Offset Strategy

EPBC2016/7817

Offset Strategy – Mirvac Greater Flagstone Project
Greenbank, Queensland

Prepared for Mirvac Queensland Pty Ltd
September 2020
Job 7598 E

saunders havill group

Document Control

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1. Introduction

1.1. EPBC Approval

Mirvac Queensland Pty Ltd, as the Proponent of the Project (EPBC Act Referral 2016/7817) was issued with an Approval by the then Department of the Environment and Energy (the Department) on the 11th October 2019, subject to conditions. Key details related to this approval are provided in **Table 1** below.

This Offset Strategy directly addresses Condition 4 of the approval and is supported by Technical Documents, as follows:

1. Technical Document 1 – Impact Site
2. Technical Document 2 – Offset Site

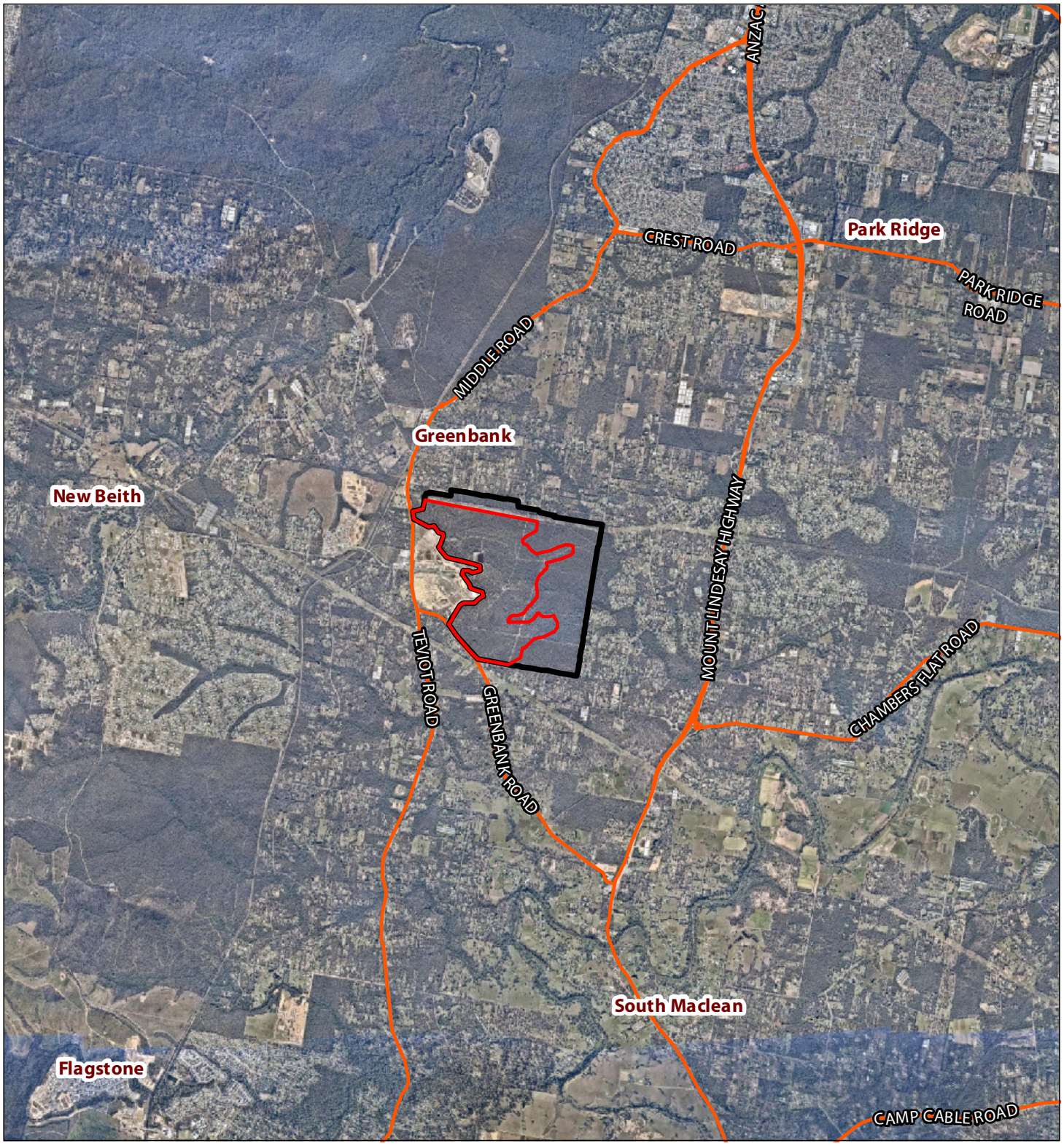
These documents should be consulted for the specific data and supporting information that define the impact and offset components, respectively, as referenced in this document.

Table 1: Approval details

Commonwealth Reference	EPBC 2016/7817
Approval Holder	Mirvac Queensland Pty Limited
CRN	060 411 207
Project Name on the Approval	Mirvac Greater Flagstone Project, Greenbank, QLD
Approved Action	Development of a master planned residential community, on Lot 1 on SP297192 (formerly Lot 205 on RP845844, Lot 434 on RP845844 (part) and Lot 9 on S312355), within the Greater Flagstone Priority Development Area, Greenbank, Queensland.
Controlling Provision(s)	Listed threatened species and communities (sections 18 & 18A)
Approval Date	11 October 2019
Expiry Date of the Approval	31 July 2040
Address	Greenbank Road, Greenbank
Local Government Area	Logan City Council (LCC)

1.2. Action Context

Contextually, the action is located in South East Queensland, approximately 10 km west of Logan Village and 30 km south of Brisbane CBD. The site is bound by Greenbank Road to the south, Teviot Road to the west and is predominately surrounded by rural residential development. Wearing Park immediately adjoins the site to the east and Greenbank Shopping Centre and Community Centre are located opposite the site, on the western side of Teviot Road. The site is located approximately 1.5 km southeast of Greenbank Military Training Camp and 1km east of the Brisbane-Sydney Railway Line. Refer to **Figures 1 & 2** for action (impact) site context and aerial.



Legend

- Referral area
- Referral impact area
- Major roads

Figure 1

Site Context

File ref. 7598 E Figure 1 Site Context A
Date *11/02/2020*
Project *Greater Flagstone Project*

0 1,000 2,000 3,000 *m*

Scale (A4): 1:75,000 [GDA 1994 MGA Z56]

N

Layer Sources Nearmap (2019)

Legend

- Referral area
- Referral impact area
- Qld DCDB

Figure 2

Site Aerial

File ref. 7598 E Figure 2 Site Aerial A
Date *11/02/2020*
Project *Greater Flagstone Project*

0 100 200 400 600 800 *m*

N

Scale (A4): 1:18,000 [GDA 1994 MGA Z56]

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2020, Aerial (Nearmap 2019)

2. Approval Condition 4

The below sub-sections indicate how each component of Condition 4 (refer extract below) will be addressed.

4. Within three (3) months of the **commencement** of **stage 1** of the action, the approval holder must submit, for approval by the **Minister,** an Offset Strategy to compensate for the loss of 230 ha of **Koala** and **Grey-headed Flying-fox habitat**. The approval holder must not **commence stage 2** of the action until the Offset Strategy has been approved by the **Minister** in writing. The approved Offset Strategy must be implemented. The approved Offset Strategy must:

   a. be prepared by a **suitably qualified person**

   b. be prepared in accordance with relevant approved **conservation advices, recovery plans** and **threat abatement plans**

   c. demonstrate that the proposed offset area(s) meets the principles of the **EPBC Act Environmental Offsets Policy** and **Environmental Management Plan Guidelines**

   d. include timelines and mechanisms for **legally securing** the offset area(s)

   e. provide a written description and map that clearly defines the location and boundaries of the proposed offset area(s) for **Koala** and **Grey-headed Flying-fox habitat** (must be accompanied by the **offset attributes** and **shapefiles**)

   f. demonstrate that there is a real potential for **Koala** and **Grey-headed Flying-fox** to utilise the offset area(s), including through (but not limited to):

      i. **habitat** suitability

      ii. connectivity with other **habitats** including **biodiversity corridors** that contain **Koala**

      iii. proximity to known **Grey-headed Flying-fox** camps.

   g. describe relevant baseline information regarding the offset area(s), based on surveys undertaken (prior to offset management commencing), including (but not limited to) quantification of the existing extent and quality of **habitat** for the **Koala** and **Grey-headed Flying-fox** present within the offset area(s) (the baseline condition)

   h. include time bound commitments to ecological outcomes and offset performance and completion criteria (including milestones) for achieving ecological outcomes for the **Koala** and **Grey-headed Flying-fox**

   i. detail the management actions and regeneration and revegetation strategies to be undertaken at the offset area(s) to achieve the ecological outcomes and offset performance and completion criteria, including:

      i. the timing and frequency of these measures, and person(s) responsible

      ii. a program to monitor and report on the effectiveness of these measures, including monitoring and reporting progress against the ecological outcomes and offset performance and completion criteria at an appropriate time and frequency

      iii. criteria for triggering adaptive management actions, contingency measures and corrective actions if the ecological outcomes and offset performance and completion criteria are not achieved, and the timing and frequency and person(s) responsible

      iv. details of the potential risks to the successful implementation of the plan and measure that will be implemented to mitigate against these risks, and

      v. the person(s) responsible for monitoring, reviewing and implementing the Offset Management Plan.

Condition 4a: The approved offset strategy must be prepared by a suitably qualified person

Condition 4a Response

This Offset Strategy has been prepared by the Saunders Havill Group Environmental Management Division who are suitably qualified having established offset approvals under the EPBC Act previously.

Condition 4b: The approved offset strategy must be prepared in accordance with relevant approved conservation advices, recovery plans and threat abatement plans

Condition 4b Response

This Offset Strategy has been prepared in accordance with relevant approved conservation advices, recovery plans and threat abatement plans. For the Koala, there is only an approved conservation advice (refer **Attachment 1**) as a recovery plan has not been adopted and a threat abatement plan has not been identified as relevant. With regard to the recovery plan, the following criteria have been addressed:

Description

The Koala *Phascolarctos cinereus*, Family Phascolarctidae, is a tree-dwelling, medium-sized marsupial with a stocky body, large rounded ears, sharp claws and variable but predominantly grey-coloured fur. It is one of Australia's most distinctive and iconic wildlife species.

Conservation Status

The Koala (combined populations in Queensland, New South Wales and the Australian Capital Territory) have been declared to be a species for the purposes of the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act) under s517 of the Act. This entity is listed as vulnerable as it has undergone a substantial decline over three generations, due to the combination of a range of factors. In Queensland, New South Wales and the Australian Capital Territory the Koala has an extensive but patchy distribution. Across this range, individual populations vary considerably in trends, and the mixture of threats faced. The species is also listed in other jurisdictions as follows:

- Queensland - vulnerable throughout the South East Queensland Bioregion, and 'least concern' (common) elsewhere in the state under the Nature Conservation Act 1992.
- New South Wales - vulnerable under the Threatened Species Conservation Act 1995. Two populations are listed as endangered; one in the Hawks Nest and Tea Gardens area of Great Lakes local government area, and one in the Pittwater area of Warringah local government area.

Distribution and Habitat

The proposed offset is located within the designated distribution from Cairns to the New South Wales – Victoria border. It is noted that Koalas inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by *Eucalyptus* at less than 800 m ASL. The proposed offset site is a woodland community dominated by *Eucalyptus* at suitable altitude where evidence of Koala activity has been recorded.

The proposed offset site is within the distribution for the protected matters and contains appropriate habitat that will be rehabilitated to provide uplift in habitat quality.

Threats

The three main threats to Koalas have been identified within the SPRAT profile as:

- Habitat loss and fragmentation;
- Vehicle strike; and
- Predation by domestic or feral dogs.

In addition, the prevalence of disease such as the Chlamydia virus in many Koala populations has led to symptoms such as infections of the eyes, urinary tract, respiratory tract and reproductive tract, with the latter having the potential to lead to infertility in females. More recently, Koala Retrovirus (KoRV) has had an increasing impact on most Queensland Koala populations. While most Koalas carry the disease, environmental stresses such as poor nutrition and overcrowding lead to conditions caused by KoRV such as leukaemia and immunodeficiency syndrome.

The proposed offset will deliver a tangible and measurable benefit for the Koala (*Phascolarctos cinereus*). Targeted land management actions will be implemented to result in a net gain in Koala habitat quality over the management period. Permanent legal protection of the offset areas from incompatible land uses will contribute to the ongoing viability of Koala in South-east Queensland. The offset will be legally secured for the duration of the impact.

The external offset site includes a range of vegetation communities, comprising 'Category B' (remnant) and 'Category C' (high value regrowth) vegetation, along with 'Category X' (non-remnant) vegetation that requires extensive rehabilitation. The external offset site has confirmed presence of Koalas.

The Offset Management Plan (refer 'Technical Document 2 – Offset Site' **Attachment 3 Appendix C**) will achieve Koala recovery in the external offset areas by delivering:

- Legal protection of the total offset area of Koala habitat to help offset the total quantum of impact;
- A net gain in Koala population density within the external offset site;
- Improvement to the quality of Koala habitat within offset areas evidenced by measurable improvement in habitat quality and reduction of threats over the management period;
- Maintenance of a contiguous landscape with good connectivity of Koala habitat to the broader landscape;
- Control of introduced predators to reduce their impact on Koala populations in the external offset area;
- Reduced risk of Koala mortality or injury due to vehicle strike within the offset area and the roads leading up to the external offset area;
- Hazard reduction to protect the external offset area from high intensity fire; and
- Reduced risk of the spread of Koala and vegetation diseases and or pathogens.

Research Priorities

Research priorities that would inform future regional and local priority actions include:

- Develop and implement an integrated program of Koala population monitoring and abundance estimates across the Koala's range, with particular focus on those regions for which population size and trends are currently least known. Targeting regions where there were previous surveys but where there are no recent estimates will enable trends to be determined over a broader range of the species;
- Develop landscape-scale population models, to provide a framework for the assessment of relative threat risk and management intervention cost-effectiveness.
- Develop understanding of gene flow and landscape connectivity,

- Identify and delineate key populations.
- Maintain or enhance research programs directed at the assessment of the incidence and consequences to populations of disease, and of mechanisms to reduce the impacts of disease;
- Maintain or enhance research programs directed at the assessment of the incidence and consequences to populations of koala mortality or injury due to dogs and traffic, and of mechanisms to reduce the impacts of these threatening factors;
- Determine the ability of inland koala populations to persist after, or recover from, drought and evaluate the likely influence of climate change on these processes.

QTFN maintain close ties with State agencies and Local Governments including data sharing and integration of habitat restoration activities. Through QTFN's network, the proposed offset management area will indirectly support the research priorities for the Koala as identified.

Priority Management Actions

A recovery plan has been recommended under the EPBC Act and will be prepared for the combined Koala populations in Queensland, New South Wales and the Australian Capital Territory. The recovery plan was slated to commence following the expiration of the National Koala Conservation and Management Strategy in 2014 for the combined populations of Queensland, New South Wales and the Australian Capital Territory.

This list does not necessarily encompass all actions that may be of benefit to Koalas, but highlights those that are considered to be of highest priority at the time of preparing the Conservation Advice.

Habitat Loss, Disturbance and Modification

- Develop and implement a development planning protocol to be used in areas of Koala populations to prevent loss of important habitat, Koala populations or connectivity options.
- Development plans should explicitly address ways to mitigate risk of vehicle strike when development occurs adjacent to, or within, Koala habitat.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Identify populations of high conservation priority.
- Investigate formal conservation arrangements, management agreements and covenants on private land, and for Crown and private land investigate and/or secure inclusion in reserve tenure if possible.
- Manage any other known, potential or emerging threats such a Bell Miner Associated Dieback or Eucalyptus rust.
- Develop and implement options of vegetation recovery and re-connection in regions containing fragmented Koala populations, including inland regions in which Koala populations were diminished by drought and coastal regions where development pressures have isolated Koala populations.

Animal Predation

- Develop and implement a management plan to control the adverse impacts of predation on Koalas by dogs in urban, peri-urban and rural environments.

Conservation Information

- Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.

The offset area and management actions as put forward by QTFN will address listed aspects of the Priority Management Actions by enhancing connectivity and habitat value for Koala in a fragmented drought affected landscape adjoining conservation areas, and securing that land as an offset in perpetuity. The risk of vehicle strike will be mitigated under the Offset Management Plan and local Koala populations will be monitored and reported on a regular basis. QTFN are involved in local landscape-scale pest management programs and through networks regularly provide information relevant to Koala conservation to the broader community. The proposed offset will contribute to the priority management actions as listed.

Existing Plans/Management Prescriptions that are Relevant to the Species

The National Koala Conservation and Management Strategy 2009-2014 (Natural Resource Management Ministerial Council 2010)

The National Koala Conservation and Management Strategy (NRMMC 2009) aims to conserve Koalas by retaining viable Koala sub-population fragments throughout their natural range. As a national strategy, it provides a framework for incorporating state and local activities into broader national actions. Key objectives of the national strategy are provided below with responses relevant to the proposal:

- The Koala remains nationally abundant and widespread, and is not nationally threatened

There are a number of characteristics of the impact site that reduce the adversity of impacts caused by the clearing of habitat critical to the survival of the Koala. Firstly, SAT surveys returned results suggesting mostly Low usage of the site by Koalas. This is likely a result of existing barriers to dispersal significantly fragmenting the site from other continuous patches of vegetation. The lack of connectivity reduces the site's ability to achieve the interim recovery objectives for coastal areas which is based upon protecting large, connected areas of Koala habitat.

Further to this, the Greater Flagstone Priority Development Area facilitates development within the Greenbank/Flagstone area in order to meet Queensland's housing demand, which will see a greater expansion of development surrounding the site. Already sites directly surrounding the impact area have been developed. The site is also in close proximity to Teviot and Greenbank arterial roads and an existing rail corridor. As such, the impact site is not expected to retain important connectivity to other patches, nor does it play an important role in facilitating connectivity in the landscape.

In terms of vegetation structure, the impact site was found to be heavily disturbed, again reducing the quality of available habitat. The vast majority of the site has been already cleared and is made up of pastoral/grazing land, with vegetated portions in the west of the site set aside for conservation,

Finally, the land assessed as critical habitat on-site received a score of 6 at the lower end of the critical habitat scale. The conservation area which is to be preserved as open space is to be subject to extensive rehabilitation works under the proposal, which includes the removal of weeds and the reestablishment of Koala habitat.

Overall, the adversity of impacts as a result of the proposed development are minimal due to the lower habitat value score of critical habitat on the site and the existing barriers to Koala dispersal to and from the site.

It is anticipated that loss of quality Koala habitat under this proposal will be mitigated in the form of management plans and offsite in Koala habitat areas maintained by the Queensland Trust for Nature. The offsets imposed are considered to contribute toward maintaining Koala as nationally abundant and widespread species.

- The threatened statuses of the Koala at state and regional levels are reduced

As for the response above, the proposed action is considered highly unlikely to contribute to the threatened status of Koalas at all levels and scales given the relatively poor quality of Koala habitat, preservation and rehabilitation of the conservation area and the provision of an external offset.

- Koalas in identified priority areas are stabilised or increasing

Not Applicable. The impact site is not within an identified priority area.

- Increased consideration of Koala habitat is demonstrated in development planning

The proposed action includes the retention and rehabilitation of the most suitable Koala habitat on-site, being the eastern conservation area, to promote augmented habitat values should Koala venture on-site. Only wooded areas that are relatively fragmented by surrounding development and historical disturbance with relatively limited ongoing Koala habitat value are proposed for removal and development. Development planning under this proposal has a demonstrated consideration of Koala habitat values.

- Productive and integrated partnerships that foster the conservation and welfare of Koalas

It is anticipated that the proposed offset for removal of Koala habitat at the impact site will continue to maintain the Koala conservation and welfare efforts of the Queensland Trust for Nature. This is considered a more optimal outcome from a Koala conservation and welfare perspective.

- Greater areas of high-quality Koala habitat are conserved and effectively managed through legislation, covenants or agreements

High Quality Koala habitat is not present on or in the vicinity of the impact site. It is anticipated that the rehabilitation of conservation area will enhance connectivity values for Koalas should they venture on-site, however, there is no adjoining Koala habitat considered of high-quality.

- Greater activity by land and resource managers to effectively protect and manage Koala populations is facilitated by state and local governments

It is anticipated that efforts to protect and manage Koala populations under this proposal will be facilitated by the Commonwealth Government in the form of management plans and an offsite offset in Koala habitat areas maintained by the Queensland Trust for Nature. Local and State Government imposed fauna management procedures are anticipated to further mitigate potential impacts on Koalas at the impact site.

- Community capacity to drive Koala conservation and care is increased

Avoidance and mitigation measures aimed at heightening community awareness are proposed. Importantly, low vehicle speeds will be imposed along residential roads, minimising the risk of high-speed vehicle strikes which were identified in the literature review as accounting for a large proportion of vehicle related deaths. In addition, awareness signage and traffic calming devices will ensure motorists are aware that Koalas have potential to occur in the area, making them more conscious of potentially dispersing Koalas and encouraging them to maintain a low vehicle speed. The distribution of "Lifestyle Guidelines" has the purpose of instilling stewardship of the issue amongst residents, encouraging them to actively protect native wildlife and making them aware of the types of fauna that could disperse onto roads.

- Overabundant Koala groups are stabilised or reducing wherever they occur or arise

Not Applicable. An overabundant Koala group is not present on or in the vicinity of the proposal site.

Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016 (Queensland EPA 2006)
Although the Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016 (Koala Plan) was replaced by the State Planning Regulatory Provisions (SPRP) and subsequently the Planning Regulation (PR),

other elements of the Koala Plan, such as policies relating to sequential clearing, use of a Koala spotter, the rehabilitation of injured or sick koalas and translocation remain in place. As a result, the mapping of Koala habitat areas under the Koala Plan (conservation, sustainability and urban Koala) has been superseded by the Development Assessment Mapping System (DAMS) Koala Priority Areas and Koala Habitat Areas. Sequential clearing requirements of Koala habitat trees under the Nature Conservation Act 1992 remain in place and Koala spotters are required in Koala habitat areas.

The Koala Plan, which came into effect on 2 October 2006, addresses the key threats facing koalas and sets out strategies to stop the decline of koala numbers and set in train the species' recovery. Issues addressed in the plan include:

- Habitat Protection and Vegetation Clearing

The proposed action includes the retention and rehabilitation of the western conservation area being the most suitable Koala habitat on-site to promote augmented habitat values. Only areas that are relatively fragmented by surrounding development and historical disturbance with reduced ongoing Koala habitat value are proposed for removal and development. All vegetation clearing under the proposal will be governed by State requirements for fauna management.

- Development

As mentioned above, The proposed action includes the retention and rehabilitation of the most suitable Koala habitat on-site, being the western conservation area, to promote augmented habitat values. Only areas that are relatively fragmented by surrounding development and historical disturbance with reduced ongoing Koala habitat value are proposed for removal and development. Development planning under this proposal has a demonstrated consideration of Koala habitat values.

- State Government Infrastructure

Not applicable.

- Vehicle Mortality and Dog Attacks

Vehicle Mortality and Dog Attacks will be mitigated by the above mentioned specified management programs and lifestyle guidelines..

- Translocation

Not applicable. It is anticipated that, should Koalas be encountered during vegetation clearing, their viability and dispersal from harm will be managed as per DES guidelines.

- Research

Not applicable.

- Zoos

Not applicable.

- Public Education

Awareness signage and traffic calming devices will be employed to ensure motorists are aware that Koalas have potential to occur in the area, making them more conscious of potentially dispersing Koalas and encouraging them to maintain a low vehicle speed. The distribution of “Lifestyle Guidelines” is intended to instil stewardship of the issue amongst residents, encouraging them to actively protect native wildlife and making them aware of the types of fauna that could disperse onto roads.

- Rehabilitation of sick, injured and orphaned koalas

It is anticipated that, should Koalas be encountered and sick, injured or orphaned, their viability and dispersal from harm will be managed as per DES guidelines.

Queensland koala response strategy (Queensland Government 2011)
The Koala Response Strategy 2011 aimed to provide baseline data on Koala distribution and population in South East Queensland. These data provide valuable information on the population dynamics of Koalas and practical support for the conservation management of the Koala. The Koala Response Strategy involves the identification, protection and rehabilitation of important Koala habitat in South-East Queensland. This is achieved through direct acquisition of sites and protection through state planning instruments.

The Draft South east Queensland Conservation Strategy 2019-2024 was released for public comment on 8 December 2019. The final version is not yet released.

Refer to 'Technical Document 1 – Impact Site' (**Attachment 2**) and 'Technical Document 2 – Offset Site' (**Attachment 3**) for further details of the impact and proposed offset metrics.

For the Grey-headed Flying-fox, there is no approved conservation advice, no adopted recovery plan and a threat abatement plan has not been identified as relevant. The current referral guidelines refer mostly to impacts on Flying-fox roosts. The quality and availability of Grey-headed Flying-fox habitat at the impact and offset sites and the uplift in these values at the offset site were determined using the Grey-headed Flying-fox Modified Habitat Quality Assessment methodology as agreed with the Department.

Refer to 'Technical Document 1 – Impact Site' (**Attachment 2**) and 'Technical Document 2 – Offset Site' (**Attachment 3**) for further details the impact and proposed offset metrics.

Condition 4c: The approved offset strategy must demonstrate that the proposed offset area(s) meets the principles of the EPBC Act Environmental Offsets Policy and Environmental Management Plan Guidelines

Condition 4c Response
The following table provides an overarching response to the EPBC Act Environmental Offsets Policy:

Environmental Offsets Policy Requirement	**Statement of suitability**
Suitable offsets must deliver an overall conservation outcome that improves or maintains the	The external offset area will directly contribute to the ongoing viability of the Koala (*Phascolarctos cinereus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*). Protection and management of the external offset area in accordance with the OMP will deliver an overall conservation outcome for a very large area of Koala habitat and Grey-headed Flying-fox foraging habitat which is currently not managed or protected. The offset will improve the viability of the protected matter. If neither the action nor the offset took place, it is anticipated that the offset area would not improve viability for the protected matter.

viability of the protected matter.	Management actions as described in the OMP will ensure that the external offset area will be intensely managed and resourced to ensure very large areas of protected Koala and Grey-headed Flying-fox habitat which substantially exceeds the quality of the habitat originally impacted by the action. The offset area will: ▪ Provide a large connected area of well-managed Koala and Grey-headed Flying-fox habitat; ▪ Be legally secured for protection; ▪ Result in the long-term reduction of threats and a net gain in Koala population density within the offset area; ▪ Control introduced predators to reduce impact on Koala populations; ▪ Reduce risk of Koala mortality or injury due to vehicle strike; ▪ Ensure the area is protected from risk of high intensity fire; and ▪ Reduce risk of the spread of Koala and vegetation diseases and or pathogens. Securing and managing the external offset area in accordance with the OMP will permanently protect the area from incompatible land uses and will contribute to the ongoing viability of South-east Queensland's Koala and Grey-headed Flying-fox populations. It will also contribute to the long-term ecological function of a broader network of wildlife corridors connected to the offset area.
Suitable offsets must be built around direct offsets but may include other compensatory measures	The offsite offsets will provide more than 100% of the total offset requirement for both the Koala and Grey-headed Flying-fox as determined using the EPBC calculator. The offset will be legally secured for protection.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	Assessment against the EPBC Act Offsets Assessment Guide determined the probability of annual extinction of the Koala and Grey-headed Flying-fox as 0.2%. This measurement was used in the Offset Calculator, ensuring that the level of statutory protection that applies to the protected matter was taken into account. All threats set out in the Department's SPRAT Database and the EPBC Act referral guidelines for the vulnerable Koala have been addressed in the OMP. In relation to Grey-headed Flying-fox, identified recovery actions have been addressed in the OMP.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	Through the permanent protection and long-term management of the external offset area, the offset will deliver a conservation gain that will adequately compensate for impacts on Koala and Grey-headed Flying-fox habitat arising from the action. The offset area will compensate for the quantum impact on Koala and Grey-headed Flying-fox at the impact site. The external offset area delivered will satisfy over the 100% direct offset

	area requirement. The offset will be appropriate and more than proportionate to the impacts of the action.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding	Confidence in the success of the offset has been assigned as per Technical Document 2 – Offset Site (**Attachment 3**). This score is conservative given the detail and intensity of the management actions set out in the OMP. The score is supported by the design and management of the offset within a contiguous landscape with good connectivity of Koala and Grey-headed Flying-fox habitat to the broader landscape. Operational management units (OMUs) have been determined in order to identify management actions suitable to different areas and existing habitat qualities within the overall offset. All OMUs are managed in a way that will achieve improved habitat scores. Risks associated with the offset delivery will be mitigated and managed by way of detailed management actions set out in the OMP. Management responses set out in the OMP are clearly framed against stated outcomes being to protect and conserve large, connected areas of Koala and Grey-headed Flying-fox habitat able to support improving populations that are genetically diverse and free or with very low incidence of disease. Provided confidences will allow for unforeseen risks primarily relating to natural events such as flood, drought, severe storms etc. Annual monitoring for compliance will occur as part of the agreement with Mirvac. Any non-compliances or risks to the offset will be identified and corrected that this time, if not prior to.
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	The proposed offset provides for outcomes beyond what is already required, determined by law or planning regulations, or agreed to under other schemes or programs. Commentary on aspects such as clearing, weed management and feral carnivore management is provided below. **Clearing** Securing the offset will protect the area from clearing. The offset site will be legally secured for the duration of the impact. Securing the site will ensure that loss of habitat values does not occur, and implemented management actions will reduce intensification of weeds causing loss of connectivity, destruction of habitat via hot intensive fires, risk of mortality or injury by dog attack etc. to protect the viability of the offset outcome. Management actions will commence once the offset is secured **Weeds** There are currently no regulated state requirements at the offset site for controlling *Lantana camara*, Broad Leaved Pepper Tree or Chinese Elm. These weeds are the main threat to the movement of Koalas. Under the Queensland Biosecurity Act 2014, *Lantana camara*, Broad Leaved Pepper and Chinese Elm are classified as a Class 3 Declared Pests. Landholders are not required to control Class 3 Declared Pest plants on their land. Weed management within the offset area will be additional to the minimum legislated requirements and align with the EPBC Environmental Offset Policy.

	Feral Carnivores Wild Dogs/Dingoes, feral Foxes and feral Cats are restricted invasive animals under the Biosecurity Act 2014 and do not require specific control measures, classified as Category 3 Pests. The Act states "The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive animals under their control". The specific requirements for Category 3 pests are: You must not distribute this restricted matter. This means it must not be given as a gift, sold, traded or released into the environment unless the distribution or disposal is authorised in a regulation or under a permit. Deliberate human distribution or disposal contrary to the legislation is a key source of spread into other areas of the state. The adaptive predator control measures, rigorous monitoring and coordinated landscape approach that will be implemented at the offset site go far beyond the minimal requirement of reducing the risks associated with invasive animals.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	▪ **Efficient and Effective:** Design of a large, connected offset area and the OMP (particularly use of OMUs) will ensure efficient delivery of management actions over a large area. Proactive management and monitoring will ensure response actions are timely and focused. ▪ **Timely:** The mix of vegetation qualities and the scale of the offset provides for management to yield conservation gain in as short as possible time. Adaptive management processes will ensure that management actions are able to be adjusted to account for improvements in technologies, processes, academic understanding etc. (refer **Section 3** and Technical Document 2 – Offset Site at **Attachment 3**). ▪ **Transparent:** A clear monitoring and reporting framework has been established as part of the OMP. This provides for regular reporting to the Department. ▪ **Scientifically Robust:** The proposed external offset area has been assessed by numerous suitably qualified individuals, management and monitoring actions will be conducted in collaboration with these and other groups to achieve enduring long-term outcomes that are beneficial for the local Koala and Grey-headed Flying-fox population. As part of monitoring and reporting on the outcomes of the offset, they will feed into ongoing scientific research into the impact and effectiveness of a range of Koala and Grey-headed Flying-fox recovery actions. ▪ **Reasonable:** The offset is reasonable being greater than the significant residual impact on Koala and Grey-headed Flying-fox habitat. The offset design has been based upon achieving conservation outcomes. The proposed offsite offset will provide greater connectivity and enhance food and habitat necessary to support Koala and Grey-headed Flying-fox populations.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored,	The OMP contains a detailed monitoring and reporting framework. The reporting framework sets out stated outcomes and associated performance indicators. These provide clear benchmarks as to the success or failure of actions. Response actions are also set out and these will also be reported. Contractual requirements between the proponent and the offset provider will account for compliance with the approval conditions. The offset provider will provide information to the Department that will transparently demonstrate compliance with the offset approval

audited and enforced	conditions and the progress towards successful delivery of the stated offset outcomes and habitat quality improvements.

The offset has been prepared as per the Environmental Offset Guidelines. Refer 'Technical Document 2 – Offset Site' (**Attachment 3**) for relevant supporting information and the EPBC calculator sheets.

Condition 4d: The approved offset strategy must include timelines and mechanisms for legally securing the offset area(s)

Condition 4d Response

Timelines and mechanisms for legally securing the offset area are outlined in 'Technical Document 2 – Offset Site' (**Attachment 3**).

Condition 4e: The approved offset strategy must provide a written description and map that clearly defines the location and boundaries of the proposed offset area(s) for Koala and Grey-headed Flying-fox habitat (must be accompanied by the offset attributes and shapefiles)

Condition 4e Response

Detailed written descriptions and maps of the offset area for Koala and Grey-headed Flying-fox habitat are provided in 'Technical Document 2 – Offset Site' (**Attachment 3**). A shapefile of the offset area will be provided.

Condition 4f: The approved offset strategy must demonstrate that there is a real potential for Koala and Grey-headed Flying-fox to utilise the offset area(s), including through (but not limited to):

i. Habitat suitability

Condition 4f.i. Response

The proposed offset area contains suitable habitat for the Koala and Grey-headed Flying-fox. This is in part evidenced by the presence of habitat features suitable for supporting Koala, evidence of Koala utilising the offset area and the proximity of Grey-headed Flying-fox roosts. Refer to 'Technical Document 2 – Offset Site' (**Attachment 3**) for further details.

ii. Connectivity with other habitat including biodiversity corridors that contain Koala

Condition 4f.ii. Response

The proposed offset site demonstrates connectivity with other habitat including biodiversity corridors that contain Koala. Refer to 'Technical Document 2 – Offset Site' (**Attachment 3**) for further details.

iii. Proximity to known Grey-headed Flying-fox camps

Condition 4f.iii. Response

The proposed offset site is suitably proximal to known Grey-headed Flying-fox camps. Refer to 'Technical Document 2 – Offset Site' (**Attachment 3**) for further details.

Condition 4g: The approved offset strategy must describe relevant baseline information regarding the offset area(s), based on surveys undertaken (prior to offset management commencing), including (but not limited to) quantification of the existing extent and quality of habitat for the Koala and Grey-headed Flying-fox present within the offset area(s) (the baseline condition)

Condition 4g Response

Relevant baseline information regarding the offset area that is based on prior surveys that quantify the existing extent and quality of habitat for the Koala and Grey-headed Flying-fox are provided in 'Technical Document 2 – Offset Site' (**Attachment 3**). The Koala Modified Habitat Quality Assessment (Koala MHQA) and Grey-headed Flying-fox Modified Habitat Quality Assessment (GHFF MUQA) methodologies as agreed with the Department were applied.

Condition 4h: The approved offset strategy must include time bound commitments to ecological outcomes and offset performance and completion criteria (including milestones) for achieving ecological outcomes for the Koala and Grey-headed Flying-fox

Condition 4h Response

Time bound commitments to ecological outcomes and offset performance and completion criteria (including milestones) for achieving ecological outcomes for the Koala and Grey-headed Flying-fox are specified in 'Technical Document 2 – Offset Site' (**Attachment 3**), and specifically the Offset Management Plan within.

Condition 4i: The approved offset strategy must detail the management actions and regeneration and revegetation strategies to be undertaken at

the offset area(s) to achieve the ecological outcomes and offset performance and completion criteria, including:

i. The timing and frequency of these measures, and person(s) responsible

ii. a program to monitor and report on the effectiveness of these measures, including monitoring and reporting progress against the ecological outcomes and offset performance and completion criteria at an appropriate time and frequency

iii. criteria for triggering adaptive management actions, contingency measures and corrective actions if the ecological outcomes and offset performance and completion criteria are not achieved, and the timing and frequency and person{s) responsible

iv. details of the potential risks to the successful implementation of the plan and measures that will be implemented to mitigate against these risks

v. the person(s) responsible for monitoring, reviewing and implementing the Offset Management Plan

Condition 4i Response

The above criteria are specified within the OMP (Refer to 'Technical Document 2 – Offset Site' (**Attachment 3**) for further details.).

It is important to note that with respect to approval conditions Mirvac Queensland Pty Ltd will be responsible for the management of the impact site, and Queensland Trust For Nature for the management of the offset site.

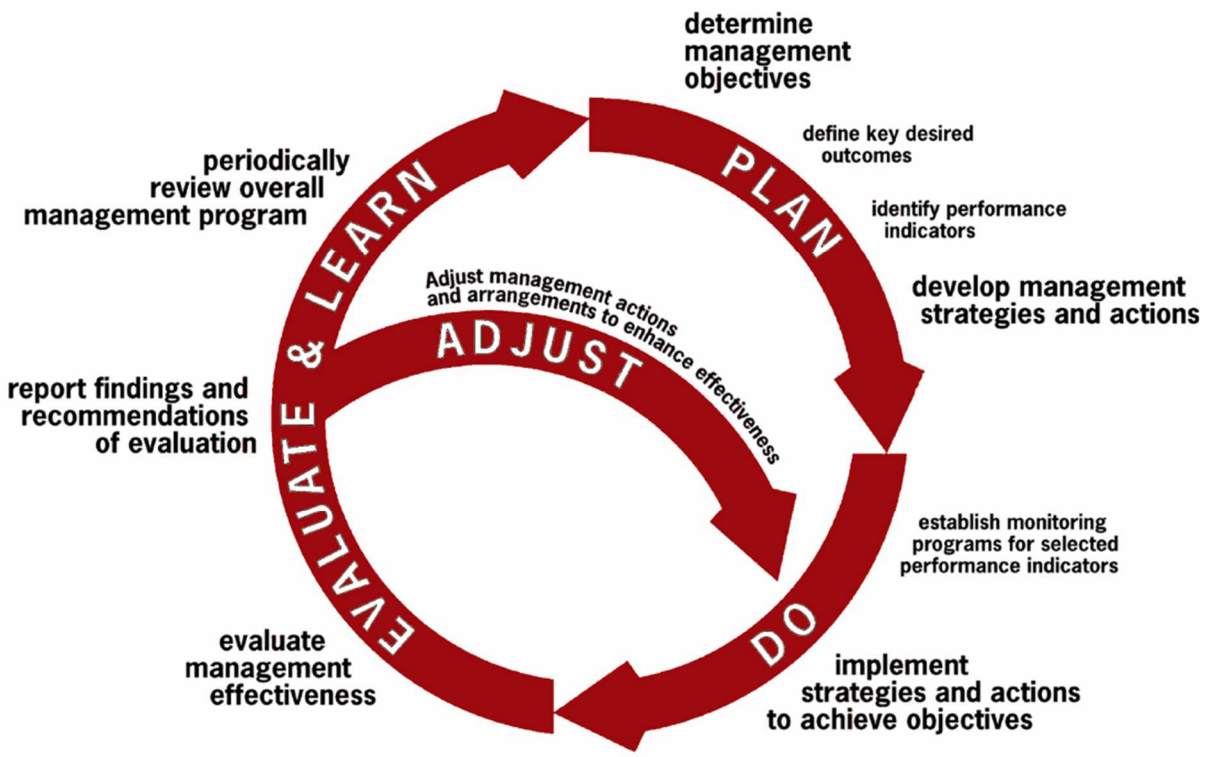
3. Adaptive Management

Given the extended management timeline, it is not possible or intended that the Offset Management Plan (OMP) will provide a detailed prescription of management actions. The OMP will be derived from the current state of knowledge of species ecology and best practice habitat management approaches for Koala and GHFF habitat.

