*Cyperus scariosus*			C		1
plants	monocots	Cyperaceae	*Fimbristylis dichotoma*	common fringe-rush		C		1
plants	monocots	Cyperaceae	*Fimbristylis ferruginea*			C		1

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plants	monocots	Cyperaceae	*Bolboschoenus caldwellii*			C		1/1
plants	monocots	Cyperaceae	*Schoenoplectus subulatus*			C		1/1
plants	monocots	Dioscoreaceae	*Dioscorea transversa*	native yam		C		1
plants	monocots	Hemerocallidaceae	*Dianella*			C		1
plants	monocots	Hemerocallidaceae	*Dianella caerulea var. assera*			C		1/1
plants	monocots	Hemerocallidaceae	*Dianella brevipedunculata*			C		2/1
plants	monocots	Hemerocallidaceae	*Geitonoplesium cymosum*	scrambling lily		C		2
plants	monocots	Hemerocallidaceae	*Dianella revoluta*			C		1
plants	monocots	Hydrocharitaceae	*Hydrilla verticillata*	hydrilla		C		1/1
plants	monocots	Hydrocharitaceae	*Ottelia ovalifolia*	swamp lily		C		1/1
plants	monocots	Hydrocharitaceae	*Hydrocharis dubia*	frogbit	Y			3/3
plants	monocots	Hypoxidaceae	*Hypoxis hygrometrica var. villosisepala*			C		1/1
plants	monocots	Juncaceae	*Juncus usitatus*			C		3/2
plants	monocots	Laxmanniaceae	*Cordyline rubra*	red-fruited palm lily		C		1
plants	monocots	Laxmanniaceae	*Lomandra multiflora subsp. multiflora*			C		1
plants	monocots	Laxmanniaceae	*Lomandra confertifolia subsp. pallida*			C		1/1
plants	monocots	Laxmanniaceae	*Arthropodium paniculatum*			C		1/1
plants	monocots	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		1
plants	monocots	Laxmanniaceae	*Cordyline petiolaris*	large-leaved palm lily		C		2/1
plants	monocots	Laxmanniaceae	*Lomandra longifolia*			C		1
plants	monocots	Laxmanniaceae	*Lomandra filiformis*			C		1
plants	monocots	Orchidaceae	*Dendrobium monophyllum*			C		1
plants	monocots	Orchidaceae	*Bulbophyllum minutissimum*	grain-of-wheat orchid		C		3/2
plants	monocots	Orchidaceae	*Dendrobium speciosum*			C		1
plants	monocots	Orchidaceae	*Pterostylis nutans*			C		1/1
plants	monocots	Orchidaceae	*Dendrobium kingianum subsp. kingianum*			C		1
plants	monocots	Orchidaceae	*Cymbidium suave*			C		1
plants	monocots	Orchidaceae	*Dockrillia linguiformis*	tongue orchid		C		3
plants	monocots	Orchidaceae	*Pterostylis ophioglossa*			C		1/1
plants	monocots	Orchidaceae	*Dendrobium gracilicaule*	slender orchid		C		1
plants	monocots	Orchidaceae	*Liparis swenssonii*	rock orchid		C		1/1
plants	monocots	Poaceae	*Aristida lignosa*			C		1/1
plants	monocots	Poaceae	*Megathyrsus maximus var. pubiglumis*		Y			1
plants	monocots	Poaceae	*Chloris divaricata var. divaricata*	slender chloris		C		1
plants	monocots	Poaceae	*Poa sieberiana var. sieberiana*			C		1/1
plants	monocots	Poaceae	*Capillipedium spicigerum*	spicytop		C		1
plants	monocots	Poaceae	*Polypogon monspeliensis*	annual beardgrass	Y			1/1
plants	monocots	Poaceae	*Chloris gayana*	rhodes grass	Y			1
plants	monocots	Poaceae	*Melinis repens*	red natal grass	Y			1
plants	monocots	Poaceae	*Panicum effusum*			C		1
plants	monocots	Poaceae	*Bothriochloa decipiens var. decipiens*			C		1
plants	monocots	Poaceae	*Chloris truncata*			C		1
plants	monocots	Poaceae	*Cynodon dactylon*		Y			1
plants	monocots	Poaceae	*Themeda triandra*	kangaroo grass		C		2
plants	monocots	Poaceae	*Austrostipa rudis*			C		1/1
plants	monocots	Poaceae	*Eriochloa procera*	slender cupgrass		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	*Eragrostis brownii*	Brown's lovegrass		C		1
plants	monocots	Poaceae	*Paspalum dilatatum*	paspalum	Y			1
plants	monocots	Poaceae	*Paspalum distichum*	water couch		C		1
plants	monocots	Poaceae	*Aristida gracilipes*			C		2
plants	monocots	Poaceae	*Imperata cylindrica*	blady grass		C		2
plants	monocots	Poaceae	*Paspalidium distans*	shotgrass		C		1
plants	monocots	Poaceae	*Axonopus fissifolius*		Y			1
plants	monocots	Poaceae	*Cenchrus caliculatus*	hillside burrgrass		C		4/4
plants	monocots	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		1
plants	monocots	Poaceae	*Panicum decompositum*			C		1
plants	monocots	Poaceae	*Eremochloa bimaculata*	poverty grass		C		1
plants	monocots	Poaceae	*Heteropogon contortus*	black speargrass		C		2
plants	monocots	Poaceae	*Alloteropsis semialata*	cockatoo grass		C		1/1
plants	monocots	Poaceae	*Chrysopogon sylvaticus*			C		1
plants	monocots	Poaceae	*Enteropogon unispiceus*			C		1
plants	monocots	Poaceae	*Paspalidium criniforme*			C		1/1
plants	monocots	Pontederiaceae	*Eichhornia crassipes*	water hyacinth	Y			1
plants	monocots	Ripogonaceae	*Ripogonum brevifolium*	small-leaved supplejack		C		3/2
plants	monocots	Smilacaceae	*Smilax australis*	barbed-wire vine		C		1
plants	monocots	Typhaceae	*Typha orientalis*	broad-leaved cumbungi		C		1
plants	monocots	Xanthorrhoeaceae	*Xanthorrhoea latifolia subsp. latifolia*			C		1/1
plants	monocots	Zingiberaceae	*Alpinia caerulea*	wild ginger		C		1
plants	mosses	Bryophyte	*Bryophyte*			C		6/6
plants	mosses	Funariaceae	*Funaria hygrometrica*			C		1/1
plants	mosses	Orthotrichaceae	*Macromitrium*			C		1/1
plants	mosses	Polytrichaceae	*Dawsonia longiseta*			C		1/1
plants	mosses	Sematophyllaceae	*Sematophyllum subhumile*			C		1/1
plants	whisk ferns	Psilotaceae	*Psilotum nudum*	skeleton fork fern		C		2/1
plants		Pylaisiadelphaceae	*Wijkia*			C		2/2

CODES

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

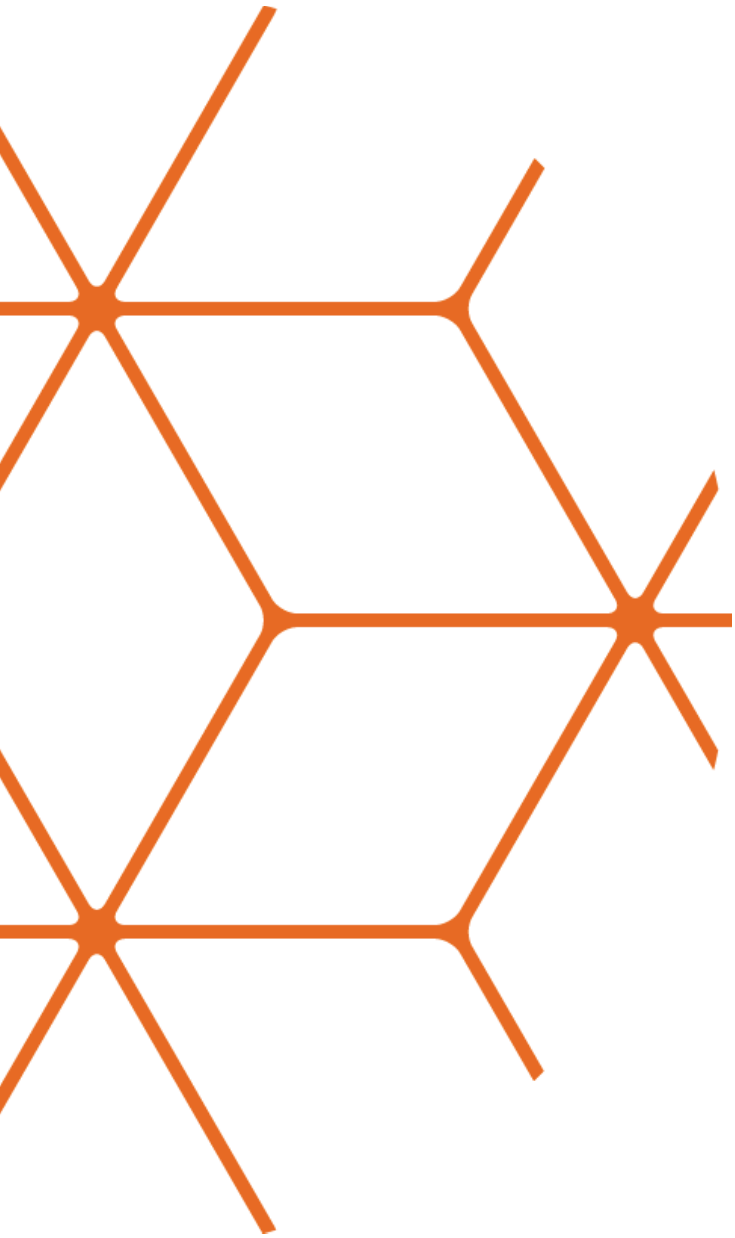
Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