It is anticipated that new techniques will become available over the course of the management period to monitor vegetation composition, Koala absence/presence and abundance, weed presence etc. To account for this an adaptive management approach is to be adopted to ensure future research and practice development can be integrated into management and monitoring actions. This will ensure best practice techniques can be adopted contemporaneously in a way that ensures delivery and measurement of stated offset outcomes.

Adaptive management refers to a way of managing natural resources where management actions are regularly reviewed and, if necessary, modified based on monitored changes in environmental condition and/or changes in base knowledge which underpins the original management approach.

Figure 3: Adaptive Management Process (CSIRO)



4. Appendices

Attachment 1

Koala Conservation Advice

Attachment 2

Technical Document 1 – Impact Site

Attachment 3

Technical Document 2 – Offset Site

Attachment 1

Koala Conservation Advice

Approved Conservation Advice for *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) (koala Northern Designatable Unit)

(s266B of the *Environment Protection and Biodiversity Conservation Act 1999*)

This Conservation Advice has been developed based on the best available information at the time this Conservation Advice was approved; this includes existing plans, records or management prescriptions for this species.

Preamble

This conservation advice concerns only the koala (combined population in Queensland, New South Wales and the Australian Capital Territory), together listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*. Some of the advice described here may also be relevant to koala populations in Victoria and South Australia, but those populations are not the focus of this conservation advice.

This brief advice distils research and management actions previously given in the *National Koala Conservation and Management Strategy 2009-2014*, many recommendations provided in the Senate Inquiry into the status, health and sustainability of Australia's koala population (Senate Environment and Communications References Committee 2011), and includes some consideration of research and management actions within a series of existing local and regional koala management plans. In many cases, these existing documents may provide far more detail about such actions, and may be more applicable at local and regional scales.

This conservation advice provides a framework which will be developed further through the establishment and implementation of a recovery plan. The recovery plan will commence following the expiration of the National Koala Conservation and Management Strategy in 2014 for the combined populations of Queensland, New South Wales and the Australian Capital Territory.

Description

The koala *Phascolarctos cinereus*, Family Phascolarctidae, is a tree-dwelling, medium-sized marsupial with a stocky body, large rounded ears, sharp claws and variable but predominantly grey-coloured fur. It is one of Australia's most distinctive and iconic wildlife species.

Conservation Status

The koala (combined populations in Queensland, New South Wales and the Australian Capital Territory) have been declared to be a species for the purposes of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) under s517 of the Act. This entity is listed as **vulnerable** as it has undergone a substantial decline over three generations, due to the combination of a range of factors.

In Queensland, New South Wales and the Australian Capital Territory the koala has an extensive but patchy distribution. Across this range, individual populations vary considerably in trends, and the mixture of threats faced.

The species is also listed in other jurisdictions as follows:

- Queensland - *vulnerable* throughout the South East Queensland Bioregion, and 'least concern' (common) elsewhere in the state under the *Nature Conservation Act 1992*.
- New South Wales - *vulnerable* under the *Threatened Species Conservation Act 1995* Two populations are listed as *endangered*; one in the Hawks Nest and Tea Gardens

area of Great Lakes local government area, and one in the Pittwater area of Warringah local government area.

Nationally, the koala is not listed as threatened under the *Environment Protection and Biodiversity Conservation Act*. At the species level, it is considered 'of least concern' on the 2010 IUCN Red List of Threatened Species, and is listed as threatened on the US *Endangered Species Act 1973*.

Distribution and Habitat

For the combined population considered here, the range extends from approximately the latitude of Cairns to the New South Wales-Victoria border, and includes some island populations. The koala's distribution is not continuous across this range, with some populations isolated by cleared land or unsuitable habitat (NSW DECC 2008).

Koalas inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by species from the genus *Eucalyptus* (Martin and Handasyde 1999). The distribution of koalas is also affected by altitude (limited to <800m ASL), temperature and, at the western and northern ends of the range, leaf moisture (Munks et al. 1996).

Threats

The main identified threats to this species are loss and fragmentation of habitat, vehicle strike, disease, and predation by dogs. Drought and incidences of extreme heat are also known to cause very significant mortality, and post-drought recovery may be substantially impaired by the range of other threatening factors.

Research Priorities

While there has been substantial investment into research on koalas, the lack of coordination and prioritisation at all levels has left significant gaps in our knowledge of the species, and hence in the capacity to manage it most effectively. The research priorities below are not exhaustive, but are those that the Committee considers will most contribute to effective conservation management of the species.

Research priorities that would inform future regional and local priority actions include:

- Develop and implement an integrated program of koala population monitoring and abundance estimates across the koala's range, with particular focus on those regions for which population size and trends are currently least known. Targeting regions where there were previous surveys but where there are no recent estimates will enable trends to be determined over a broader range of the species;
- Develop landscape-scale population models, to provide a framework for the assessment of relative threat risk and management intervention cost-effectiveness.
- Develop understanding of gene flow and landscape connectivity,
- Identify and delineate key populations.
- Maintain or enhance research programs directed at the assessment of the incidence and consequences to populations of disease, and of mechanisms to reduce the impacts of disease;
- Maintain or enhance research programs directed at the assessment of the incidence and consequences to populations of koala mortality or injury due to dogs and traffic, and of mechanisms to reduce the impacts of these threatening factors;
- Determine the ability of inland koala populations to persist after, or recover from, drought and evaluate the likely influence of climate change on these processes.

- Determine the social and economic benefits of costs of and barriers to implementing effective management interventions to conserve the koala across its range, including the governance arrangements.

Priority Management Actions

The following priority recovery and threat abatement actions will support the recovery of the koala in Queensland, New South Wales and the Australian Capital Territory. It should be noted that the status of, and threats to, individual koala populations vary over their range and thus so too will the priority actions. Additionally, koala populations are subject to a range of management prescriptions in different areas in response to varying circumstances. The actions identified below do not seek to reproduce the intent or detail of the relevant management plans. Rather, they identify at a broad level the important actions that are applicable over most of the koala's range in Queensland, New South Wales and the Australian Capital Territory. Persons or agencies responsible for koala conservation should consult the relevant plans at all scales when determining their own priority actions.

A recovery plan has been recommended under the EPBC Act and will be prepared for the combined koala populations in Queensland, New South Wales and the Australian Capital Territory. The recovery plan will commence following the expiration of the National Koala Conservation and Management Strategy in 2014 for the combined populations of Queensland, New South Wales and the Australian Capital Territory.

Habitat Loss, Disturbance and Modification

- Develop and implement a development planning protocol to be used in areas of koala populations to prevent loss of important habitat, koala populations or connectivity options.
- Development plans should explicitly address ways to mitigate risk of vehicle strike when development occurs adjacent to, or within, koala habitat.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Identify populations of high conservation priority.
- Investigate formal conservation arrangements, management agreements and covenants on private land, and for Crown and private land investigate and/or secure inclusion in reserve tenure if possible.
- Manage any other known, potential or emerging threats such a Bell Miner Associated Dieback or *Eucalyptus* rust.
- Develop and implement options of vegetation recovery and re-connection in regions containing fragmented koala populations, including inland regions in which koala populations were diminished by drought and coastal regions where development pressures have isolated koala populations.

Animal Predation

- Develop and implement a management plan to control the adverse impacts of predation on koalas by dogs in urban, peri-urban and rural environments.

Conservation Information

- Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.

This list does not necessarily encompass all actions that may be of benefit to koalas, but highlights those that are considered to be of highest priority at the time of preparing the Conservation Advice.

Existing Plans/Management Prescriptions that are Relevant to the Species

The National Koala Conservation and Management Strategy 2009-2014 (Natural Resource Management Ministerial Council 2010).

Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016 (Queensland EPA 2006).

Recovery plan for the koala (*Phascolarctos cinereus*) (NSW DECC 2008).

Queensland koala response strategy (Queensland Government 2011).

In New South Wales, some local councils have established, or are preparing, Comprehensive Koala Plans of Management under State Environmental Planning Policy 44. Enquiries about such plans should be directed to the local council where applicable.

These prescriptions were current at the time of publishing; please refer to the relevant agency's website for any updated versions.

Information Sources:

Munks SA, Corkrey R and Foley WJ (1996) Characteristics of arboreal marsupial habitat in the semi-arid woodlands of northern Queensland. Wildlife Research 23:185-195.

Natural Resource Management Ministerial Council (2010) National Koala Conservation and Management Strategy 2009–2014. Department of the Environment, Water, Heritage and the Arts

NSW DECC (2008) Recovery plan for the koala (*Phascolarctos cinereus*). New South Wales Department of Environment and Climate Change Sydney.

Queensland EPA (2006) Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016. Brisbane.

Queensland Government (2011) Koala response strategy.
Viewed: 15/11/2011
Available on the internet at: http://www.derm.qld.gov.au/wildlife-ecosystems/wildlife/koalas/koala_crisis_response_strategy/index.html

Senate Environment and Communications References Committee (2011) The koala—saving our national icon. Senate Printing Unit, Parliament House. Canberra

Attachment 2

Technical Document 1 – Impact Site

Technical Document 1 – Impact Site

EPBC2016/7817 – Condition 4

Offset Strategy – Technical Document 1 – Impact Site

Mirvac Greater Flagstone Project

Greenbank, Queensland

Prepared for Mirvac Queensland Pty Ltd

September 2020

Job 7598 E

saunders havill group

Document Control

Document: 7598 E Greenbank, Queensland, Mirvac Greater Flagstone Project Technical Document 1 - Impact Site, prepared by Saunders Havill Group for Mirvac Queensland Pty Ltd, dated September 2020.

Document Issue

Issue	Date	Prepared By	Checked By
Issue A	10.02.2020	JG/AW	AD
Issue B	14.02.2020	JG/LC	AD
Issue C	18.02.2020	JG	AD
Issue D	26.06.2020	JG	AD
Issue E	08.07.2020	AD/MC	AD
Issue F	11.09.2020	AD/MC	AD

Prepared by

ABN 24 144 972 949
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Table of Contents

Figures

Tables

1. Introduction

This 'Technical Document 1 - Impact Site' is intended to support the Mirvac Greater Flagstone Offset Strategy. It outlines the technical assessment and specific data sets that underpin the habitat quality scores achieved for the impact site that feed into the EPBC offset calculator to determine the quantum impact on critical habitat for the Koala and foraging habitat for the Grey-headed Flying-fox (GHFF).

The technical assessment for the offset site is contained within a separate supporting document 'Technical Document 2 – Offset Site', and that document should be consulted for the specific data that define the offset component.

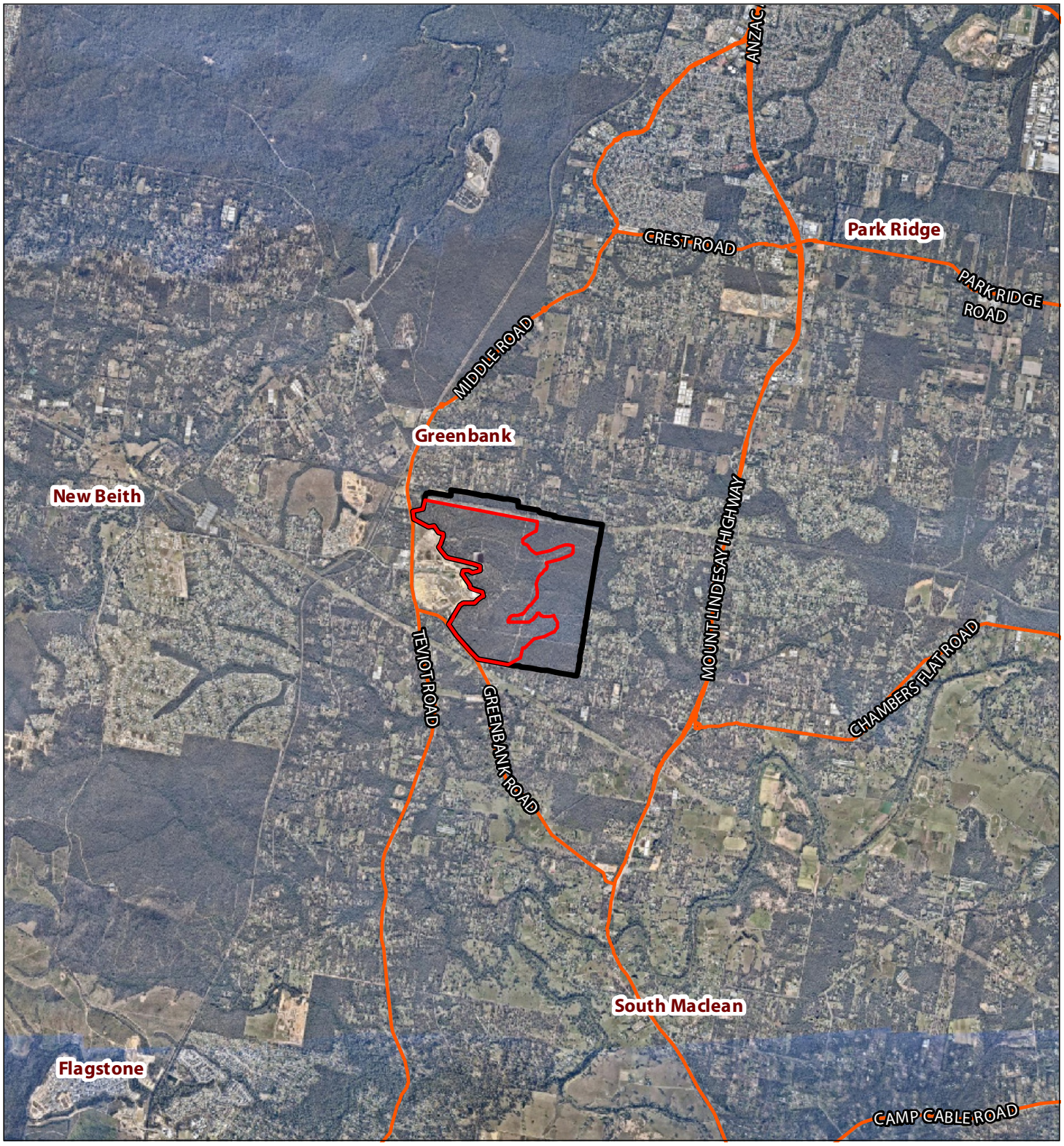
1.1. Impact Site Location and Details

The impact site is located at 456-522 Greenbank Road, Greenbank and is situated approximately 30 kilometres (km) south of Brisbane and 10 km west of Logan Village. The land comprises of the following cadastral allotment (refer to **Figures 1 & 2** for the Site Context and Site Aerial):

- Lot 1 on SP297192 (formerly Lot 205 on RP845844).

The land tenure is freehold and is located in the Greater Flagstone Priority Development Area (PDA) within the Logan City Council Local Government Area, where it retains an *urban living* land use zoning.

The site is bound by Greenbank Road to the south, Teviot Road to the west and is predominately surrounded by rural residential development. Wearing Park immediately adjoins the site to the east and Greenbank Shopping Centre and Community Centre are located opposite the site, on the western side of Teviot Road. The site is located approximately 1.5 km southeast of Greenbank Military Training Camp and 1 km east of the Brisbane-Sydney Railway Line (**Figures 1 & 2**).



Legend

- Referral area
- Referral impact area
- Major roads

Figure 1

Site Context

File ref. 7598 E Figure 1 Site Context A
Date *11/02/2020*
Project *Greater Flagstone Project*

0 1,000 2,000 3,000 *m*

Scale (A4): 1:75,000 [GDA 1994 MGA Z56]

N

Layer Sources Nearmap (2019)

Legend

- Referral area
- Referral impact area
- Qld DCDB

Figure 2

Site Aerial

File ref. 7598 E Figure 2 Site Aerial A
Date *11/02/2020*
Project *Greater Flagstone Project*

0 100 200 400 600 800 *m*

N

Scale (A4): 1:18,000 [GDA 1994 MGA Z56]

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2020, Aerial (Nearmap 2019)

2. Impact Site – Koala Impact Score

2.1. MHQA Methodology – Koala

The impact site was assessed using a modified version of the Queensland State Governments "Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy" Version 1.2 April 2017 (DEHP 2017). The purpose of this guideline is to provide a methodology for proponents to determine the habitat quality of a site under the Queensland Environmental Offsets framework. The guideline is a step-by-step methodology explaining how to measure habitat quality for land-based offsets. This methodology has been adopted and tailored/modified to assess the impacts and offsets relating to Matters of National Environmental Significance (MNES).

The traditional terrestrial habitat quality assessment assesses three (3) core indicators – Site Condition, Site Context and Species Habitat Index.

The modified habitat quality assessment (MHQA) combines the three (3) core indicators into two (2) (Site Condition and Site Context) with each being equally weighted at 30% of the final score. The balance of the weighting (40%) has been attributed to the third indicator which is independent of the traditional habitat quality assessment, being Species Stocking Rate. The Species Stocking Rate has been added to the MHQA to better incorporate MNES, and for the purpose of this offset strategy, the vulnerable-listed Koala MNES. The following section details the methodology utilised to assess the Site Condition, Site Context and Species Stocking Rate under the MHQA for Koala.

2.1.1 Site Condition – Koala

Assessing Site Condition is an integral step in determining specific quantification of impacts, while also determining whether or not an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset. The on-site condition is a key element of habitat quality and has a direct influence on the biodiversity it supports. Site Condition is assessed using a suite of attributes to describe the structure and function of the vegetation community, and is benchmarked against the expected range for a relatively undisturbed community.

The site condition assessment under the MHQA is assessed using fifteen (15) condition characteristics being:

- recruitment of woody perennial species in EDL;
- native plant species richness – trees;
- native plant species richness – shrubs;
- native plant species richness – grasses;
- native plant species richness – forbs;
- tree canopy height;
- Sub-canopy cover;
- tree canopy cover;
- native grass cover;
- organic litter;
- large trees;
- coarse woody debris;
- non-native plant cover;
- quality and availability of food and foraging habitat; and
- quality and availability of shelters.

Assessment methodology of the above condition characteristics do not differ from the traditional habitat quality assessment. In developing the MHQA to better incorporate MNES, two (2) Species Habitat Index characteristics, being:

- quality and availability of food and foraging habitat; and,
- quality and availability of shelters;

have been added to the site condition indicator.

2.1.2 Site Context – Koala

The Site Context assessment deals with the site and its adjacent surroundings. Site Context is measured using a suite of attributes to describe the location of the habitat within the surrounding landscape and the influence of its associated threats. This assessment also considers the influence of adjacent vegetated areas and ecological corridors. Under the MHQA, site context is measured using the following seven (7) characteristics:

- size of patch;
- connectedness;
- context;
- ecological corridors;
- role of site location to species overall population in the state;
- threats to the species; and
- species mobility capacity.

Unlike the traditional habitat quality assessment methodology where site connectedness is assessed against the surrounding remnant vegetation only, the MHQA site connectedness is assessed against the surrounding MNES habitat, in this instance, Koala habitat. Whilst remnant eucalypt forest vegetation is critical habitat for Koala, equally Koalas can utilise areas of non-remnant vegetation or high value regrowth vegetation that does not yet achieve remnant status. Therefore, site context under the MHQA accounts for surrounding Koala habitat rather than remnant vegetation.

In developing the MHQA, three (3) Species Habitat Index characteristics were nominated:

- role of site location to overall species population in the state;
- threats to the species; and,
- species mobility capacity.

2.1.3 Species Stocking Rate – Koala

The MHQA incorporates Species Stocking Rate as an attribute not discussed under the traditional terrestrial habitat assessment methodology. Species Stocking Rates are estimates of the Koala carrying capacity of the site at the time of undertaking the survey.

Baseline Koala activity levels were determined by utilising the Spot Assessment Technique (Phillips et al. 2011). The SAT survey results indicated a 'low – high' Koala activity across the site. Utilising these Koala activity levels, and inferring the results with current available published scientific literature, an estimated Koala carrying capacity (stocking rate) was determined.

2.1.4 Impact Site MHQA – Assessment Units

A map to define the assessment units of the impact site was prepared as per the Guide to determining terrestrial habitat quality (DEHP 2017) and the MHQA. The number of transects allocated per Assessment Unit is in accordance

with that agreed with the Department prior to the impact site habitat quality assessment field works being augmented accordingly.

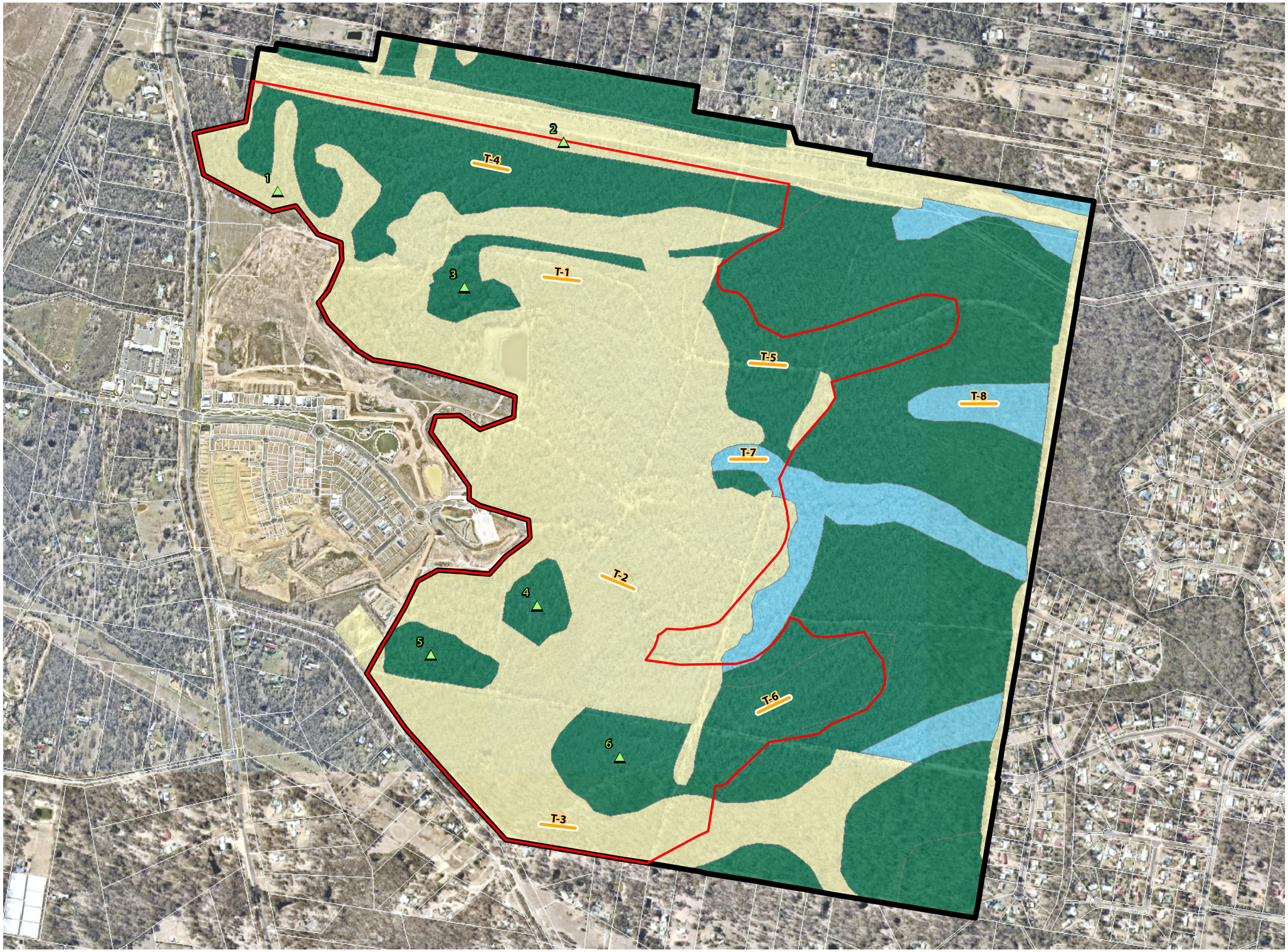
The impact site was divided into three assessment units agreed with the Department, as follows (refer **Plan A)**.

1. AU1 (Non-remnant RE12.9-10.2) – Three (3) transects and two (2) observation site
2. AU2 (Remnant RE12.9-10.2) – Three (3) transects and four (4) observation sites
3. AU3 (Remnant RE12.3.11) – Two (2) transects

The following are presented for reference in **Appendix A**.

- Raw habitat quality data summary
- Raw habitat quality transect data
- MHQA Working Sheets
- Biocondition benchmarks
- Koala SAT data
- Koala MHQA Summary Table

A. Impact Site Habitat Transects



NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources
Qld State Cadastre and Mapping layers © State of Queensland (Department of Natural Resources and Mines) 2019. Updated data available at http://qldspatialinformation.qld.gov.au/catalogue//
Aerial Imagery © Nearmap, 2019

*This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

Legend

- Referral area
- Impact area
- Qld DCDB
- Remnant on Alluvial plains
- Remnant on undulating country on fine grained sedimentary rocks or sandstone ranges
- Non-remnant area
- Habitat transects
- Vegetation observation site

Issue	Date	Description	Drawn	Checked
B	10/02/2020	Internal Update	TC	AD

0 50 100 200 300 400 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:11,000 @ A3

saunders havill group

mirvac

Everleigh

ADDRESS/RPD: Greenbank Road, Greenbank *10/02/2020* *7598 E01 Impact Site Habitat AUs B*

2.2. Site Condition – Koala

2.2.1 Habitat Transect Data Assessment – Koala

Table 1 outlines the application of the MHQA to Habitat Transect Data. Refer to **Appendix A** for empirical data from which these results are tabulated.

Table 1: Habitat Transect Data Assessment – Koala

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Recruitment of woody perennial species in EDL	5	3	5	3	These data are taken directly from transect information (**Appendix A**).
Native plant species richness – trees	5	2.5	2.5	2.5	
Native plant species richness – shrubs	5	0	0	0	
Native plant species richness – grasses	5	2.5	2.5	0	
Native plant species richness – forbs	5	2.5	2.5	0	
Tree canopy height	5	4	4	5	
Tree canopy cover	5	4	4	4	
Shrub canopy cover	5	0	0	0	
Native grass cover	5	1	3	0	
Organic litter	5	5	5	3	
Large trees	15	5	5	5	
Coarse woody debris	5	5	5	2	
Non-native plant cover	10	5	5	5	
Totals	**80**	**39.5**	**43.5**	**29.5**	The totals are a sum of the reference scores.

2.2.2 Species Habitat Index Data Site Condition – Koala

Table 2 provides the assessment of Species Habitat Indices that support the Site Condition score as per the MHQA. Justifications for the Species Habitat Indices are provided.

Table 2: Species Habitat Index Assessment – Site Condition – Koala

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Quality and availability of food and foraging habitat	10	5	5	5	Analysing the results of the raw data and MHQA Working Sheets (refer **Appendix A**) and **Table 1**, above, the quality and availability of food and foraging habitat and quality and availability of shelter habitat is moderate (score of 5). The results of the detailed surveys indicate that the Site Conditions for AU1, AU2 and AU3 scored 39.5, 43.5 and 29.5/80, which are considered within a moderate threshold.
Quality and availability of shelter habitat	10	5	5	5	
Totals	**20**	**10**	**10**	**10**	The totals are a sum of the reference scores.

2.2.3 Site Condition Scores – Koala

Table 3 provides the Site Condition scores for each assessment unit and the MHQA weighted score.

Table 3: Site Condition Scores – Koala

Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Site Condition Totals	100	49.5	53.5	39.5	The totals are a sum of **Table 1 & 2** totals.
MHQA Weighted Score (30%)	**3.00**	**1.49**	**1.61**	**1.19**	The MHQA weighting of 30% is applied to the Site Condition totals, above.

2.3. Site Context – Koala

2.3.1 GIS Data – Koala

Table 4 outlines the application of the MHQA to GIS Site Context data.

Table 4: GIS Data Assessment – Koala

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Size of the patch	10	10	10	10	Refer to **Appendix B Plan 1**.
Connectedness	5	2	2	2	Refer to **Appendix B Plan 2**.
Context	5	4	4	4	Refer to **Appendix B Plan 3**.
Ecological corridors	6	6	6	6	Refer to **Appendix B Plan 1**.
Totals	**26**	**22**	**22**	**22**	The totals are a sum of the reference scores.

2.3.2 Species Habitat Index Data Site Context – Koala

Table 5 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 5: Species Habitat Index Assessment – Site Context – Koala

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Role of site location to species overall population in the State	5	1	1	1	The site has been strategically designated within the urban footprint and Priority Development Area to cater for the future south east Queensland population. The site is fragmented from areas of broad conservation and connectivity associated with the Flinders-Karawatha Bioregional Corridor to the south-west by existing urban development, major roads and rail. This connectivity is anticipated to be further fragmented when future approvals within the Greater Flagstone PDA are implemented. Further, future development will result in an increase of key threats to the species, including road upgrades, new roads and an increase in domestic animals. As such, the role of the site location to species overall population in the State has scored a 1 (not or unlikely to be critical to species' survival), as per the MHQA - Site Context score methodology (refer **Appendix A** for supporting data and the Preliminary Documentation).
Threats to the species	15	7	7	7	A number of existing threats pose risk to survival of local Koala populations. These include: *Vehicle Strike*: A review of the Australian Koala Foundation Koala map shows a number of verified sightings for Koala within close proximity to the site were made along major roads including Greenbank Road (80kph), Teviot Road (80kph) and Mount Lindesay Highway (100kph). The location of these sightings indicates the risk of vehicular strike is considerably high. While the Ipswich Koala Protection Society has not released a newsletter since 2015, review of local records indicates a high percentage of deaths from vehicular strike in the Greenbank and Greater Flagstone areas. Additionally, it is noted that anticipated growth and planned upgrades to Teviot Road and Mount Lindesay Highway will result in increased traffic flows. *Dog Attack*: The Ipswich Koala Protection Society holds substantial records for both frequent and regular Koala mortality from vehicle strike and dog attack within the immediate proximity of the project site. LCC states on their website that on average, approximately 110 Koalas are attacked and killed by dogs each year. Further, between 1997 and 2008, EHP's Moggill Koala Hospital and the Australian Wildlife Hospital at Beerwah admitted around 1400 Koalas that had been attacked by dogs. Dog ownership in rural residential areas is considerably high, with properties >600m^2 allowed to keep 2 dogs without or up to 4 dogs with Council approval. As the site is within a rural residential context and fragmented from other major tracts of vegetation by local and State roads, existing threats are perceived as moderate and subsequently scored a 7 as per the MHQA - Site Context score methodology (refer **Appendix A** for supporting data and the Preliminary Documentation).

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Species mobility capacity	10	4	7	7	*AU1* The species mobility of the Koala for AU1 (non-remnant) is highly restricted as it immediately adjoins the existing, approved residential development to the west. This high level of restriction has been scored a 4, as per the MHQA - Site Context score methodology (refer **Appendix A** for supporting data). *AU2 & 3* The species mobility of the Koala for AU2 & AU3 (remnant) is moderately restricted given the surrounding rural residential properties and major roads. This moderate level of restriction has been scored a 7, as per the MHQA - Site Context score methodology (refer **Appendix A** for supporting data).
Totals	**30**	**12**	**15**	**15**	The totals are a sum of the reference scores.

2.3.3 Site Context Scores – Koala

Table 6 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 6: Site Context Scores – Koala

Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Site Context Totals	56	34	37	37	The totals are a sum of **Table 4 & 5** Totals.
MHQA Weighted Score (30%)	**3.00**	**1.82**	**1.98**	**1.98**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

2.4. Species Stocking Rate – Koala

Table 7 provides the Species Stocking Rate Scores for each assessment with justifications weighted as per the MHQA methodology.

Table 7: Species Stocking Rate Scores – Koala

Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
MHQA Weighted Species Stocking Rate Score (40%)	**4.00**	**2.29**	**2.29**	**2.29**	Species Stocking Rate (SSR) has been scored as per the results of the MHQA Working Sheets - Species Stocking Rate Table and SSR Supplementary Table as per **Appendix A**.

2.5. Modified habitat Quality Assessment Habitat Scores – Koala

Table 8 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Impact Site.

Table 8: Modified Habitat Quality Assessment Score – Koala

Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Site Condition MHQA Weighted Score	3.00	1.49	1.61	1.19	Refer MHQA Weighted Score **Table 3**.
Site Context MHQA Weighted Score	3.00	1.82	1.98	1.98	Refer MHQA Weighted Score **Table 6**.
Species Stocking MHQA Weighted Score	4.00	2.29	2.29	2.29	Refer MHQA Weighted Score **Table 7**.
Assessment Unit Habitat Assessment Scores	10.00	5.59	5.87	5.45	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	148.00	80.00	2.00	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.64	0.35	0.01	The Assessment Unit Area Weighting is the proportion of the total impact area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	NA	3.60	2.04	0.05	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Impact Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
Impact Site Modified Habitat Quality Score	**10**	**5.69**			The Impact Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.

2.6. Impact Site MHQA Score Summary – Koala

The Modified Habitat Quality Assessment (MHQA) tool for Koala was applied across the impact site to determine the impact site score for Koala habitat. Eight (8) MHQA transects were completed across the impact site focussing on the three (3) dominant vegetation communities impacted by the proposed development (**Plan A**), being:

1. Non-remnant RE12.9-10.2 – AU1
2. Remnant RE12.9-10.2 – AU2
3. Remnant RE12.3.11 – AU3

Results of the MHQA (refer **Sections 2.2 to 2.5**) indicate that:

4. AU1 (Non-remnant RE12.9-10.2) has a habitat quality score of **5.59**
5. AU2 (Remnant RE12.9-10.2 has a habitat quality score of **5.87**
6. AU3 (Remnant RE12.3.11) has a habitat quality score of **5.45**

2.6.1 Impact Site MHQA Score – Koala

With weighting, the impact site score totals 5.69. When the score is rounded, the impact site habitat quality for Koala is **6**.

The Impact Site has a Modified Habitat Quality Assessment Score for the Koala of 6

2.7. Quantum of Impact – Koala

The proposed residential development will see the direct removal or fragmentation of 230 hectares of critical habitat for the Koala. The residual impacts on the Koala as a result of the development will be the loss of 230 ha of critical habitat with a MHQA score of 6. As such, the Quantum of Impact is calculated as follows for the Koala:

Quantum of Impact for Koala = 230 ha * 0.6 = 138 ha

3. Impact Site – GHFF Impact Score

3.1. MHQA Methodology – GHFF

The impact site was assessed using a GHFF Foraging Habitat Assessment (GHFF FHA) tool developed by the Saunders Havill Group (2019) which adopts characteristics of the Queensland State Governments "Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy" Version 1.2 April 2017 (DEHP 2017), while also integrating published scientific literature on GHFF foraging habitat.

The traditional terrestrial habitat quality assessment assesses three (3) core indicators—Site Condition, Site Context and Species Habitat Index.

The GHFF FHA tool combines the aspects of the three (3) core indicators and published scientific literature into two (2) (Site Condition and Site Context) with Site Condition being weighted with 40% and Site Context weighted at 30% of the final score. The balance of the weighting (30%) has been attributed to the third indicator which is independent of the traditional habitat quality assessment, being Species Stocking Rate. The slightly higher 40% weighting attributed to the Site Condition criteria reflects that the impact adversely affects foraging habitat for the GHFF, with Site Context attributes for the highly mobile species and Species Stocking Rate where in this case a roost site is not impacted weighted evenly at 30% each for the balance of the score.

The Species Stocking Rate assessment incorporated in the GHFF FHA tool is focussed on 'foraging habitat' for GHFF rather than presence/absence of the species. This assessment of 'foraging habitat' for species stocking rate has been incorporated into the GHFF FHA tool as Grey-headed Flying-fox roosting camp or species presence was not observed on-site, however, suitable foraging habitat for the species was evident. Therefore, the density of foraging habitat available on-site is considered an appropriate assessment benchmark for Species Stocking Rate.

The following section details the methodology utilised to assess the Site Condition, Site Context and Species Stocking Rate under the GHFF FHA.

3.1.1 Site Condition – GHFF

Assessing site condition is an integral step in determining specific quantification of impacts, while also determining whether or not an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset. The on-site condition is a key element of habitat quality and has a direct influence on the biodiversity it supports. Site Condition is assessed using a suite of attributes to describe the structure and function of the vegetation community, and is benchmarked against the expected range for a relatively undisturbed community.

The site condition assessment under the GHFF FHA is assessed using six (6) condition characteristics being:

- Vegetation condition;
- Species richness (canopy trees);
- Flower scores (average);
- Timing of biological shortages;
- Quality of foraging habitat (trees >0.65 wt p*r); and
- Non-native plant cover.

Assessment methodology of the above condition characteristics is outlined below:

- Vegetation condition – This condition characteristic is assessed using the Queensland Vegetation Management Act 1999 vegetation community status definition, being Category B (remnant), Category C (high-value regrowth) and Category X (non-remnant). This characteristic is scored from a desktop mapping perspective and verified on-ground during assessment.

Table GHFF1: GHFF FHA Vegetation Condition Scoring

Score	Description
5	Category X / non-remnant
10	Category C / regrowth
20	Category B / remnant

- Species richness (canopy trees) – This condition characteristic is assessed using a 100 m X 20 m plot following the contour of the land when possible. Within the plot, all canopy tree and subcanopy tree specimens are recorded. It should be noted that non-GHFF foraging species are also documented.

Table GHFF 2: GHFF FHA Species Richness Scoring

Score	Description
0	0 GHFF foraging species
5	1 – 3 GHFF foraging species
10	4 – 6 GHFF foraging species
20	> 6 GHFF foraging species

- Flower scores (average) – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within 'Ranking the feeding habitat of Grey-headed flying foxes for conservation management' (Eby and Law 2008) and the Draft Recovery Plan for the Grey-headed Flying-fox (DEE 2017) and determining the flower score of the recorded canopy species. The individual score for each flowering GHFF foraging tree is then divided by the number of species recorded (GHFF foraging and non-GHFF foraging trees) to produce an average. The benchmark values for this condition characteristic have been derived from the findings published by Eby and Law (2008 - Ranking the feeding habitat of Grey-headed flying foxes for conservation management).