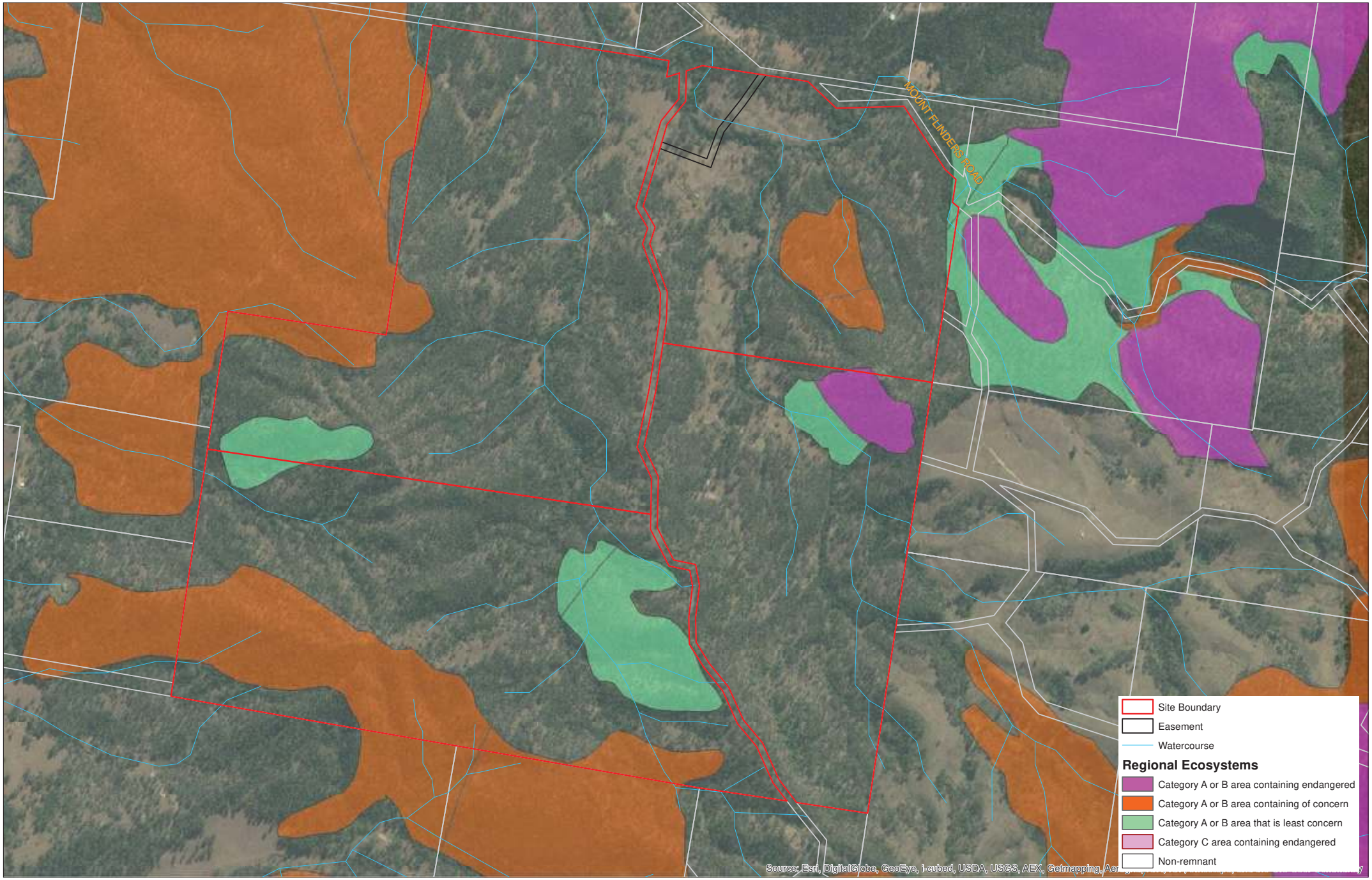
A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

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 D

DNRM Vegetation Communities Plan





APPENDIX D: DNRM VEGETATION COMMUNITIES PLAN

0 200 400 600 800 Metres

A3 Scale 1:10,000

File: 2166-KOAR-R-01-AD
Date: 28/07/2014

Source:
Cadastral Boundaries: State of Queensland (Department of Natural Resources and Mines) 2012
Roads: Geoscience Australia 2011
Watercourse: VMA QLD Regrowth Watercourses Version 2.1 Department of Environment and Heritage Protection 2012
Roads: Geoscience Australia 2012
Vegetation management regional ecosystem and remnant map - version 8.0: Department of Natural Resources and Mines 2014

APPENDIX E

DEHP Map of Referable Wetlands

APPENDIX E: DEHP REFERABLE WETLANDS AND WATERWAYS MAP

0 500 1,000 Metres

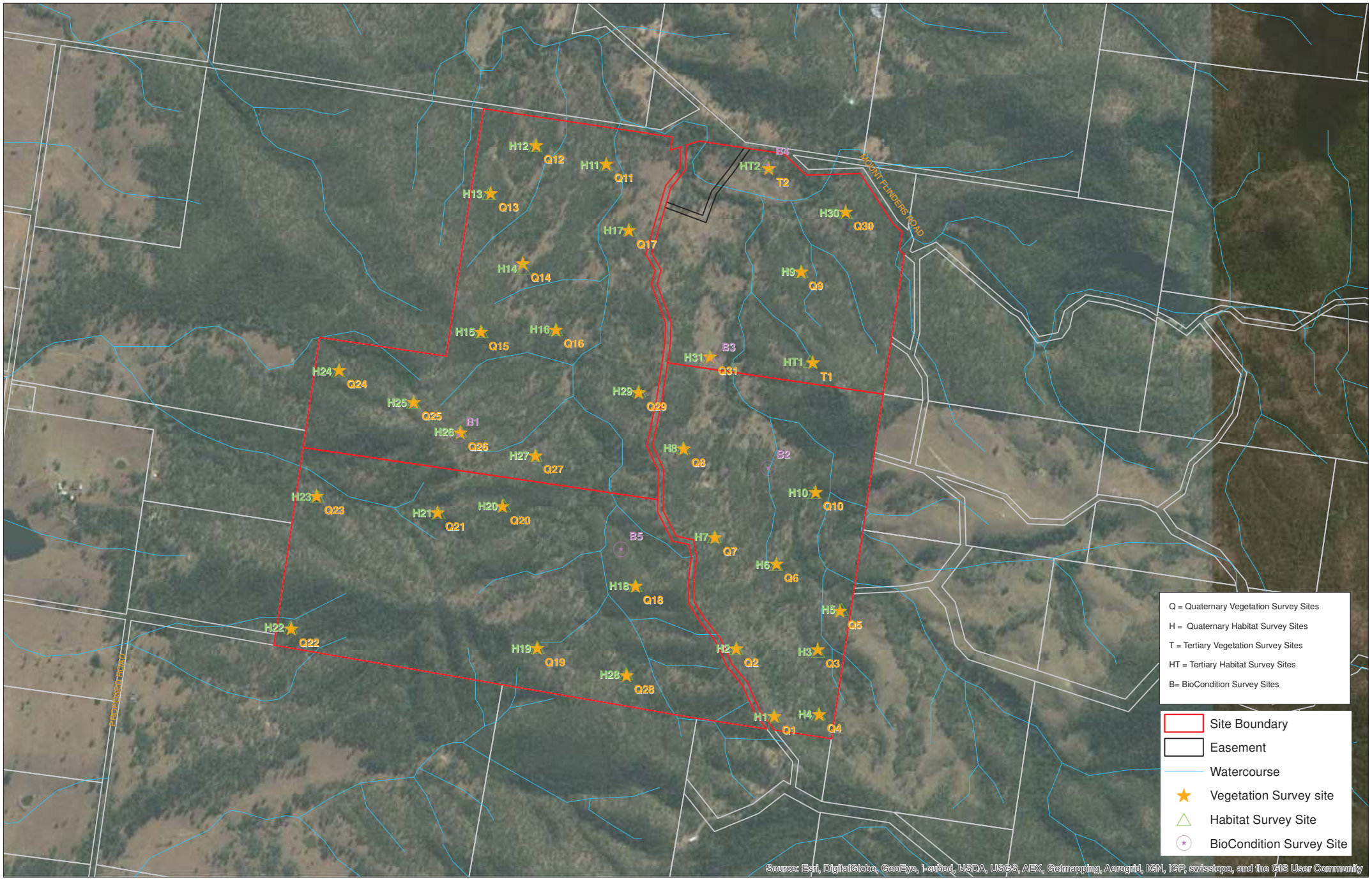
A3 Scale 1:10,000

File: 2166-KOAR-R-01-AE
Date: 28/07/2014

Source:
Cadastral Boundaries: State of Queensland (Department of Natural Resources and Mines) 2012
Roads: Geoscience Australia 2011
Watercourse: VMA QLD Regrowth Watercourses Version 2.1 Department of Environment and Heritage Protection 2012
QLD Wetland Data: "Queensland Wetland Data - Wetlands" - Department of Environment and Heritage Protection 2012

APPENDIX F

Site Survey Plan



APPENDIX F: SITE SURVEY PLAN

0 200 400 600 800 1,000 1,200 Metres

A3 Scale 1:12,500

File: 2166-KOAR-R-01-AF
Date: 28/07/2014

Source:
Cadastral Boundaries: State of Queensland (Department of Natural Resources and Mines) 2012
Roads: Geoscience Australia 2011
Watercourse: VMA QLD Regrowth Watercourses Version 2.1 Department of Environment and Heritage Protection 2012
Roads: Geoscience Australia 2012
Survey Sites: NewGround 2014

APPENDIX G

Desktop Figures

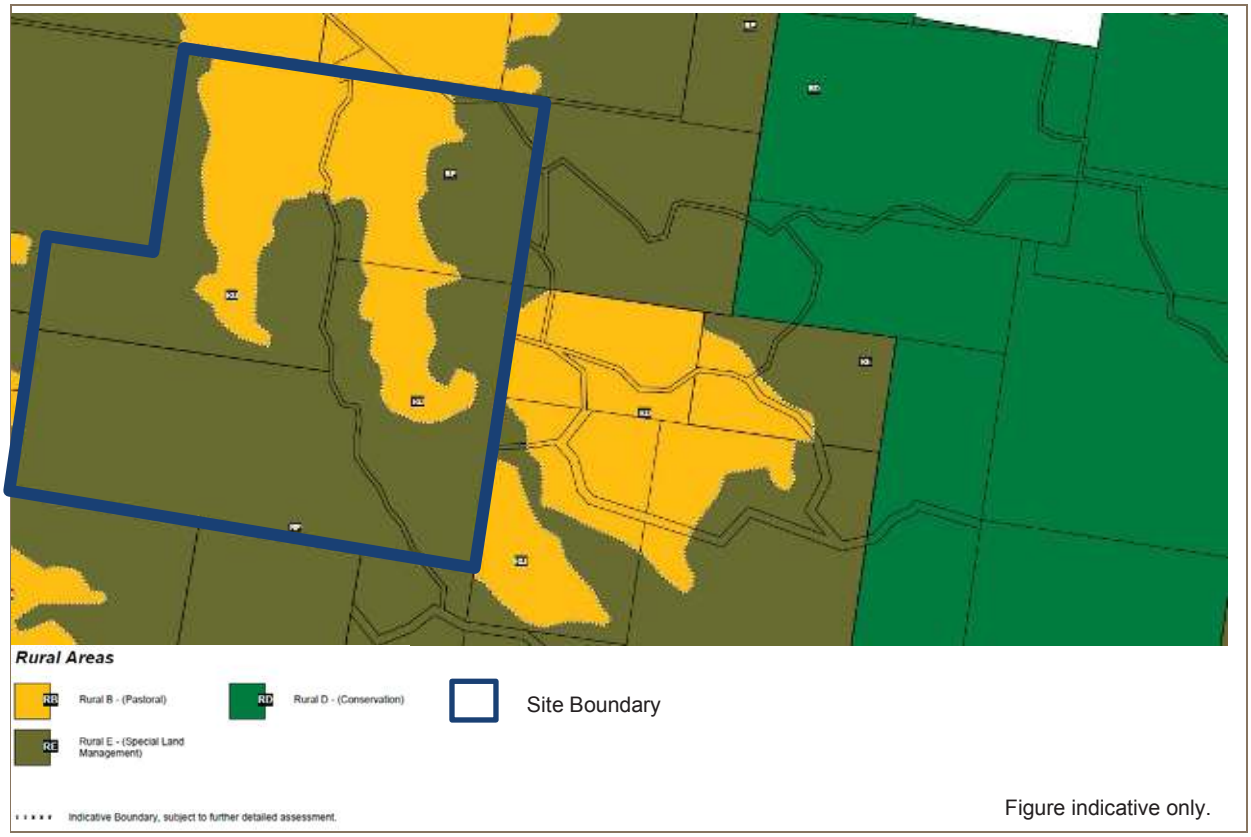


FIGURE G1- RELEVANT EXTRACT FROM IPSWICH PLANNING SCHEME 2006 ZONING MAP (Z49)

Source: (ICC, 2006)

N

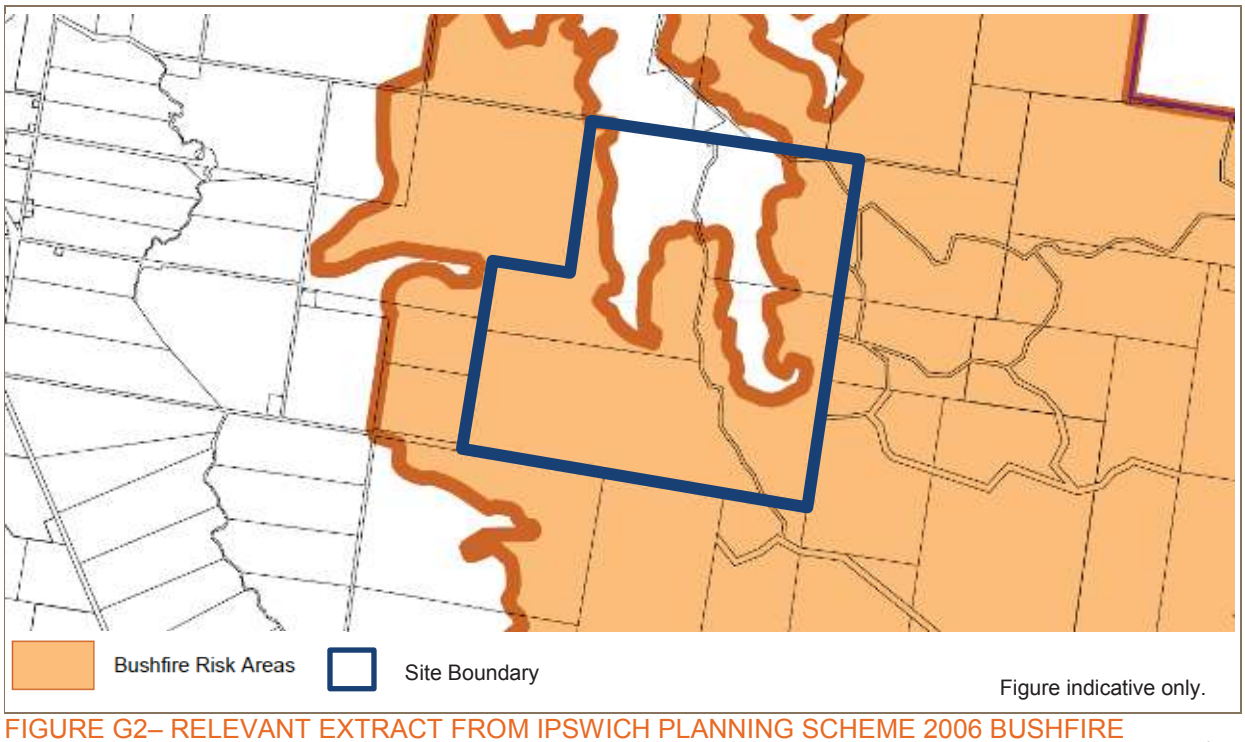


FIGURE G2– RELEVANT EXTRACT FROM IPSWICH PLANNING SCHEME 2006 BUSHFIRE RISK AREAS OVERLAY MAP (OV1)

Source: (ICC, 2006)

N

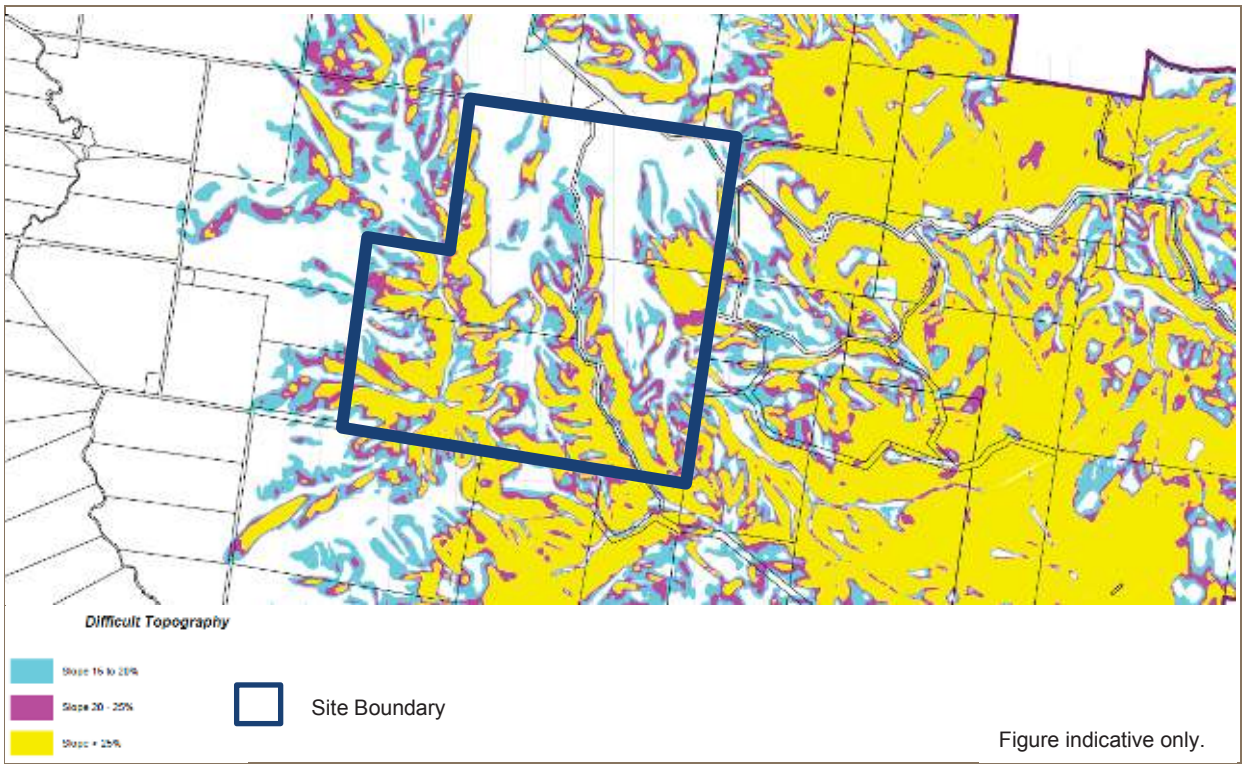


FIGURE G3- RELEVANT EXTRACT FROM IPSWICH PLANNING SCHEME 2006 DIFFICULT TOPOGRAPHY OVERLAY MAP (OV4)