Table GHFF 3: GHFF FHA Flower Score (average) Scoring

Score	Description
2	0.01 – 0.25
5	0.26 – 0.50
8	0.51 – 0.75
10	0.76 – 1.00

- Timing of biological shortages – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within 'Ranking the feeding habitat of Grey-headed flying foxes for conservation management' (Eby and Law 2008) and the Draft Recovery Plan for the Grey-headed Flying-fox (DEE 2017) and determining the ability of the canopy species in the vegetation community to produce foraging habitat during biological shortages (food shortages, pregnancy and birthing, lactation, mating and conception, migration paths and fruit industries). It should be noted that this condition characteristic is weighted and 'food shortages' has been weighted heavier than the balance of the characteristics which are equal, as 'food shortages' is recognised as a major issue.

Table GHFF 4: GHFF FHA Timing of Biological Shortages Scoring

Score	Description
2.5	Food shortages
1.5	Pregnancy and birthing
1.5	Lactation
1.5	Mating and conception
1.5	Migration paths
1.5	Fruit industries
Total (/10)	Combine total of above

- Quality of foraging habitat – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within 'Ranking the feeding habitat of Grey-headed flying foxes for conservation management' (Eby and Law 2008) and the Draft Recovery Plan for the Grey-headed Flying-fox (DEE 2017) and determining which canopy species recorded contain a flower score greater than 0.65 wt p*r and is recognised as a significant food plant by Eby and Law (2008). It should be noted that species recorded that are not prescribed a value by Eby and Law (2008) but are recognised as GHFF foraging trees have been given an average weighted value of related species or, in the case of *Eucalyptus crebra* (Narrow-leaved Ironbark) been prescribed a value of 0.65 and classified as a significant food plant given its importance as a winter flowering species as acknowledged in the Draft Recovery Plan for the Grey-headed Flying-fox (DEE 2017).

Table GHFF 5: GHFF FHA Quality of Foraging Habitat (trees >0.65 wt p*r) Scoring

Score	Description
0	0 significant GHFF foraging tree species
5	1 – 3 significant GHFF foraging tree species
10	4 – 6 significant GHFF foraging tree species
20	> 6 significant GHFF foraging tree species

- Non-native plant cover – This condition characteristic is assessed using a 100 m X 20 m plot following the contour of the land when possible. All non-native plant cover was assessed by estimating the cover of exotic species over the 100 m X 20 m plot.

Table GHFF 6: GHFF FHA Non-Native Plant Cover Scoring

Score	Description
1	> 50 % non-native plant cover
5	25 – 50 % non-native plant cover
10	5 – 25 % non-native plant cover
20	< 5 % non-native plant cover

It should be noted that for on-ground assessment purposes, the 100 m X 20 m plot utilised for the GHFF FHA overlaps with the on-ground condition characteristics of the Koala MHQA (refer **Plan A** and **Appendix A**).

3.1.2 Site Context – GHFF

The site context assessment deals with the site and its adjacent surroundings. Site context is measured using a suite of attributes to describe the location of the habitat within the surrounding landscape and the influence of its associated threats. This assessment also considers the influence of adjacent vegetated areas and ecological corridors. Under the GHFF FHA, site context is measured using the following six (6) characteristics:

- Size of patch;
- Connectedness (active GHFF roost camps in a 30 km radius);
- Context (percentage of GHFF foraging habitat in a 20 km radius);
- Ecological corridors;
- Role of site location to species overall population in the state (active GHFF national flying-fox monitoring viewer 'level 3' roost camps in a 30 km radius); and
- Threats to the species.

Assessment methodology of the above context characteristics is outlined below:

- Size of patch – This context characteristic is assessed using a modified version of the traditional habitat quality assessment with the directly connected patch of GHFF foraging habitat to site measured. This context characteristic is measured using GIS. The benchmark values for this context characteristic are those used in the traditional habitat quality assessment.

Table GHFF 7: GHFF FHA Size of Patch Scoring

Score	Description
0	< 5 hectares
2	5 – 25 hectares
5	26 – 100 hectares
7	101 – 200 hectares
10	> 200 hectares

- Connectedness – This context characteristic is assessed by analysing the number of active GHFF roost camps (over the past year of monitoring (11/17 – 11/18)) within a 30 km radius of the site. For consistency purposes this assessment is to utilise the data provided on the national flying-fox monitoring viewer (Australian Government).

Table GHFF 8: GHFF FHA Connectedness Scoring

Score	Description
0	< 1 active Grey-headed Flying-fox camp within a 30 km radius
3	1 – 3 active Grey-headed Flying-fox camp within a 30 km radius
6	4 – 6 active Grey-headed Flying-fox camp within a 30 km radius
10	> 6 active Grey-headed Flying-fox camp within a 30 km radius

- Context – This context characteristic is assessed using a modified version of the traditional habitat quality assessment with the percentage of GHFF foraging habitat within a twenty (20) kilometre buffer of the site measured. This context characteristic is measured using GIS.

Table GHFF 9: GHFF FHA Context Scoring

Score	Description
0	< 10 % Grey-headed Flying-fox foraging habitat within a 20 km radius
3	10 – 30 % Grey-headed Flying-fox foraging habitat within a 20 km radius
6	31 – 75 % Grey-headed Flying-fox foraging habitat within a 20 km radius
10	> 75 % Grey-headed Flying-fox foraging habitat within a 20 km radius

- Ecological corridors – This context characteristic is assessed using the traditional habitat quality assessment methodology which involves determining the proximity of the site to state, bioregional, regional or sub-regional corridors.

Table GHFF 10: GHFF FHA Ecological Corridors Scoring

Score	Description
0	Not within an ecological corridor
6	Sharing a common boundary with an ecological corridor
10	Within an ecological corridor

- Threats to species – This context characteristic is assessed by analysing the published scientific literature regarding threats to GHFF and determining the number and severity of the threatening processes observed at or adjacent to the site.

Table GHFF 11: GHFF FHA Threats to Species Scoring

Score	Description
1	High level threat to the species
5	Moderate level threat to the species
10	Low level threat to the species

- Role of site location to species overall population in the state (active GHFF national flying-fox monitoring viewer 'level 3' roost camps in a 30 km radius) – This context characteristic is assessed by analysing the number of active GHFF roost camps level 3 or greater (over the past year of monitoring within a 30 km radius of the site. For consistency purposes this assessment is to utilise the data provided on the national flying-fox monitoring viewer (Australian Government).

Table GHFF 12: GHFF FHA Role of Site Location to Species Overall Population in the State Scoring

Score	Description
0	< 1 active level 3 Grey-headed Flying-fox camp within a 30 km radius
5	1 – 3 active level 3 Grey-headed Flying-fox camp within a 30 km radius
10	> 3 active level 3 Grey-headed Flying-fox camp within a 30 km radius

3.1.3 Species Stocking Rate – GHFF

The GHFF FHA incorporates Species Stocking Rate is an attribute not discussed under the traditional terrestrial habitat assessment methodology. As discussed above, species stocking rate for GHFF associated with this proposed action is related to the density of GHFF foraging habitat at the site at the time of undertaking the survey.

Species stocking rate was determined based on the percentage of large trees recorded relative to the benchmark of for each assessment unit using State habitat quality threshold scoring.

Table GHFF 13: Species Stocking Rate Scoring

Score	Large trees present
0	No large trees present
5	0-50% of the benchmark Regional Ecosystem DBH
10	>50%-100% of the benchmark Regional Ecosystem DBH
15	>100% of the benchmark Regional Ecosystem DBH

3.1.4 Impact Site MHQA – Assessment Units

Refer **Section 2.1.1** and **Plan A**. The following additional items are presented for reference in **Appendix A**.

- GHFF MHQA Summary Table

3.2. Site Condition – GHFF

Table 9 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 9: Site Condition Scores – GHFF

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Vegetation Condition	20	5	20	20	Category X non-remnant vegetation is scored 5 (AU1) and Category B remnant vegetation is scored 20 (AU2 & AU3, refer **Table GHFF 1**).
Species Richness	20	10	10	10	From the transect data at **Appendix A** the site supports: AU1 – Mean 5.33 (T1 = 6, T2 = 7, T3 = 3) scores 10 (**Table GHFF 2**). AU2 – Mean 4.33 (T4 = 5, T5 = 5, T6 = 3) scores 10 (**Table GHFF 2**). AU3 – Mean 4.00 (T5 = 5, T6 = 3) scores 10 (**Table GHFF 2**). The species richness score for each assessment unit is 10.
Flower Score	10	8	8	8	From the transect data at **Appendix A** the site supports: AU1 – Mean 0.533 (T1 Mean 0.590, T2 Mean 0.460, T3 Mean 0.550) scores 8 (**Table GHFF 3**). AU2 – Mean 0.589 (T4 Mean 0.627, T5 Mean 0.589, T6 Mean 0.550) scores 8 (**Table GHFF 3**). AU3 – Mean 0.558 (T7 Mean 0.460, T8 Mean 0.655) scores 8 (**Table GHFF 3**). The flower score for each assessment unit is 8.
Timing of Biological Shortages	10	10	10	10	From the transect data at **Appendix A** the site supports: AU1 – Mean 10 (T1 = 10, T2 = 10, T3 = 10) (**Table GHFF 4**). AU2 – Mean 10 (T4 =10, T5 =10, T6 = 10) (**Table GHFF 4**). AU3 – Mean 10 (T7 = 10, T8 = 10) (**Table GHFF 4**). The timing of biological shortages score for each assessment unit is the maximum of 10.
Quality of Foraging Habitat	20	5	5	5	From the transect data at **Appendix A** the site supports: AU1 – Mean 3.00 (T1 = 2, T2 = 4, T3 = 3) scores 5 (**Table GHFF 5**). AU2 – Mean 2.33 (T4 = 3, T5 = 2, T6 = 2) scores 5 (**Table GHFF 5**). AU3 – Mean 1.50 (T5 = 2, T6 = 1) scores 5 (**Table GHFF 5**). The quality of foraging habitat score for each assessment unit is 5.
Non-native Plant Cover	20	10	10	10	From the transect data at **Appendix A**, non-native plant cover score is 10 (5-25% cover, refer **Table GHFF 6**).
Site Condition Totals	**100**	**48**	**63**	**63**	The totals are a sum of the reference scores.
MHQA Weighted Score (40%)	**4.00**	**1.92**	**2.52**	**2.52**	The MHQA weighting of 40% is applied to the Site Condition Totals, above.

3.3. Site Context – GHFF

3.3.1 GIS Data – GHFF

Table 10 outlines the application of the MHQA to GIS Site Context data.

Table 10: GIS Data Assessment – GHFF

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Size of the patch	10	10	10	10	The patch size is greater than 200 ha and scores 10. Refer to **Appendix B Plan 1** and **Table GHFF 7.**
Connectedness	10	10	10	10	There are fourteen active GHFF camps within 30 km of the site and scores 10. Refer to **Appendix B Plan 4** and **Table GHFF 8**.
Context	10	6	6	6	There is greater than 30% but less than 75% foraging habitat within a 20 km radius of the site and scores 6 (39.9%, refer to **Appendix B Plan 5** and **Table GHFF 9**).
Ecological corridors	10	10	10	10	The site is within an ecological corridor and scores 10. Refer to **Appendix B Plan 1** and **Table GHFF 10**.
Totals	**40**	**36**	**36**	**36**	The totals are a sum of the reference scores.

3.3.2 Species Habitat Index Data Site Context – GHFF

Table 11 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 11: Species Habitat Index Assessment – Site Context – GHFF

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Threats to species	10	10	10	10	The impact site is considered to maintain low level threats to species. Although there are power lines in the north of the site, these are distant from the flowering trees and there is no fruit netting or other flying-fox controls on-site. Each assessment unit scores a 10 (**Table GHFF 11**).
Role of site location to species overall population in the state	10	10	10	10	There are four GHFF camps greater than or equal to level 3 within 30 km of the site (**Appendix B Plan 4**). The score for each assessment unit is 10 (**Table GHFF 12**).
Totals	**20**	**20**	**20**	**20**	The totals are a sum of the reference scores.

3.3.3 Site Context Scores – GHFF

Table 12 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 12: Site Context Scores – GHFF

Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Site Condition Totals	60	56	56	56	The totals are a sum of **Table 10 & 11** totals.
MHQA Weighted Score (30%)	**3.00**	**2.80**	**2.80**	**2.80**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

3.4. Species Stocking Rate – GHFF

Table 13 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 13: Species Stocking Rate Scores – GHFF

Site Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
GHFF Foraging Tree Density	15	5	5	5	Each score is based on the percentage of large trees recorded relative to the biocondition benchmark for each assessment unit. From the transect data the site supports: AU1 – Mean 18% (T1 = 12, T2 = 10, T3 = 0) scores 5 (**Table GHFF 13**). AU2 – Mean 26% (T4 =6, T5 = 24, T6 = 0) scores 5 (**Table GHFF 13**). AU3 – Mean 41% (T7 = 16, T8 = 2) scores 5 (**Table GHFF 13**). The GHFF foraging tree density Species Stocking Rate score for each assessment unit is 5.
MHQA Weighted Score (30%)	**3.00**	**1.00**	**1.00**	**1.00**	The MHQA weighting of 30% is applied to the Species Stocking Rate Scores, above.

3.5. Modified habitat Quality Assessment Habitat Scores – GHFF

Table 14 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Impact Site.

Table 14: Modified Habitat Quality Assessment Score – GHFF

Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Site Condition MHQA Weighted Score	4.00	1.92	2.52	2.52	Refer MHQA Weighted Score **Table 9**.
Site Context MHQA Weighted Score	3.00	2.80	2.80	2.80	Refer MHQA Weighted Score **Table 12**.
Species Stocking Rate MHQA Weighted Score	3.00	1.00	1.00	1.00	Refer MHQA Weighted Score **Table 13**.

Reference	Maximum Score	AU1 – Non-remnant	AU2 – RE12.9-10.2	AU3 – RE 12.3.11	Justification
Assessment Unit Habitat Assessment Scores	10.00	5.72	6.32	6.32	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	148.00	80.00	2.00	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.64	0.35	0.01	The Assessment Unit Area Weighting is the proportion of the total impact area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	NA	3.68	2.20	0.05	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Impact Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
Impact Site Modified Habitat Quality Score	**10**	**5.93**			The Impact Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.

3.6. Impact Site MHQA Score Summary – GHFF

The Modified Habitat Quality Assessment (MHQA) tool for GHFF was applied across the impact site to determine the impact site score for GHFF habitat. Eight (8) MHQA transects were completed across the impact site focussing on the three (3) dominant vegetation communities impacted by the proposed development (**Plan A**), being:

1. Non-remnant RE12.9-10.2 – AU1
2. Remnant RE12.9-10.2 – AU2
3. Remnant RE12.3.11 – AU3

Results of the MHQA (refer **Sections 3.2 to 3.5**) indicate that:

1. AU1 (Non-remnant RE12.9-10.2) has a habitat quality score of **5.72**
2. AU2 (Remnant RE12.9-10.2 has a habitat quality score of **6.32**
3. AU3 (Remnant RE12.3.11) has a habitat quality score of **6.32**

3.6.1 Impact Site MHQA Score – GHFF

With area weighting, the impact site score totals 5.93. When the score is rounded, the impact site habitat quality for GHFF is **6**.

The Impact Site has Modified Habitat Quality Assessment Score for the GHFF of 6

3.7. Quantum of Impact – GHFF

The proposed residential development will see the direct removal or fragmentation of 230 hectares of foraging habitat for the Grey-headed Flying-fox. The residual impacts on the GHFF as a result of the development will be the loss of 230 ha of foraging habitat with a MHQA score of 6. As such, the Quantum of Impact is calculated as follows for the GHFF:

Quantum of Impact for GHFF = 230 ha * 0.6 = 138 ha.

4. Appendices

Appendix A

Habitat Quality Data

Appendix B

Site Context GIS Data

Appendix A

Habitat Quality Data

Raw Habitat Transect Data Summary Table

Assessment Units	AU1 - Non-remnant 12.9-10.2				AU2 - Remnant 12.9-10.2				AU3 - Remnant 12.3.11		
Transect Number and Assessment Unite Mean	T1	T2	T3	Mean	T4	T5	T6	Mean	T7	T8	Mean
Recruitment of woody perennial species in EDL	0	33	100	44.33	100	57	100	85.67	60	33	46.5
Native plant species richness – trees	6	6	2	4.67	3	7	2	4.00	5	3	4
Native plant species richness – T2	4	6	5	5.00	7	5	5	5.67	7	5	6
Native plant species richness – shrubs	1	0	0	0.33	0	0	1	0.33	0	0	0
Native plant species richness – grasses	2	2	3	2.33	2	2	3	2.33	2	2	2
Native plant species richness – forbs	7	4	4	5.00	4	7	5	5.33	7	2	4.5
Tree canopy height	16	16	18	16.67	24	20	22	22.00	18	24	21
Tree canopy cover	24.4	75.4	44.2	48.00	69.1	48.8	39.4	52.43	25.3	62.5	43.9
T2 canopy height	7	7	10	8.00	8	8	8	8.00	9	10	9.5
T2 canopy cover	76.4	76.6	61.9	71.63	68.1	89.5	36.5	64.70	76.7	88.3	82.5
Shrub canopy cover	1.7	0	0	0.57	0	0	0	0.00	0	0	0
Native grass cover	9.4	3.6	16.2	9.73	3.2	3	34	13.40	1.2	4.6	2.9
Organic litter	57	95	76.8	76.27	91.6	93.4	32.6	72.53	73.2	94	83.6
Large trees euc	6	5	0	3.67	3	12	0	5.00	8	1	4.5
Large trees non-euc	0	0	0	0.00	0	1	0	0.33	1	0	0.5
Coarse woody debris	14	47.2	27.4	29.53	22.6	18.6	35.5	25.57	25.7	16.6	21.15
Non-native plant cover	20	5	5	10.00	10	5	5	6.67	15	5	10

Raw Habitat Transect Data

Habitat Quality Site Assessment Template.....

PLEASE NOTE - YELLOW INDICATES AN AUTO POPULATED FIELD

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Please note that this form should be completed individually for each assessment unit under consideration.

Is this Assessment for:	An Impact Site	☑	An Offset Site	☐	an Advanced Offset Site	☐

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Job Number	7598	Project Name	

Part B - Site Data

Property		Date	1/08/2019

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
1		12.9-10.2	Southeast Queensland

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.

Site description and Location (including details of discrete polygons within the assessment unit)

Transect 1 - Non-remnant with scatterd canopy trees, moderate weeds, high leaf litter

Part C - Native Species Richness: (*list species below)

Tree species richness:			
Total number of species	6		
Scientific Name	*Corymbia citriodora*	Common Name	Spotted Gum
Scientific Name	*Eucalyptus tereticornis*	Common Name	Forest Red Gum
Scientific Name	*Angophora leiocarpa*	Common Name	Smooth-barked Apple
Scientific Name	*Eucalyptus siderophloia*	Common Name	Grey Ironbark
Scientific Name	*Acacia leiocalyx*	Common Name	Early Black Wattle
Scientific Name	*Eucalyptus crebra*	Common Name	Narrow Leaved Ironbark
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	1		
Scientific Name	*Jacksonia scoparia*	Common Name	Dogwood
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	2		
Scientific Name	*Imperata cylindrica*	Common Name	Blady Grass
Scientific Name	*Aristida vagans*	Common Name	Threeawn Speargrass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	7		
Scientific Name	*Lobelia purpurascens*	Common Name	White Root
Scientific Name	*Chrysocephalum apiculatum*	Common Name	Yellow Buttons
Scientific Name	*Parsonsia straminea*	Common Name	Monkey Rope
Scientific Name	*Adiantum atroviride*	Common Name	Maidenhair Fern
Scientific Name	*Dianella caerulea*	Common Name	Blue Flax-lily
Scientific Name	*Gahnia aspera*	Common Name	Saw Sedge
Scientific Name	*Melichrus procumbens*	Common Name	Jam Tarts

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	20.00%		
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Danthonia spicata*	Common Name	Poverty Grass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	140.00		
1	1.10	26	
2	1.40	27	
3	3.20	28	
4	2.60	29	
5	3.80	30	
6	1.90	31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	

23		48	
24		49	
25		50	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	10.00%	10.00%	12.00%	5.00%	10.00%	9.40%
Native other grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Native forbs and other species	5.00%	30.00%	5.00%	35.00%	15.00%	18.00%
Native shrubs	0.00%	0.00%	8.00%	0.00%	0.00%	1.60%
Non-native grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Non native forbs and shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Litter	85.00%	0.00%	75.00%	60.00%	65.00%	57.00%
Rock	0.00%	0.00%	0.00%	0.00%	0.00%	
Bare Ground	0.00%	0.00%	0.00%	0.00%	10.00%	2.00%
Cryptogram	0.00%	0.00%	0.00%	0.00%	0.00%	

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	380	Non- Eucalypt Large tree DBH benchmark used:	200
Number of large eucalypt trees:	6	Number of large non eucalypt trees:	0
Total Number Large Trees:	6		

Median Tree Canopy Height Measurements	Canopy:	16.00	Sub-canopy:	7.00	Emergent:	

Percentage of ecologically dominant layer species regenerating:	0

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	24.40%	Sub-canopy:	76.40%	Emergent:	0.00%
Shrub canopy cover %	1.70%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	5.20%	12.80%	7.60%	T2	0.00%	13.60%	13.60%
T1	30.20%	34.10%	3.90%	T2	17.30%	47.20%	29.90%
T1	60.90%	67.20%	6.30%	T2	51.60%	69.00%	17.40%
T1	93.40%	100.00%	6.60%	T2	79.10%	90.90%	11.80%
T1				T2	96.30%	100.00%	3.70%
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			

Layer	Start	End	Interval	Layer	Start	End	Interval
Shrub	42.80%	43.80%	1.00%	Shrub			
Shrub	71.90%	72.60%	0.70%	Shrub			
Shrub				Shrub			
Shrub				Shrub			

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Habitat Quality Site Assessment Template.....

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Is this Assessment for:	An Impact Site	☑	An Offset Site	☐	an Advanced Offset Site	☐

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Job Number	7598	Project Name	

Part B - Site Data

Property		Date	1/08/2019

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
1		12.9-10.2	Southeast Queensland

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.

Site description and Location (including details of discrete polygons within the assessment unit)

Transect 2 - non-remnant

Part C - Native Species Richness: (*list species below)

Tree species richness:			
Total number of species	6		
Scientific Name	*Corymbia citriodora*	Common Name	Spotted Gum
Scientific Name	*Eucalyptus tereticornis*	Common Name	Forest Red Gum
Scientific Name	*Corymbia intermedia*	Common Name	Pink Bloodwood
Scientific Name	*Eucalyptus siderophloia*	Common Name	Grey Ironbark
Scientific Name	*Corymbia tesselaris*	Common Name	Moreton Bay Ash
Scientific Name	*Eucalyptus crebra*	Common Name	Narrow-leaved Iron Bark
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	0		
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	2		
Scientific Name	*Imperata cylindrica*	Common Name	Blady Grass
Scientific Name	*Aristida vagans*	Common Name	Threeawn Speargrass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	4		
Scientific Name	*Lobelia purpurascens*	Common Name	White Root
Scientific Name	*Lomandra multiflora*	Common Name	Many Flowered Mat Rush
Scientific Name	*Dianella caerulea*	Common Name	Blue Flax-lily
Scientific Name	*Gahnia aspera*	Common Name	Saw Sedge
Scientific Name		Common Name	
Scientific Name		Common Name	

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	5.00%		
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Cyperus rotundus*	Common Name	Nutgrass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	472.00		
1	2.00	26	
2	1.00	27	
3	10.00	28	
4	3.00	29	
5	4.00	30	
6	3.00	31	
7	2.10	32	
8	3.20	33	
9	0.90	34	
10	2.00	35	
11	1.00	36	
12	2.00	37	
13	4.00	38	
14	2.00	39	
15	5.00	40	
16	2.00	41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	

24		49	
25		50	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	5.00%	5.00%	2.00%	4.00%	2.00%	3.60%
Native other grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Native forbs and other species	0.00%	0.00%	0.00%	0.00%	0.00%	
Native shrubs	2.00%	0.00%	0.00%	2.00%	3.00%	1.40%
Non-native grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Non native forbs and shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Litter	93.00%	95.00%	98.00%	94.00%	95.00%	95.00%
Rock	0.00%	0.00%	0.00%	0.00%	0.00%	
Bare Ground	0.00%	0.00%	0.00%	0.00%	0.00%	
Cryptogram	0.00%	0.00%	0.00%	0.00%	0.00%	

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	380	Non- Eucalypt Large tree DBH benchmark used:	200
Number of large eucalypt trees:	5	Number of large non eucalypt trees:	0
Total Number Large Trees:	5		

Median Tree Canopy Height Measurements	Canopy:	16.00	Sub-canopy:	7.00	Emergent:	

Percentage of ecologically dominant layer species regenerating:	33

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	75.40%	Sub-canopy:	76.60%	Emergent:	0.00%
Shrub canopy cover %	0.00%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	0.00%	26.20%	26.20%	T2	0.00%	1.60%	1.60%
T1	38.40%	52.60%	14.20%	T2	4.60%	12.90%	8.30%
T1	57.30%	65.20%	7.90%	T2	14.60%	19.40%	4.80%
T1	70.90%	87.00%	16.10%	T2	21.00%	42.20%	21.20%
T1	89.00%	100.00%	11.00%	T2	47.70%	53.70%	6.00%
T1				T2	56.40%	61.40%	5.00%
T1				T2	64.00%	73.00%	9.00%
T1				T2	75.70%	89.80%	14.10%
T1				T2	93.40%	100.00%	6.60%
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			

Layer	Start	End	Interval	Layer	Start	End	Interval
Shrub							
Shrub							
Shrub							
Shrub							

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Habitat Quality Site Assessment Template.....

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Is this Assessment for: **An Impact Site** ☑ **An Offset Site** ☐ **an Advanced Offset Site** ☐

Habitat Quality Assessment Unit Score Sheet			

Part A - Administrative

Job Number	7598	Project Name	

Part B - Site Data

Property		Date	1/08/2019

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
1		12.9-10.2	Southeast Queensland

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.
Site description and Location (including details of discrete polygons within the assessment unit)
Transect 3 - Non remnant

Part C - Native Species Richness: (*list species below)

Tree species richness:			
Total number of species	2		
Scientific Name	*Corymbia citriodora*	Common Name	Spotted Gum
Scientific Name	*Eucalyptus crebra*	Common Name	Narrow-leaved Iron Bark
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	0		
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	3		
Scientific Name	*Imperata cylindrica*	Common Name	Blady Grass
Scientific Name	*Themeda triandra*	Common Name	Kangaroo Grass
Scientific Name	*Aristida leptopoda*	Common Name	White Speargrass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	4		
Scientific Name	*Chrysocephalum apiculatum*	Common Name	Yellow Buttons
Scientific Name	*Lomandra multiflora*	Common Name	Many Flowered Mat Rush
Scientific Name	*Entolasia stricta*	Common Name	Wiry Panic
Scientific Name	*Ozothamnus diosmifolius*	Common Name	Sago Flower
Scientific Name		Common Name	
Scientific Name		Common Name	

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	5.00%		
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Sida rhombifolia*	Common Name	Sida
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	274.00		
1	6.00	26	
2	4.00	27	
3	1.50	28	
4	3.00	29	
5	1.00	30	
6	1.00	31	
7	0.40	32	
8	4.00	33	
9	6.50	34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	

24		49	
25		50	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	2.00%	4.00%	20.00%	15.00%	40.00%	16.20%
Native other grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Native forbs and other species	0.00%	0.00%	0.00%	0.00%	25.00%	5.00%
Native shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Non-native grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Non native forbs and shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Litter	98.00%	96.00%	80.00%	75.00%	35.00%	76.80%
Rock	0.00%	0.00%	0.00%	0.00%	0.00%	
Bare Ground	0.00%	0.00%	0.00%	0.00%	0.00%	
Cryptogram	0.00%	0.00%	0.00%	0.00%	0.00%	

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	380	Non- Eucalypt Large tree DBH benchmark used:	200
Number of large eucalypt trees:	0	Number of large non eucalypt trees:	0
Total Number Large Trees:	0		

Median Tree Canopy Height Measurements	Canopy:	18.00	Sub-canopy:	10.00	Emergent:	

Percentage of ecologically dominant layer species regenerating:	100

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	44.20%	Sub-canopy:	61.90%	Emergent:	0.00%
Shrub canopy cover %	0.00%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	10.20%	17.40%	7.20%	T2	2.90%	3.20%	0.30%
T1	18.90%	23.00%	4.10%	T2	8.60%	17.30%	8.70%
T1	29.00%	34.20%	5.20%	T2	19.30%	29.50%	10.20%
T1	42.40%	47.70%	5.30%	T2	40.90%	55.40%	14.50%
T1	49.00%	56.10%	7.10%	T2	62.10%	67.80%	5.70%
T1	58.10%	62.60%	4.50%	T2	73.20%	76.10%	2.90%
T1	75.00%	81.30%	6.30%	T2	77.90%	93.10%	15.20%
T1	95.50%	100.00%	4.50%	T2	95.60%	100.00%	4.40%
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			

Layer	Start	End	Interval	Layer	Start	End	Interval
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Habitat Quality Site Assessment Template.....

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Is this Assessment for:	An Impact Site	☑	An Offset Site	☐	an Advanced Offset Site	☐

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Job Number	7598	Project Name	

Part B - Site Data

Property		Date	1/08/2019

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
2		12.9-10.2	Southeast Queensland

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.

Site description and Location (including details of discrete polygons within the assessment unit)

Transect 4 - remnant

Part C - Native Species Richness: (*list species below)

Tree species richness:			
Total number of species	3		
Scientific Name	*Corymbia citriodora*	Common Name	Spotted Gum
Scientific Name	*Eucalyptus crebra*	Common Name	Narrow-leaved Iron Bark
Scientific Name	*Eucalyptus tereticornis*	Common Name	Forest Red Gum
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	0		
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	2		
Scientific Name	*Imperata cylindrica*	Common Name	Blady Grass
Scientific Name	*Aristida leptopoda*	Common Name	White Speargrass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	4		
Scientific Name	*Chrysocephalum apiculatum*	Common Name	Yellow Buttons
Scientific Name	*Lomandra multiflora*	Common Name	Many Flowered Mat Rush
Scientific Name	*Parsonsia straminea*	Common Name	Monkey Rope
Scientific Name	*Ozothamnus diosmifolius*	Common Name	Sago Flower
Scientific Name		Common Name	
Scientific Name		Common Name	

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	10.00%		
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	226.00		
1	4.00	26	
2	6.00	27	
3	2.00	28	
4	4.00	29	
5	1.10	30	
6	1.30	31	
7	3.40	32	
8	0.80	33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	

24		49	
25		50	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	6.00%	3.00%	4.00%	2.00%	1.00%	3.20%
Native other grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Native forbs and other species	0.00%	0.00%	0.00%	0.00%	0.00%	
Native shrubs	0.00%	0.00%	8.00%	0.00%	8.00%	3.20%
Non-native grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Non native forbs and shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Litter	94.00%	97.00%	88.00%	88.00%	91.00%	91.60%
Rock	0.00%	0.00%	0.00%	0.00%	0.00%	
Bare Ground	0.00%	0.00%	0.00%	10.00%	0.00%	2.00%
Cryptogram	0.00%	0.00%	0.00%	0.00%	0.00%	

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	380	Non- Eucalypt Large tree DBH benchmark used:	200
Number of large eucalypt trees:	3	Number of large non eucalypt trees:	0
Total Number Large Trees:	3		

Median Tree Canopy Height Measurements	Canopy:	24.00	Sub-canopy:	8.00	Emergent:	

Percentage of ecologically dominant layer species regenerating:	100

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	69.10%	Sub-canopy:	68.10%	Emergent:	0.00%
Shrub canopy cover %	0.00%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	0.00%	23.30%	23.30%	T2	0.00%	4.10%	4.10%
T1	27.80%	45.00%	17.20%	T2	7.50%	10.50%	3.00%
T1	57.90%	77.80%	19.90%	T2	12.00%	17.40%	5.40%
T1	84.50%	93.20%	8.70%	T2	20.50%	24.00%	3.50%
T1				T2	27.20%	31.20%	4.00%
T1				T2	32.70%	44.90%	12.20%
T1				T2	50.00%	66.80%	16.80%
T1				T2	73.40%	83.60%	10.20%
T1				T2	86.60%	95.50%	8.90%
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			

Layer	Start	End	Interval	Layer	Start	End	Interval
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Habitat Quality Site Assessment Template.....

PLEASE NOTE - YELLOW INDICATES AN AUTO POPULATED FIELD

For all environmental offset applications you must:

- Complete form (Environmental Offsets Delivery Form 1– Notice of Election and Advanced Offsets Details)
- Complete any other forms relevant to your application
- Provide the mandatory supporting information identified on the forms as being required to accompany your application

This form is useful for undertaking a **habitat quality analysis** of an impact and/or offset/advanced offset site.
Please note that this form should be completed individually for each assessment unit under consideration.

Is this Assessment for:	An Impact Site	☑	An Offset Site	☐	an Advanced Offset Site	☐

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Job Number	7598	Project Name	

Part B - Site Data

Property		Date	1/08/2019

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
2		12.9-10.2	Southeast Queensland

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.

Site description and Location (including details of discrete polygons within the assessment unit)

Transect 5 - remnant

Part C - Native Species Richness: (*list species below)

Tree species richness:			
Total number of species	7		
Scientific Name	*Corymbia citriodora*	Common Name	Spotted Gum
Scientific Name	*Eucalyptus seeana*	Common Name	Narrow-leaved Red Gum
Scientific Name	*Lophostemon suaveolens*	Common Name	Swamp Box
Scientific Name	*Corymbia intermedia*	Common Name	Pink Bloodwood
Scientific Name	*Angophora leiocarpa*	Common Name	Smooth-barked Apple
Scientific Name	*Eucalyptus tereticornis*	Common Name	Forest Red Gum
Scientific Name	*Eucalyptus siderophloia*	Common Name	Grey Ironbark
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	0		
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	2		
Scientific Name	*Aristida vagans*	Common Name	Threeawn Speargrass
Scientific Name	*Themeda triandra*	Common Name	Kangaroo Grass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	7		
Scientific Name	*Chrysocephalum apiculatum*	Common Name	Yellow Buttons
Scientific Name	*Lomandra longifolia*	Common Name	Long-leaved Matrush
Scientific Name	*Dianella caerulea*	Common Name	Blue Flax-lily
Scientific Name	*Melichrus procumbens*	Common Name	Jam Tarts
Scientific Name	*Adiantum atroviride*	Common Name	Maidenhair Fern
Scientific Name	*Gahnia aspera*	Common Name	Saw Sedge
Scientific Name	*Lobelia purpurascens*	Common Name	White Root

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	5.00%		
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Danthonia spicata*	Common Name	Poverty Grass
Scientific Name	*Cyperus rotundus*	Common Name	Nutgrass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	186.00		
1	1.30	26	
2	1.10	27	
3	3.20	28	
4	4.70	29	
5	0.70	30	
6	3.80	31	
7	2.10	32	
8	1.70	33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	

23		48	
24		49	
25		50	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	3.00%	0.00%	4.00%	3.00%	5.00%	3.00%
Native other grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Native forbs and other species	8.00%	0.00%	0.00%	8.00%	0.00%	3.20%
Native shrubs	0.00%	0.00%	0.00%	2.00%	0.00%	0.40%
Non-native grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Non native forbs and shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Litter	89.00%	100.00%	96.00%	87.00%	95.00%	93.40%
Rock	0.00%	0.00%	0.00%	0.00%	0.00%	
Bare Ground	0.00%	0.00%	0.00%	0.00%	0.00%	
Cryptogram	0.00%	0.00%	0.00%	0.00%	0.00%	

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	380	Non- Eucalypt Large tree DBH benchmark used:	200
Number of large eucalypt trees:	12	Number of large non eucalypt trees:	1
Total Number Large Trees:	13		

Median Tree Canopy Height Measurements	Canopy:	20.00	Sub-canopy:	8.00	Emergent:	

Percentage of ecologically dominant layer species regenerating:	57

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	48.80%	Sub-canopy:	89.50%	Emergent:	0.00%
Shrub canopy cover %	0.00%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	8.60%	13.20%	4.60%	T2	0.00%	31.50%	31.50%
T1	15.30%	24.90%	9.60%	T2	32.90%	47.30%	14.40%
T1	30.40%	45.80%	15.40%	T2	49.50%	69.00%	19.50%
T1	50.10%	53.50%	3.40%	T2	71.20%	77.60%	6.40%
T1	56.20%	63.00%	6.80%	T2	82.30%	100.00%	17.70%
T1	66.60%	71.20%	4.60%	T2			
T1	78.00%	82.40%	4.40%	T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			

Layer	Start	End	Interval	Layer	Start	End	Interval
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Habitat Quality Site Assessment Template.....

PLEASE NOTE - YELLOW INDICATES AN AUTO POPULATED FIELD

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- Provide the mandatory supporting information identified on the forms as being required to accompany your application

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Please note that this form should be completed individually for each assessment unit under consideration.

Is this Assessment for:	An Impact Site	☑	An Offset Site	☐	an Advanced Offset Site	☐

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Job Number	7598	Project Name	

Part B - Site Data

Property	Offset Downs	Date	

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
2		12.9-10.2	Southeast Queensland

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.

Site description and Location (including details of discrete polygons within the assessment unit)

Corymbia citriodora dominated with *Eucalyptus crebra* .
RE12.9-10.2

Part C - Native Species Richness: (*list species below)

Tree species richness:			
Total number of species	2		
Scientific Name	*Corymbia citriodora*	Common Name	Spotted Gum
Scientific Name	*Eucalyptus crebra*	Common Name	Narrow-leaved Ironbark
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	1		
Scientific Name	*Petalostigma pubescens*	Common Name	Quinine Bush
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	3		
Scientific Name	*Imperata cylindrica*	Common Name	Blady Grass
Scientific Name	*Cymbopogon refractus*	Common Name	Barbed Wire Grass
Scientific Name	*Aristida leptopoda*	Common Name	White Speargrass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	5		
Scientific Name	*Entolasia stricta*	Common Name	Wiry Panic
Scientific Name	*Lomandra multiflora*	Common Name	Many Flowered Mat Rush
Scientific Name	*Chrysocephalum apiculatum*	Common Name	Yellow Buttons
Scientific Name	*Dianella caerulea*	Common Name	Blue Flax-lily
Scientific Name	*Ozothamnus diosmifolius*	Common Name	Sago Flower
Scientific Name		Common Name	
Scientific Name		Common Name	

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	5.00%		
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Passiflora suberosa*	Common Name	Corky Passion Vine
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	355.00		
1	1.00	26	
2	1.00	27	
3	4.50	28	
4	2.50	29	
5	2.00	30	
6	0.50	31	
7	5.00	32	
8	2.00	33	
9	2.00	34	
10	3.60	35	
11	1.60	36	
12	1.30	37	
13	0.60	38	
14	1.70	39	
15	5.00	40	
16	1.20	41	
17		42	
18		43	

19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	5.00%	65.00%	40.00%	40.00%	20.00%	34.00%
Native other grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Native forbs and other species	0.00%	0.00%	0.00%	0.00%	0.00%	
Native shrubs	0.00%	5.00%	0.00%	5.00%	0.00%	2.00%
Non-native grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Non native forbs and shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Litter	5.00%	23.00%	45.00%	10.00%	80.00%	32.60%
Rock	0.00%	0.00%	0.00%	0.00%	0.00%	
Bare Ground	90.00%	7.00%	15.00%	10.00%	0.00%	24.40%
Cryptogram	0.00%	0.00%	0.00%	0.00%	0.00%	

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	400 mm	Non- Eucalypt Large tree DBH benchmark used:	250 mm
Number of large eucalypt trees:	0	Number of large non eucalypt trees:	0
Total Number Large Trees:	0		

Median Tree Canopy Height Measurements	Canopy:	22.00	Sub-canopy:	8.00	Emergent:	

Percentage of ecologically dominant layer species regenerating:	100

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	39.40%	Sub-canopy:	36.50%	Emergent:	0.00%
Shrub canopy cover %	0.00%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	4.90%	9.20%	4.30%	T2	2.50%	4.20%	1.70%
T1	15.30%	23.00%	7.70%	T2	12.60%	15.20%	2.60%
T1	62.00%	74.20%	12.20%	T2	17.10%	18.00%	0.90%
T1	76.80%	92.00%	15.20%	T2	21.20%	23.40%	2.20%
T1				T2	26.80%	44.00%	17.20%
T1				T2	49.00%	50.00%	1.00%
T1				T2	60.00%	61.50%	1.50%
T1				T2	68.00%	76.10%	8.10%
T1				T2	93.00%	94.30%	1.30%
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			

Layer	Start	End	Interval	Layer	Start	End	Interval
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Habitat Quality Site Assessment Template.....

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This form is useful for undertaking a **habitat quality analysis** of an impact and/or offset/advanced offset site.
Please note that this form should be completed individually for each assessment unit under consideration.

Is this Assessment for:	An Impact Site	☑	An Offset Site	☐	an Advanced Offset Site	☐

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Job Number	7598	Project Name	

Part B - Site Data

Property	Offset Downs	Date	

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
3		12.3.11	Southeast Queensland

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.

Site description and Location (including details of discrete polygons within the assessment unit)

Alluvial remnant area; low weed disturabnce; Acacia regrowth understorey.

Part C - Native Species Richness: (*list species below)

Tree species richness:			
Total number of species	5		
Scientific Name	*Eucalyptus tereticornis*	Common Name	Forest Red Gum
Scientific Name	*Corymbia intermedia*	Common Name	Pink Bloodwood
Scientific Name	*Lophostemon suaveolens*	Common Name	Swamp Box
Scientific Name	*Corymbia citriodora*	Common Name	Spotted Gum
Scientific Name	*Allocasarina littoralis*	Common Name	Black She-oak
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	0		
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	2		
Scientific Name	*Imperata cylindrica*	Common Name	Blady Grass
Scientific Name	*Aristida vagans*	Common Name	Threeawn Speargrass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	7		
Scientific Name	*Lomandra longifolia*	Common Name	Long-leaved Matrush
Scientific Name	*Dianella caerulea*	Common Name	Blue Flax-lily
Scientific Name	*Juncus usitatus*	Common Name	Common Rush
Scientific Name	*Gahnia aspera*	Common Name	Saw Sedge
Scientific Name	*Lobelia purpurascens*	Common Name	White Root
Scientific Name	*Glycine tabacina*	Common Name	Variable Glycine
Scientific Name	*Velleia spathulata*	Common Name	Wild Pansies

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	15.00%		
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Passiflora suberosa*	Common Name	Corky Passion Vine
Scientific Name	*Cyperus rotundus*	Common Name	Nutgrass
Scientific Name	*Dathonica spicata*	Common Name	Poverty Grass
Scientific Name	*Passiflora foetida*	Common Name	Stinking Passionflower
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	257.00		
1	3.00	26	
2	2.00	27	
3	2.10	28	
4	3.20	29	
5	1.80	30	
6	1.80	31	
7	2.50	32	
8	2.10	33	
9	1.10	34	
10	2.90	35	
11	2.00	36	
12	1.20	37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	

19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	1.00%	3.00%	2.00%	0.00%	0.00%	1.20%
Native other grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Native forbs and other species	0.00%	0.00%	10.00%	15.00%	2.00%	5.40%
Native shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Non-native grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Non native forbs and shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Litter	79.00%	92.00%	45.00%	75.00%	75.00%	73.20%
Rock	0.00%	0.00%	0.00%	0.00%	0.00%	
Bare Ground	20.00%	5.00%	43.00%	10.00%	23.00%	20.20%
Cryptogram	0.00%	0.00%	0.00%	0.00%	0.00%	

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	440 mm	Non- Eucalypt Large tree DBH benchmark used:	260 mm
Number of large eucalypt trees:	8	Number of large non eucalypt trees:	1
Total Number Large Trees:	9		

Median Tree Canopy Height Measurements	Canopy:	18.00	Sub-canopy:	9.00	Emergent:	

Percentage of ecologically dominant layer species regenerating:	60

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	25.30%	Sub-canopy:	76.70%	Emergent:	0.00%
Shrub canopy cover %	0.00%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	0.00%	9.00%	9.00%	T2	2.10%	5.40%	3.30%
T1	76.10%	87.50%	11.40%	T2	15.20%	20.50%	5.30%
T1	95.10%	100.00%	4.90%	T2	22.00%	29.60%	7.60%
T1				T2	31.60%	41.70%	10.10%
T1				T2	43.60%	58.20%	14.60%
T1				T2	60.60%	86.80%	26.20%
T1				T2	90.40%	100.00%	9.60%
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			

Layer	Start	End	Interval	Layer	Start	End	Interval
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Habitat Quality Site Assessment Template.....

PLEASE NOTE - YELLOW INDICATES AN AUTO POPULATED FIELD

For all environmental offset applications you must:

- Complete form (Environmental Offsets Delivery Form 1– Notice of Election and Advanced Offsets Details)
- Complete any other forms relevant to your application
- Provide the mandatory supporting information identified on the forms as being required to accompany your application

This form is useful for undertaking a **habitat quality analysis** of an impact and/or offset/advanced offset site.
Please note that this form should be completed individually for each assessment unit under consideration.

Is this Assessment for:	An Impact Site	☑	An Offset Site	☐	an Advanced Offset Site	☐

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Job Number	7598	Project Name	

Part B - Site Data

Property	Offset Downs	Date	

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
3		12.3.11	Southeast Queensland

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.

Site description and Location (including details of discrete polygons within the assessment unit)

More representative of RE12.3.11.

Part C - Native Species Richness: (*list species below)

Tree species richness:			
Total number of species	3		
Scientific Name	*Eucalyptus tereticornis*	Common Name	Forest Red Gum
Scientific Name	*Corymbia intermedia*	Common Name	Pink Bloodwood
Scientific Name	*Angophora leiocarpa*	Common Name	Smooth-barked Apple
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	0		
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	2		
Scientific Name	*Aristida leptopoda*	Common Name	White Speargrass
Scientific Name	*Imperata cylindrica*	Common Name	Blady Grass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	2		
Scientific Name	*Lomandra multiflora*	Common Name	Many Flowered Mat Rush
Scientific Name	*Ozothamnus diosmifolius*	Common Name	Sago Flower
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	5.00%		
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Passiflora suberosa*	Common Name	Corky Passion Vine
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	166.00		
1	5.00	26	
2	0.60	27	
3	2.00	28	
4	0.50	29	
5	1.70	30	
6	1.00	31	
7	2.50	32	
8	1.00	33	
9	2.30	34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	

22		47	
23		48	
24		49	
25		50	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	3.00%	10.00%	0.00%	5.00%	5.00%	4.60%
Native other grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Native forbs and other species	0.00%	0.00%	0.00%	0.00%	0.00%	
Native shrubs	0.00%	2.00%	0.00%	5.00%	0.00%	1.40%
Non-native grass	0.00%	0.00%	0.00%	0.00%	0.00%	
Non native forbs and shrubs	0.00%	0.00%	0.00%	0.00%	0.00%	
Litter	97.00%	88.00%	100.00%	90.00%	95.00%	94.00%
Rock	0.00%	0.00%	0.00%	0.00%	0.00%	
Bare Ground	0.00%	0.00%	0.00%	0.00%	0.00%	
Cryptogram	0.00%	0.00%	0.00%	0.00%	0.00%	

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	490 mm	Non- Eucalypt Large tree DBH benchmark used:	360 mm
Number of large eucalypt trees:	1 (630 mm)	Number of large non eucalypt trees:	0
Total Number Large Trees:	1		

Median Tree Canopy Height Measurements	Canopy:	24.00	Sub-canopy:	10.00	Emergent:	

Percentage of ecologically dominant layer species regenerating:	33

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	62.50%	Sub-canopy:	88.30%	Emergent:	0.00%
Shrub canopy cover %	0.00%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	9.60%	28.00%	18.40%	T2	0.00%	11.30%	11.30%
T1	38.30%	55.50%	17.20%	T2	13.10%	24.60%	11.50%
T1	59.10%	76.00%	16.90%	T2	26.40%	50.00%	23.60%
T1	90.00%	100.00%	10.00%	T2	53.30%	68.60%	15.30%
T1				T2	71.10%	92.90%	21.80%
T1				T2	95.20%	100.00%	4.80%
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			
T1				T2			

Layer	Start	End	Interval	Layer	Start	End	Interval
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			
Shrub				Shrub			

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

MHQA Working Sheets

IMPACT - KOALA

			ASSESSMENT UNIT 1				ASSESSMENT UNIT 2				ASSESSMENT UNIT 3		
			AU01 Transect 1	AU01 Transect 2	AU01 Transect 3	AU01 Average	AU02 Transect 4	AU02 Transect 5	AU02 Transect 6	AU02 Average	AU03 Transect 7	AU03 Transect 8	AU03 Average
		Max score	RE 12.9-10.2	RE 12.9-10.2	RE 12.9-10.2		RE 12.9-10.2	RE 12.9-10.2	RE 12.9-10.2		RE 12.3.11	RE 12.3.11	
SITE CONDITION													
Habitat Transect Data Assessment													
Recruitment of woody perennial species in EDL	Transect data		0%	33%	100%	44.33%	100%	57%	100%	85.67%	60%	33%	46.50%
	RE Benchmark					100%				100%			100%
	% of Benchmark					44%				86%			47%
	Habitat Quality Assessment Score	5				3				5			3
Native plant species richness - trees	Transect data		6	6	2	5	3	7	2	4	5	3	4
	RE Benchmark					6				6			7
	% of Benchmark					83%				67%			57%
	Habitat Quality Assessment Score	5				2.5				2.5			2.5
Native plant species richness - shrubs	Transect data		1	0	0	0	0	0	1	0	0	0	0
	RE Benchmark					7				7			7
	% of Benchmark					0%				0%			5%
	Habitat Quality Assessment Score	5				0				0			0
Native plant species richness - grasses	Transect data		2	2	3	2	2	2	3	2	2	2	2
	RE Benchmark					7				7			12
	% of Benchmark					29%				29%			17%
	Habitat Quality Assessment Score	5				2.5				2.5			0
Native plant species richness - forbs	Transect data		7	4	4	5	4	7	5	5	7	2	5
	RE Benchmark					13				13			25
	% of Benchmark					38%				38%			20%
	Habitat Quality Assessment Score	5				2.5				2.5			0
Tree emergent canopy height (m)	Transect data		na	na	na	na	na	na	na	na	na	na	na
	RE Benchmark					na				na			na
	% of Benchmark					na				na			na
	Habitat Quality Assessment Score	5				na				na			na
Tree EDL canopy height (m)	Transect data		16	16	18	16.67	24	20	22	22.00	18	24	21.00
	RE Benchmark					21				21			23
	% of Benchmark					79%				105%			91%
	Habitat Quality Assessment Score	5				5				5			5
Tree sub-canopy canopy height (m)	Transect data		7	7	10	8.00	8	8	8	8.00	9	10	9.50
	RE Benchmark					12				12			8
	% of Benchmark					67%				67%			119%
	Habitat Quality Assessment Score	5				3				3			5
Tree canopy height (score)	Habitat Quality Assessment Score					4				4			5
Tree emergent canopy cover (%)	Transect data		na	na	na	na	na	na	na	na	na	na	na
	RE Benchmark					na				na			na
	% of Benchmark					na				na			na
	Habitat Quality Assessment Score	5				na				na			na
Tree EDL canopy cover (%)	Transect data		24.4	75.4	44.2	48.00	69.1	48.8	39.4	52.43	25.3	62.5	43.90
	RE Benchmark					64				64			56
	% of Benchmark					75%				82%			78%
	Habitat Quality Assessment Score	5				5				5			5
Tree sub-canopy cover (%)	Transect data		76.4	76.6	61.9	71.63	68.1	89.5	36.5	64.70	76.7	88.3	82.50
	RE Benchmark					20				20			33
	% of Benchmark					358%				324%			250%
	Habitat Quality Assessment Score	5				3				3			3
Tree canopy cover (score)	Habitat Quality Assessment Score					4				4			4
Shrub canopy cover (%)	Transect data		1.7	0	0	0.57	0	0	0	0.00	0	0	0.00
	RE Benchmark					6				6			20
	% of Benchmark					9.4%				0%			0%
	Habitat Quality Assessment Score	5				0				0			0
Native perennial grass cover (%)	Transect data		9.4	3.6	16.2	9.73	3.2	3	34	13.40	1.2	4.6	2.90
	RE Benchmark					21				21			44
	% of Benchmark					46%				64%			7%
	Habitat Quality Assessment Score	5				1				3			0
Organic litter (%)	Transect data		57	95	76.8	76.27	91.6	93.4	32.6	72.53	73.2	94	83.60
	RE Benchmark					48				48			37
	% of Benchmark					159%				151%			226%
	Habitat Quality Assessment Score	5				5				5			3
Large trees	Transect data		12	10	0	7	6	24	0	10	16	2	9
	RE Benchmark					38				38			22
	% of Benchmark					18%				26%			41%
	Habitat Quality Assessment Score	15				5				5			5
Coarse woody debris	Transect data		140	472	274	295.33	226	186	355	255.67	257	166	211.50
	RE Benchmark					506				506			555
	% of Benchmark					58%				51%			38%
	Habitat Quality Assessment Score	5				5				5			2
Non-native plant cover (%)	Transect data		20%	5%	5%	10%	10%	5%	5%	6.67%	15%	5%	10.00%
	RE Benchmark					N/A				N/A			N/A
	% of Benchmark					N/A				N/A			N/A
	Habitat Quality Assessment Score	10				5				5			5
Total - AU Average		**80**	**39.50**				**43.50**				**29.50**		

Benchmark	< 20%	20% to 75%	> 75%		
Score	0	3	5		
Benchmark	< 25%	25% to 90%	>= 90%		
Score	0	2.5	5		
Benchmark	< 25%	25% to 90%	>= 90%		
Score	0	2.5	5		
Benchmark	< 25%	25% to 90%	>= 90%		
Score	0	2.5	5		
Benchmark	< 25%	25% to 90%	>= 90%		
Score	0	2.5	5		
Benchmark	< 25%	25% to 70%	> 70%		
Score	0	3	5		
Benchmark	< 25%	25% to 70%	> 70%		
Score	0	3	5		
Benchmark	< 25%	25% to 70%	> 70%		
Score	0	3	5		
Benchmark	< 10%	10% to 50%	> 200%	50% to 200%	
Score	0	2	3	5	
Benchmark	< 10%	10% to 50%	> 200%	50% to 200%	
Score	0	2	3	5	
Benchmark	< 10%	10% to 50%	> 200%	50% to 200%	
Score	0	2	3	5	
Benchmark	< 10%	10% to 50%	> 200%	50% to 200%	
Score	0	3	3	5	
Benchmark	< 10%	10% to 50%	50% to 90%	> 90%	
Score	0	1	3	5	
Benchmark	< 10%	10% to 50%	> 200%	50% to 200%	
Score	0	3	3	5	
Benchmark	0%	> 0% to 50%	> 50% to 100%	> 100%	
Score	0	5	10	15	
Benchmark	< 10%	10% to 50%	> 200%	50% to 200%	
Score	0	2	2	5	
% weed cover	> 50%	> 25% to 50%	> 5% to 25%	<= 5%	
Score	0	3	5	10	

Site Condition - Species Habitat Index Data

Quality and availability of food and foraging habitat	Habitat transect data (% of max. score)		49%	54%	37%	
	Score	10	5	5	5	
Quality and availability of shelter	Habitat transect data (% of max. score)		49%	54%	37%	
	Score	10	5	5	5	
Total		**20**	**10**	**10**	**10**	

Benchmark	< 33%	33% to 67%	> 67%		
Score	1	5	10		
Benchmark	< 33%	33% to 67%	> 67%		
Score	1	5	10		

SITE CONDITION TOTAL		**100**	**49.50**	**53.5**	**39.5**
MHQA Weighted Score (30%)		**3**	**1.49**	**1.61**	**1.19**

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	GIS data		>200	>200	>200
	Score	10	10	10	10
Connectedness (%)	GIS data		47.9%	47.9%	47.9%
	Score	5	2	2	2
Context (% remnant)	GIS data		53.4%	53.4%	53.4%
	Score	5	4	4	4
Ecological corridors	GIS data		Within (whole or part)	Within (whole or part)	Within (whole or part)
	Score	6	6	6	6
Total		**26**	**22**	**22**	**22**

Benchmark	< 5	5 to 25	> 25 to 100	> 100 to 200	> 200	>200	
Score	0	2	5	7	10	10	
Benchmark	0% to 10%	> 10% to < 50%	50% to 75%	> 75%	> 500 ha		
Score	0	2	4	5	(not used)		
Benchmark	< 10%	10% to 30%	> 30% to 75%	> 75%			
Score	0	2	4	5			
Benchmark	Not within	Sharing a common boundary	Within (whole or part)				
Score	0	4	6				

Species Habitat Index Data Site Context

Role of site location to species overall population in the State	Value		Not or unlikely to be critical to species' survival	Not or unlikely to be critical to species' survival	Not or unlikely to be critical to species' survival
	Score	5	1	1	1
Threats to species	Value		Moderate threat level	Moderate threat level	Moderate threat level
	Score	15	7	7	7
Species mobility capacity	Value		Highly restricted (51-75% reduction)	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)
	Score	10	4	7	7
Total		**30**	**12**	**15**	**15**

Benchmark	Not or unlikely to be critical to species' survival	Likely to be critical to species survival	Critical to species survival			
Score	1	4	5			
Benchmark	High threat level	Moderate threat level	Low threat level (i.e. likely to survive)			
Score	1	7	15			
Benchmark	Severely restricted (76-100% reduction)	Highly restricted (51-75% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)		
Score	1	4	7	10		

SITE CONTEXT TOTAL		**56**	**34**	**37**	**37**
MHQA Weighted Score (30%)		**3**	**1.82**	**1.98**	**1.98**

SPECIES STOCKING RATE

Presence detected on or adjacent to site (neighbouring property with connected habitat)	Value		Yes - on site	Yes - on site	Yes - on site
	Score	10	10	10	10
Species usage of the site (habitat type and evidenced usage)	Value		Breeding	Breeding	Breeding
	Score	15	15	15	15
Approximate density (per ha)	Value		Low	Low	Low
	Score	30	10	10	10

Benchmark	No	Yes - adjacent	Yes - on site		
Score	0	5	10		
Benchmark	Not habitat	Dispersal	Foraging	Breeding	
Score	0	5	10	15	
Benchmark	0 Low	Med	High		
Score	0 10	20	30		

Role/importance of species population on site (score from supplementary table below)	Value		5	5	5	
	Score	15	5	5	5	
Total		**70**	**40**	**40**	**40**	
MHQA Weighted Score (40%)		**4**	**2.29**	**2.29**	**2.29**	

Benchmark	0	5	to	15	20	to	35	40	to	45
Score	0		5			10			15	

Species Stocking Rate - Supplementary Table

Key source population for breeding	Value		No	No	No
	Score	10	0	0	0
Key source population for dispersal	Value		Possibly	Possibly	Possibly
	Score	5	5	5	5
Necessary for maintainin genetic diversity	Value		No	No	No
	Score	15	0	0	0
Near the limit of the species range	Value		No	No	No
	Score	15	0	0	0
Total		**45**	**5**	**5**	**5**

Benchmark	No	Yes	Possibly
Score	0	10	10
Benchmark	No	Yes	Possibly
Score	0	5	5
Benchmark	No	Yes	Possibly
Score	0	15	15
Benchmark	No	Yes	
Score	0	15	

MHQA SUMMARY

Site Condition		**3**	**1.49**	**1.61**	**1.19**
Site Context		**3**	**1.82**	**1.98**	**1.98**
Species Stocking Rate		**4**	**2.29**	**2.29**	**2.29**
TOTAL - Assessment Unit Habitat Assessment Scores		**10**	**5.59**	**5.87**	**5.45**
Assessment Unit Areas		**230.00**	**148.00**	**80.00**	**2.00**
Assessment Unit Weighting		**1**	**0.64**	**0.35**	**0.01**
Assessment Unit Weighted Scores		**NA**	**3.60**	**2.04**	**0.05**
Impact Site Modified Habitat Quality Score		**10**	**5.69**		
TOTAL - ROUNDED TO NEAREST WHOLE NUMBER		**10**	**6**		

IMPACT - GREY HEADED FLYING FOX (GHFF)

SITE CONDITION

Site Condition - Habitat Transect Data Assessment

			ASSESSMENT UNIT 1				ASSESSMENT UNIT 2				ASSESSMENT UNIT 3		
			AU01	AU01	AU01		AU02	AU02	AU02		AU03	AU03	
			Transect 1	Transect 2	Transect 3	AU01 Average	Transect 4	Transect 5	Transect 6	AU02 Average	Transect 7	Transect 8	AU03 Average
		Max score	RE 12.9-10.2	RE 12.9-10.2	RE 12.9-10.2		RE 12.9-10.2	RE 12.9-10.2	RE 12.9-10.2		RE 12.3.11	RE 12.3.11	
Vegetation Condition	Value		Category X / non-remnant	Category X / non-remnant	Category X / non-remnant	Category X / non-remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant
	Score	20				5				20			20
Species richness - canopy trees	Transect data		6	7	3	5.33	5	5	3	4.33	5	3	4.00
	Score	20				10				10			10
Flower scores (average)	Transect data		0.59	0.46	0.55	0.533	0.627	0.589	0.55	0.589	0.46	0.655	0.558
	Score	10				8				8			8
Timing of biological shortages	Food shortages	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	Pregnancy and birthing	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Lactation	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Mating and conception	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Migration paths	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Fruit industries	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Total Score (sum of above)	10				10				10			10.0
Quality of foraging habitat (trees >0.65 wt p*r)	Transect data		2	4	3	3.00	3	2	2	2.33	2	1	1.50
	Habitat Quality Assessment Score	20				5				5			5
Non-native plant cover (%)	Transect data		20%	5%	5%	10%	10%	5%	5%	7%	15%	5%	10%
	Score	20				10				10			10
Total - AU Average		**100**		**48.00**				**63.00**				**63.00**	
SITE CONDITION TOTAL		**100**		**48.00**				**63.00**				**63.00**	
MHQA Weighted Score (40%)		**4**		**1.92**				**2.52**				**2.52**	

Benchmark	Category X / non-remnant			Category C / regrowth			Category B / remnant		
Score	5			10			20		
Benchmark	0	1 to 3	4 to 6	> 6					
Score	0	5	10	20					
Benchmark	0	0.01 to 0.25	0.26 to 0.50	0.51 to 0.75	0.76 to 1.00				
Score	0	2	5	8	10				

Benchmark	0	1 to 3	4 to 6	> 6					
Score	0	5	10	20					
Benchmark	> 50%	> 25% to 50%	5% to 25%	< 5%					
Score	1	5	10	20					

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	GIS data		>200	>200	>200	
	Score	10	10	10	10	
Connectedness (active GHFF camps within 30km radius)	GIS data		14	14	14	
	Score	10	10	10	10	
Context (% GHFF foraging habitat within a 20km radius)	GIS data		39.90%	39.90%	39.90%	
	Score	10	6	6	6	
Ecological corridors	GIS data		Within (whole or part)	Within (whole or part)	Within (whole or part)	
	Score	10	10	10	10	
Total		**40**	**36**	**36**	**36**	

Benchmark	< 5	5 to 25	> 25 to 100	> 100 to 200	> 200	>200
Score	0	2	5	7	10	10
Benchmark	< 1	1 to 3	4 to 6	> 6		
Score	0	3	6	10		
Benchmark	< 10%	10% to 30%	> 30% to 75%	> 75%		
Score	0	3	6	10		
Benchmark	Not within	Sharing a common boundary	Within (whole or part)			
Score	0	6	10			

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	Value		4	4	4	
	Score	10	10	10	10	
Threats to the species	Value		Low threat level (i.e. likely to survive)	Low threat level (i.e. likely to survive)	Low threat level (i.e. likely to survive)	
	Score	10	10	10	10	
Total		**20**	**20**	**20**	**20**	

Benchmark	< 1	1 to 3	> 3						
Score	0	5	10						
Benchmark	High threat level						Moderate threat level	Low threat level (i.e. likely to survive)	
Score	1						5	10	

SITE CONTEXT TOTAL		**60**	**56**	**56**	**56**	
MHQA Weighted Score (30%)		**3**	**2.80**	**2.80**	**2.80**	

SPECIES STOCKING RATE

Large trees present	Transect data		12	10	0	7	6	24	0	10	16	2	9
	RE Benchmark					38				38			22
	% of Benchmark					18%				26%			41%
	Habitat Quality Assessment Score	15				5				5			5
Total		**15**		**5**				**5.00**				**5.00**	
MHQA Weighted Score (30%)		**3**		**1.00**				**1.00**				**1.00**	

Benchmark	0%	> 0% to 50%	> 50% to 100%	> 100%
Score	0	5	10	15

MHQA SUMMARY

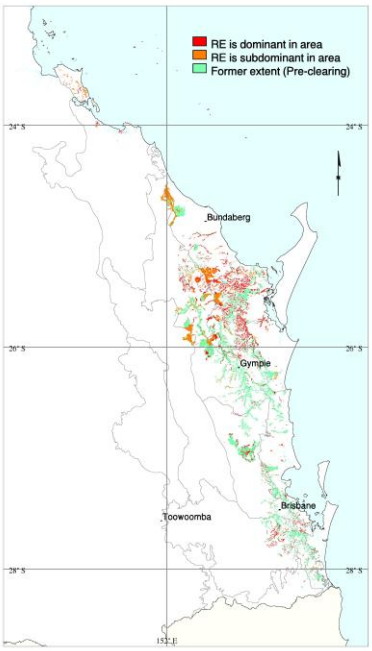
Site Condition		**4**	**1.92**	**2.52**	**2.52**
Site Context		**3**	**2.80**	**2.80**	**2.80**
Species Stocking Rate		**3**	**1.00**	**1.00**	**1.00**
TOTAL - Assessment Unit Habitat Assessment Scores		**10**	**5.72**	**6.32**	**6.32**
Assessment Unit Areas		**230.00**	**148.00**	**80.00**	**2.00**
Assessment Unit Weighting		**1**	**0.64**	**0.35**	**0.01**
Assessment Unit Weighted Scores		**NA**	**3.68**	**2.20**	**0.05**
Impact Site Modified Habitat Quality Score		**10**	**5.93**		
TOTAL - ROUNDED TO NEAREST WHOLE NUMBER		**10**	**6**		

Biocondition Benchmarks

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.3.11

Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open-forest on alluvial plains usually near coast



Melinda Laidlaw

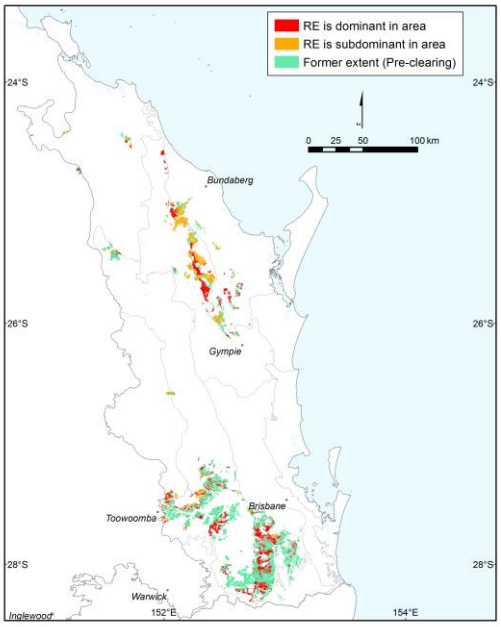
BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	7
		Shrub:	7
		Grass:	12
		Forbs and other:	25
Trees:	Tree canopy	Tree canopy median height (m):	23
		Tree canopy cover (%):	56
	Tree sub-canopy	Tree sub-canopy median height (m):	8
		Tree sub-canopy cover (%):	33
	Large trees	Large eucalypt tree dbh threshold (cm):	49
		Number of large eucalypt trees per hectare:	22
		Large non-eucalypt tree dbh threshold (cm):	36
		Number of large non-eucalypt trees per hectare:	8
	Typical tree species: Eucalyptus tereticornis (blue gum), Eucalyptus siderophloia (red ironbark), Melaleuca quinquenervia (swamp paperbark)		
Shrubs:		Native shrub cover (%):	20
	Typical shrub species: Acacia leiocalyx (early flowering black wattle), Allocasuarina littoralis (woolly oak), Alphitonia excelsa (soap tree)		
Ground cover (%):		Native perennial grass cover (%):	44
		Organic litter cover (%):	37
	Typical ground cover species: Themeda triandra (kangaroo grass), Imperata cylindrica (blady grass), Eremochloa bimaculata (poverty grass), Lomandra longifolia (spiny mat rush), Eustrephus latifolius (wombat berry)		
Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:			555
Non-native plant cover			0
None listed			

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Users should refer to the regional ecosystem description database (REDD) and/or the technical description for more complete lists of characteristic species. Only the most frequently used common name is given. Other common names may be used in other regions. Declared pest species in Queensland are designated (^).

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.9-10.2

Corymbia citriodora subsp. variegata +/- Eucalyptus crebra open forest on sedimentary rocks



Annie Kelly

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	6
		Shrub:	7
		Grass:	7
		Forbs and other:	13
Trees:	Emergent canopy	Tree emergent canopy median height (m):	na
		Tree emergent canopy cover (%):	na
	Tree canopy	Tree canopy median height (m):	21
		Tree canopy cover (%):	64
	Tree sub-canopy	Tree sub-canopy median height (m):	12
		Tree sub-canopy cover (%):	20
	Large trees	Large eucalypt tree dbh threshold (cm):	38
		Number of large eucalypt trees per hectare:	38
		Large non-eucalypt tree dbh threshold (cm):	na
		Number of large non-eucalypt trees per hectare:	na
	Typical tree species: Corymbia citriodora subsp. variegata (spotted gum), Eucalyptus crebra (narrow-leaved red ironbark), Eucalyptus tereticornis (forest red gum), Corymbia intermedia (pink bloodwood), Eucalyptus moluccana (gum-topped box)		
Shrubs:		Native shrub cover (%):	6
	Typical shrub species: Lophostemon confertus (brush box), Allocasuarina spp., Acacia spp., Alphitonia excelsa (red ash), Pultenaea euchila (orange pultenaea)		
Ground cover (%):		Native perennial grass cover (%):	21
		Organic litter cover (%):	48
	Typical grass, forbs and other species: Cymbopogon refractus (barbed-wire grass), Themeda triandra (kangaroo grass), Imperata cylindrica (blady grass), Aristida spp., Entolasia stricta (wiry panic)		
Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:			506
Non-native plant cover			0
	Typical non-native species: Lantana camara^ (lantana), Lantana montevidensis^ (creeping lantana), Opuntia spp., Melinis repens (red natal grass)		

Benchmark based on: 4 reference sites, 13 Corveg sites and expert opinion **Benchmark reliability ranking:** high

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Shrub and ground strata may contain recruiting canopy species. 'Eucalypt' refers to species belonging to the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia. Users should refer to regional ecosystem technical descriptions for more complete lists of characteristic species. Common names can differ between regions. Declared pest species in Queensland are designated (^).

SAT Data

SAT Survey	Meander Time Before Koala Evidence	SAT Survey Results	SAT Survey Use (Activity Category East Coast (low))
1	4 minutes	3.33%	Low
2	8 minutes	13.33%	Low
3	28 minutes	6.67%	Low
4	6 minutes	23.33%	Medium
5	10 minutes	26.67%	Medium
6	7 minutes	6.67%	Low
7	4 minutes	20.00%	Low
8	4 minutes	6.67%	Low
9	30 minutes	6.67%	Low
10	14 minutes	16.67%	Low
11	2 minutes	3.33%	Low
12	32 minutes	6.67%	Low
13	3 minutes	20.00%	Low
14	4 minutes	40.00%	High
15	2 minutes	10.00%	Low
16	9 minutes	20.00%	Low
17	2 minutes	16.67%	Low
18	4 minutes	30.00%	Medium
19	15 minutes	6.67%	Low
20	15 minutes	13.33%	Low
21	10 minutes	6.67%	Low
22	8 minutes	26.67%	Medium
23	2 minutes	16.67%	Low
24	5 minutes	13.33%	Low
25	10 minutes	23.33%	Medium
26	32 minutes	20.00%	Low
27	3 minutes	6.67%	Low
28	9 minutes	3.33%	Low
29	30 minutes	16.67%	Low
Notes	Two (2) extra meanders were completed for approximately 30 minutes each without finding any evidence of koala use. Both of these areas contained very thick regrowth dominated by *Acacia concurrens* (Black Wattle) with the majority of trees trunk diameter less than 100 millimetres.		