Source: (ICC, 2006)

N

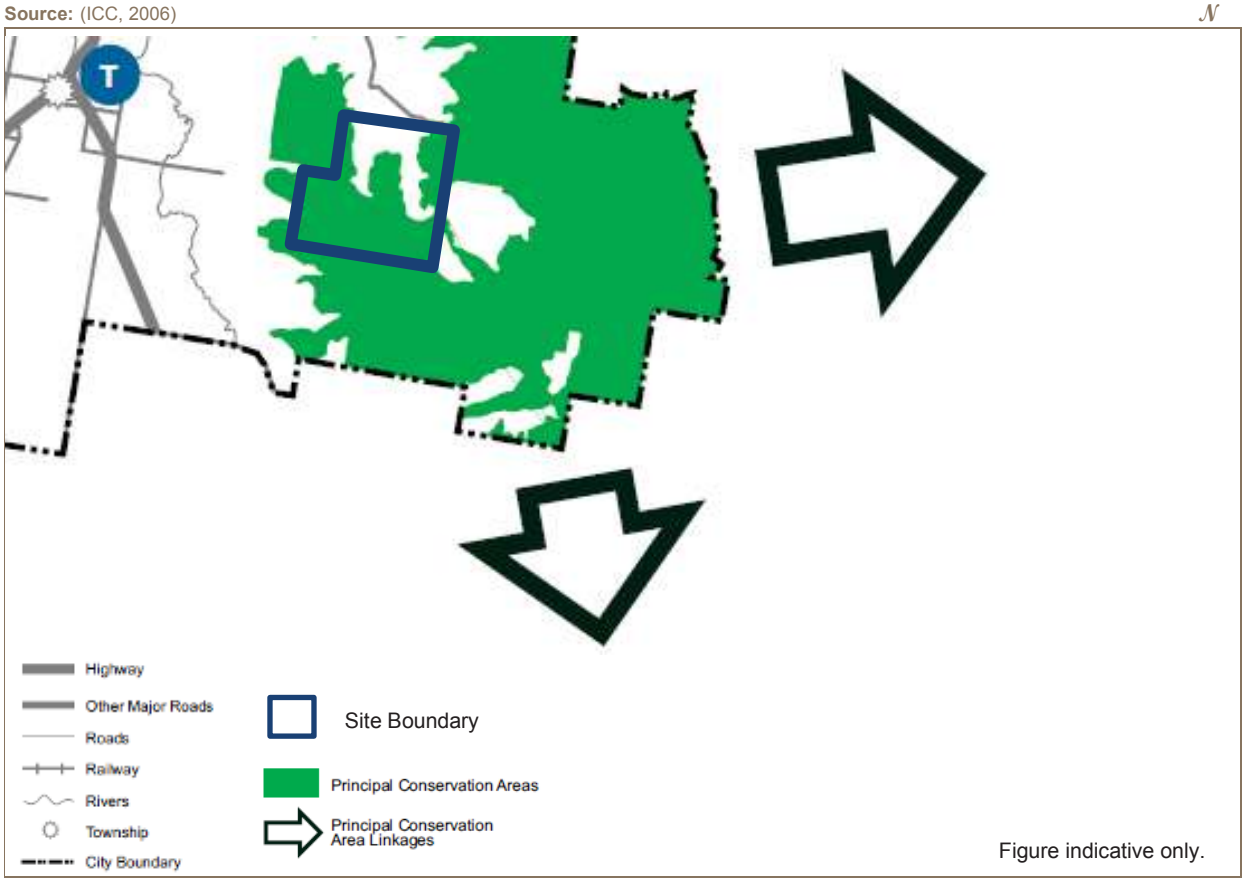


FIGURE G4- RELEVANT EXTRACT FROM IPSWICH PLANNING SCHEME 2006 PRINCIPLE CONSERVATION AREAS & INTEGRATED OPEN SPACE NETWORK (KRM MAP 1)

Source: (ICC, 2006)

N

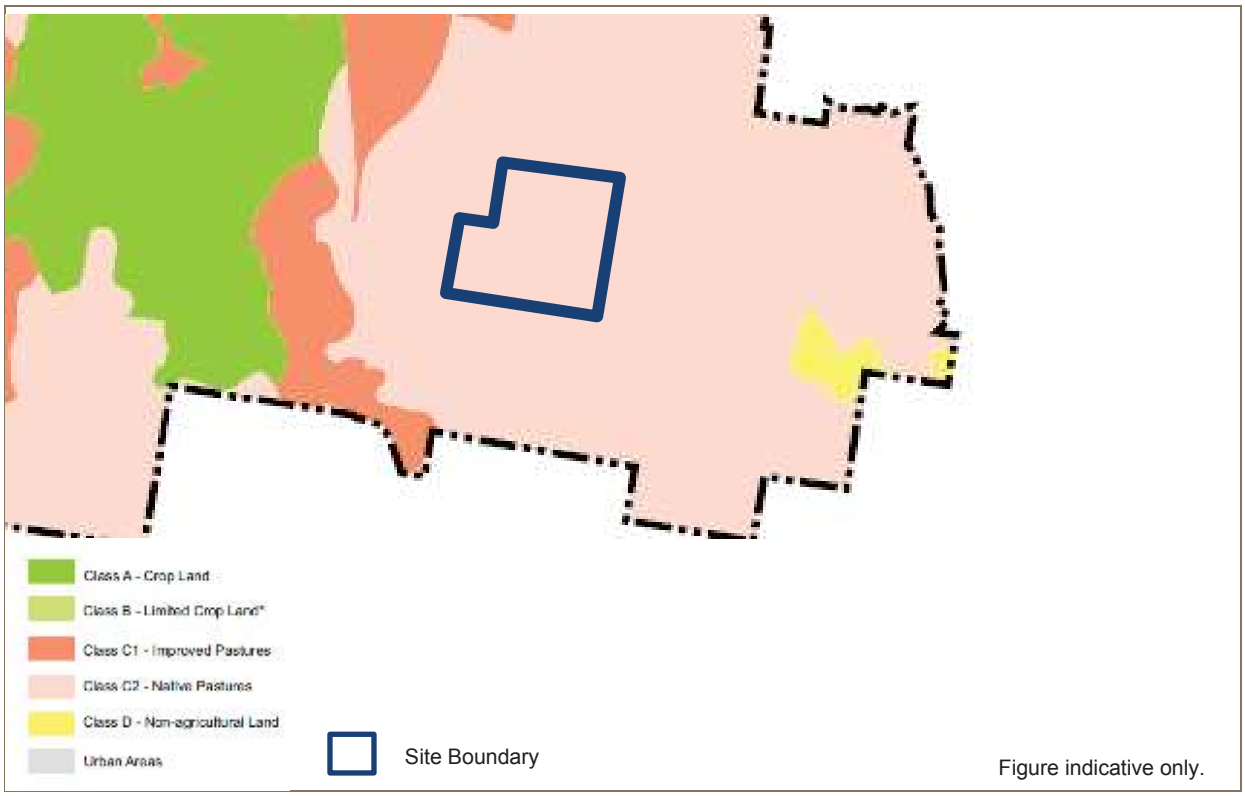


FIGURE G5- RELEVANT EXTRACT FROM IPSWICH PLANNING SCHEME 2006 RURAL AREAS AGRICULTURAL LAND CLASSES (KRM MAP 5)

Source: (ICC, 2006)