Koala MHQA Summary Table

Attribute	Characteristic		Current Values		
		Maximum score	AU1	AU2	AU3
			Non-remnant	Remnant RE12.9-10	Remnant RE12.3
Site Condition (30%)	Recruitment of woody perennial species in EDL	**5**	3	5	3
	Native plant species richness – trees	**5**	2.5	2.5	2.5
	Native plant species richness – shrubs	**5**	0	0	0
	Native plant species richness – grasses	**5**	2.5	2.5	0
	Native plant species richness – forbs	**5**	2.5	2.5	0
	Tree canopy height	**5**	4	4	5
	Tree canopy cover	**5**	4	4	4
	Shrub canopy cover	**5**	0	0	0
	Native grass cover	**5**	1	3	0
	Organic litter	**5**	5	5	3
	Large trees	**15**	5	5	5
	Coarse woody debris	**5**	5	5	2
	Non-native plant cover	**10**	5	5	5
	Quality and availability of food and foraging habitat	**10**	5	5	5
	Quality and availability of shelter habitat	**10**	5	5	5
	Site Condition Score	**100**	49.5	53.5	39.5
	Site Condition Score (out of 3)	**3.00**	1.49	1.61	1.19
Site Context (30%)	Size of the patch	**10**	10	10	10
	Connectedness	**5**	2	2	2
	Context	**5**	4	4	4
	Ecological corridors	**6**	6	6	6
	Role of site location to species overall population in the State	**5**	1	1	1
	Threats to the species	**15**	7	7	7
	Species mobility capacity	**10**	4	7	7
	Site Context Score	**56**	34	37	37
	Site Context Score (out of 3)	**3**	1.82	1.98	1.98
Species Stocking Rate (40%)	Species Stocking Rate Score	**4**	2.29	2.29	2.29
	Species Stocking Rate Score (out of 4)	**4.00**	2.29	2.29	2.29
Total			5.59	5.87	5.45
Area (hectares)			148.00	80.00	2.00
Weighting			0.64	0.35	0.01
Weighted Scores			3.60	2.04	0.05
Score			**5.69**		

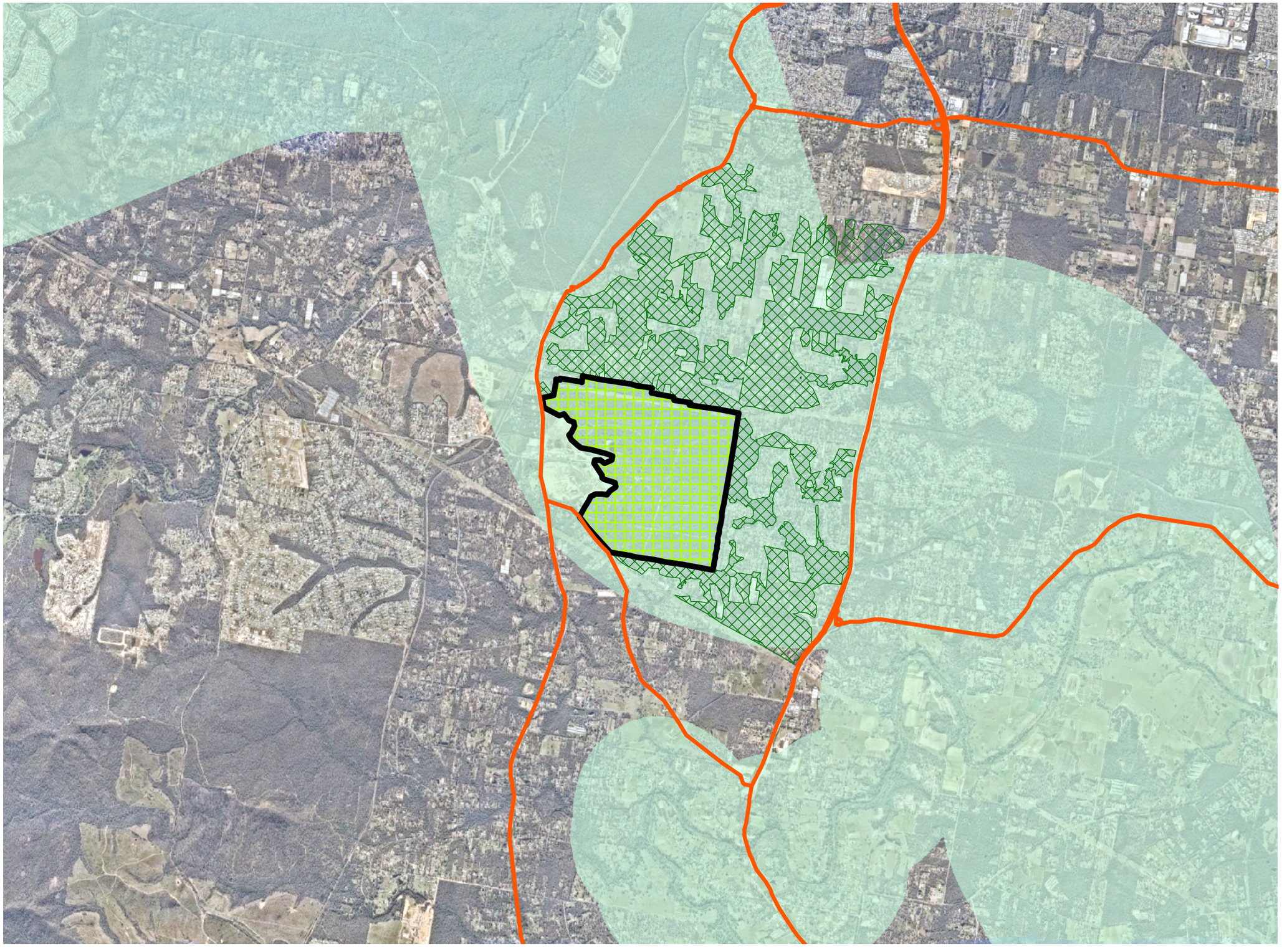
GHFF MHQA Summary Table

Assessment Unit - Regional Ecosystem			AU 1	AU 2	AU 3
Site Reference		Maximum Score	Non-remnant	Remnant (RE12.9-10.2)	Remnant (RE12.3.11)
Site Condition (40%)	Vegetation Condition	**20**	5	20	20
	Species Richness	**20**	10	10	10
	Flower Score	**10**	8	8	8
	Timing of Biological Shortages	**10**	10	10	10
	Quality of Foraging Habitat	**20**	5	5	5
	Non-native Plant Cover	**20**	10	10	10
	Site Condition Score	**100**	**48**	**63**	**63**
	Site Condition Score - out of 4	**4.00**	**1.92**	**2.52**	**2.52**
Site Context (30%)	Size of patch	**10**	10	10	10
	Connectedness	**10**	10	10	10
	Context	**10**	6	6	6
	Ecological Corridors	**10**	10	10	10
	Role of site location to species overall population in the state	**10**	10	10	10
	Threats to the species	**10**	10	10	10
	Site Context Score	**60**	**56**	**56**	**56**
	Site Context Score - out of 3	**3.00**	**2.80**	**2.80**	**2.80**
Species Stocking Rate (30%)	GHFF Foraging Tree Density		5	5	5
	Species Stocking Rate Score	**15**	5	5	5
	Species Stocking Rate Score - out of 3	**3.00**	**1.00**	**1.00**	**1.00**
Total			**5.72**	**6.32**	**6.32**
Area (hectares)			148.00	80.00	2.00
Weighting			0.64	0.35	0.01
Weighted Scores			3.68	2.20	0.05
Score				**5.93**	

Appendix B

Site Context GIS Data

1. Ecological Corridors & Size of Patch



NOTES
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Legend

- Referral area
- Motorway/highway/Major arterial road
- Critical habitat on site
- Adjoining Koala critical habitat patch >200 ha
- Bioregional corridor

Issue	Date	Description	Drawn	Checked
A	17/01/2020	Preliminary	TC	MS

0 500 1,000 1,500 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:50,000 @ A3

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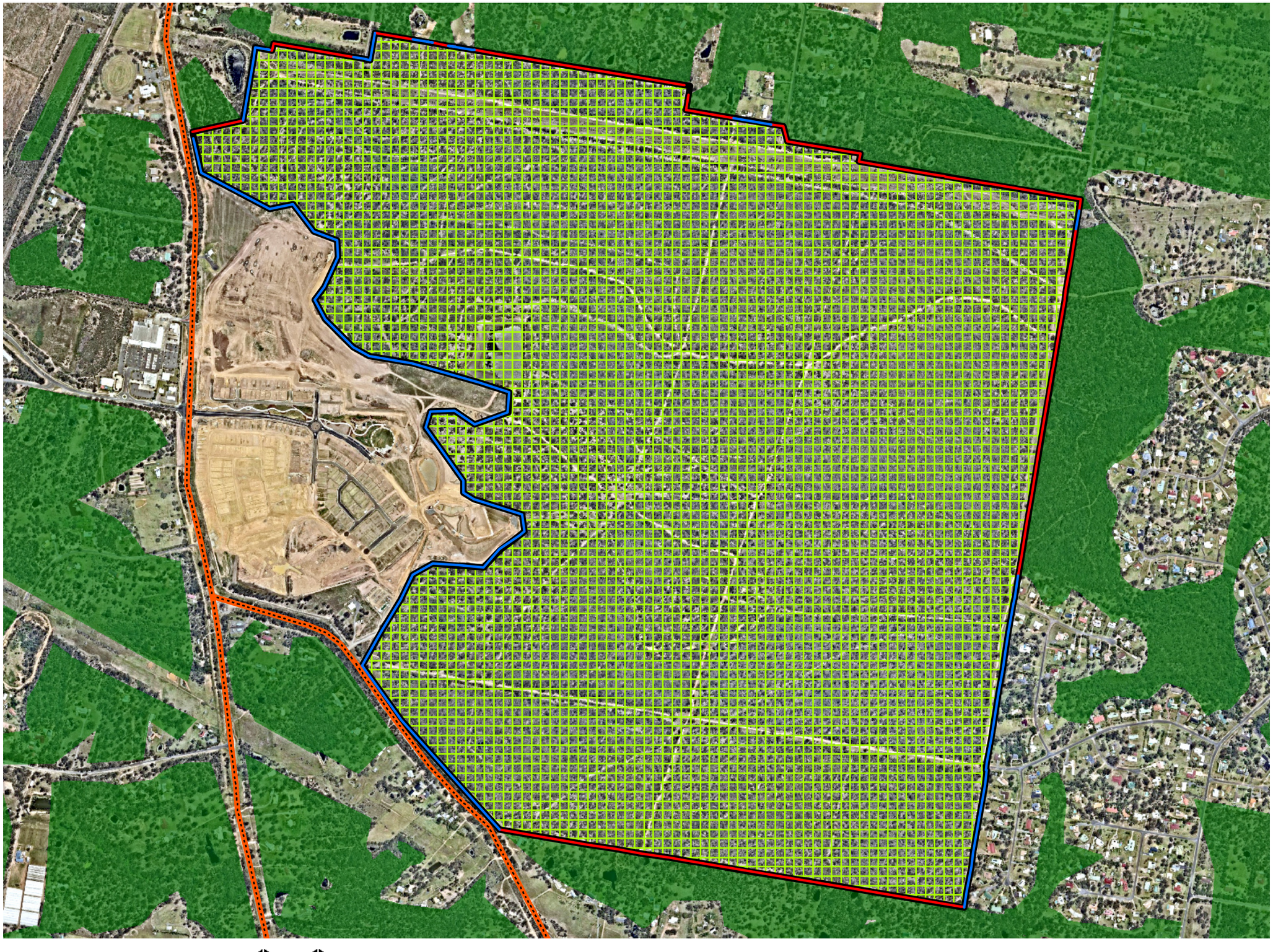
Everleigh

ADDRESS/RPD: Greenbank Road, Greenbank *17/01/2020* *7598 E 01 Ecological Corridors A*

2. Connectedness



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Legend

- Referral area
- Motorway/highway/Major arterial road
- Critical habitat on site
- Koala Critical habitat (offsite)
- Boundary length supporting a koala critical habitat connection off site
- Boundary length not supporting a koala critical habitat connection off site

47.9% of critical habitat onsite is connected to critical habitat offsite.

Issue	Date	Description	Drawn	Checked
A	17/01/2020	Preliminary	TC	MS

0 200 400 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:11,000 @A3

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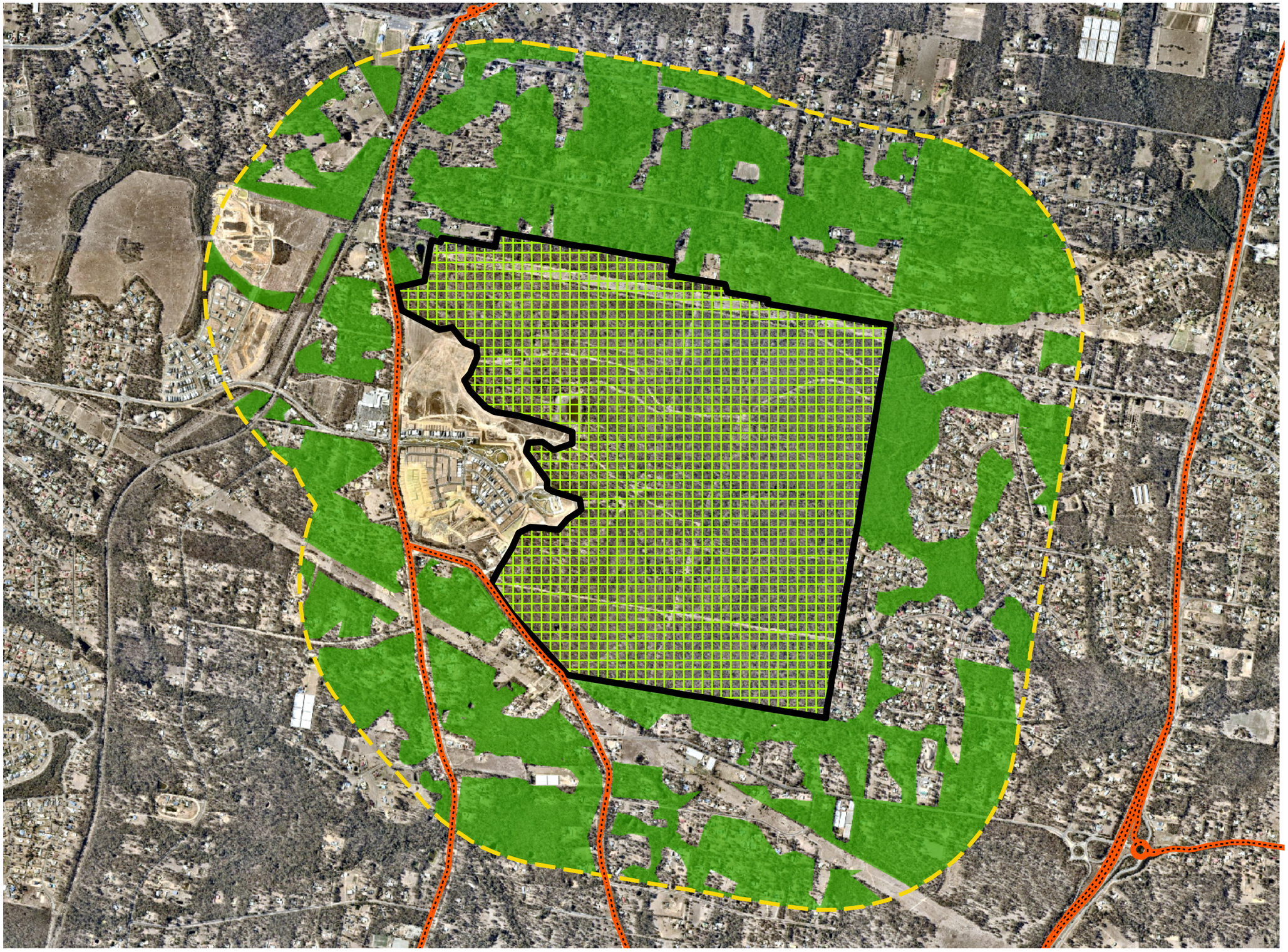
3. Context - Koala



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Legend

- Referral area
- Motorway/highway/Major arterial road
- Critical habitat on site
- 1km buffer boundary
- Critical habitat within 1km context buffer area

Context (1km buffer) area comprises of 53.4% Koala critical habitat

Issue	Date	Description	Drawn	Checked
A	17/01/2020	Preliminary	TC	MS

0 200 400 600 800 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:20,000 @ A3

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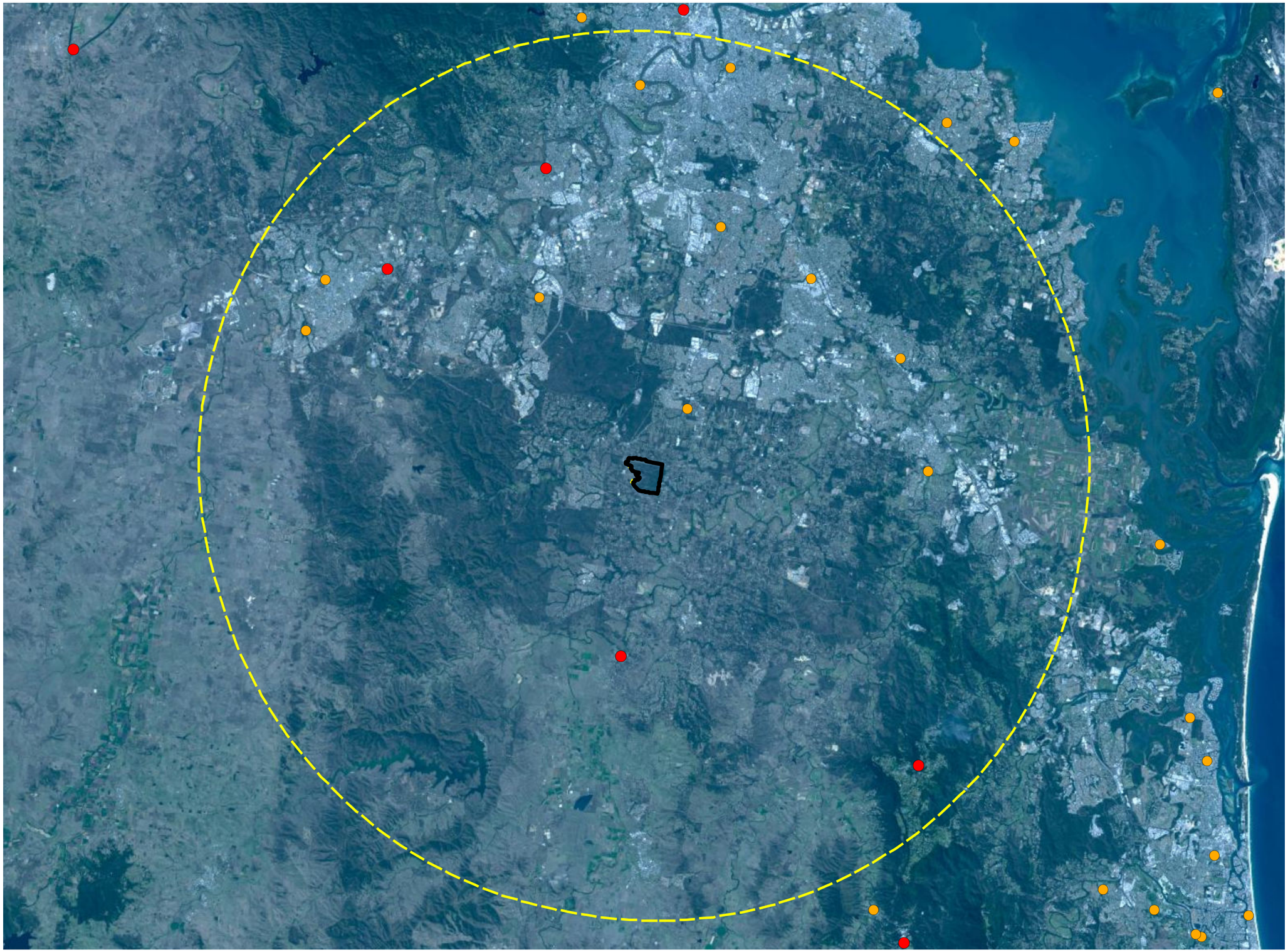
ADDRESS/RPD: Greenbank Road, Greenbank *17/01/2020* *7598 E 03 Koala Context A*

4. GHFF Roosts (30km radius)



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Legend

- Referral area
- Grey-headed Flying Fox Camp locations (level 1 & 2) (2019 records, DoE)
- Grey-headed Flying Fox Camp locations (>= level 3) (2019 records, DoE)
- 30km referral area radius

Issue	Date	Description	Drawn	Checked
A	14/02/2020	Preliminary	LC	AD

0 2 4 6 8 km

Transverse Mercator | GDA 1994 | Zone 56 | 1:270,000 @ A3

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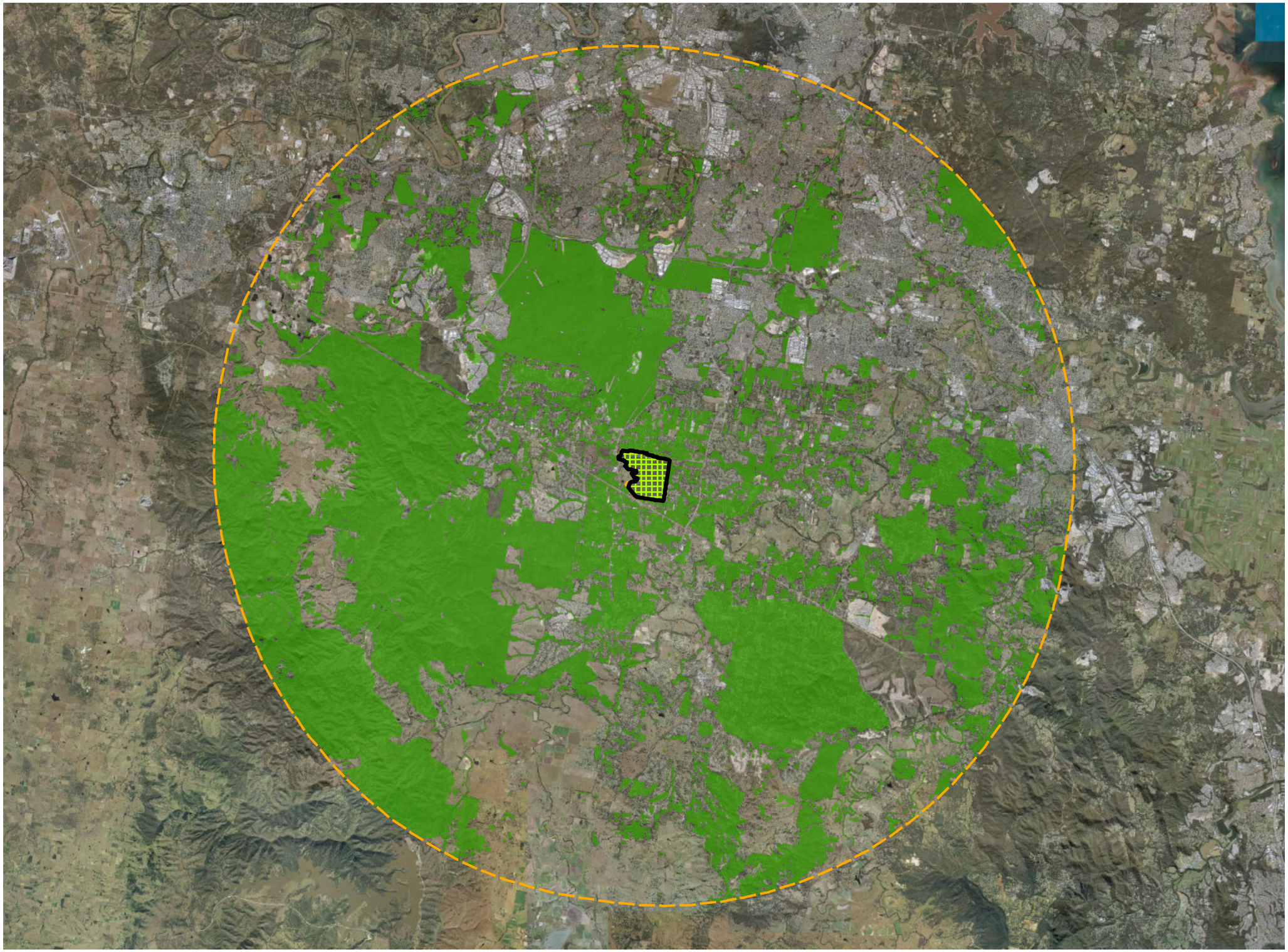
ADDRESS/RPD: Greenbank Road, Greenbank *14/02/2020* *7598 E 04 GHFF Roosts 30km buffer*

5. GHFF Critical Habitat (20km radius)



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Legend

- Referral area
- Critical habitat on site
- 20km referral area radius
- Critical habitat within 20 km context buffer area

Context (20km buffer) area comprises of 39.9% Grey-headed Flying Fox critical habitat

Issue	Date	Description	Drawn	Checked
A	14/02/2020	Preliminary	LC	AD

0 2 4 6 km

Transverse Mercator | GDA 1994 | Zone 56 | 1:190,100 @ A3

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mirvac

Everleigh

ADDRESS/RPD: Greenbank Road, Greenbank *14/02/2020* *7598 E 05 Critical Habitat 20km buffer*

Attachment 3

Technical Document 2 – Offset Site

Technical Document 2 – Offset Site

EPBC2016/7817 – Condition 4

Offset Strategy – Technical Document 2 – Offset Site
Mirvac Greater Flagstone Project
Greenbank, Queensland

Prepared for Mirvac Queensland Pty Ltd
September 2020
Job 7598 E

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Document Issue

Issue	Date	Prepared By	Checked By
Issue A	12.02.2020	JG/AW/FS	AD
Issue B	17.02.2020	JG/FS	AD
Issue C	18.02.2020	JG/KG/FS	AD
Issue D	26.06.2020	JG	AD
Issue E	08.07.2020	AD/MC	AD
Issue F	13.07.2020	MC	AD
Issue G	11.09.2020	AD/MC	AD
Issue H	23.09.2020	MC	AD

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Technical Tables

1. Introduction

This 'Technical Document 2 - Offset Site' is intended to support the Mirvac Greater Flagstone Offset Strategy. It outlines the technical assessment and specific data sets that underpin the habitat quality scores at a baseline level and with the application of the Offset Management Plan that feed into the EPBC offset calculator to determine the size of the offset for the Koala and Grey-headed Flying-fox (GHFF).

The technical assessment for the impact site is contained within a separate supporting document 'Technical Document 1 – Impact Site', and that document should be consulted for the specific data that define the impact component.

1.1. Offset Site Location and Details

Extensive work and negotiations have resulted in an agreement to utilise the services provided by Queensland Trust for Nature (QTFN) and secure land previously assessed for offset value and suitability.

The nominated offset land (**Site Summary Table**, below) is located on a 2,000 ha cattle farming property named "Aroona", within the Little Liverpool Range, South-East Queensland. The land was donated to QTFN in 2015. QTFN will eventually utilise the bulk of the site for conservation through various biological offset agreements. It is proposed that a 686.44 ha patch of the site will be of suitable size and condition to meet the requirements to offset the potential impacts to the Koala and GHFF habitat from this project. The offset area includes a range of vegetation communities including remnant, regrowth and cleared areas requiring revegetation. These areas can be described broadly as:

- Remnant vegetation – areas identified as remnant vegetation are those areas of existing vegetation mapped under the VMA as remnant. These areas were observed as having the potential to still be disturbed from surrounding land uses, understorey clearing and weed invasion.
- Regrowth – areas mapped under the VMA as regrowth or otherwise identified as being currently degraded in some way through disturbance and weed invasion. Works are to be undertaken within these zones to improve the condition including weed management, natural regeneration, seeding and infill planting as required.
- Cleared – areas identified as being mostly devoid of vegetation, where grazing and other agricultural practices occurred in the past, or are currently occurring. These areas require significant planting and on-ground works to establish vegetation communities reflective of the nearby remnant vegetation.

Notably, the offset site is currently impacted by a weedy understorey dominated by *Lantana camara*. Lantana has the capacity to fuel forest fires, creating hotter and larger fires that native vegetation is unable to withstand (Berry et al 2011, DAF 2016). Until vegetation reaches maximum scores for large tree status, management is required to reduce overall weed species and ensure the improvement of Koala habitat. Improvements to this vegetation category will be realised through increases in the large tree score, resulting in greater abundance of food and shelter habitat, the reduction in invasive weed species that limit koala movement and a reduction in other threatening processes. Lantana camara is widespread and present across all Regional Ecosystems and vegetation categories.

A detailed survey of weed coverage at Aroona was conducted in mid-2019 by the University of Queensland Conservation Masters researchers (Summary UQ 2019). The report used remote sensing data and ground truthed surveys to produce a detailed analysis about the level of *Lantana camara* across the property. The results highlight:

- Over 117 ha of lantana camara ground truthed onsite
- Of the 117 ha known, the infestation density is >50% of coverage
- The data confirms with high confidence that >50% coverage through most of Aroona's remnant, regrowth and some parts of cleared alluvial plains.

Lantana camara is considered a key threatening process to Koalas, impacting movement between trees and prolonging time spent on the ground, making them susceptible to predators (Paull et al 2019, The Honourable Leeanne Enoch 2019). The Queensland Draft Koala Strategy 2019-2024 lists Koala habitat restoration, including removal of weeds, as a key priority, and these recommendations were developed at the advice of the Koala expert panel (Queensland Government 2019). As well as presenting a barrier to movement, Lantana also changes the structure and health of the ecosystem, which will lead to a decline in the health and quality of Koala food and habitat. Lantana is a transformer weed, that changes wildfire behaviour resulting in destruction of native trees (Berry et al 2011, DAF 2016). It also supresses eucalypt recruitment, both through its alleleopathic properties and its capacity to shade out other species. This prevents eucalypt recruitment, leading to an overall decline in habitat health if not managed (Threatened Species Scientific Committee, 2010). If eucalypt species cannot recruit, there will be no succession of vegetation, meaning the future health of the ecosystem is under threat.

There are currently no regulated state requirements at the offset site for controlling *Lantana camara*, Broad Leaved Pepper Tree or Chinese Elm. These weeds are the main threat to the movement of Koalas. Under the Queensland Biosecurity Act 2014, *Lantana camara*, Broad Leaved Pepper and Chinese Elm are classified as a Class 3 declared pest. Landholders are not required to control Class 3 declared pest plants on their land. Weed management within the offset area will be additional to the minimum legislated land management practices and align with the EPBC Environmental Offset Policy.

QTFN were engaged to develop an Offset Strategy and then implement it through the Offset Management Plan (OMP). The objective of this strategy is to summarise existing habitat quality for the Koala and Grey-headed Flying-fox present on the offset area and to identify land management actions that will achieve a net gain in Koala and Grey-headed Flying-fox habitat quality over the term of the offset. The Strategy identifies outcomes focused management actions, which will fulfil a statutory requirement, pursuant to the EPBC Act, for the provision of Koala and Grey-headed Flying-fox habitat offsets.

The site is expected to provide long-term protection, conservation, and management of MNES impacted by the current proposal – the Koala and the GHFF.

Site Summary Table

Address	"Aroona" 338 Alpers Road, Mount Mort
Offset RPD and Area	Part or whole of lots: 54/CC1018 44/CC32 45/CC32 6/RP21558 13?RP21558 31/CH312311 216/CH311631 218/CH311734 222/CH311798 30/CH312310 64/CC552
Offset Area	686.44 hectares
Land Tenure	Freehold
Local Government Area	Ipswich City Council and Lockyer Valley Regional Council
Regional Ecosystems at offset area	• Least Concern RE 12.3.7 • Endangered RE 12.3.3 • Least Concern RE 12.8.17 • Least Concern RE 12.8.16 • Least Concern RE 12.8.9 • Of Concern RE 12.9-10.7

2. MHQA Methodology – Koala

The offset site was assessed using a modified version of the Queensland State Governments "Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy" Version 1.2 April 2017 (DEHP 2017). The purpose of this guideline is to provide a methodology for proponents to determine the habitat quality of a site under the Queensland Environmental Offsets framework. The guideline is a step-by-step methodology explaining how to measure habitat quality for land-based offsets. This methodology has been adopted and tailored/modified to assess the impacts and offsets relating to Matters of National Environmental Significance (MNES).

The traditional terrestrial habitat quality assessment assesses three (3) core indicators – Site Condition, Site Context and Species Habitat Index.

The modified habitat quality assessment (MHQA) combines the three (3) core indicators into two (2) (Site Condition and Site Context) with each being equally weighted at 30% of the final score. The balance of the weighting (40%) has been attributed to the third indicator which is independent of the traditional habitat quality assessment, being Species Stocking Rate. The Species Stocking Rate has been added to the MHQA to better incorporate MNES, and for the purpose of this offset strategy, the vulnerable-listed Koala MNES. The following section details the methodology utilised to assess the Site Condition, Site Context and Species Stocking Rate under the MHQA for Koala.

2.1. Site Condition – Koala

Assessing Site Condition is an integral step in determining specific quantification of impacts, while also determining whether an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset. The on-site condition is a key element of habitat quality and has a direct influence on the biodiversity it supports. Site Condition is assessed using a suite of attributes to describe the structure and function of the vegetation community, and is benchmarked against the expected range for a relatively undisturbed community.

The site condition assessment under the MHQA is assessed using fifteen (15) condition characteristics being:

- recruitment of woody perennial species in EDL;
- native plant species richness – trees;
- native plant species richness – shrubs;
- native plant species richness – grasses;
- native plant species richness – forbs;
- tree canopy height;
- Sub-canopy cover;
- tree canopy cover;
- native grass cover;
- organic litter;
- large trees;
- coarse woody debris;
- non-native plant cover;
- quality and availability of food and foraging habitat; and
- quality and availability of shelters.

Assessment methodology of the above condition characteristics do not differ from the traditional habitat quality assessment. In developing the MHQA to better incorporate MNES, two (2) Species Habitat Index characteristics, being:

- quality and availability of food and foraging habitat; and,
- quality and availability of shelters;

have been added to the site condition indicator.

2.2. Site Context – Koala

The Site Context assessment deals with the site and its adjacent surroundings. Site Context is measured using a suite of attributes to describe the location of the habitat within the surrounding landscape and the influence of its associated threats. This assessment also considers the influence of adjacent vegetated areas and ecological corridors. Under the MHQA, site context is measured using the following seven (7) characteristics:

- size of patch;
- connectedness;
- context;
- ecological corridors;
- role of site location to species overall population in the state;
- threats to the species; and
- species mobility capacity.

Unlike the traditional habitat quality assessment methodology where site connectedness is assessed against the surrounding remnant vegetation only, the MHQA site connectedness is assessed against the surrounding MNES habitat, in this instance, Koala habitat. Whilst remnant eucalypt forest vegetation is critical habitat for Koala, equally Koalas can utilise areas of non-remnant vegetation or high value regrowth vegetation that does not yet achieve remnant status. Therefore, site context under the MHQA accounts for surrounding Koala habitat rather than remnant vegetation.

In developing the MHQA, three (3) Species Habitat Index characteristics were nominated:

- role of site location to overall species population in the state;
- threats to the species; and,
- species mobility capacity.

2.3. Species Stocking Rate – Koala

The MHQA incorporates Species Stocking Rate as an attribute not discussed under the traditional terrestrial habitat assessment methodology. Species Stocking Rates are estimates of the Koala carrying capacity of the site at the time of undertaking the survey.

Baseline Koala activity levels were determined by utilising the Spot Assessment Technique (Phillips et al. 2011). The SAT survey results indicated a 'low – high' Koala activity across the offset site. Utilising these Koala activity levels, and inferring the results with current available published scientific literature, an estimated Koala carrying capacity (stocking rate) was determined.

2.4. Offset Site MHQA – Assessment Units

An ecological assessment was conducted at Aroona in 2016 by AusEcology environmental consultants. The surveys were carried out using biocondition plots and data relating to the habitat quality of the land-based offset was collected in line with the modified version of the Queensland State Governments "Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy" Version 1.2 April 2017 (DEHP 2017). These plots, herein referred to as 'Habitat Quality Transects' allowed for the assessment of the offset area to determine the condition of the vegetation and its suitability as an offset for the Koala and the Grey-headed Flying-fox (GHFF).

For the AusEcology assessment, the site was broken up into eleven assessment units based on land zones and vegetation status (remnant, regrowth and cleared). The Regional Ecosystems (RE) within each land zone were either singular or composite (a mix of multiple) Regional Ecosystems.

Fourteen Habitat Quality Transects were established across these assessment units. The transects were distributed in such a way as to provide a representative sample of the Regional Ecosystems and gradient condition states of each Assessment Unit present on the property.

For the purposes of managing the offset, the land was categorised into three management units, remnant (OMU-1), regrowth (OMU-2) and cleared (OMU-3) as agreed with the Department. Both regrowth and remnant vegetation are dominated by Koala and GHFF food tree species, with remnant vegetation in good ecological condition providing food, shelter and corridors for Koalas. Both remnant and regrowth areas contain significant weed infestations that impact on Koala dispersal and recruitment of Koala and GHFF food and habitat trees. These Offset Management Units create the opportunity to improve habitat by the removal of threats and increasing the connectivity of the site through natural regeneration. The cleared areas present an opportunity to create additional habitat and increase the connectivity and context of habitat in the surrounding landscape through active revegetation.

A breakdown of the Offset Management Units (OMUs) and Assessment Units (AUs) is provided in the summary Table below. The location of the habitat assessment transects in relation to mapped Regional Ecosystems, Assessment Units and OMUs are shown in **Appendix A**.

In summary, the offset site was divided into three assessment units as agreed with the Department and outlined below (refer **Appendix A** for relevant plans**)**.

1. OMU1 (Remnant Vegetation)
2. OMU2 (Regrowth Vegetation)
3. OMU3 (Cleared Areas)

MHQA Assessment Units Table

OMU	VMA Status	Assessment Unit	Land zone	Number of sites	Status	Regional Ecosystems
OMU-1	**Category B**	**AU02**	**8**	**2**	**Remnant**	**12.8.9**
		AU03	**8**	**1**	**Remnant**	**12.8.16**
		AU05	**8**	**2**	**Remnant**	**12.8.17**
OMU-2	**Category C**	**AU01**	**9-10**	**2**	**Mature Regrowth**	**12.9-10.7**
		AU04	**8**	**3**	**Mature Regrowth**	**12.8.16**
		AU06	**8**	**1**	**Mature Regrowth**	**12.8.17**
		AU07	**3**	**2**	**Mature Regrowth**	**12.3.3**
		AU08	**3**	**1**	**Mature Regrowth**	**12.3.7**
OMU-3	**Category X**	**AU09**	**3**	**Nil**	**Cleared**	**Cleared 12.3.7**
		AU11	**3**	**Nil**	**Cleared**	**Cleared 12.3.3**
		AU12	**3**	**Nil**	**Cleared**	**Cleared 12.8.17**

The following are presented for reference in **Appendix A**.

- Offset Management Units
- Habitat Quality Assessment Units
- MHQA Working Sheets
- Biocondition Benchmarks
- Weed Report
- Koala SAT Summary Table
- Koala SAT Raw Data

3. Koala Baseline Assessment

3.1. Site Condition – Baseline Koala

3.1.1 Habitat Transect Data Assessment – Baseline Koala

Table 1 outlines the application of the MHQA to Habitat Transect Data. Refer to **Appendix A** for empirical data from which these results are tabulated.

Table 1: Habitat Transect Data Assessment – Baseline Koala

Site Reference	Maximum Score	OMU1 - Remnant			OMU2 - Regrowth					OMU3 - Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
Recruitment of woody perennial species in EDL	5	5	5	5	5	5	5	3	0	0	0	0	These data are taken directly from transect information (**Appendix A**). For each AU, MHQA transects were conducted within Regional Ecosystems and scored compared to the benchmark. The results were then averaged within the AUs. Updated non-native plant cover surveys were conducted in 2019 for the whole of property using GIS remote sensing data and ground-truthed with the non-native plant cover survey methodology from the MHQA transects. Surveys provide a high level of accuracy for estimated weed abundance. Coverage estimations across the property were >50% for all non-native species, with the majority of Lantana camara infestations confirmed at a density of >50% across all AUs. A conservative score of 3 was ascribed across all AUs (refer **Appendix A** Weed Report).
Native plant species richness – trees	5	5	5	5	5	5	2.5	5	5	0	0	0	
Native plant species richness – shrubs	5	2.5	0	0	0	2.5	2.5	0	0	0	0	0	
Native plant species richness – grasses	5	5	5	2.5	5	5	2.5	2.5	2.5	0	0	0	
Native plant species richness – forbs	5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0	0	0	
Tree canopy height	5	4	5	4	3	4	3	4	5	0	0	0	
Tree canopy cover	5	5	5	5	2.5	5	2.5	5	5	0	0	0	
Shrub canopy cover	5	5	3	3	3	3	3	3	0	0	0	0	
Native grass cover	5	1	1	5	3	5	3	3	5	0	0	0	
Organic litter	5	5	5	5	5	5	5	5	3	0	0	0	
Large trees	15	5	15	15	5	5	0	10	5	0	0	0	
Coarse woody debris	5	2	5	5	2	2	2	2	0	0	0	0	
Non-native plant cover	10	3	3	3	3	3	3	3	3	3	3	3	
Totals	**80**	**50.0**	**59.5**	**60.0**	**44.0**	**52.0**	**36.5**	**48.0**	**36.0**	**3.0**	**3.0**	**3.0**	The totals are a sum of the reference scores.

3.1.2 Species Habitat Index Data Site Condition – Baseline Koala

Table 2 provides the assessment of Species Habitat Indices that support the Site Condition score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 2: Species Habitat Index Assessment – Site Condition – Baseline Koala

Site Reference	Maximum Score	OMU1 - Remnant			OMU2 - Regrowth					OMU3 - Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
Quality and availability of food and foraging habitat	10	5	10	10	5	5	5	5	5	1	1	1	Koala food and foraging habitat is scored from the site condition, primarily around the 'Large tree' count score. As trees mature into large trees and canopy increases, there is greater availability of food for Koalas. OMU1 has high food and foraging habitat quality due to the relatively high scores for 'Large trees', tree canopy height and coverage, and recruitment of woody perennial species. Total scores for OMU1 ranges between 50 and 60 out of 80, placing AU03 and AU05 in the top third for potential score, or high value, and AU02 in the middle third, or moderate value. This results in a high to moderate food and foraging score of 10 to 5. OMU2 has moderate food and foraging habitat quality due to the moderate score for 'Large trees', and less than benchmark scores for tree canopy height and recruitment of woody perennial species.

Site Reference	Maximum Score	OMU1 - Remnant			OMU2 - Regrowth					OMU3 - Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
													Total scores for OMU2 range from 36 to 52 out of 80, placing it in the bottom two thirds for potential site condition score. This results in a moderate food and foraging score of 5. OMU3 has poor food and foraging habitat quality due to the absence of 'Large trees' and complex woody vegetation. This results in a low food and foraging score of 1.
Quality and availability of shelter habitat	10	5	10	10	5	5	5	5	5	1	1	1	Koala shelter habitat is scored from the site condition scores, primarily around the 'Large tree' score for eucalyptus and non-eucalyptus species. As trees mature into large trees and the canopy increases there is greater capacity to provide shelter habitat for Koalas. As for food and foraging scores, the shelter scores for OMU1, OMU2, and OMU3 are therefore scored high (10) to moderate (5) and low (1).
Totals	**20**	**10**	**20**	**20**	**10**	**10**	**10**	**10**	**10**	**2**	**2**	**2**	The totals are a sum of the reference scores.

3.1.3 Site Condition Scores – Baseline Koala

Table 3 provides the Site Condition scores for each assessment unit and the MHQA weighted score.