N

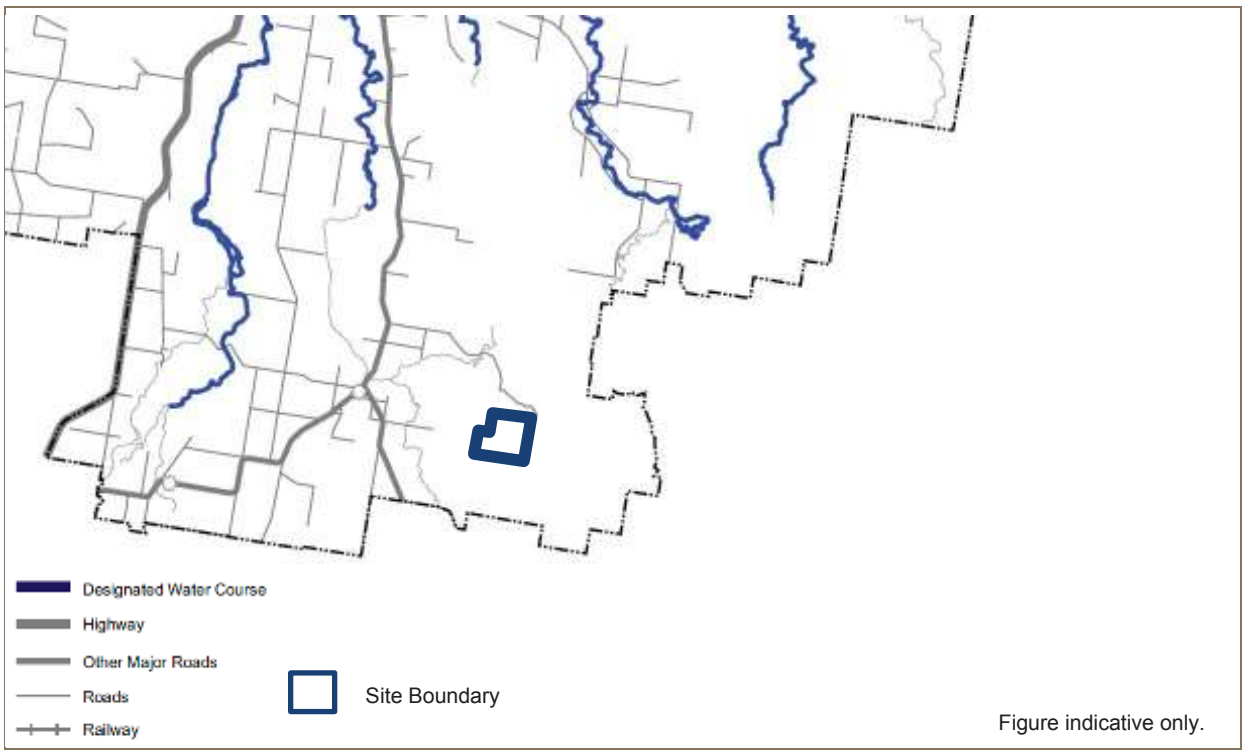


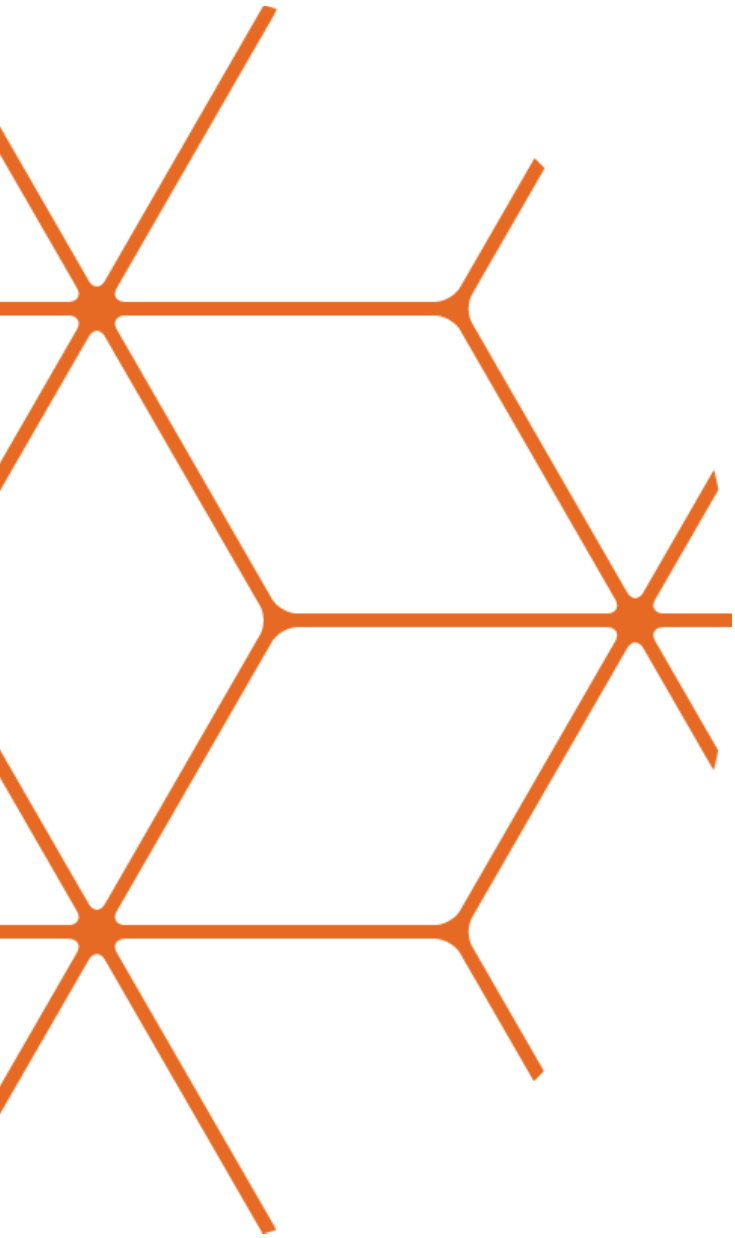
FIGURE G6– RELEVANT EXTRACT FROM IPSWICH PLANNING SCHEME 2006 DESIGNATED WATER COURSES (KRM MAP 6)

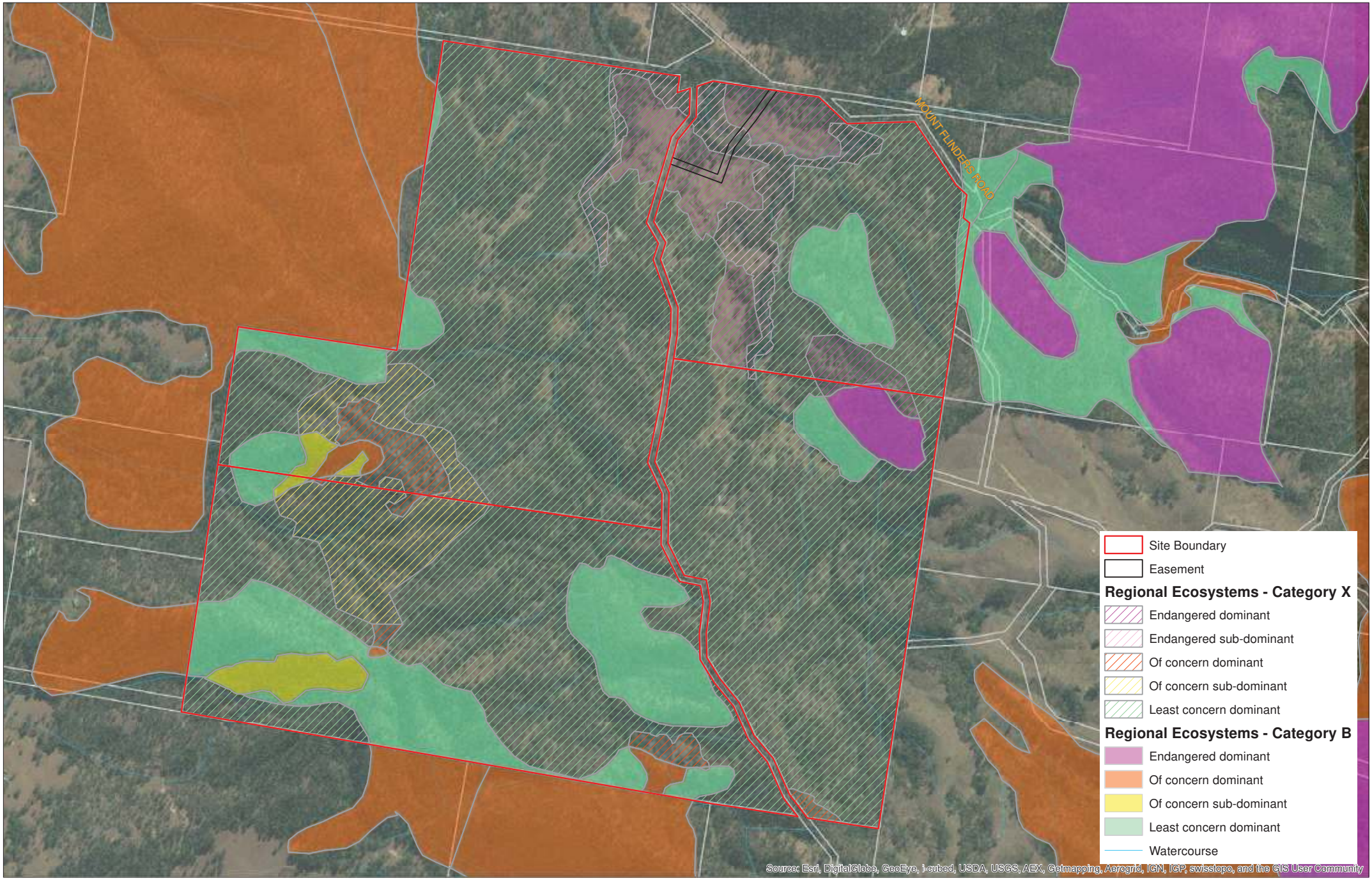
Source: (ICC, 2006)

N

APPENDIX H

Ground-truthed Regional Ecosystems and Vegetation Mapping Plan





APPENDIX H: GROUND-TRUTHED REGIONAL ECOSYSTEMS AND VEGETATION MAPPING PLAN

0 200 400 600 800 Metres

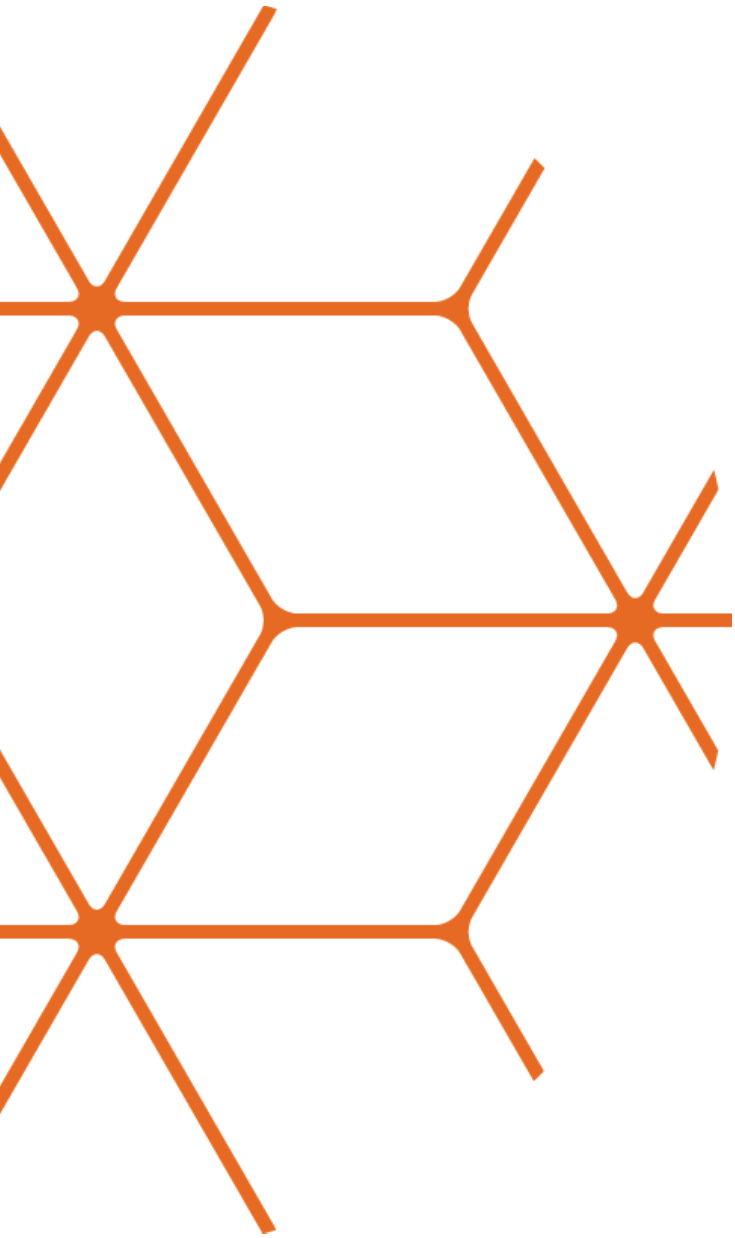
A3 Scale 1:10,000

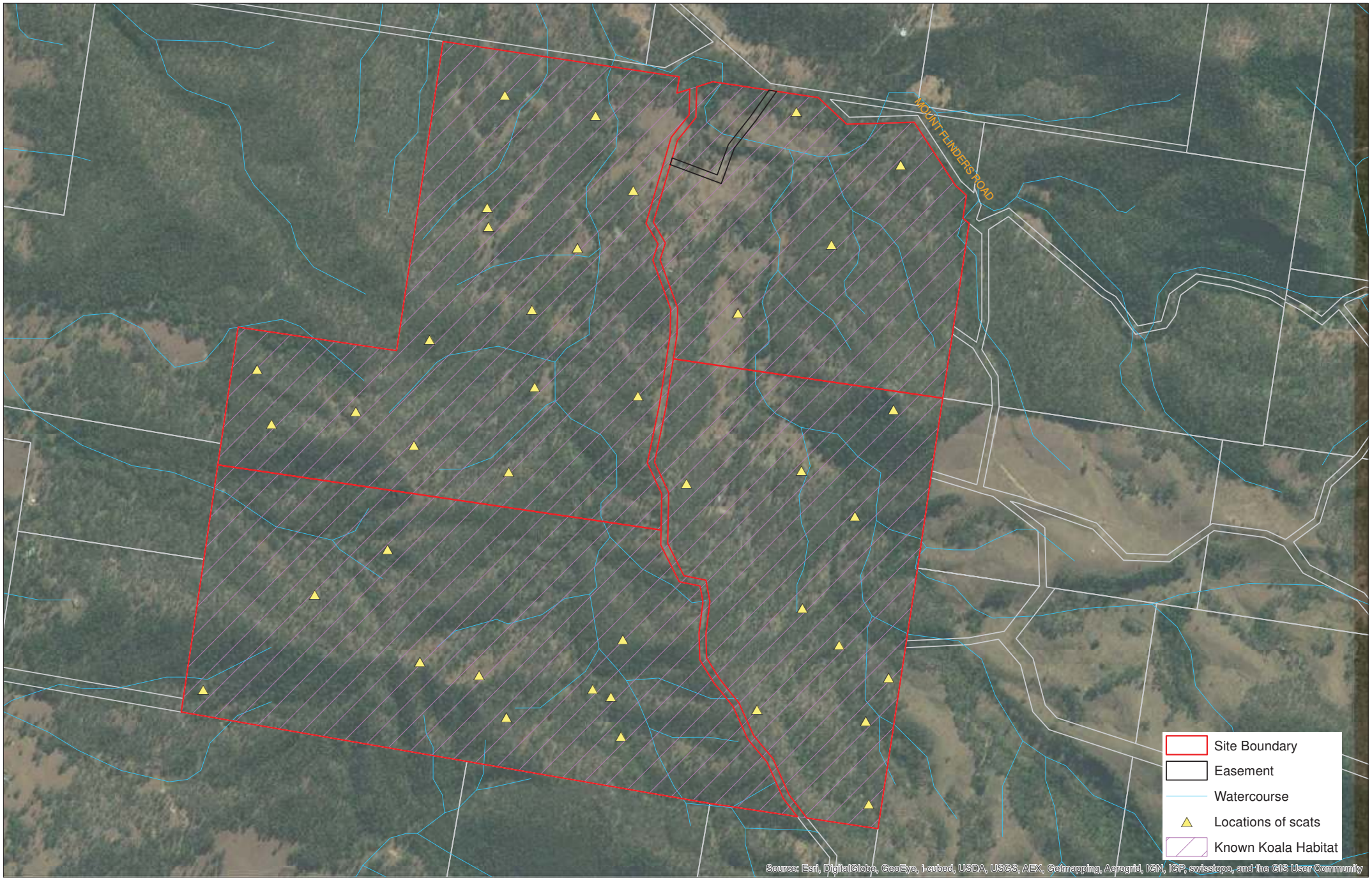
File: 2166-KOAR-R-01-AH
Date: 28/07/2014

Source:
Cadastral Boundaries: State of Queensland (Department of Natural Resources and Mines) 2012
Roads: Geoscience Australia 2011
Watercourse: VMA QLD Regrowth Watercourses Version 2.1 Department of Environment and Heritage Protection 2012
Roads: Geoscience Australia 2012
Regional Ecosystems - Category X: NewGround 2014
Regional Ecosystems – Category B Extents: Vegetation management regional ecosystem and remnant map – version 8.0: Department of Natural Resources and Mines 2014

APPENDIX I

Koala Habitat Area Plan





APPENDIX I: KOALA HABITAT AREA PLAN

0 200 400 600 800 Metres

A3 Scale 1:10,000

File: 2166-KOAR-R-01-AI
Date: 28/07/2014

Source:
Cadastral Boundaries: State of Queensland (Department of Natural Resources and Mines) 2012
Roads: Geoscience Australia 2011
Watercourse: VMA QLD Regrowth Watercourses Version 2.1 Department of Environment and Heritage Protection 2012
Roads: Geoscience Australia 2012
Locations of scats: NewGround 2014