Table 3: Site Condition Scores – Baseline Koala

Site Reference	Maximum Score	OMU1 - Remnant			OMU2 - Regrowth					OMU3 - Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
Site Condition Totals	100	60.0	79.5	80.0	54.0	62.0	46.5	58.0	46.0	5.0	5.0	5.0	The totals are a sum of **Table 1 & 2** totals.
MHQA Weighted Score (30%)	**3.00**	**1.80**	**2.39**	**2.40**	**1.62**	**1.86**	**1.40**	**1.74**	**1.38**	**0.15**	**0.15**	**0.15**	The MHQA weighting of 30% is applied to the Site Condition totals, above.

3.2. Site Context – Baseline Koala

3.2.1 GIS Data – Baseline Koala

Table 4 outlines the application of the MHQA to GIS Site Context data.

Table 4: GIS Data Assessment – Baseline Koala

Site Reference	Maximum Score	OMU1 – Remnant	OMU2 – Regrowth	OMU3 – Cleared	Justification
Size of the patch	10	10	10	10	The offset area is located within a patch of connected remnant and regrowth vegetation of >200 ha (refer **Appendix B**).
Connectedness	5	4	4	4	The offset area is connected to remnant and regrowth vegetation by 74.8% of the perimeter. It receives a score of 4 (refer **Appendix B**).
Context	5	4	4	4	The vegetation within a 1km buffer is 71.6% remnant or regrowth vegetation (refer **Appendix B**).
Ecological corridors	6	6	6	6	The offset site is within an ecological corridor (refer **Appendix B**) and scores 6.
Totals	**26**	**24**	**24**	**24**	The totals are a sum of the reference scores.

3.2.2 Species Habitat Index Data Site Context – Baseline Koala

Table 5 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 5: Species Habitat Index Assessment – Site Context – Baseline Koala

Site Reference	Maximum Score	OMU1 – Remnant	OMU2 – Regrowth	OMU3 – Cleared	Justification
Role of site location to species overall population in the State	5	4	4	4	The role of the site location to species overall population in the state is likely to be critical to the species survival. The offset site located in a connected corridor, contributing at offset to large tract of vegetation critical to the species survival.
Threats to the species	15	7	7	1	The entire property is currently used for grazing purposes, with varying intensity. Historical clearing, high numbers of stock and lack of pest and weed management has resulted in the property providing degraded and modified Koala habitat The landscape has historically high numbers of feral carnivores, that are currently uncontrolled (refer **Appendix C** Offset Management Plan Section 6.4) as engagement in baiting programs on surrounding properties has decreased over the years. For the last 20 years the wild dog and fox populations have not been managed at Aroona, due to preference by the previous owner not to trap, shoot or bait. The threat from introduced carnivores on Koalas is high across the entire property. Initial monitoring data indicates that packs of wild dogs and numerous foxes have been recorded across the property. In some instances, packs of up to 9 individuals have been observed. Currently no management is undertaken for feral carnivores, except when carnivores pose a threat to cattle. Images below show high dog abundance and predation by foxes on large mammals.  *Images show high dog abundance and predation by foxes on large mammals* Koala mortality (adult male) has been recorded within the proposed offset area in June 2017. Cause of death was recorded as potential fox/dog mortality due to the deceased individual having a good body condition score and potential wounds on underside.  High numbers of feral carnivores present a significant threat to Koalas. This combined with the extensive barriers to dispersal from weeds means the threat to Koala is moderate. OMU1 and OMU2 have a moderate level of threat. Habitat quality transects shows extensive weed cover, which impacts significantly on Koala dispersal and becomes a barrier to movement.

Site Reference	Maximum Score	OMU1 – Remnant	OMU2 – Regrowth	OMU3 – Cleared	Justification
					OMU3 areas have a high level of threat. The lack of vegetation means Koalas are exposed to feral carnivore attack if traversing these areas. The non-native plant cover in the cleared areas also provides significant barriers to dispersal and increases time spent on the ground, increasing the likelihood of feral carnivore attack.
Species mobility capacity	10	7	7	1	OMU1 and OMU2 species mobility capacity is moderately restricted. Weed coverage across the offset area is approximately 50%. This impacts Koala ability to traverse the landscape leading to a moderate restriction. The presence of feral carnivores within the offset area will further restrict species mobility. OMU3 is cleared. The large distances travelled across open spaces of OMU3 means Koalas are severely restricted in their mobility capacity.
Totals	**30**	**18**	**18**	**6**	The totals are a sum of the reference scores.

3.2.3 Site Context Scores – Baseline Koala

Table 6 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 6: Site Context Scores – Baseline Koala

Reference	Maximum Score	OMU1 – Remnant	OMU2 – Regrowth	OMU3 – Cleared	Justification
Site Context Totals	56	42	42	30	The totals are a sum of **Table 4 & 5** Totals.
MHQA Weighted Score (30%)	**3.00**	**2.25**	**2.25**	**1.61**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

3.3. Species Stocking Rate – Baseline Koala

Table 7 provides the Species Stocking Rate Scores for each assessment with justifications weighted as per the MHQA methodology.

Table 7: Species Stocking Rate Scores – Baseline Koala

Reference	Maximum Score	OMU1 – Remnant	OMU2 – Regrowth	OMU3 – Cleared	Justification
MHQA Weighted Species Stocking Rate Score (40%)	**4.00**	**2.57**	**2.57**	**0.29**	Species Stocking Rate (SSR) has been scored as per the results of the MHQA Working Sheets - Species Stocking Rate Table and SSR Supplementary Table as per **Appendix A**.

3.4. Modified habitat Quality Assessment Habitat Scores – Baseline Koala

Table 8 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Offset Site.

Table 8: Modified Habitat Quality Assessment Score – Baseline Koala

Site Reference	Maximum Score	OMU1 - Remnant			OMU2 - Regrowth					OMU3 - Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
Site Condition MHQA Weighted Score	3.00	1.80	2.39	2.40	1.62	1.86	1.40	1.74	1.38	0.15	0.15	0.15	Refer MHQA Weighted Score **Table 3**.
Site Context MHQA Weighted Score	3.00	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	1.61	1.61	1.61	Refer MHQA Weighted Score **Table 6**.
Species Stocking MHQA Weighted Score	4.00	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	0.29	0.29	0.29	Refer MHQA Weighted Score **Table 7**.
Assessment Unit Habitat Assessment Scores	10.00	6.62	7.21	7.22	6.44	6.68	6.22	6.56	6.20	2.04	2.04	2.04	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	6.95	289.18	63.48	0.29	168.16	104.89	1.38	6.70	6.72	0.88	37.81	Refer **Appendix A**.

Site Reference	Maximum Score	OMU1 - Remnant			OMU2 - Regrowth					OMU3 - Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
Assessment Unit Area Weighting	1.00	0.02	0.80	0.18	0.00	0.60	0.37	0.00	0.02	0.15	0.02	0.83	The Assessment Unit Area Weighting is the proportion of the total offset area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	1.00	0.13	5.80	1.27	0.01	3.99	2.32	0.03	0.15	0.30	0.04	1.70	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Offset Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
OMU Modified Habitat Quality Assessment Scores	**10**	**7.198**			**6.496**					**2.043**			The Offset Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheets

3.5. Offset Site MHQA Score Summary – Baseline Koala

The Modified Habitat Quality Assessment (MHQA) tool for Koala was applied across the offset site to determine the baseline habitat score for Koala. Ten (10) MHQA transects were completed across the offset site focussing on the three (3) dominant vegetation communities present (**Appendix A**), being:

1. Remnant – OMU1
2. Regrowth – OMU2
3. Cleared areas – OMU3

Results of the MHQA (refer **Sections 3.2 to 3.4**) indicate that:

1. OMU1 (Remnant) has a habitat quality score of **7.198**
2. OMU2 (Regrowth) has a habitat quality score of **6.496**
3. OMU3 (Cleared areas) has a habitat quality score of **2.043**

3.5.1 Offset Site MHQA Scores – Baseline Koala

With rounding, offset site baseline habitat scores are OMU1 -7, OMU2 – 6 and OMU3 - 2.

The Offset Site has baseline Modified Habitat Quality Assessment Scores for the Koala of:
OMU1 – 7
OMU2 – 6
OMU3 - 2

4. Koala Offset Assessment

4.1. OMU1 Site Condition – Offset Koala

4.1.1 OMU1 Habitat Transect Data Assessment – Offset Koala

Table 9 outlines the application of the MHQA to Habitat Transect Data. Refer to **Appendix A** for supporting data from which these results are tabulated.

Table 9: OMU1 Habitat Transect Data Assessment – Offset Koala

Site Reference	Maximum Score	OMU1 - Baseline			OMU1 - Offset			OMU3 - Gain			Justification
		AU02	AU03	AU05	AU02	AU03	AU05	AU02	AU03	AU05	
Recruitment of woody perennial species in EDL	5	5	5	5	5	5	5	0	0	0	Recruitment of woody perennial species score maintained: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of woody perennial species. Currently the property is managed as a grazing enterprise (**Appendix C** OMP Section 4.1), with the proposed offset area grazed heavily with cattle. With the offset in place cattle will be removed from the offset area and wildfire hazard reduction actions implemented (refer **Appendix C** OMP Section 7.3 and Figure 7.1).
Native plant species richness – trees	5	5	5	5	5	5	5	0	0	0	Native tree species richness score maintained: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – shrubs	5	2.5	0	0	2.5	2.5	2.5	0	2.5	2.5	Native shrub species richness score maintained and increased: Weed reduction, ecological burns to encourage shrub diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – grasses	5	5	5	2.5	5	5	5	0	0	2.5	Native grasses species richness score maintained and increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – forbs	5	2.5	2.5	2.5	5	5	5	2.5	2.5	2.5	Native forbs species richness score increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Tree canopy height	5	4	5	4	5	5	5	1	0	1	Tree canopy height score maintained and increased: Existing species meet or are just below benchmark tree canopy height. Securing the offset will ensure protection for remnant vegetation. Justification as per "Recruitment of woody perennial species in EDL".
Tree canopy cover	5	5	5	5	5	5	5	0	0	0	Tree canopy cover score maintained: Existing species meet benchmark tree canopy cover. Securing the offset will ensure protection for remnant vegetation. Justification as per "Recruitment of woody perennial species in EDL".
Shrub canopy cover	5	5	3	3	5	5	5	0	2	2	Shrub canopy cover score maintained or increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Native grass cover	5	1	1	5	5	5	5	4	4	0	Grass cover score increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of grass cover and species. Justification as per "Recruitment of woody perennial species in EDL".
Organic litter	5	5	5	5	5	5	5	0	0	0	Organic litter score maintained: Weed reduction, ecological burns and removal of cattle grazing pressure will result in an increase in organic litter. Justification as per "Recruitment of woody perennial species in EDL".
Large trees	15	5	15	15	15	15	15	10	0	0	Large trees score maintained or increased: Ecological burns to reduce the risk of wildfire and securing the offset from incompatible land uses will result in Large Trees meeting the benchmark score. Direct seeding or infill planting will be carried out if weed removal results in cleared patches. Justification as per "Recruitment of woody perennial species in EDL".
Coarse woody debris	5	2	5	5	5	5	5	3	0	0	CWD score maintained or increased: Securing the offset from incompatible land uses and the risk of clearing will result in an increase in Coarse Woody Debris. Justification as per "Recruitment of woody perennial species in EDL".
Non-native plant cover	10	3	3	3	10	10	10	7	7	7	Intensive weed management set out in the OMP Section 6.2 (**Appendix C**) will result in a significant reduction in weed species across the offset area. Detailed reporting and monitoring will ensure a reduction in weeds species to a low level of threat by the end of the 20 year management period. Justification as per "Recruitment of woody perennial species in EDL".
Totals	**80**	**50.0**	**59.5**	**60.0**	**77.5**	**77.5**	**77.5**	**27.5**	**18.0**	**17.5**	The totals are a sum of the reference scores.

4.1.2 OMU1 Species Habitat Index Data Site Condition – Offset Koala

Table 10 provides the assessment of Species Habitat Indices that support the Site Condition score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 10: OMU1 Species Habitat Index Assessment – Site Condition – Offset Koala

Site Reference	Maximum Score	OMU1 - Baseline			OMU1 - Offset			OMU1 - Gain			Justification
		AU02	AU03	AU05	AU02	AU03	AU05	AU02	AU03	AU05	
Quality and availability of food and foraging habitat	10	5	10	10	10	10	10	5	0	0	The quality and availability of food and foraging habitat will improve with the offset in AU02, but the baseline for AU03 and AU05 is already scored at maximum of 10. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Quality and availability of shelter habitat	10	5	10	10	10	10	10	5	0	0	The quality and availability of shelter habitat will improve with the offset in AU02, but the baseline for AU03 and AU05 is already scored at maximum of 10. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Totals	**20**	**10**	**20**	**20**	**20**	**20**	**20**	**10**	**0**	**0**	The totals are a sum of the reference scores.

4.1.3 OMU1 Site Condition Scores – Offset Koala

Table 11 provides the Site Condition scores for each assessment unit and the MHQA weighted score.

Table 11: OMU1 Site Condition Scores – Offset Koala

Site Reference	Maximum Score	OMU1 - Baseline			OMU1 - Offset			OMU1 - Gain			Justification
		AU02	AU03	AU05	AU02	AU03	AU05	AU02	AU03	AU05	
Site Condition Totals	100	60.0	79.5	80.0	97.5	97.5	97.5	37.5	18.0	17.5	The totals are a sum of **Table 10 & 11** totals.
MHQA Weighted Score (30%)	**3.00**	**1.80**	**2.39**	**2.40**	**2.93**	**2.93**	**2.93**	**1.13**	**0.54**	**0.53**	The MHQA weighting of 30% is applied to the Site Condition totals, above.

4.2. OMU1 Site Context – Offset Koala

4.2.1 OMU1 GIS Data – Offset Koala

Table 12 outlines the application of the MHQA to GIS Site Context data.

Table 12: OMU1 GIS Data Assessment – Offset Koala

Site Reference	Maximum Score	OMU1 – Baseline	OMU1 – Offset	OMU1 – Gain	Justification
Size of the patch	10	10	10	0	GIS Context data for Size of Patch, Context and Ecological Corridors will be maintained with the offset. With the implementation of the offset and surrounding offset commitments, Connectedness will increase to a score of 5 (currently 74.8% will increase to > 75%).
Connectedness	5	4	5	1	
Context	5	4	4	0	
Ecological corridors	6	6	6	0	
Totals	**26**	**24**	**25**	**1**	The totals are a sum of the reference scores.

4.2.2 OMU1 Species Habitat Index Data Site Context – Offset Koala

Table 13 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 13: OMU1 Species Habitat Index Assessment – Site Context – Offset Koala

Site Reference	Maximum Score	OMU1 – Baseline	OMU1 – Offset	OMU1 – Gain	Justification
Role of site location to species overall population in the State	5	4	5	1	Due to the scale of the offset and its location in a large connected corridor within the Little Liverpool Range, the improvement in habitat quality for Koalas and long-term protection of habitat will result in the location being of critical importance to the overall population in the state.
Threats to the species	15	7	15	8	Threats to the species are identified as impacts of feral carnivores and predation on Koalas, linked with the abundance of weed species, restricting Koala's ability to move through the landscape and making them further vulnerable to predation. Gains to the threats to the species score will be realised through management of the threatening processes detailed in Section 6.2 and 6.4 of the OMP (**Appendix C**). Feral carnivore monitoring and control will occur bi-annually, with a Relative Abundance Index established for each feral species, with control events aimed at targeting population increases. Methodology for control will include trapping and shooting. Weed management will include detailed surveying, treatment and follow-up treatment to reduce overall coverage to <5% across the offset site. Gains to the Threats to the species score can be further ensured due to the size and location of the offset within the landscape. The offset area is of significant size and located adjacent to another large offset, totalling over 1,200 hectares. Additionally, the land is located within the Little Liverpool Range, a large, continuously connected tract of vegetation. QTFN are founders of the Little Liverpool Range Initiative, which centres on coordination land management actions across the range. Coordinated pest and weed management both within the offset areas and across neighbouring properties will significantly reduce the threats to the species from a moderate to a low level of threat (i.e. Koalas are more likely to survive in the offset area). Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Species mobility capacity	10	7	10	3	An improvement in species mobility capacity will be gained through the significant reduction in non-native plant cover across the offset site. The OMP Section 6.2 (**Appendix C**) details the strategy for weed management in removing weeds that significantly impact Koala dispersal. These include transformer weeds (shrubs) that block Koalas movement through the landscape, including Lantana camara and Broad-leaved Pepper. These are a significant problem in riparian zones, which provide important habitat for Koalas in times of drought and fire and under a changing climate scenario. The offset management plan details how surveying, treatment and follow-up treatment specific to weed species will ensure a reduction in non-native plant cover across the site to <5%. Removal of barrier to dispersal weeds including Lantana camara and Broad-leaved Pepper will increase the mobility capacity for koalas to only minor restrictions. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Totals	**30**	**18**	**30**	**12**	The totals are a sum of the reference scores.

4.2.3 OMU1 Site Context Scores – Offset Koala

Table 14 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 14: OMU1 Site Context Scores – Offset Koala

Reference	Maximum Score	OMU1 – Baseline	OMU1 – Offset	OMU1 – Gain	Justification
Site Context Totals	56	42	55	13	The totals are a sum of **Table 12 & 13** Totals.
MHQA Weighted Score (30%)	**3.00**	**2.25**	**2.95**	**0.70**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

4.3. OMU1 Species Stocking Rate – Offset Koala

Table 15 provides the Species Stocking Rate Scores for each assessment with justifications weighted as per the MHQA methodology.

Table 15: OMU1 Species Stocking Rate Scores – Offset Koala

Reference	Maximum Score	OMU1 – Baseline	OMU1 – Offset	OMU1 – Gain	Justification
MHQA Weighted Species Stocking Rate Score (40%)	**4.00**	**2.57**	**3.14**	**0.57**	Species Stocking Rate (SSR) has been scored as per the results of the MHQA Working Sheets - Species Stocking Rate Table and SSR Supplementary Table as per **Appendix A**. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area. The gain in SSR is reliant upon an increase in approximate density from low to medium as per the Key Perfomance Indicators. Where Koala acitivty was recorded in OMU1, the mean acitivty level at baseline was 10.7%. The activity level need only increase to 23% over the management period to achieve a medium score suggesting the proposed gain is readily achievable under the OMP.

4.4. OMU1 Modified habitat Quality Assessment Habitat Scores – Offset Koala

Table 16 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Offset Site.

Table 16: OMU1 Modified Habitat Quality Assessment Score – Offset Koala

Site Reference	Maximum Score	OMU1 - Baseline			OMU1 - Offset			OMU1 - Gain			Justification
		AU02	AU03	AU05	AU02	AU03	AU05	AU02	AU03	AU05	
Site Condition MHQA Weighted Score	3.00	1.80	2.39	2.40	2.93	2.93	2.93	1.13	0.54	0.53	Refer MHQA Weighted Score **Table 11**.
Site Context MHQA Weighted Score	3.00	2.25	2.25	2.25	2.95	2.95	2.95	0.70	0.70	0.70	Refer MHQA Weighted Score **Table 14**.
Species Stocking MHQA Weighted Score	4.00	2.57	2.57	2.57	3.14	3.14	3.14	0.57	0.57	0.57	Refer MHQA Weighted Score **Table 15**.
Assessment Unit Habitat Assessment Scores	10.00	6.62	7.21	7.22	9.01	9.01	9.01	2.40	1.81	1.80	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	6.95	289.18	63.48	6.95	289.18	63.48	6.95	289.18	63.48	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.02	0.80	0.18	0.02	0.80	0.18	0.02	0.80	0.18	The Assessment Unit Area Weighting is the proportion of the total offset area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	1.00	0.13	5.80	1.27	0.17	7.25	1.59	0.05	1.45	0.32	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Offset Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
OMU Modified Habitat Quality Assessment Scores	**10**	**7.20**			**9.01**			**1.82**			The Offset Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.
Rounded Scores	**10**	**7**			**9**			**2**			Refer MHQA.

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheet

4.5. OMU2 Site Condition – Offset Koala

4.5.1 OMU2 Habitat Transect Data Assessment – Offset Koala

Table 17 outlines the application of the MHQA to Habitat Transect Data. Refer to **Appendix A** for supporting data from which these results are tabulated.

Table 17: OMU2 Habitat Transect Data Assessment – Offset Koala

Site Reference	Maximum Score	OMU2 - Baseline					OMU2 - Offset					OMU2 - Gain					Justification
		AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	
Recruitment of woody perennial species in EDL	5	5	5	5	3	0	5	5	5	5	5	0	0	0	2	5	Recruitment of woody perennial species score maintained and improved: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of woody perennial species. Currently the property is managed as a grazing enterprise (**Appendix C** OMP Section 4.1), with the proposed offset area grazed heavily with cattle. With the offset in place cattle will be removed from the offset area and wildfire hazard reduction actions implemented (refer **Appendix C** OMP Section 7.3 and Figure 7.1).
Native plant species richness – trees	5	5	5	2.5	5	5	5	5	5	5	5	0	0	2.5	0	0	Native tree species richness score maintained or increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – shrubs	5	0	2.5	2.5	0	0	2.5	2.5	2.5	2.5	2.5	2.5	0	0	2.5	2.5	Native shrub species richness score maintained or increased: Weed reduction, ecological burns to encourage shrub diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – grasses	5	5	5	2.5	2.5	2.5	5	5	5	5	5	0	0	2.5	2.5	2.5	Native grasses species richness score maintained or increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – forbs	5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	2.5	2.5	2.5	2.5	2.5	Native forbs species richness score increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Tree canopy height	5	3	4	3	4	5	5	5	5	5	5	2	1	2	1	0	Tree canopy height score maintained or increased: Securing the offset will ensure protection for regrowth vegetation. Justification as per "Recruitment of woody perennial species in EDL".
Tree canopy cover	5	2.5	5	2.5	5	5	5	5	5	5	5	2.5	0	2.5	0	0	Tree canopy cover score maintained or increased: Existing species meet or are just below the benchmark tree canopy cover. Securing the offset will ensure protection. Justification as per "Recruitment of woody perennial species in EDL".
Shrub canopy cover	5	3	3	3	3	0	5	5	5	5	5	2	2	2	2	5	Shrub canopy cover score increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of species. Justification as per "Recruitment of woody perennial species in EDL".
Native grass cover	5	3	5	3	3	5	5	5	5	5	5	2	0	2	2	0	Grass cover score maintained or increased: Weed reduction, ecological burns to encourage species diversity and removal of cattle grazing pressure will result in the increase of grass cover and species. Justification as per "Recruitment of woody perennial species in EDL".
Organic litter	5	5	5	5	5	3	5	5	5	5	5	0	0	0	0	2	Organic litter score maintained or increased: Weed reduction, ecological burns and removal of cattle grazing pressure will result in an increase in organic litter. Justification as per "Recruitment of woody perennial species in EDL".
Large trees	15	5	5	0	10	5	10	10	10	15	10	5	5	10	5	5	Large tree benchmark score increased: Large tree benchmark likely to reach between 50-100% of the benchmark. Score based in unpredictability around climate change and optimal growing conditions and rainfall for trees. Justification as per "Recruitment of woody perennial species in EDL".
Coarse woody debris	5	2	2	2	2	0	5	5	5	5	5	3	3	3	3	5	CWD score increased: Securing the offset from incompatible land uses and the risk of clearing and managing wildfire will result in an increase in Coarse Woody Debris. Justification as per "Recruitment of woody perennial species in EDL".
Non-native plant cover	10	3	3	3	3	3	10	10	10	10	10	7	7	7	7	7	Intensive weed management set out in the OMP Section 6.2 (**Appendix C**) will result in a significant reduction in weed species across the offset area. Detailed

Site Reference	Maximum Score	OMU2 - Baseline					OMU2 - Offset					OMU2 - Gain					Justification
		AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	
																	reporting and monitoring will ensure a reduction in weeds species to a low level of threat by the end of the 20 year management period. Justification as per "Recruitment of woody perennial species in EDL".
Totals	**80**	**44.0**	**52.0**	**36.5**	**48.0**	**36.0**	**72.5**	**72.5**	**72.5**	**77.5**	**72.5**	**28.5**	**20.5**	**36.0**	**29.5**	**36.5**	The totals are a sum of the reference scores.

4.5.2 OMU2 Species Habitat Index Data Site Condition – Offset Koala

Table 18 provides the assessment of Species Habitat Indices that support the Site Condition score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 18: OMU2 Species Habitat Index Assessment – Site Condition – Offset Koala

Site Reference	Maximum Score	OMU2 - Baseline					OMU2 - Offset					OMU2 - Gain					Justification
		AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	
Quality and availability of food and foraging habitat	10	5	5	5	5	5	10	10	10	10	10	5	5	5	5	5	Large tree score likely to reach at least 50% of benchmark over the life of the offset management plan (20 years) as immature trees grow to reach 'Large tree' status, without the risk of removal or clearing or high intensity fire. Site Condition demonstrates improvement overall. This means the quality and availability of food and foraging habitat will increase. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Quality and availability of shelter habitat	10	5	5	5	5	5	10	10	10	10	10	5	5	5	5	5	Large tree score likely to reach at least 50% of benchmark over the life of the offset management plan (20 years) as immature trees grow to reach 'Large tree' status, without the risk of removal or clearing or high intensity fire. Site Condition demonstrates improvement overall. This means the quality and availability shelter habitat will increase. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Totals	**20**	**10**	**10**	**10**	**10**	**10**	**20**	**20**	**20**	**20**	**20**	**10**	**10**	**10**	**10**	**10**	The totals are a sum of the reference scores.

4.5.3 OMU2 Site Condition Scores – Offset Koala

Table 19 provides the Site Condition scores for each assessment unit and the MHQA weighted score.

Table 19: OMU2 Site Condition Scores – Offset Koala

Site Reference	Maximum Score	OMU2 - Baseline					OMU2 - Offset					OMU2 - Gain					Justification
		AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	
Site Condition Totals	100	54.0	62.0	46.5	58.0	46.0	92.5	92.5	92.5	97.5	92.5	38.5	30.5	46.0	39.5	46.5	The totals are a sum of **Table 17 & 18** totals.
MHQA Weighted Score (30%)	**3.00**	**1.62**	**1.86**	**1.40**	**1.74**	**1.38**	**2.78**	**2.78**	**2.78**	**2.93**	**2.78**	**1.16**	**0.92**	**1.38**	**1.19**	**1.40**	The MHQA weighting of 30% is applied to the Site Condition totals, above.

4.6. OMU2 Site Context – Offset Koala

4.6.1 OMU2 GIS Data – Offset Koala

Table 20 outlines the application of the MHQA to GIS Site Context data.

Table 20: OMU2 GIS Data Assessment – Offset Koala

Site Reference	Maximum Score	OMU2 – Baseline	OMU2 – Offset	OMU2 – Gain	Justification
Size of the patch	10	10	10	0	GIS Context data for Size of Patch, Context and Ecological Corridors will be maintained with the offset. With the implementation of the offset and surrounding offset commitments, Connectedness will increase to a score of 5 (currently 74.8% will increase to > 75%).
Connectedness	5	4	5	1	
Context	5	4	4	0	
Ecological corridors	6	6	6	0	
Totals	**26**	**24**	**25**	**1**	The totals are a sum of the reference scores.

4.6.2 OMU2 Species Habitat Index Data Site Context – Offset Koala

Table 21 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 21: OMU2 Species Habitat Index Assessment – Site Context – Offset Koala

Site Reference	Maximum Score	OMU2 – Baseline	OMU2 – Offset	OMU2 – Gain	Justification
Role of site location to species overall population in the State	5	4	5	1	Due to the scale of the offset and its location in a large connected corridor along the Little Liverpool Range, the improvement in habitat quality for Koalas and long-term protection of habitat will result in the location being of critical importance to the overall population in the state.
Threats to the species	15	7	15	8	Gains to the threats to the species score will be realised through management of the threatening processes detailed in Section 6.2 and 6.4 of the OMP (**Appendix C**). Feral carnivore monitoring and control will occur bi-annually, with a Relative Abundance Index established for each feral species, with control events aimed at targeting population increases. Methodology for control will include trapping and shooting. Weed management will include detailed surveying, treatment and follow-up treatment to reduce overall coverage to <5% across the offset site. Gains to the Threats to the species score can be further ensured due to the size and location of the offset within the landscape. The offset area is of significant size and located adjacent to another large offset, totalling over 1,200 hectares. Additionally, the land is located within the Little Liverpool Range, a large, continuously connected tract of vegetation. QTFN are founders of the Little Liverpool Range Initiative, which centres on coordination land management actions across the range. Coordinated pest and weed management both within the offset areas and across neighbouring properties will significantly reduce the threats to the species from a moderate to a low level of threat (i.e. Koalas are more likely to survive in the offset area). Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Species mobility capacity	10	7	10	3	An improvement in species mobility capacity will be gained through the significant reduction in non-native plant cover across the offset site. The OMP Section 6.2 (**Appendix C**) details the strategy for weed management in removing weeds that significantly impact Koala dispersal. These include transformer weeds (shrubs) that block Koalas movement through the landscape, including Lantana camara and Broad-leaved Pepper. These are a significant problem in riparian zones, which provide important habitat for Koalas in times of drought and fire and under a changing climate scenario. The offset management plan details how surveying, treatment and follow-up treatment specific to weed species will ensure a reduction in non-native plant cover across the site to <5%. Removal of barrier to dispersal weeds including Lantana camara and Broad-leaved Pepper will increase the mobility capacity for koalas to only minor restrictions. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Totals	**30**	**18**	**30**	**12**	The totals are a sum of the reference scores.

4.6.3 OMU2 Site Context Scores – Offset Koala

Table 22 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 22: OMU2 Site Context Scores – Offset Koala

Reference	Maximum Score	OMU2 – Baseline	OMU2 – Offset	OMU2 – Gain	Justification
Site Context Totals	56	42	55	13	The totals are a sum of **Table 20 & 21** Totals.
MHQA Weighted Score (30%)	**3.00**	**2.25**	**2.95**	**0.70**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

4.7. OMU2 Species Stocking Rate – Offset Koala

Table 23 provides the Species Stocking Rate Scores for each assessment with justifications weighted as per the MHQA methodology.

Table 23: OMU2 Species Stocking Rate Scores – Offset Koala

Reference	Maximum Score	OMU2 – Baseline	OMU2 – Offset	OMU2 – Gain	Justification
MHQA Weighted Species Stocking Rate Score (40%)	**4.00**	**2.57**	**3.14**	**0.57**	Species Stocking Rate (SSR) has been scored as per the results of the MHQA Working Sheets - Species Stocking Rate Table and SSR Supplementary Table as per **Appendix A**. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area. The gain in SSR is reliant upon an increase in approximate density from low to medium as per the Key Perfomance Indicators. Where Koala acitivty was recorded in OMU2, the mean acitivty level at baseline was 8.7%. The activity level need only increase to 23% over the management period to achieve a medium score suggesting the proposed gain is readily achievable under the OMP.

4.8. OMU2 Modified habitat Quality Assessment Habitat Scores – Offset Koala

Table 24 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Offset Site.

Table 24: OMU2 Modified Habitat Quality Assessment Score – Offset Koala

Site Reference	Maximum Score	OMU2 - Baseline					OMU2 - Offset					OMU2 - Gain					Justification
		AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	
Site Condition MHQA Weighted Score	3.00	1.62	1.86	1.40	1.74	1.38	2.78	2.78	2.78	2.93	2.78	1.16	0.92	1.38	1.19	1.40	Refer MHQA Weighted Score **Table 19**.
Site Context MHQA Weighted Score	3.00	2.25	2.25	2.25	2.25	2.25	2.95	2.95	2.95	2.95	2.95	0.70	0.70	0.70	0.7	0.70	Refer MHQA Weighted Score **Table 22**.
Species Stocking MHQA Weighted Score	4.00	2.57	2.57	2.57	2.57	2.57	3.14	3.14	3.14	3.14	3.14	0.57	0.57	0.57	0.57	0.57	Refer MHQA Weighted Score **Table 23**.
Assessment Unit Habitat Assessment Scores	10.00	6.44	6.68	6.22	6.56	6.20	8.86	8.86	8.86	9.01	8.86	2.42	2.18	2.64	2.45	2.66	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	0.29	168.16	104.89	1.38	6.70	0.29	168.16	104.89	1.38	6.70	0.29	168.16	104.89	1.38	6.70	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.00	0.60	0.37	0.00	0.02	0.00	0.60	0.37	0.00	0.02	0.00	0.60	0.37	0.00	0.02	The Assessment Unit Area Weighting is the proportion of the total offset area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	1.00	0.01	3.99	2.32	0.03	0.15	0.01	5.30	3.30	0.04	0.21	0.00	1.31	0.98	0.01	0.06	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Offset Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
OMU Modified Habitat Quality Assessment Scores	**10**	**6.496**					**8.865**					**2.369**					The Offset Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.
Rounded Scores	**10**	**6**					**9**					**3**					Refer MHQA.

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheets

4.9. OMU3 Site Condition – Offset Koala

4.9.1 OMU3 Habitat Transect Data Assessment – Offset Koala

Table 25 outlines the application of the MHQA to Habitat Transect Data. Refer to **Appendix A** for supporting data from which these results are tabulated.

Table 25: OMU3 Habitat Transect Data Assessment – Offset Koala

Site Reference	Maximum Score	OMU3 - Baseline			OMU3 - Offset			OMU3 - Gain			Justification
		AU09	AU11	AU12	AU09	AU11	AU12	AU09	AU11	AU12	
Recruitment of woody perennial species in EDL	5	0	0	0	5	5	5	5	5	5	Recruitment of woody perennial species score increased: Planting and direct seeding in OMU3 will significantly increase the woody perennial species. Section 6.3 of the OMP (**Appendix C**) details how revegetation will occur and guarantee a gain in this asset. Cattle and fire will be excluded from OMU3 until the plantings are of sufficient size to withstand hazard reduction activities as per Section 7.3 of the OMP. Weed management of OMU3 areas will be in accordance with Section 6.2 of the OMP and will improve the non-native vegetation cover score. These methods apply to all site reference items where the score will be increased through actions under the Offset Management Plan. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Native plant species richness – trees	5	0	0	0	5	5	5	5	5	5	Native tree species richness score increased. Planting and direct seeding will significantly increase native tree species richness. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – shrubs	5	0	0	0	2.5	2.5	2.5	2.5	2.5	2.5	Native shrub species richness score increased: Planting and direct seeding will significantly increase native shrub species richness. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – grasses	5	0	0	0	2.5	2.5	2.5	2.5	2.5	2.5	Native grasses species richness score increased: Native grass species richness score increased: Weed management, planting and direct seeding will significantly increase native grass species richness. Justification as per "Recruitment of woody perennial species in EDL".
Native plant species richness – forbs	5	0	0	0	2.5	2.5	2.5	2.5	2.5	2.5	Native forb species richness score increased: Native forb species richness score increased: Weed management, planting and direct seeding will significantly increase native forb species richness. Justification as per "Recruitment of woody perennial species in EDL".
Tree canopy height	5	0	0	0	3	3	3	3	3	3	Tree canopy height score increased: Planting and direct seeding will significantly increase Tree canopy height. Justification as per "Recruitment of woody perennial species in EDL".
Tree canopy cover	5	0	0	0	2	2	2	2	2	2	Tree canopy cover score increased: Planting and direct seeding will significantly increase Tree canopy cover. Justification as per "Recruitment of woody perennial species in EDL".
Shrub canopy cover	5	0	0	0	5	5	5	5	5	5	Shrub canopy cover score increased: Planting and direct seeding will significantly increase Shrub canopy cover. Justification as per "Recruitment of woody perennial species in EDL".
Native grass cover	5	0	0	0	3	3	3	3	3	3	Grass cover score increased: Weed management, removal of cattle grazing pressure and appropriate fire management will result in the increase of native grass cover.
Organic litter	5	0	0	0	5	5	5	5	5	5	Organic litter score increased: Weed management, removal of cattle grazing pressure and appropriate fire management will result in the increase of native grass cover.
Large trees	15	0	0	0	5	5	5	5	5	5	Large trees score increased:. Planting and direct seeding will significantly increase native Large tree score. Justification as per "Recruitment of woody perennial species in EDL".
Coarse woody debris	5	0	0	0	5	5	5	5	5	5	CWD score increased: Securing the offset from incompatible land uses and the risk of clearing, and wildfire risk management will result in an increase in Coarse Woody Debris.
Non-native plant cover	10	3	3	3	10	10	10	7	7	7	Intensive weed management set out in the OMP Section 6.2 (**Appendix C**) will result in a significant reduction in weed species across the offset area. Detailed reporting and monitoring will ensure a reduction in weeds species to a low level of threat by the end of the 20 year management period.
Totals	**80**	**3.0**	**3.0**	**3.0**	**55.5**	**55.5**	**55.5**	**52.5**	**52.5**	**52.5**	The totals are a sum of the reference scores.

4.9.2 OMU3 Species Habitat Index Data Site Condition – Offset Koala

Table 26 provides the assessment of Species Habitat Indices that support the Site Condition score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 26: OMU3 Species Habitat Index Assessment – Site Condition – Offset Koala

Site Reference	Maximum Score	OMU3 - Baseline			OMU3 - Offset			OMU3 - Gain			Justification
		AU09	AU11	AU12	AU09	AU11	AU12	AU09	AU11	AU12	
Quality and availability of food and foraging habitat	10	1	1	1	10	10	10	9	9	9	OMU3 will undergo significant revegetation to improve the quality and availability of food and foraging habitat for koalas. Cleared areas will be revegetated with plantings and direct seeding. At the completion of the Offset Management Plan (20 years) the OMU3 vegetation will provide significant habitat for koalas. The OMU will be revegetated in line with the pre-clearing RE, although not all trees are expected to reach large tree status by year 20. Due to the unknown impacts of drought and variations in rainfall produced by climate change that may impact on optimum growing conditions, a conservative approach would suggest that at least one 'Large tree' will be recorded after 20 years, giving a score of 10. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Quality and availability of shelter habitat	10	1	1	1	10	10	10	9	9	9	OMU3 will undergo significant revegetation to improve the quality and availability of shelter habitat for Koalas. Cleared areas will be revegetated with plantings and direct seeding. At the completion of the Offset Management Plan (20 years) the OMU3 vegetation will provide significant habitat for Koalas. The OMU will be revegetated in line with the pre-clearing RE, although not all trees are expected to reach large tree status by year 20. Due to the unknown impacts of drought and variations in rainfall produced by climate change that may impact on optimum growing conditions, a conservative approach would suggest that at least one 'Large tree' will be recorded after 20 years. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Totals	**20**	**2**	**2**	**2**	**20**	**20**	**20**	**18**	**18**	**18**	The totals are a sum of the reference scores.

4.9.3 OMU3 Site Condition Scores – Offset Koala

Table 27 provides the Site Condition scores for each assessment unit and the MHQA weighted score.