APPENDIX J

Inventory of Flora and Fauna Species Recorded on Site

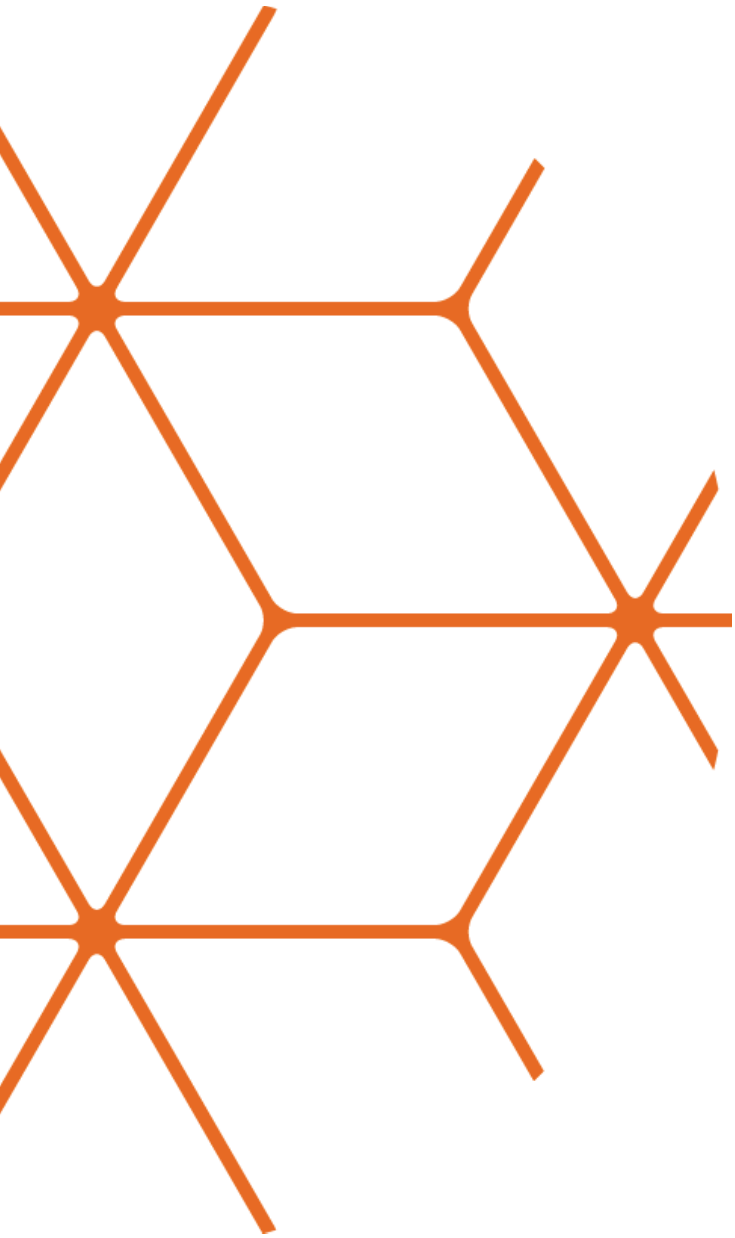


TABLE J1 FLORA SPECIES RECORDED DURING NEW GROUND FIELD SURVEY

SCIENTIFIC NAME	COMMON NAME
Acacia disparrima	-
Acacia falcata	sickle wattle
Acacia fimbriata	Brisbane wattle
Acacia maidenii	maiden's wattle
Acacia salicina	doolan
*Ageratina riparia**	mistflower
*Ageratum houstonianum**	blue billygoat weed
Allocasuarina littoralis	-
Allocasuarina luehmannii	bull oak
Alphitonia excelsa	soap tree
Alyxia ruscifolia	chainfruit
Angophora subvelutina	-
Araucaria cunninghamii	hoop pine
Aristida queenslandica	-
*Asparagus aethiopicus** D3, WoNS	asparagus fern
*Baccharis halimifolia** D2	groundsel bush
Bothriochloa bladhii	-
Bothriochloa decipiens	-
Brachychiton populneus	kurrajong
Breynia oblongifolia	-
Brunoniella australis	blue trumpet
Calotis lappulacea	yellow burr daisy
Capillipedium parviflorum	scented top
Cassytha pubescens	downy devil's twine
Centella asiatica	-
Cheilanthes distans	bristly cloak fern
Cheilanthes sieberi	-
Chrysocephalum apiculatum	yellow buttons
*Cirsium vulgare**	spear thistle
*Conyza sumatrensis**	tall fleabane
Corymbia citriodora	spotted gum
Corymbia tessellaris	-
Cyanthillium cinereum	-
Cymbidium canaliculatum	-
Cymbopogon refractus	barbed-wire grass
Cyperus gracilis	-
Daviesia ulicifolia	native gorse
Desmodium rhytidophyllum	-
Dianella sp. (infertile)	-
Dichondra repens	kidney weed
Dodonaea viscosa	-
Einadia hastata	-
*Emilia sonchifolia**	-

TABLE J1 FLORA SPECIES RECORDED DURING NEW GROUND FIELD SURVEY

SCIENTIFIC NAME	COMMON NAME
Eremophila debilis	winter apple
Erythrina vespertilio	-
Eucalyptus crebra	narrow-leaved ironbark
Eucalyptus tereticornis	forest red gum
Eucalyptus melanophloia	silver-leaved ironbark
Eustrephus latifolius	wombat berry
Exocarpos cupressiformis	native cherry
Ficus coronata	creek sandpaper fig
Ficus opposita	-
Fimbristylis nutans	-
Flemingia parviflora	-
Glossocardia bidens	native cobbler's pegs
*Gomphocarpus physocarpus**	balloon cottonbush
*Gomphrena celosioides**	gomphrena weed
Grewia latifolia	dysentery plant
Gymnostachys anceps	settler's flax
Hardenbergia violacea	-
Heteropogon contortus	black speargrass
Imperata cylindrica	blady grass
Jacksonia scoparia	-
Jagera pseudorhus	foam bark
*Lantana camara** [D3, WoNS]	lantana
*Lantana montevidensis** [D3]	-
Lobelia purpurascens	white root
Lomandra longifolia	-
Lomandra multiflora	-
Lophostemon confertus	brush box
Maclura cochinchinensis	cockspur thorn
*Macroptilium lathyroides**	-
Mallotus philippensis	red kamala
Melaleuca bracteata	-
Melaleuca irbyana^ [E]	swamp tea-tree
*Melinis repens**	red natal grass
Oplismenus aemulus	creeping shade grass
*Opuntia stricta** [D2,WoNS]	common prickly pear
*Opuntia tomentosa** [D2,WoNS]	velvety tree pear
*Passiflora suberosa**	corky passion flower
Petalostigma pubescens	quinine tree
Pittosporum angustifolium	-
*Portulaca pilosa**	-
Pterocaulon redolens	-
*Senecio madagascariensis** [D2, WoNS]	fireweed
*Sida rhombifolia**	-

TABLE J1 FLORA SPECIES RECORDED DURING NEW GROUND FIELD SURVEY

SCIENTIFIC NAME	COMMON NAME
*Sigesbeckia orientalis**	Indian weed
Smilax australis	barbed-wire vine
*Solanum seaforthianum**	Brazilian nightshade
Sporobolus creber	-
*Tephrosia glomeruliflora**	-
Trema tomentosa	poison peach

E - Endangered as listed under the *Nature Conservation (Wildlife) Regulation 2006* (Qld) .

* - Introduced species.

D3 - Class 3 Declared plant listed under the *Land Protection (Pest and Stock Route Management) Regulation (2003).*

D2 - Class 2 Declared plant listed under the *Land Protection (Pest and Stock Route Management) Regulation (2003).*

WoNS – Weed of National Significance.

^ Subject to Qld herbarium species verification.