Table 27: OMU3 Site Condition Scores – Offset Koala

Site Reference	Maximum Score	OMU3 - Baseline			OMU3 - Offset			OMU3 - Gain			Justification
		AU09	AU11	AU12	AU09	AU11	AU12	AU09	AU11	AU12	
Site Condition Totals	100	5.0	5.0	5.0	75.5	75.5	75.5	70.5	70.5	70.5	The totals are a sum of **Table 25 & 26** totals.
MHQA Weighted Score (30%)	**3.00**	**0.15**	**0.15**	**0.15**	**2.27**	**2.27**	**2.27**	**2.12**	**2.12**	**2.12**	The MHQA weighting of 30% is applied to the Site Condition totals, above.

4.10. OMU3 Site Context – Offset Koala

4.10.1 OMU3 GIS Data – Offset Koala

Table 28 outlines the application of the MHQA to GIS Site Context data.

Table 28: OMU3 GIS Data Assessment – Offset Koala

Site Reference	Maximum Score	OMU3 – Baseline	OMU3 – Offset	OMU3 – Gain	Justification
Size of the patch	10	10	10	0	GIS Context data for Size of Patch, Context and Ecological Corridors will be maintained with the offset. With the implementation of the offset and surrounding offset commitments, Connectedness will increase to a score of 5 (currently 74.8% will increase to > 75%).
Connectedness	5	4	5	1	
Context	5	4	4	0	
Ecological corridors	6	6	6	0	

Site Reference	Maximum Score	OMU3 – Baseline	OMU3 – Offset	OMU3 – Gain	Justification
Totals	**26**	**24**	**25**	**1**	The totals are a sum of the reference scores.

4.10.2 OMU3 Species Habitat Index Data Site Context – Offset Koala

Table 29 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 29: OMU3 Species Habitat Index Assessment – Site Context – Offset Koala

Site Reference	Maximum Score	OMU3 – Baseline	OMU3 – Offset	OMU3 – Gain	Justification
Role of site location to species overall population in the State	5	4	5	1	Due to the scale of the offset and its location in a large connected corridor along the Little Liverpool Range, the improvement in habitat quality for Koalas and long-term protection of habitat will result in the location being of critical importance to the overall population in the state.
Threats to the species	15	1	15	14	Threats to the species are identified as impacts of feral carnivores and predation on Koalas, linked with the abundance of weed species, restricting Koala's ability to move through the landscape and making them further vulnerable to predation. OMU3 areas contain no koala habitat and also shows extensive weed cover. The historically high and uncontrolled numbers of feral carnivores means that Koalas traversing long distances through OMU3 areas are under significant threat. Gains to the threats to the species score will be realised through revegetation, which will reduce the time Koalas spend traversing through open OMU3 areas and reduce the threat from predation by feral carnivores. Gains will also be realised through management of the threatening processes detailed in Section 6.2 and 6.4 of the OMP (**Appendix C**). Feral carnivore monitoring and control will occur bi-annually, with a Relative Abundance Index established for each feral species, with control events aimed at targeting population increases. Methodology for control will include trapping and shooting. Weed management will include detailed surveying, treatment and follow-up treatment to reduce overall coverage to <5% across the offset site. Gains to the Threats to the species score can be further ensured due to the size and location of the offset within the landscape. The offset area is of significant size and located adjacent to another large offset, totalling over 1,200 hectares. Additionally, the land is located within the Little Liverpool Range, a large, continuously connected tract of vegetation. QTFN are founders of the Little Liverpool Range Initiative, which centres on coordination of land management actions across the range. Coordinated pest and weed management both within the offset areas and across neighbouring properties will significantly reduce the threats to the species from a high to a low level of threat (i.e. Koalas are likely to survive in the offset area). Within the OMU3 areas revegetation and weed reduction, combined with coordinated feral carnivore control will significantly reduce the threats to the species in OMU3. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Species mobility capacity	10	1	10	9	Revegetation of OMU3 will significantly increase the species mobility capacity for the OMU3 area. Currently with no vegetation Koala mobility is highly restricted, requiring animals to spend a large amount of time on the ground traversing between trees. Weed cover in the OMU3 areas further hinders mobility. With the implementation of the OMP (**Appendix C**) including revegetation and weed control, Koalas will be able to fully utilise OMU3 as habitat. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Totals	**30**	**6**	**30**	**24**	The totals are a sum of the reference scores.

4.10.3 OMU3 Site Context Scores – Offset Koala

Table 30 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 30: OMU3 Site Context Scores – Offset Koala

Reference	Maximum Score	OMU3 – Baseline	OMU3 – Offset	OMU3 – Gain	Justification
Site Context Totals	56	30	55	25	The totals are a sum of **Table 28 & 29** Totals.
MHQA Weighted Score (30%)	**3.00**	**1.61**	**2.95**	**1.34**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

4.11. OMU3 Species Stocking Rate – Offset Koala

Table 31 provides the Species Stocking Rate Scores for each assessment with justifications weighted as per the MHQA methodology.

Table 31: OMU3 Species Stocking Rate Scores – Offset Koala

Reference	Maximum Score	OMU3 – Baseline	OMU3 – Offset	OMU3 – Gain	Justification
MHQA Weighted Species Stocking Rate Score (40%)	**4.00**	**0.29**	**2.29**	**2.00**	Species Stocking Rate (SSR) has been scored as per the results of the MHQA Working Sheets - Species Stocking Rate Table and SSR Supplementary Table as per **Appendix A**. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area. The gain in SSR is reliant upon an increase in approximate density from zero to low as per the Key Perfomance Indicators. With extensive native tree plantings and rehabilitation works in OMU3, the activity level need only increase above zero to achieve a low score suggesting the proposed gain is readily achievable under the OMP.

4.12. OMU3 Modified habitat Quality Assessment Habitat Scores – Offset Koala

Table 32 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Offset Site.

Table 32: OMU3 Modified Habitat Quality Assessment Score – Offset Koala

Site Reference	Maximum Score	OMU3 - Baseline			OMU3 - Offset			OMU3 - Gain			Justification
		AU09	AU11	AU12	AU09	AU11	AU12	AU09	AU11	AU12	
Site Condition MHQA Weighted Score	3.00	0.15	0.15	0.15	2.27	2.27	2.27	2.12	2.12	2.12	Refer MHQA Weighted Score **Table 27**.
Site Context MHQA Weighted Score	3.00	1.61	1.61	1.61	2.95	2.95	2.95	1.34	1.34	1.34	Refer MHQA Weighted Score **Table 30**.
Species Stocking MHQA Weighted Score	4.00	0.29	0.29	0.29	2.29	2.29	2.29	2.00	2.00	2.00	Refer MHQA Weighted Score **Table 31**.
Assessment Unit Habitat Assessment Scores	10.00	2.04	2.04	2.04	7.50	7.50	7.50	5.46	5.46	5.46	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	6.72	0.88	37.81	6.72	0.88	37.81	6.72	0.88	37.81	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.15	0.02	0.83	0.15	0.02	0.83	0.15	0.02	0.83	The Assessment Unit Area Weighting is the proportion of the total offset area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	1.00	0.30	0.04	1.70	1.11	0.15	6.24	0.81	0.11	4.54	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Offset Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
OMU Modified Habitat Quality Assessment Scores	**10**	**2.043**			**7.497**			**5.454**			The Offset Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.
Rounded Scores	**10**	**2**			**7**			**5**			Refer MHQA.

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheets

4.13. Koala Offset Assessment Summary

Section 4 outlines justifications for habitat quality improvements across the offset site focussing on the three (3) dominant vegetation communities present (**Appendix A**), being:

1. Remnant – OMU1
2. Regrowth – OMU2
3. Cleared areas – OMU3

Results of the habitat quality gain assessment in **Section 4** indicate that:

1. OMU1 (Remnant) will achieve an offset habitat quality score of **9.014**
2. OMU2 (Regrowth) will achieve an offset habitat quality score of **8.865**
3. OMU3 (Cleared areas) will achieve an offset habitat quality score of **7.497**

4.13.1 Koala offset habitat scores

With rounding, the following offset site habitat scores will be achieved.

OMU1 – Baseline 7 – Gain 2 – Offset Habitat Quality Score 9
OMU2 – Baseline 6 – Gain 3 – Offset Habitat Quality Score 9
OMU3 – Baseline 2 – Gain 5 – Offset Habitat Quality Score 7

5. Koala Offset Calculation

The quantum impact from 'Technical Document 1 – Impact Site' and attributes as justified in **Sections 3 & 4** were applied to the EPBC offsets calculator along with the following to determine offset requirements as per the EPBC Act Environmental Offsets Policy.

5.1. Averted Loss and Risk of Loss

The averted loss attribute is influenced by several factors, each of which can have a different weighting/level of loss depending on the land to which it pertains. For example, development in remnant vegetation may require assessment under the *Vegetation Management Act 1999* (VMA), however, under the *Planning Act 2016* an exemption may be invoked and consequently the former no longer prevents the vegetation from being cleared. Conversely, the highest levels of protection under the VMA — the Category A designation — cannot be disregarded when considering development under the *Planning Act 2016* and will in nearly 100% of cases preclude development from occurring.

Diagram 1 illustrates how key factors influence the value of 'with' and 'without' offset averted loss percentages for the proposed offset site. Risk of loss percentages are not nominated on this diagram as these fluctuate across the site and are interdependent with other risk of loss factors.

Category B and Category C vegetation are not fully protected under a State Code. The approval process, if followed, could result in Category B and C vegetation being cleared. As a result, risk of loss cannot be assessed as 0% in these areas.

Accepted development vegetation clearing codes (being self-assessable vegetation clearing codes under the VMA) apply to Category B and C vegetation and are available on this site given its rural zoning and historic and ongoing use as a cattle grazing.

These include the following codes available at https://www.qld.gov.au/environment/land/vegetation/codes:

a) Managing clearing to improve the operational efficiency of existing agriculture: a self-assessable vegetation clearing code.
b) Managing a native forest practice: A self-assessable vegetation clearing code.
c) Necessary environmental clearing: A self-assessable vegetation clearing code.
d) Managing weeds: A self-assessable vegetation clearing code.

Given the extent and density of weed infestation in these areas, it is considered that codes (c) and (d) could permit extensive clearing of these areas. Clearing for the purposes of managing weeds allows the clearing of native vegetation, as long as the site is maintained as a functioning regional ecosystem with retained trees having a DBH of over 20 cm. Given a large number of trees within the offset fall short of this size, and are located in areas with high weed infestations, clearing could be classified as a legitimate tool for environmental management.

It has been assessed that the application of self-assessable vegetation clearing codes in these areas would result in loss of a significant amount of koala and GHFF food and habitat trees, and prevent the recruitment of juvenile trees. Risk of loss has been assessed at an average of 10% across all B/C areas (OMU 1 and 2), although in some areas it is considered to be substantially higher.

Diagram 1: Risk of Loss Factor

Risk of loss factor								
Low ◄----------								----------► ***High***
Factor: Protections under the *Vegetation Management Act 1999*								
◄----------								----------►
Category A	<	**Category B**	<	**Category C**		<		**Category X**
Factor: Protections under the *Planning Act 2016*								
◄----------								----------►
Prohibited development	<	Impact assessable development	<	Code assessable development	<	Accepted development	<	Exempt development
Factor: Protections under the planning scheme (zoning, codes, policies and self-assessable opportunities)								
◄----------								----------►
Prohibited development	<	Impact assessable development	<	Code assessable development	<	Accepted development	<	Exempt development
Factor: Historical land use								
◄----------								----------►
Land use that did not clear vegetation (e.g., natural area)			<					Agricultural production — vegetation clearing as part of routine management
Factor: Influences from adjoining land uses								
◄----------								----------►
Surrounded by Category A / National Park / Conservation Estate <u>under active management</u>			<					Surrounded by rural activities (adjacent clearing, threats are ongoing and new)
Factor: Existing threat management								
◄----------								----------►
Successful and ongoing pest management programme			<					Pests known to occur, non-existent ongoing management

Category X areas contain no clearing controls under the VMA. Clearing of this area requires no permit, and regrowth and established vegetation in these areas are under significant risk. Category X areas are "exempt from the requirements under the Vegetation Management Act 1999." (Section 20A). Category X areas are also known as 'exempt areas' because activity in Category X areas is not regulated by the VMA.

Across the site, existing low scoring Koala habitat in areas which have been mapped as Category X are considered to have no risk of loss as limited vegetation is present in these areas, therefore, has been attributed a risk of loss of 0%.

Once the offset land is legally secured through a Voluntary Declaration under the VMA, the varying protections (i.e., Category B protected, Category X unprotected) will be replaced with the Category A classification that will apply over 100% of the offset site. This classification means land management activities are severely restricted and only those stipulated in the approved offset management plan are permissible. The offset will be legally secured for the duration of the impact.

The quality of the offset site as an offset, would be maintained and enhanced as it is protected and managed through initial development controls and ultimately weed management and bushland revegetation and regeneration. The

importance of the offset site as a refuge and linkage area within the region will increase in the future should development pressures encroach into existing rural areas.

Risk of Loss Summary

Management Unit	Risk of Loss "Without Offset"	Risk of Loss "With Offset"	Differential
OMU-1 (remnant vegetation)	10	0	10
OMU-2 (regrowth vegetation)	10	0	10
OMU-3 (cleared vegetation)	0	0	0

5.2. Confidence

5.2.1 Confidence in Averted Loss

Confidence in averted loss scores are supported by the design and management actions of the OMP (**Appendix C**). Risks associated with the delivery of the offset will be mitigated by way of detailed management actions and milestones. Management responses set out in the OMP are clearly framed against stated outcomes being to protect and conserve large, connected areas of Koala habitat capable of supporting and improving populations that area genetically diverse and free of disease. As such, the confidence in averted loss is attributed a score of 90% for each OMU.

5.2.2 Confidence in Quality Improvement

With regard to confidence in quality improvement, a 75% score was given to OMU2 and OMU 2 to allow for risks primarily relating to natural events such as flood, drought, severe storms etc. (-10% confidence adjustment) and in respect of potential impacts of cattle grazing as a bushfire fuel reduction tool (further -15% confidence adjustment). A 70% score for OMU3 reflects the potential for risks highlighted above to have greater impact on revegetated areas.

Confidence in Quality Improvement Summary

Management Unit	Confidence
OMU-1 (remnant vegetation)	75%
OMU-2 (regrowth vegetation)	75%
OMU-3 (cleared vegetation)	70%

5.3. Time Until Ecological Benefit

The length of the Offset Management Plan is 20 years. Full ecological benefit will be realised over this time.

In the OMU1 and OMU2 areas, the improvements to habitat quality will realised through the reduction in weed abundance, supplementary direct seeding and management of threats (refer OMP in **Appendix C**).

In the OMU3 areas, vegetation planted at the commencement of the offset management plan will have matured sufficiently to be fully utilised as Koala habitat (refer OMP in **Appendix C**).

Time Until Ecological Benefit Summary

Management Unit	Time Until Ecological Benefit
OMU-1 (remnant vegetation)	20 years
OMU-2 (regrowth vegetation)	20 years
OMU-3 (cleared vegetation)	20 years

5.4. Offset Area

When all relevant attributes are applied to the EPBC Offsets calculator (refer **Appendix D**), the following offset areas for each assessment unit are required:

Offset Area Summary

Management Unit	Offset Area Required	% Impact Offset
OMU-1 (remnant vegetation)	359.61 ha	54.08%
OMU-2 (regrowth vegetation)	281.42 ha	55.55%
OMU-3 (cleared vegetation)	45.41 ha	11.07%
Totals	**686.44 ha**	**120.70%**

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheets

6. MHQA Methodology – GHFF

The offset site was assessed using a GHFF Foraging Habitat Assessment (GHFF FHA) tool developed by the Saunders Havill Group (2019) which adopts characteristics of the Queensland State Governments "Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy" Version 1.2 April 2017 (DEHP 2017), while also integrating published scientific literature on GHFF foraging habitat.

The traditional terrestrial habitat quality assessment assesses three (3) core indicators—Site Condition, Site Context and Species Habitat Index.

The GHFF FHA tool combines the aspects of the three (3) core indicators and published scientific literature into two (2) (Site Condition and Site Context) with Site Condition being weighted with 40% and site context weighted at 30% of the final score. The balance of the weighting (30%) has been attributed to the third indicator which is independent of the traditional habitat quality assessment, being Species Stocking Rate. The slightly higher 40% weighting attributed to the Site Condition criteria reflects that the impact adversely affects foraging habitat for the GHFF, with Site Context attributes for the highly mobile species and Species Stocking Rate where in this case a roost site is not impacted weighted evenly at 30% each for the balance of the score.

The Species Stocking Rate assessment incorporated in the GHFF FHA tool is focussed on 'foraging habitat' for GHFF rather than presence/absence of the species. This assessment of 'foraging habitat' for species stocking rate has been incorporated into the GHFF FHA tool as Grey-headed Flying-fox roosting camp or species presence was not observed on-site, however, suitable foraging habitat for the species was evident. Therefore, the density of foraging habitat available on-site is considered an appropriate assessment benchmark for Species Stocking Rate.

The following section details the methodology utilised to assess the site condition, site context and species stocking rate under the GHFF FHA.

6.1. Site Condition – GHFF

Assessing site condition is an integral step in determining specific quantification of impacts, while also determining whether an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset. The on-site condition is a key element of habitat quality and has a direct influence on the biodiversity it supports. Site condition is assessed using a suite of attributes to describe the structure and function of the vegetation community, and is benchmarked against the expected range for a relatively undisturbed community.

The site condition assessment under the GHFF FHA is assessed using six (6) condition characteristics being:

- Vegetation condition;
- Species richness (canopy trees);
- Flower scores (average);
- Timing of biological shortages;
- Quality of foraging habitat (trees >0.65 wt p*r); and
- Non-native plant cover.

Assessment methodology of the above condition characteristics is outlined below:

- Vegetation condition – This condition characteristic is assessed using the Queensland Vegetation Management Act 1999 vegetation community status definition, being Category B (remnant), Category C (high-value regrowth) and Category X (non-remnant). This characteristic is scored from a desktop mapping perspective and verified on-ground during assessment.

Table GHFF1: GHFF FHA Vegetation Condition Scoring

Score	Description
5	Category X / non-remnant
10	Category C / regrowth
20	Category B / remnant

- Species richness (canopy trees) – This condition characteristic is assessed using a 100 m X 20 m plot following the contour of the land when possible. Within the plot, all canopy tree and subcanopy tree specimens are recorded. It should be noted that non-GHFF foraging species are also documented.

Table GHFF 2: GHFF FHA Species Richness Scoring

Score	Description
0	0 GHFF foraging species
5	1 – 3 GHFF foraging species
10	4 – 6 GHFF foraging species
20	> 6 GHFF foraging species

- Flower scores (average) – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within 'Ranking the feeding habitat of Grey-headed flying foxes for conservation management' (Eby and Law 2008) and the Draft Recovery Plan for the Grey-headed Flying-fox (DEE 2017) and determining the flower score of the recorded canopy species. The individual score for each flowering GHFF foraging tree is then divided by the number of species recorded (GHFF foraging and non-GHFF foraging trees) to produce an average. The benchmark values for this condition characteristic have been derived from the findings published by Eby and Law (2008) (Ranking the feeding habitat of Grey-headed flying foxes for conservation management).

Table GHFF 3: GHFF FHA Flower Score (average) Scoring

Score	Description
2	0.01 – 0.25
5	0.26 – 0.50
8	0.51 – 0.75
10	0.76 – 1.00

- Timing of biological shortages – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within 'Ranking the feeding habitat of Grey-headed flying foxes for conservation management' (Eby and Law 2008) and the Draft Recovery Plan for the Grey-headed Flying-fox (DEE 2017) and determining the ability of the canopy species in the vegetation community to produce foraging habitat during biological shortages (food shortages, pregnancy and birthing, lactation, mating and conception, migration paths and fruit industries). It should be noted that this condition characteristic is weighted and 'food shortages' has been weighted heavier than the balance of the characteristics which are equal, as 'food shortages' is recognised as a major issue.

Table GHFF 4: GHFF FHA Timing of Biological Shortages Scoring

Score	Description
2.5	Food shortages
1.5	Pregnancy and birthing
1.5	Lactation
1.5	Mating and conception
1.5	Migration paths
1.5	Fruit industries
Total (/10)	Combine total of above

- Quality of foraging habitat – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within 'Ranking the feeding habitat of Grey-headed flying foxes for conservation management' (Eby and Law 2008) and the Draft Recovery Plan for the Grey-headed Flying-fox (DEE 2017) and determining which canopy species recorded contain a flower score greater than 0.65 wt p*r and is recognised as a significant food plant by Eby and Law (2008). It should be noted that species recorded that are not prescribed a value by Eby and Law (2008) but are recognised as GHFF foraging trees, have been given an average weighted value of related species or, in the case of *Eucalyptus crebra* (Narrow-leaved Ironbark) been prescribed a value of 0.65 and classified as a significant food plant given its importance as a winter flowering species as acknowledged in the Draft Recovery Plan for the Grey-headed Flying-fox (DEE 2017).

Table GHFF 5: GHFF FHA Quality of Foraging Habitat (trees >0.65 wt p*r) Scoring

Score	Description
0	0 significant GHFF foraging tree species
5	1 – 3 significant GHFF foraging tree species
10	4 – 6 significant GHFF foraging tree species
20	> 6 significant GHFF foraging tree species

- Non-native plant cover – This condition characteristic is assessed using a 100 m X 20 m plot following the contour of the land when possible. All non-native plant cover was assessed by estimating the cover of exotic species over the 100 m X 20 m plot.

Table GHFF 6: GHFF FHA Non-Native Plant Cover Scoring

Score	Description
1	> 50 % non-native plant cover
5	25 – 50 % non-native plant cover
10	5 – 25 % non-native plant cover
20	< 5 % non-native plant cover

It should be noted that for on-ground assessment purposes, the 100 m X 20 m plot utilised for the GHFF FHA overlaps with the on-ground condition characteristics of the Koala MHQA (refer **Appendix A**).

6.2. Site Context – GHFF

The site context assessment deals with the site and its adjacent surroundings. Site context is measured using a suite of attributes to describe the location of the habitat within the surrounding landscape and the influence of its associated threats. This assessment also considers the influence of adjacent vegetated areas and ecological corridors. Under the GHFF FHA, site context is measured using the following six (6) characteristics:

- Size of patch;
- Connectedness (active GHFF roost camps in a 30 km radius);
- Context (percentage of GHFF foraging habitat in a 20 km radius);
- Ecological corridors;
- Role of site location to species overall population in the state (active GHFF national flying-fox monitoring viewer 'level 3' roost camps in a 30 km radius); and
- Threats to the species.

Assessment methodology of the above context characteristics is outlined below:

- Size of patch – This context characteristic is assessed using a modified version of the traditional habitat quality assessment with the directly connected patch of GHFF foraging habitat to site measured. This context characteristic is measured using GIS. The benchmark values for this context characteristic are those used in the traditional habitat quality assessment.

Table GHFF 7: GHFF FHA Size of Patch Scoring

Score	Description
0	< 5 hectares
2	5 – 25 hectares
5	26 – 100 hectares
7	101 – 200 hectares
10	> 200 hectares

- Connectedness – This context characteristic is assessed by analysing the number of active GHFF roost camps (over the past year of monitoring (11/17 – 11/18)) within a 30 km radius of the site. For consistency purposes this assessment is to utilise the data provided on the national flying-fox monitoring viewer (Australian Government).

Table GHFF 8: GHFF FHA Connectedness Scoring

Score	Description
0	< 1 active Grey-headed Flying-fox camp within a 30 km radius
3	1 – 3 active Grey-headed Flying-fox camp within a 30 km radius
6	4 – 6 active Grey-headed Flying-fox camp within a 30 km radius
10	> 6 active Grey-headed Flying-fox camp within a 30 km radius

- Context – This context characteristic is assessed using a modified version of the traditional habitat quality assessment with the percentage of GHFF foraging habitat within a twenty (20) kilometre buffer of the site measured. This context characteristic is measured using GIS.

Table GHFF 9: GHFF FHA Context Scoring

Score	Description
0	< 10 % Grey-headed Flying-fox foraging habitat within a 20 km radius
3	10 – 30 % Grey-headed Flying-fox foraging habitat within a 20 km radius
6	31 – 75 % Grey-headed Flying-fox foraging habitat within a 20 km radius
10	> 75 % Grey-headed Flying-fox foraging habitat within a 20 km radius

- Ecological corridors – This context characteristic is assessed using the traditional habitat quality assessment methodology which involves determining the proximity of the site to state, bioregional, regional or sub-regional corridors.

Table GHFF 10: GHFF FHA Ecological Corridors Scoring

Score	Description
0	Not within an ecological corridor
6	Sharing a common boundary with an ecological corridor
10	Within an ecological corridor

- Threats to species – This context characteristic is assessed by analysing the published scientific literature regarding threats to GHFF and determining the number and severity of the threatening processes observed at or adjacent to the site.

Table GHFF 11: GHFF FHA Threats to Species Scoring

Score	Description
1	High level threat to the species
5	Moderate level threat to the species
10	Low level threat to the species

- Role of site location to species overall population in the state (active GHFF national flying-fox monitoring viewer 'level 3' roost camps in a 30 km radius) – This context characteristic is assessed by analysing the number of active GHFF roost camps level 3 or greater (over the past year of monitoring (11/17 – 11/18)) within a 30 km radius of the site. For consistency purposes this assessment is to utilise the data provided on the national flying-fox monitoring viewer (Australian Government).

Table GHFF 12: GHFF FHA Role of Site Location to Species Overall Population in the State Scoring

Score	Description
0	< 1 active level 3 Grey-headed Flying-fox camp within a 30 km radius
5	1 – 3 active level 3 Grey-headed Flying-fox camp within a 30 km radius
10	> 3 active level 3 Grey-headed Flying-fox camp within a 30 km radius

6.3. Species Stocking Rate – GHFF

The GHFF FHA incorporates Species Stocking Rate is an attribute not discussed under the traditional terrestrial habitat assessment methodology. As discussed above, species stocking rate for GHFF associated with this proposed action is related to the density of GHFF foraging habitat at the site at the time of undertaking the survey.

Species stocking rate was determined based on the percentage of large trees recorded relative to the benchmark of for each assessment unit using State habitat quality threshold scoring.

Table GHFF 13: Species Stocking Rate Scoring

Score	Large trees present
0	No large trees present
5	0-50% of the benchmark Regional Ecosystem DBH
10	>50%-100% of the benchmark Regional Ecosystem DBH
15	>100% of the benchmark Regional Ecosystem DBH

6.4. Offset Site MHQA – Assessment Units

Refer **Section 2.1.1** and **Appendix A**. The following are presented for reference in **Appendix A**.

7. GHFF Baseline Assessment

7.1. Site Condition – Baseline GHFF

Table 33 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 33: Site Condition Scores – Baseline GHFF

Site Reference	Maximum Score	OMU1 – Remnant			OMU2 – Regrowth					OMU3 – Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
Vegetation Condition	20	20	20	20	10	10	10	10	10	5	5	5	OMU1 remnant scores 20, OMU2 regrowth scores 10 and OMU3 cleared scores 5 (refer **Appendix A** and **Table GHFF 1**).
Species Richness	20	10	20	10	10	20	10	10	10	0	0	0	OMU1 and OMU2 species richness scores per AU range from 10 to 20 where equal to or less than or greater than 6 floral foraging species are present. OMU3 scores 0 due to the absence of suitable foraging habitat (refer **Appendix A** and **Table GHFF 2**).
Flower Score	10	8	8	8	8	8	8	8	8	0	0	0	OMU1 and OMU2 maintain flower ratings of 0.6 so are scored 8. OMU3 scores 0 due to the absence of suitable foraging habitat (refer **Appendix A** and **Table GHFF 3**).
Timing of Biological Shortages	10	10	10	10	10	10	10	10	10	0	0	0	The timing of biological shortages for OMU1 and OMU2 are the maximum of 10. OMU3 scores 0 due to the absence of suitable foraging habitat (refer **Appendix A** and **Table GHFF 4**).
Quality of Foraging Habitat	20	5	5	5	5	5	5	5	5	0	0	0	OMU1 and OMU2 maintain between 1 – 3 significant GHFF foraging tree species so score 5. OMU3 scores 0 due to the absence of suitable foraging habitat (refer **Appendix A** and **Table GHFF 5**).
Non-native Plant Cover	20	5	5	5	5	5	5	5	5	5	5	5	Updated non-native plant cover surveys were conducted in 2019 for the whole of property using GIS remote sensing data and ground-truthed with the non-native plant cover survey methodology from the MHQA transects. Surveys provide a high level of accuracy for estimated weed abundance. Coverage estimations across the property were >50% for all non-native species, with the majority of Lantana camara infestations confirmed at a density of >50% across all OMUs. A conservative score of 5 was ascribed across all OMUs (refer **Appendix A** Weed Report and **Table GHFF 6**).
Site Condition Totals	**100**	**58**	**68**	**58**	**48**	**58**	**48**	**48**	**48**	**10**	**10**	**10**	The totals are a sum of the reference scores.
MHQA Weighted Score (40%)	**4.00**	**2.32**	**2.72**	**2.32**	**1.92**	**2.32**	**1.92**	**1.92**	**1.92**	**0.40**	**0.40**	**0.40**	The MHQA weighting of 40% is applied to the Site Condition Totals, above.

7.2. Site Context – Baseline GHFF

7.2.1 GIS Data – Baseline GHFF

Table 34 outlines the application of the MHQA to GIS Site Context data.

Table 34: GIS Data Assessment – Baseline GHFF

Site Reference	Maximum Score	OMU1 – Remnant	OMU2 – Regrowth	OMU3 – Cleared	Justification
Size of the patch	10	10	10	10	The patch is greater than 200 ha and scores 10. Refer **Appendix B** and **Table GHFF 7**.
Connectedness	10	3	3	3	There are two active GHFF camps located within 30 km of the site so connectedness scores 3 (refer **Appendix B** and **Table GHFF 8**).
Context	10	6	6	6	45% of the area within 20 km of the offset site is foraging habitat for the GHFF so context scores 6 (refer **Appendix B** and **Table GHFF 9**).
Ecological corridors	10	10	10	10	The site is within an ecological corridor so scores 10 (refer **Appendix B** and GHFF **Table 10**).
Totals	**40**	**29**	**29**	**29**	The totals are a sum of the reference scores.

7.2.2 Species Habitat Index Data Site Context – Baseline GHFF

Table 35 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 35: Species Habitat Index Assessment – Site Context – Baseline GHFF

Site Reference	Maximum Score	OMU1 – Remnant	OMU2 – Regrowth	OMU3 – Cleared	Justification
Threats to species	10	5	5	1	OMU1 and OMU2 threats to the species are assessed as moderate. The draft recovery plan for GHFF lists the primary threat to the survival of GHFF as loss and degradation of foraging and roosting habitat. Protecting and enhancing existing foraging habitat is listed as recovery objective Number 1 for the species. Of particular importance is the protection and enhancement of winter foraging habitat. The OMU1 and OMU2 areas are under threat from habitat degradation through significant weed infestation. The weed species prevent the recruitment of GHFF food trees, leading to a loss of available food, and increase the risk of high intensity fire that will destroy habitat. Additionally, OMU1 and OMU2 contain Regional Ecosystems that have capacity with offset to provide large amounts of GHFF winter food tree *Eucalyptus crebra*. The current degraded quality of the habitat within OMU1 and OMU2 means without management there will continue to be a moderate threat to the species and decreased GHFF food supply within these areas. OMU3 threats to the species is assessed as high. OMU3 areas contain degraded habitat with no opportunity for food trees for GHFF. The high level of weed coverage within OMU3 heightens the fuel load and significantly impacts risk to the whole offset area. This increases the risk of high intensity fires moving through the offset between OMU areas. High intensity fires can spread into the crown layer and destroy GHFF food trees.
Role of site location to species overall population in the state	10	5	5	5	There is one level 3 GHFF camp within 30 km of the site so the role of the site scores 5 (refer **Appendix B** and **Table GHFF 12**).
Totals	**20**	**10**	**10**	**6**	The totals are a sum of the reference scores.

7.2.3 Site Context Scores – Baseline GHFF

Table 36 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 36: Site Context Scores – Baseline GHFF

Reference	Maximum Score	OMU1 – Remnant	OMU2 – Regrowth	OMU3 – Cleared	Justification
Site Condition Totals	60	39	39	35	The totals are a sum of **Table 34 & 35** totals.
MHQA Weighted Score (30%)	**3.00**	**1.95**	**1.95**	**1.75**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

7.3. Species Stocking Rate – Baseline GHFF

Table 37 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 37: Species Stocking Rate Scores – Baseline GHFF

Site Reference	Maximum Score	OMU1 – Remnant			OMU2 – Regrowth					OMU3 – Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
GHFF Foraging Tree Density	15	5	15	15	5	5	0	10	5	0	0	0	The foraging tree density for each AU was calculated as a proportion of large trees relative to the benchmark score (refer **Appendix A** and **Table GHFF 13**).
MHQA Weighted Score (30%)	**3.00**	**1.00**	**3.00**	**3.00**	**1.00**	**1.00**	**0.00**	**2.00**	**1.00**	**0.00**	**0.00**	**0.00**	The MHQA weighting of 30% is applied to the Species Stocking Rate Scores, above.

7.4. Modified habitat Quality Assessment Habitat Scores – Baseline GHFF

Table 38 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Offset Site.

Table 38: Modified Habitat Quality Assessment Score – Baseline GHFF

Site Reference	Maximum Score	OMU1 - Remnant			OMU2 - Regrowth					OMU3 - Cleared			Justification
		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12	
Site Condition MHQA Weighted Score	4.00	2.32	2.72	2.32	1.92	2.32	1.92	1.92	1.92	0.40	0.40	0.40	Refer MHQA Weighted Score **Table 33**.
Site Context MHQA Weighted Score	3.00	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.75	1.75	1.75	Refer MHQA Weighted Score **Table 36**.
Species Stocking MHQA Weighted Score	3.00	1.00	3.00	3.00	1.00	1.00	0.00	2.00	1.00	0.00	0.00	0.00	Refer MHQA Weighted Score **Table 37**.
Assessment Unit Habitat Assessment Scores	10.00	5.27	7.67	7.27	4.87	5.27	3.87	5.87	4.87	2.15	2.15	2.15	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	6.95	289.18	63.48	0.29	168.16	104.89	1.38	6.70	6.72	0.88	37.81	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.02	0.80	0.18	0.00	0.60	0.37	0.00	0.02	0.15	0.02	0.83	The Assessment Unit Area Weighting is the proportion of the total offset area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	1.00	0.10	6.17	1.28	0.01	3.15	1.44	0.03	0.12	0.32	0.04	1.79	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Offset Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
OMU Modified Habitat Quality Assessment Scores	**10**	**7.55**			**4.74**					**2.15**			The Offset Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheets

7.5. Offset Site MHQA Score Summary – Baseline GHFF

The Modified Habitat Quality Assessment (MHQA) tool for GHFF was applied across the offset site to determine the baseline habitat score for GHFF. Ten (10) MHQA transects were completed across the offset site focussing on the three (3) dominant vegetation communities present (**Appendix A**) being:

1. Remnant – OMU1
2. Regrowth – OMU2
3. Cleared areas – OMU3

Results of the MHQA (refer **Sections 8.2 to 8.4**) indicate that:

1. OMU1 (Remnant) has a habitat quality score of **7.55**
2. OMU2 (Regrowth) has a habitat quality score of **4.74**
3. OMU3 (Cleared areas) has a habitat quality score of **2.15**

7.5.1 Offset Site MHQA Score – Baseline GHFF

With rounding, offset site baseline habitat scores are OMU1 – 8, OMU2 – 5 and OMU3 - 2.

The Offset Site has baseline Modified Habitat Quality Assessment Scores for the GHFF of:
OMU1 – 8
OMU2 – 5
OMU3 - 2

8. GHFF Offset Assessment

8.1. OMU1 Site Condition – Offset GHFF

Table 39 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 39: OMU1 Site Condition Scores – Offset GHFF

Site Reference	Maximum Score	OMU1 – Baseline			OMU1 – Offset			OMU1 – Gain			Justification
		AU02	AU03	AU05	AU02	AU03	AU05	AU02	AU03	AU05	
Vegetation Condition	20	20	20	20	20	20	20	0	0	0	These site condition attributes are expected to be maintained under the offset scenario given they are reflected in the prevailing Regional Ecosystem.
Species Richness	20	10	20	10	20	20	20	10	0	10	Under the outlined management actions over a 20 year period the species richness will be augmented to seven species throughout the OMU to reflect the remnant species mix. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Flower Score	10	8	8	8	8	8	8	0	0	0	These site condition attributes are expected to be maintained under the offset scenario given they are reflected in the prevailing Regional Ecosystem.
Timing of Biological Shortages	10	10	10	10	10	10	10	0	0	0	These site condition attributes are expected to be maintained under the offset scenario given they are reflected in the prevailing Regional Ecosystem.
Quality of Foraging Habitat	20	5	5	5	5	5	5	0	0	0	These site condition attributes are expected to be maintained under the offset scenario given they are reflected in the prevailing Regional Ecosystem.
Non-native Plant Cover	20	5	5	5	20	20	20	15	15	15	Intensive weed management set out in the OMP Section 6.2 (**Appendix C**) will result in a significant reduction in weed species across the offset area. Detailed reporting and monitoring will ensure a reduction in weeds species to a low level of threat by the end of the 20 year management period. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Site Condition Totals	**100**	**58**	**68**	**58**	**83**	**83**	**83**	**25**	**15**	**25**	The totals are a sum of the reference scores.
MHQA Weighted Score (40%)	**4.00**	**2.32**	**2.72**	**2.32**	**3.32**	**3.32**	**3.32**	**1.00**	**0.60**	**1.00**	The MHQA weighting of 40% is applied to the Site Condition Totals, above.

8.2. OMU1 Site Context – Offset GHFF

8.2.1 OMU1 GIS Data – Offset GHFF

Table 40 outlines the application of the MHQA to GIS Site Context data.

Table 40: OMU1 GIS Data Assessment – Offset GHFF

Site Reference	Maximum Score	OMU1 – Baseline	OMU1 – Offset	OMU1 – Gain	Justification
Size of the patch	10	10	10	0	GIS Context data will be maintained with the offset.
Connectedness	10	3	3	0	
Context	10	6	6	0	
Ecological corridors	10	10	10	0	
Totals	**40**	**29**	**29**	**0**	The totals are a sum of the reference scores.