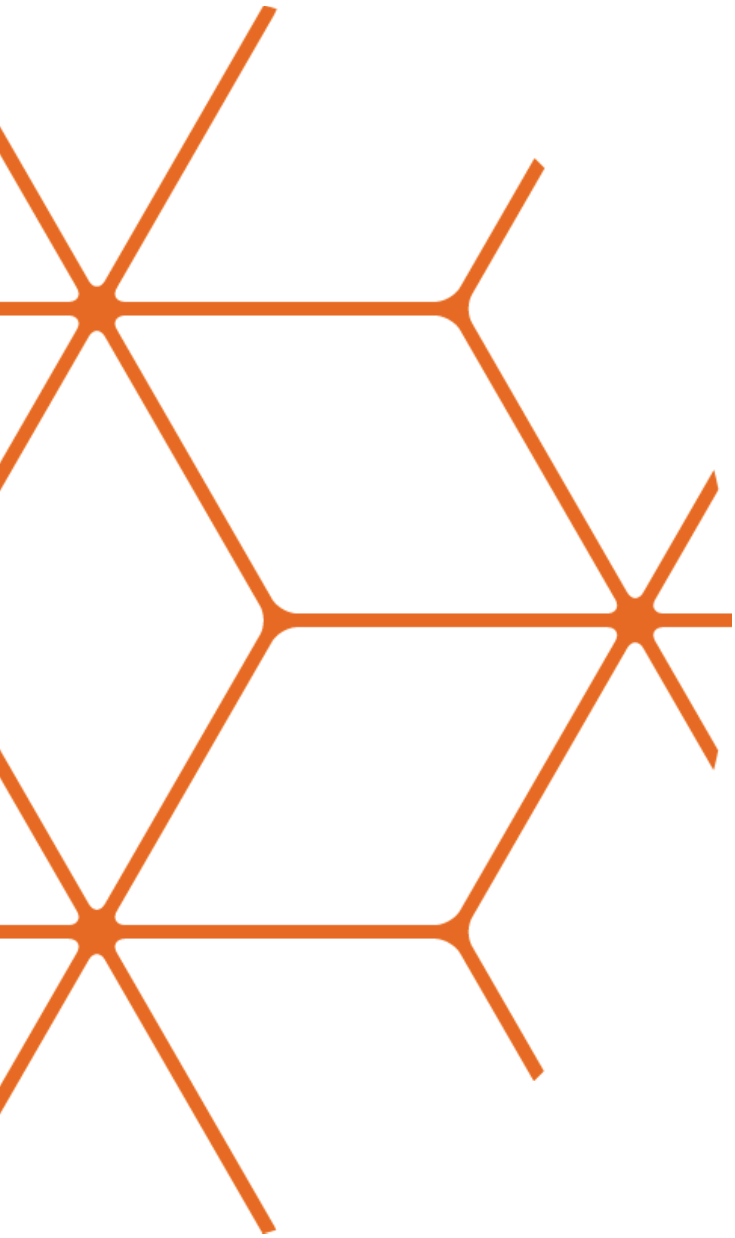
TABLE J2 FAUNA SPECIES RECORDED DURING THE NEW GROUND FIELD SURVEY

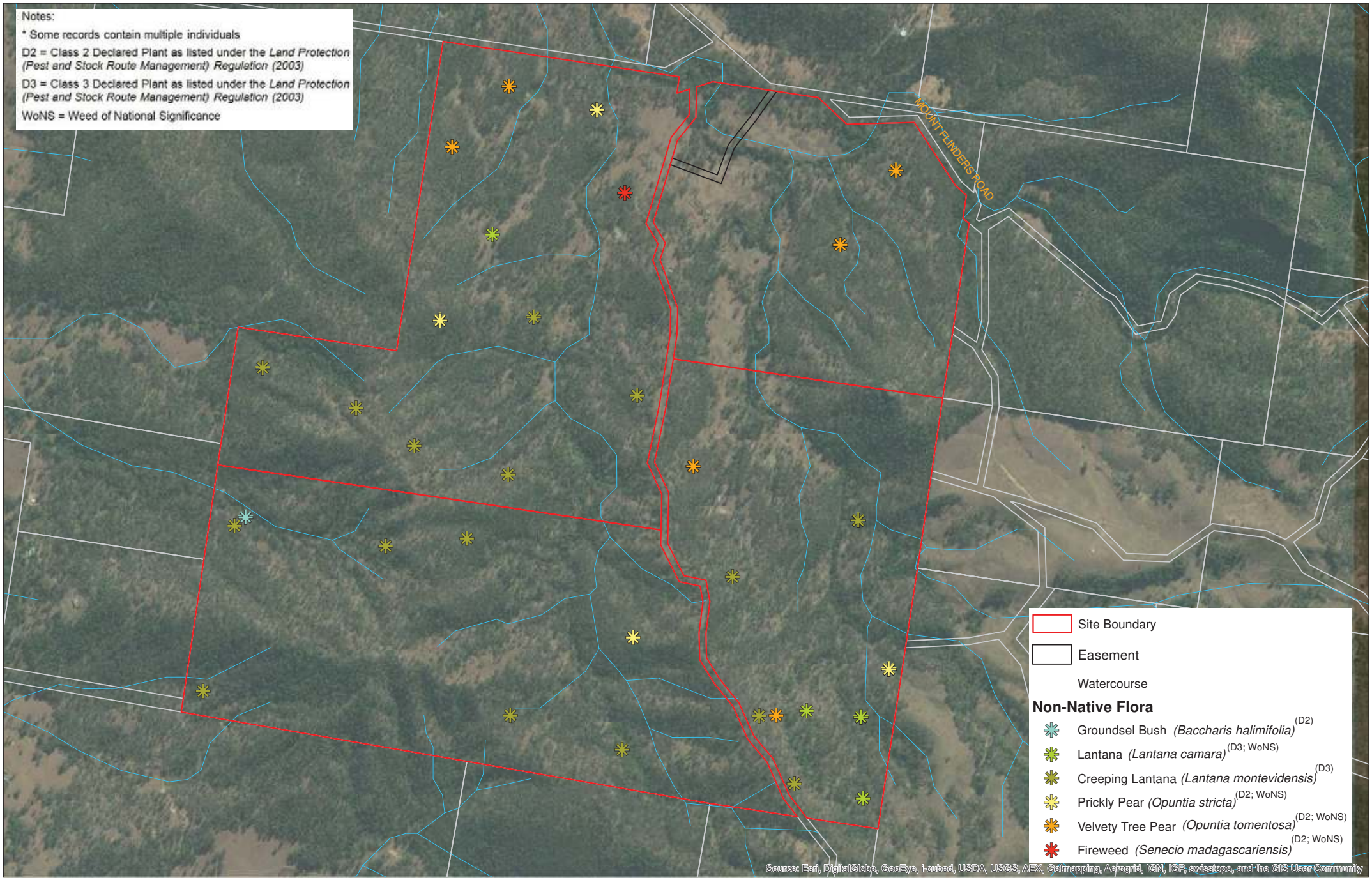
SCIENTIFIC NAME	COMMON NAME
BIRDS	
Anas superciliosa	pacific black duck
Climacteris picumnus	brown treecreeper
Climacteris rufus	rufous treecreeper
Corvus coronoides	Australian raven
Corvus orru	torresian crow
Cracticus tibicen	Australian magpie
Dacelo novaeguineae	laughing kookaburra
Dicrurus bracteatus	spangled drongo
Eolophys roeicapilla	galah
Geopelia humeralis	bar shouldered dove
Lalage sueurii	white winged triller
Malurus cyaneus	superb fairywren
Manorina melanocephala	noisy miner
Manorina melanophrys	bell miner
Pachycephala pectoralis	golden whistler
Pardalotus striatus	striated pardalote
Petroica boodang	scarlet robin
Platycercus adscitus	pale-headed rosella
Podargus strigoides	tawny frogmouth
Psophodes olivaceus	eastern whipbird
Rhipidura albiscapa	grey fantail
Rhipidura leucophrys	willie wagtail
Sericornis citreogularis	yellow-throated scrubwren
Stepera graculina	pied currawong
Trichoglossus haematodus	rainbow lorikeet
Vanellus miles	masked lapwing
Mammals	
*Bos taurus**	cow
*Equus caballus**	horse
Trachyglossus aculeatus	echidna
Wallabia bicolor	swamp wallaby

* - Introduced species

APPENDIX K

Disturbance Observations Plan





APPENDIX K: DISTURBANCE OBSERVATIONS PLAN

0 200 400 600 800 Metres

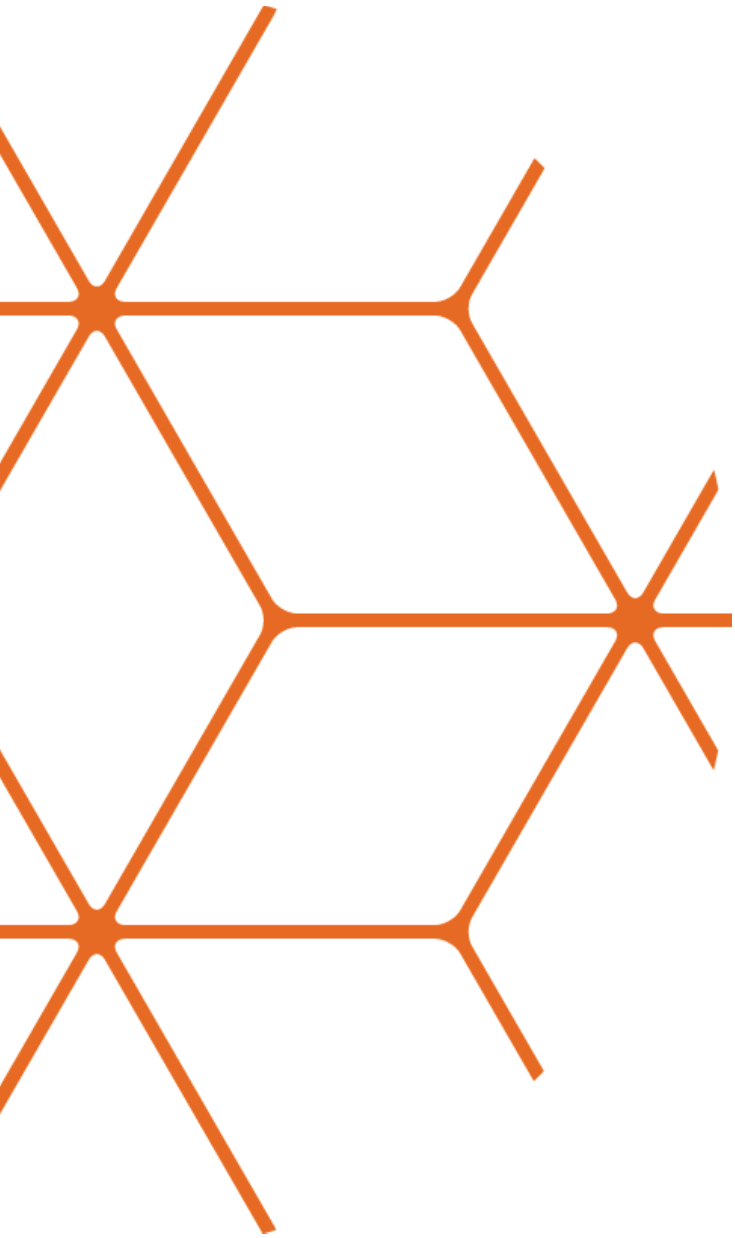
A3 Scale 1:10,000

File: 2166-KOAR-R-01-AK
Date: 28/07/2014

Source:
Cadastral Boundaries: State of Queensland (Department of Natural Resources and Mines) 2012
Roads: Geoscience Australia 2011
Watercourse: VMA QLD Regrowth Watercourses Version 2.1 Department of Environment and Heritage Protection 2012
Roads: Geoscience Australia 2012
Non-Native Flora: NewGround 2014

APPENDIX L

Proposed Offset Area Plan



APPENDIX L: PROPOSED OFFSET AREA PLAN

0 200 400 600 800 1,000 Metres

A3 Scale 1:10,000

File: 2166-KOAR-R-01-AL-140728
Date: 11/08/2014

Source:
Cadastral Boundaries & Easements: State of Queensland (Department of Natural Resources and Mines) 2014
Proposed Offset Area: NewGround Environmental 2014