8.2.2 OMU1 Species Habitat Index Data Site Context – Offset GHFF

Table 41 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 41: OMU1 Species Habitat Index Assessment – Site Context – Offset GHFF

Site Reference	Maximum Score	OMU1 – Baseline	OMU1 – Offset	OMU1 – Gain	Justification
Threats to species	10	5	10	5	At the completion of the OMP it is expected that the threats to the species in OMU1 areas will be low. This is due to addressing the primary threat of habitat loss and degradation to the GHFF survival and addressing recovery objective Number 1 of protecting and enhancing GHFF food and foraging habitat, particularly winter flowering trees as listed in the Draft Recovery Plan. The OMP (**Appendix C**) outlines the significant restoration to be undertaken in OMU1 areas, including the removal of weeds and supplementary direct seeding to ensure an increase in availability and quality of GHFF food trees (**Appendix C** OMP Sections 6.2 & 6.3). The management plan will also reduce overall fuel hazard and the significant threat of high intensity wildfire that can spread to the crown and destroy GHFF food trees. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Role of site location to species overall population in the state	10	5	5	0	GIS Context data will be maintained with the offset.
Totals	**20**	**10**	**15**	**5**	The totals are a sum of the reference scores.

8.2.3 OMU1 Site Context Scores – Offset GHFF

Table 42 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 42: OMU1 Site Context Scores – Offset GHFF

Reference	Maximum Score	OMU1 – Baseline	OMU1 – Offset	OMU1 – Gain	Justification
Site Condition Totals	60	39	44	5	The totals are a sum of **Table 40 & 41** totals.
MHQA Weighted Score (30%)	**3.00**	**1.95**	**2.20**	**0.25**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

8.3. OMU 1Species Stocking Rate – Offset GHFF

Table 43 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 43: OMU1 Species Stocking Rate Scores – Offset GHFF

Site Reference	Maximum Score	OMU1 – Remnant			OMU1 – Offset			OMU1 – Gain			Justification
		AU02	AU03	AU05	AU02	AU03	AU05	AU02	AU03	AU05	
GHFF Foraging Tree Density	15	5	15	15	15	15	15	10	0	0	A significant portion of the remnant vegetation is nearing or at 'Large tree' size. With the offset management plan in place for 20 years the remnant areas will easily reach greater than benchmark large tree status. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
MHQA Weighted Score (30%)	**3.00**	**1.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**2.00**	**0.00**	**0.00**	The MHQA weighting of 30% is applied to the Species Stocking Rate Scores, above.

8.4. OMU1 Modified habitat Quality Assessment Habitat Scores – Offset GHFF

Table 44 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Offset Site.

Table 44: OMU1 Modified Habitat Quality Assessment Score – Offset GHFF

Site Reference	Maximum Score	OMU1 – Baseline			OMU1 – Offset			OMU1 – Gain			Justification
		AU02	AU03	AU05	AU02	AU03	AU05	AU02	AU03	AU05	
Site Condition MHQA Weighted Score	4.00	2.32	2.72	2.32	3.32	3.32	3.32	1.00	0.60	1.00	Refer MHQA Weighted Score **Table 39**.

Site Reference	Maximum Score	OMU1 – Baseline			OMU1 – Offset			OMU1 – Gain			Justification
		AU02	AU03	AU05	AU02	AU03	AU05	AU02	AU03	AU05	
Site Context MHQA Weighted Score	3.00	1.95	1.95	1.95	2.20	2.20	2.20	0.25	0.25	0.25	Refer MHQA Weighted Score **Table 42**.
Species Stocking MHQA Weighted Score	3.00	1.00	3.00	3.00	3.00	3.00	3.00	2.00	0.00	0.00	Refer MHQA Weighted Score **Table 43**.
Assessment Unit Habitat Assessment Scores	10.00	5.27	7.67	7.27	8.52	8.52	8.52	3.25	0.85	1.25	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	6.95	289.18	63.48	6.95	289.18	63.48	6.95	289.18	63.48	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.02	0.80	0.18	0.02	0.80	0.18	0.02	0.80	0.18	The Assessment Unit Area Weighting is the proportion of the total offset area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	1.00	0.10	6.17	1.28	0.16	6.85	1.50	0.06	0.68	0.22	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Offset Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
OMU Modified Habitat Quality Assessment Scores	**10**	**7.55**			**8.52**			**0.97**			The Offset Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.
Rounded Scores	**10**	**8**			**9**			**1**			Refer MHQA.

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheet

8.5. OMU2 Site Condition – Offset GHFF

Table 45 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 45: OMU2 Site Condition Scores – Offset GHFF

Site Reference	Maximum Score	OMU2 – Baseline					OMU2 – Offset					OMU2 – Gain					Justification
		AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	
Vegetation Condition	20	10	10	10	10	10	20	20	20	20	20	10	10	10	10	10	These site condition attributes are expected to be improve under the offset scenario given they are reflected in the prevailing Regional Ecosystem as the vegetation develops from regrowth to remnant status. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Species Richness	20	10	20	10	10	10	10	20	20	10	10	0	0	10	0	0	Under the outlined management actions over a 20 year period the species richness will be augmented to seven species in AU06 to reflect the remnant species mix. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Flower Score	10	8	8	8	8	8	8	8	8	8	8	0	0	0	0	0	These site condition attributes are expected to be maintained under the offset scenario given they are reflected in the prevailing Regional Ecosystem.
Timing of Biological Shortages	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	These site condition attributes are expected to be maintained under the offset scenario given they are reflected in the prevailing Regional Ecosystem.
Quality of Foraging Habitat	20	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	These site condition attributes are expected to be maintained under the offset scenario given they are reflected in the prevailing Regional Ecosystem.
Non-native Plant Cover	20	5	5	5	5	5	20	20	20	20	20	15	15	15	15	15	Intensive weed management set out in the OMP Section 6.2 (**Appendix C**) will result in a significant reduction in weed species across the offset area. Detailed reporting and monitoring will ensure a reduction in weeds species to a low level of threat by the end of the 20 year management period. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Site Condition Totals	**100**	**48**	**58**	**48**	**48**	**48**	**73**	**83**	**83**	**73**	**73**	**25**	**25**	**35**	**25**	**25**	The totals are a sum of the reference scores.
MHQA Weighted Score (40%)	**4.00**	**1.92**	**2.32**	**1.92**	**1.92**	**1.92**	**2.92**	**3.32**	**3.32**	**2.92**	**2.92**	**1.00**	**1.00**	**1.40**	**1.00**	**1.00**	The MHQA weighting of 40% is applied to the Site Condition Totals, above.

8.6. OMU2 Site Context – Offset GHFF

8.6.1 OMU2 GIS Data – Offset GHFF

Table 46 outlines the application of the MHQA to GIS Site Context data.

Table 46: OMU2 GIS Data Assessment – Offset GHFF

Site Reference	Maximum Score	OMU2 – Baseline	OMU2 – Offset	OMU2 – Gain	Justification
Size of the patch	10	10	10	0	GIS Context data will be maintained with the offset.
Connectedness	10	3	3	0	
Context	10	6	6	0	
Ecological corridors	10	10	10	0	
Totals	**40**	**29**	**29**	**0**	The totals are a sum of the reference scores.

8.6.2 OMU2 Species Habitat Index Data Site Context – Offset GHFF

Table 47 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 47: OMU2 Species Habitat Index Assessment – Site Context – Offset GHFF

Site Reference	Maximum Score	OMU2 – Baseline	OMU2 – Offset	OMU2 – Gain	Justification
Threats to species	10	5	10	5	At the completion of the OMP (**Appendix C**) it is expected that the threats to the species in OMU2 areas will be low. This is due to addressing the primary threat of habitat loss and degradation to the GHFF survival, and addressing recovery objective Number 1 of protecting and enhancing GHFF food and foraging habitat, particularly winter flowering trees as listed in the Draft Recovery Plan. The OMP outlines the significant restoration to be undertaken in OMU2 areas, including the removal of weeds and supplementary direct seeding to ensure an increase in availability and quality of GHFF food trees (**Appendix C** OMP Sections 6.2 & 6.3). The management plan will also reduce overall fuel hazard and the significant threat of high intensity wildfire that can spread to the crown and destroy GHFF food trees. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Role of site location to species overall population in the state	10	5	5	0	GIS Context data will be maintained with the offset.
Totals	**20**	**10**	**15**	**5**	The totals are a sum of the reference scores.

8.6.3 OMU2 Site Context Scores – Offset GHFF

Table 48 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 48: OMU2 Site Context Scores – Offset GHFF

Reference	Maximum Score	OMU2 – Baseline	OMU2 – Offset	OMU2 – Gain	Justification
Site Condition Totals	60	39	44	5	The totals are a sum of **Table 46 & 47** totals.
MHQA Weighted Score (30%)	**3.00**	**1.95**	**2.20**	**0.25**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

8.7. OMU2 Species Stocking Rate – Offset GHFF

Table 49 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 49: OMU2 Species Stocking Rate Scores – Offset GHFF

Site Reference	Maximum Score	OMU2 – Baseline					OMU2 – Offset					OMU2 – Gain					Justification
		AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	
GHFF Foraging Tree Density	15	5	5	0	10	5	10	10	10	15	10	5	5	10	5	5	A portion of the regrowth vegetation is in advanced stages with many trees nearly reaching benchmark large tree status. With the offset management plan in place for 20 years the regrowth areas will easily reach between 50-100% of benchmark status. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
MHQA Weighted Score (30%)	**3.00**	**1.00**	**1.00**	**0.00**	**2.00**	**1.00**	**2.00**	**2.00**	**2.00**	**3.00**	**2.00**	**1.00**	**1.00**	**2.00**	**1.00**	**1.00**	The MHQA weighting of 30% is applied to the Species Stocking Rate Scores, above.

8.8. OMU2 Modified habitat Quality Assessment Habitat Scores – Offset GHFF

Table 50 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Offset Site.

Table 50: OMU2 Modified Habitat Quality Assessment Score – Offset GHFF

Site Reference	Maximum Score	OMU2 – Baseline					OMU2 – Offset					OMU2 – Gain					Justification
		AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	AU01	AU04	AU06	AU07	AU08	
Site Condition MHQA Weighted Score	4.00	1.92	2.32	1.92	1.92	1.92	2.92	3.32	3.32	2.92	2.92	1.00	1.00	1.40	1.00	1.00	Refer MHQA Weighted Score **Table 45**.
Site Context MHQA Weighted Score	3.00	1.95	1.95	1.95	1.95	1.95	2.20	2.20	2.20	2.20	2.20	0.25	0.25	0.25	0.25	0.25	Refer MHQA Weighted Score **Table 48**.
Species Stocking MHQA Weighted Score	3.00	1.00	1.00	0.00	2.00	1.00	2.00	2.00	2.00	3.00	2.00	1.00	1.00	2.00	1.00	1.00	Refer MHQA Weighted Score **Table 49**.
Assessment Unit Habitat Assessment Scores	10.00	4.87	5.27	3.87	5.87	4.87	7.12	7.52	7.52	8.12	7.12	2.25	2.25	3.65	2.25	2.25	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	0.29	168.16	104.89	1.38	6.70	0.29	168.16	104.89	1.38	6.70	0.29	168.16	104.89	1.38	6.70	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.00	0.60	0.37	0.00	0.02	0.00	0.60	0.37	0.00	0.02	0.00	0.60	0.37	0.00	0.02	The Assessment Unit Area Weighting is the proportion of the total offset area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	1.00	0.01	3.15	1.44	0.03	0.12	0.01	4.49	2.80	0.04	0.17	0.00	1.34	1.36	0.01	0.05	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Offset Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
OMU Modified Habitat Quality Assessment Scores	**10**	**4.74**					**7.51**					**2.77**					The Offset Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.
Rounded Scores	**10**	**5**					**8**					**3**					Refer MHQA.

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheet

8.9. OMU3 Site Condition – Offset GHFF

Table 51 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 51: OMU3 Site Condition Scores – Offset GHFF

Site Reference	Maximum Score	OMU3 – Baseline			OMU3 – Offset			OMU3 – Gain			Justification
		AU09	AU11	AU12	AU09	AU11	AU12	AU09	AU11	AU12	
Vegetation Condition	20	5	5	5	20	20	20	15	15	15	After 20 years of management, OMU3 will be restored to Category B remnant vegetation. Section 6.3 of the OMP (**Appendix C**) details how revegetation will occur and guarantee a gain in this asset, through planting, direct seeding and weed management. Revegetation will occur in-line with cattle and fire will be excluded from OMU3 until the plantings are of sufficient size to withstand hazard reduction activities as per Section 7.3 of the Offset Management Plan. Weed management of OMU3 areas will be in accordance with Section 6.2 of the Offset Management Plan and will improve the non-native vegetation cover score. These methods apply to all site reference items where the score will be increased through actions under the Offset Management Plan. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Species Richness	20	0	0	0	20	10	20	20	10	20	Species richness of the OMU3 will be increased by the revegetation of the site to its preclearing remnant Regional Ecosystem. This will increase the GHFF foraging tree species in accordance with the species diversity of the preclear regional ecosystem. Management actions will follow those outlined in the 'vegetation condition' asset above.
Flower Score	10	0	0	0	8	8	8	8	8	8	Flower score of OMU3 will be increased by the revegetation of the site to its preclearing remnant regional ecosystem. Management actions will follow those outlined in the 'vegetation condition' asset above.
Timing of Biological Shortages	10	0	0	0	10	10	10	10	10	10	Timing of biological shortages score will be increased by the revegetation of the site to its preclearing remnant regional ecosystem. Management actions will follow those outlined in the 'vegetation condition' asset above.
Quality of Foraging Habitat	20	0	0	0	5	5	5	5	5	5	Quality of foraging habitat score will be increased by the revegetation of the site to is preclearing remnant regional ecosystem. Management actions will follow those outlined in the 'vegetation condition' asset above.
Non-native Plant Cover	20	5	5	5	20	20	20	15	15	15	Intensive weed management set out in the OMP Section 6.2 (**Appendix C**) will result in a significant reduction in weed species across the offset area. Detailed reporting and monitoring will ensure a reduction in weeds species to a low level of threat by the end of the 20 year management period. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Site Condition Totals	**100**	**10**	**10**	**10**	**83**	**73**	**83**	**73**	**63**	**73**	The totals are a sum of the reference scores.
MHQA Weighted Score (40%)	**4.00**	**0.40**	**0.40**	**0.40**	**3.32**	**2.92**	**3.32**	**2.92**	**2.52**	**2.92**	The MHQA weighting of 40% is applied to the Site Condition Totals, above.

8.10. OMU3 Site Context – Offset GHFF

8.10.1 OMU3 GIS Data – Offset GHFF

Table 52 outlines the application of the MHQA to GIS Site Context data.

Table 52: OMU3 GIS Data Assessment – Offset GHFF

Site Reference	Maximum Score	OMU3 – Baseline	OMU3 – Offset	OMU3 – Gain	Justification
Size of the patch	10	10	10	0	GIS Context data will be maintained with the offset.
Connectedness	10	3	3	0	
Context	10	6	6	0	
Ecological corridors	10	10	10	0	
Totals	**40**	**29**	**29**	**0**	The totals are a sum of the reference scores.

8.10.2 OMU3 Species Habitat Index Data Site Context – Offset GHFF

Table 53 provides the assessment of Species Habitat Indices that support the Site Context score as per the MHQA. Justifications for each Species Habitat Index are provided.

Table 53: OMU3 Species Habitat Index Assessment – Site Context – Offset GHFF

Site Reference	Maximum Score	OMU3 – Baseline	OMU3 – Offset	OMU3 – Gain	Justification
Threats to species	10	1	10	9	At the completion of the OMP (**Appendix C**) it is expected that the threats to the species in OMU3 areas will be low. This is due to addressing the primary threat of habitat loss and degradation to the GHFF survival, listed in the Draft Recovery Plan. The OMP outlines the significant restoration to be undertaken in OMU3 areas and the creation of new habitat through the planting of GHFF food trees. New habitat will include stands of *Eucalyptus crebra* a species that provides critical winter foraging habitat. Revegetation will provide uplift in the quality and quantity available, directly addressing the primary threat of habitat loss and degradation. Additionally, significant weed reduction will be undertaken in OMU3. Weed reduction will reduce fuel hazard and the threat of high intensity wildfire, particularly whilst stands of vegetation mature. Immature trees will be able to flower and provide food for GHFF, but there is a risk that without weed management, the threat for high intensity fires will destroy immature threes. Management of weeds within OMU3 will realise significant gains and reduction in threat. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.
Role of site location to species overall population in the state	10	5	5	0	GIS Context data will be maintained with the offset.
Totals	**20**	**6**	**15**	**9**	The totals are a sum of the reference scores.

8.10.3 OMU3 Site Context Scores – Offset GHFF

Table 54 provides the Site Context scores for each assessment unit and the MHQA weighted score.

Table 54: OMU3 Site Context Scores – Offset GHFF

Reference	Maximum Score	OMU3 – Baseline	OMU3 – Offset	OMU3 – Gain	Justification
Site Condition Totals	60	35	44	9	The totals are a sum of **Table 52 & 53** totals.
MHQA Weighted Score (30%)	**3.00**	**1.75**	**2.20**	**0.45**	The MHQA weighting of 30% is applied to the Site Context Totals, above.

8.11. OMU3 Species Stocking Rate – Offset GHFF

Table 55 provides the assessment of Site Condition scores as per the MHQA. Justifications for each site reference are provided.

Table 55: OMU3 Species Stocking Rate Scores – Offset GHFF

Site Reference	Maximum Score	OMU3 – Baseline			OMU3 – Offset			OMU3 – Gain			Justification
		AU09	AU11	AU12	AU09	AU11	AU12	AU09	AU11	AU12	
GHFF Foraging Tree Density	15	0	0	0	5	5	5	5	5	5	The revegetation of OMU3 will result in the site reaching remnant vegetation status within the timeframe of the Offset Management Plan (20 years). During this time the planted trees will mature and start to reach the 'Large tree benchmark' size. It is expected that at least one of the trees will reach large tree size within 20 years. A conservative score of 5 is ascribed based on unpredictability around climate change and optimal growing conditions and rainfall for trees. Refer to **Appendix C** OMP Section 5 for a breakdown of milestones and performance indicators to achieve proposed quality gains for management of the offset area.

Site Reference	Maximum Score	OMU3 – Baseline			OMU3 – Offset			OMU3 – Gain			Justification
		AU09	AU11	AU12	AU09	AU11	AU12	AU09	AU11	AU12	
MHQA Weighted Score (30%)	**3.00**	**0.00**	**0.00**	**0.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	The MHQA weighting of 30% is applied to the Species Stocking Rate Scores, above.

8.12. OMU3 Modified habitat Quality Assessment Habitat Scores – Offset GHFF

Table 56 applies the MHQA methodology to the Site Condition, Site Context and Species Stocking Rate scores from previous Sections to calculate the Modified Habitat Quality Assessment Score for the Offset Site.

Table 56: OMU3 Modified Habitat Quality Assessment Score – Offset GHFF

Site Reference	Maximum Score	OMU3 – Baseline			OMU3 – Offset			OMU3 – Gain			Justification
		AU09	AU11	AU12	AU09	AU11	AU12	AU09	AU11	AU12	
Site Condition MHQA Weighted Score	4.00	0.40	0.40	0.40	3.32	2.92	3.32	2.92	2.52	2.92	Refer MHQA Weighted Score **Table 51**.
Site Context MHQA Weighted Score	3.00	1.75	1.75	1.75	2.20	2.20	2.20	0.45	0.45	0.45	Refer MHQA Weighted Score **Table 54**.
Species Stocking MHQA Weighted Score	3.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	Refer MHQA Weighted Score **Table 55**.
Assessment Unit Habitat Assessment Scores	10.00	2.15	2.15	2.15	6.52	6.12	6.52	4.37	3.97	4.37	The Assessment Unit Habitat Assessment Score is a summation of the Site Condition, Site Context and Species Stocking Rate MHQA weighted scores for each Assessment Unit.
Assessment Unit Areas	NA	6.72	0.88	37.81	6.72	0.88	37.81	6.72	0.88	37.81	Refer **Appendix A**.
Assessment Unit Area Weighting	1.00	0.15	0.02	0.83	0.15	0.02	0.83	0.15	0.02	0.83	The Assessment Unit Area Weighting is the proportion of the total offset area attributed to each Assessment Unit.
Assessment Unit Weighted Scores	1.00	0.32	0.04	1.79	0.96	0.12	5.43	0.64	0.08	3.64	The Assessment Unit Weighted Scores are the Assessment Unit Habitat Assessment Scores weighted as per the proportion each Assessment Unit contributes to the Offset Site area (Assessment Unit Habitat Assessment Score * Assessment Unit Area Weighting).
OMU Modified Habitat Quality Assessment Scores	**10**	**2.15**			**6.51**			**4.36**			The Offset Site Modified Habitat Quality Assessment Score is the summation of the Assessment Unit Weighted Scores.
Rounded Scores	**10**	**2**			**7**			**5**			Refer MHQA.

NB: Rounded scores in this table do not reflect the calculator sheet outputs that incorporate multiple decimal places for accuracy – refer Appendix A for MHQA Working Sheets

8.13. GHFF Offset Assessment Summary

Section 7 outlines justifications for habitat quality improvements across the offset site focussing on the three (3) dominant vegetation communities present (**Appendix A**), being:

4. Remnant – OMU1
5. Regrowth – OMU2
6. Cleared areas – OMU3

Results of the habitat quality gain assessment in **Section 8** indicate that:

4. OMU1 (Remnant) will achieve an offset habitat quality score of **8.52**
5. OMU2 (Regrowth) will achieve an offset habitat quality score of **7.51**
6. OMU3 (Cleared areas) will achieve an offset habitat quality score of **6.51**

8.13.1 Koala offset habitat scores

With rounding, the following offset site habitat scores will be achieved.

OMU1 – Baseline 8 – Gain 1 – Offset Habitat Quality Score 9
OMU2 – Baseline 5 – Gain 3 – Offset Habitat Quality Score 8
OMU3 – Baseline 2 – Gain 5 – Offset Habitat Quality Score 7

9. GHFF Offset Calculation

The quantum impact from 'Technical Document 1 – Impact Site' and attributes as justified in **Sections 7 & 8** were applied to the EPBC offsets calculator along with the following to determine offset requirements as per the EPBC Act Environmental Offsets Policy.

9.1. Averted Loss and Risk of Loss

Refer to **Section 5.1** for further explanation.

Risk of Loss Summary

Management Unit	Risk of Loss "Without Offset"	Risk of Loss "With Offset"	Differential
OMU-1 (remnant vegetation)	10	0	10
OMU-2 (regrowth vegetation)	10	0	10
OMU-3 (cleared vegetation)	0	0	0

9.2. Confidence

9.2.1 Confidence in Averted Loss

Confidence in averted loss scores are supported by the design and management actions of the OMP (**Appendix C**). Risks associated with the delivery of the offset will be mitigated by way of detailed management actions and milestones. Management responses set out in the OMP are clearly framed against stated outcomes being to protect and conserve large, connected areas of Koala habitat capable of supporting and improving populations that area genetically diverse and free of disease. As such, the confidence in averted loss is attributed a score of 90% for each OMU.

9.2.2 Confidence in Quality Improvement

With regard to confidence in quality improvement, a 75% score was given to OMU2 and OMU 2 to allow for risks primarily relating to natural events such as flood, drought, severe storms etc. (-10% confidence adjustment) and in respect of potential impacts of cattle grazing as a bushfire fuel reduction tool (further -15% confidence adjustment). A 70% score for OMU3 reflects the potential for risks highlighted above to have greater impact on revegetated areas.

Confidence in Quality Improvement Summary

Management Unit	Confidence
OMU-1 (remnant vegetation)	75%
OMU-2 (regrowth vegetation)	75%
OMU-3 (cleared vegetation)	70%

9.3. Time Until Ecological Benefit

Time until ecological benefit for OMU1 is 20 years. This is the time in which the majority of the benefits will be realised, including significantly improving the habitat through the reduction of weeds and supplementary direct seeding to increase GHFF food availability in OMU 1 and OMU 2.

For OMU3 the length of the Offset Management Plan is also 20 years. Full ecological benefit will be realised over this time. In the OMU3 areas, vegetation planted at the commencement of the offset management plan will have matured sufficiently to be fully utilised as GHFF habitat.

Time Until Ecological Benefit Summary

Management Unit	**Time Until Ecological Benefit**
OMU-1 (remnant vegetation)	20 years
OMU-2 (regrowth vegetation)	20 years
OMU-3 (cleared vegetation)	20 years

9.4. Offset Area

When all relevant attributes are applied to the EPBC Offsets calculator (refer **Appendix D**), the following offset areas for each assessment unit are required to mitigate the quantum impact on GHFF foraging habitat:

Offset Area Summary

Management Unit	**Offset Area Required**	**% Impact Offset**
OMU-1 (remnant vegetation)	359.61 ha	37.18%
OMU-2 (regrowth vegetation)	281.42 ha	53.79%
OMU-3 (cleared vegetation)	45.41 ha	11.07%
Totals	**686.44 ha**	**102.03%**

10. Offset Suitability Assessment

The external offset site, located in the Little Liverpool Range will permanently secure 686.44 ha within a State significant biodiversity corridor in South-East Queensland. The external offset site includes a range of vegetation communities, comprising 'Category B' (remnant) and 'Category C' (high value regrowth) vegetation, along with 'Category X' (non-remnant) vegetation that requires extensive rehabilitation. The external offset intends to provide long-term protection and management of two (2) MNES, being:

- Documented populations of Koala (*Phascolarctos cinereus*), a 'vulnerable' listed species under the EPBC Act; and
- High quality habitat for Grey-headed Flying-fox (*Pteropus poliocephalus*), a 'vulnerable' listed species under the EPBC Act.

The external offset will deliver a tangible and measurable benefit for the Koala (*Phascolarctos cinereus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*). Targeted land management actions will be implemented to result in a net gain in Koala and Grey-headed Flying-fox habitat quality over the management period (refer **Appendix C**). Permanent legal protection of the offset areas from incompatible land uses will contribute to the ongoing viability of Koala and Grey-headed Flying-fox in South-east Queensland. The offset will be legally secured for the duration of the impact.

Implementation of the Koala MHQA method found that the cleared lower slopes of the external offset site scored a two (2) due to the absence of habitat but presence of context values, while the vegetated areas scored six (6) for regrowth and seven (7) for remnant. Land management will progress vegetated areas to a score of nine (9) and cleared areas to a score of seven (7). Justification of offset area attribute values as per the Koala MHQA method are presented in **Sections 3 to 5 and Appendix C OMP Section 5**.

The external offset area is a potential food resource for two (2) federally recognised colonies of Grey-headed Flying-fox located within 30 km and provides high quality foraging habitat in vegetated areas due to its diversity and range of mature trees. Implementation of the GHFF MHQA method found that the cleared lower slopes of the external offset site scored a two (2) due to the absence of habitat but presence of context values, while the vegetated areas scored eight (8) and five (5) for remnant and regrowth, respectively. Land management will progress vegetated areas to a score of nine (9) for remnant, eight (8) for regrowth and seven (7) for cleared areas. Justification of offset area attribute values as per the GHFF MHQA method are presented in **Sections 7 to 9 and Appendix C OMP Section 5**.

10.1. Offset Management Plan

The OMP (refer to **Attachment C**) details further the existing habitat quality for the Koala (*Phascolarctos cinereus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*) present on the external offset site. Management actions designed to achieve a net gain in Koala and Grey-headed Flying-fox habitat quality are proposed.

The OMP identifies outcomes, performance measures and outcomes-focused management actions that will fulfil statutory requirements pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), for the provision of Koala (*Phascolarctos cinereus*) habitat and Grey-headed Flying-fox (*Pteropus poliocephalus*) foraging habitat offsets.

10.2. Overarching Objectives

The objective of achieving a net gain in habitat is described by the EPBC Act Environmental Offsets Policy (DEE, 2012a) and verified through the use of the Offsets Assessment Guide (DEE, 2012b). The OMP (**Attachment C**) will achieve Koala and Grey-headed Flying-fox recovery in the external offset areas by delivering:

- Legal protection of a total offset area of 686.44 ha of Koala and Grey-headed Flying-fox habitat to help offset the total quantum of impact of 138 ha. Based on the EPBC Act Calculator, this offset represents 120.70% (for the Koala) and 102.03% (for the Grey-headed Flying-fox) of the required offset;
- A net gain in Koala population density within the external offset site;
- Improvement to the quality of Koala and Grey-headed Flying-fox habitat within offset areas evidenced by measurable improvement in habitat quality and reduction of threats over the management period;
- Maintenance of a contiguous landscape with good connectivity of Koala and Grey-headed Flying-fox habitat to the broader landscape;
- Control of introduced predators to reduce their impact on Koala populations in the external offset area;
- Reduced risk of Koala mortality or injury due to vehicle strike within the offset area and the roads leading up to the external offset area;
- Wildfire hazard reduction to protect the external offset area from high intensity fire; and
- Reduced risk of the spread of Koala and vegetation diseases and or pathogens.

10.3. Management Framework

The external offset area has been delineated into Operational Management Units (OMUs) (**Appendix A**). The purpose of the OMUs is to more efficiently and effectively deliver the offset outcomes. Each OMU is a different size and contains varying vegetation communities, vegetation conditions and habitat quality for the Koala and Grey-headed Flying-fox. The OMUs contain the following vegetation communities:

- OMU-01: Remnant/'Category B' vegetation;
- OMU-02: Regrowth/'Category C' vegetation; and
- OMU-03: Non-remnant, cleared pasture/'Category X' vegetation

A set of management actions has been designed to progress each OMU towards the offset outcomes as quickly and efficiently as possible (refer **Appendix C** OMP).

10.4. Attributes of the OMP for managing habitat for Koala and Grey-headed Flying-fox

Using the respective Recovery Plans for each species, nine (9) attributes were identified that refer to either or both the Koala and Grey-headed Flying-fox (for more detail refer to **Appendix C** OMP), which were used to guide all management actions. Management actions are summarised below:

1. Occurrence – As Koala are the only confirmed species on site, net gain in Koala population density is the intended offset outcome (particularly in previously cleared areas). The Grey-headed Flying-fox foraging habitat improvements will facilitate enhanced foraging habitat for the species.
2. Vegetation composition – For both the Koala and Grey-headed Flying-fox, the offset will restore to pre-clearance regional ecosystems, reduce weed cover, improve structure and floristic diversity, halt clearing and remove domestic livestock except as per fire risk management tool.
3. Habitat connectivity – For both the Koala and Grey-headed Flying-fox, the offset outcome is to create a contiguous landscape (including facilitating the management of the area between management units),

providing good connectivity with surrounding properties also managed by QTFN and contribute to dispersal throughout the Little Liverpool Range.

4. Feral animals – Relevant to Koala, intended offset outcome is to not injure or have a mortality caused by a feral animal attack. This will be measured through the reduction of abundance of feral animals within the external offset area.
5. Vehicle strike – Relevant to Koala, the outcome is not to have a Koala mortality or injury on roads.
6. Dispersal – For both the Koala and Grey-headed Flying-fox, the outcome is creation of contiguous habitat across the Little Liverpool Range by establishing self-sustaining vegetation resembling the pre-clearance RE's, reduce weeds, retain and enhance floristic diversity and structure, and ongoing preservation and recruitment of food and shelter trees.
7. Wildfire – For both the Koala and Grey-headed Flying-fox, the outcome is to remove the risk of high intensity fires and subsequent mortalities of Koala and loss of habitat.
8. Disease – Relevant to Koala, the outcome is to exclude the risk of spread of diseases and pathogens and control access of third-party contractors who may act as vectors.
9. Recovery value – Relevant to Koala, the outcome is to create a contiguous landscape that allows the establishment of new territories and facilitates gene flow throughout the Little Liverpool Range, permanently remove existing threat of habitat degradation due to incompatible land uses, foster Koala populations that are genetically diverse, free of disease and breeding.

10.5. Offset Assessment

The external offset areas were assessed using the EPBC Offsets Calculator and Assessment Guide (DEE, 2014; DEHP, 2014). As the three (3) OMUs have different existing and future values as offsets, each OMU was assessed separately then summed, providing a total to 120.70% (for the Koala) and 102.03% (for the Grey-headed Flying-fox) of the required offset, which satisfies the EPBC offset policy (DEE, 2012a; 2012b).

10.6. Legislative Requirements

The offset is consistent with the relevant Commonwealth policies and guidance documents on offsets on the following basis:

- The proposed conservation outcome improves or maintains the viability of Koala and Grey-headed Flying-fox habitat;
- The proposed conservation outcome is based upon a direct offset of 686.44 ha of land within a State significant corridor under the ownership of Queensland Trust for Nature;
- The proposed conservation outcome is proportionate to the residual impact on habitat, being 120.70% and 102.03% of the required offset for the Koala and Grey-headed Flying-fox, respectively, in accordance with the offset calculator;
- The risk of the offset not succeeding is accounted for by QTFN's experience in this field; and,
- The offset will be legally secured for the duration of the impact.

The proposed external offset is:

- Efficient – capitalises on existing wildlife corridors (Little Liverpool Range) and protected areas;
- Effective – protecting high quality habitat within a landscape-level corridor of State significance;
- Timely – QTFN's experience in delivering offsets will ensure the offset is secured through a Voluntary Declaration (VDec) under the Vegetation Management Act 1999 promptly following approval of this Offset Strategy, noting that Stage 2 of the action will not commence until the VDec is registered;

- Transparent – being physical land owned by Queensland Trust for Nature that will be protected under covenant, with annual reports available for viewing;
- Scientifically robust – being based on numerous studies and assessments conducted by suitably qualified individuals; and
- Reasonable – being equivalent to the significant residual impact on Koala habitat.

Refer to **Suitability Tables**, below, for the suitability assessment for the external offset against the EPBC Act Environmental Offset Policy.

Suitability Table EPBC Act Offset Policy External Offset Requirements

Environmental Offsets Policy Requirement	**Statement of suitability**	**OMP reference** (QTFN 2020) (**Appendix C**)
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.	The external offset area will directly contribute to the ongoing viability of the Koala (*Phascolarctos cinereus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*). Protection and management of the external offset area in accordance with the OMP (**Appendix C**) will deliver an overall conservation outcome for a very large area of Koala habitat and Grey-headed Flying-fox foraging habitat which is currently not managed or protected. The offset will improve the viability of the protected matter: ▪ In 'Category B' (OMU-01) areas from a start quality of 7 to 9 for Koala and 8 to 9 for the Grey-headed Flying-fox; ▪ In 'Category C' (OMU-02) areas from a start quality of 6 to 9 for Koala and 5 to 8 for the Grey-headed Flying-fox; and ▪ In 'Category X' (OMU-03) areas from a start quality of 2 to 7 for the Koala and 2 to 7 for the Grey-headed Flying-fox. If neither the action nor the offset took place, it is anticipated that: ▪ In 'Category B' (OMU-01) areas, habitat quality would remain 7 (Koala) and 8 (Grey-headed Flying-fox); ▪ In 'Category C' (OMU-02) areas, habitat quality would remain 6 (Koala) and 5 (Grey-headed Flying-fox); and ▪ In 'Category X' (OMU-03) areas, habitat quality would remain a 2 for both Koala and Grey-headed Flying-fox. Management actions as described in the OMP (refer **Appendix C** – Appendix C – Tabulated Management Schedule) will ensure that the external offset area will be intensely managed and resourced to ensure very large areas of protected Koala and Grey-headed Flying-fox habitat which substantially exceeds the quality of the habitat originally impacted by the action.	Section 4.2 - Suitability as an offset. Sections 5 to 7 OMU management actions.

	The offset area will: ▪ Provide a large area of well-managed Koala and Grey-headed Flying-fox habitat connected with the Little Liverpool Range, a large continuous and ecologically important habitat covering over 20,500 ha within a State significant corridor; ▪ Be legally secured for the duration of the impact; ▪ Result in the long-term reduction of threats and a net gain in Koala population density within the offset area; ▪ Control of introduced predators to reduce impact on Koala populations; ▪ Reduced risk of Koala mortality or injury due to vehicle strike; ▪ Ensure wildfire hazard reduction to protect the offset area from high intensity fire; and ▪ Reduced risk of the spread of Koala and vegetation diseases and or pathogens. Securing and managing the external offset area in accordance with the OMP will permanently protect the area from incompatible land uses and will contribute to the ongoing viability of South-east Queensland's Koala and Grey-headed Flying-fox populations. It will also contribute to the long-term ecological function of a broader network of wildlife corridors connected to the offset areas through the Little Liverpool Range, a large continuous and ecologically important habitat covering over 20,500 ha within a State significant corridor.	
Suitable offsets must be built around direct offsets but may include other compensatory measures	The offsite offsets will provide 120.70% and 102.03% of the total offset requirement for the Koala and Grey-headed Flying-fox, respectively, as determined using the EPBC calculator (refer **Appendix D**). The offset will be legally secured for the duration of the impact.	Section 3 - Implementation objectives.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	Assessment against the EPBC Act Offsets Assessment Guide determined the probability of annual extinction of the Koala and Grey-headed Flying-fox as 0.2%. This measurement was used in the Offset Calculator, ensuring that the level of statutory protection that applies to the protected matter was taken in to account. All threats set out in the Department's SPRAT Database and the EPBC Act referral guidelines for the vulnerable Koala have been addressed in the OMP. In relation to Grey-headed Flying-fox, identified recovery actions have been addressed in the OMP.	Appendix B – EPBC 2016/7817 Proposed Map. Appendix C – Tabulated Management Schedule.

Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	Through the permanent protection and long-term management of the external offset area, the offset will deliver a conservation gain that will adequately compensate for impacts on Koala and Grey-headed Flying-fox habitat arising from the action. The total area to be permanently protected and managed is 686.44 hectares. This will help compensate the 138 ha adjusted quantum impact hectares (i.e. 230 ha of impact on Koala and Grey-headed Flying-fox habitat at score of 6). The external offset area delivered will satisfy over the 100% direct offset area requirement, delivering 120.70% and 102.03% for the Koala and Grey-headed Flying-fox, respectively. The offset is considered to be appropriate and more than proportionate to the impacts of the action.	Sections 5 to 7 - OMU management actions.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding	Confidence in the success of the offset has been assigned a value of 75% for OMU-01 and OMU-02. This score is considered conservative given the detail and intensity of the management actions set out in the OMP. The score is supported by the design and management of the offset within a contiguous landscape with good connectivity of Koala and Grey-headed Flying-fox habitat to the broader landscape. Operational management units (OMUs) have been determined in order to identify management actions suitable to different areas and existing habitat qualities within the overall offset. All OMUs are managed in a way that will achieve a habitat score of 9 to 7 for the Koala and 7 to 9 for the Grey-headed Flying-fox. Risks associated with the offset delivery will be mitigated and managed by way of detailed management actions set out in the OMP. Management responses set out in the OMP are clearly framed against stated outcomes being to protect and conserve large, connected areas of Koala and Grey-headed Flying-fox habitat able to support improving populations that are genetically diverse and free or with very low incidence of disease. The 70% score for OMU-03 was given to allow for unforeseen risks primarily relating to natural events such as flood, drought, severe storms etc. Annual monitoring for compliance will occur as part of the agreement with Mirvac. Any non-compliances or risks to the offset will be identified and corrected that this time, if not prior to.	Sections 5 to 7 - OMU management actions. Section 6 – Management Framework Appendix C – Tabulated Management Schedule.

Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	Securing the offset under Voluntary Declaration provides a process to protect areas of native vegetation, not otherwise protected under the *Vegetation Management Act 1999*, from clearing. A Voluntary Declaration is used to protect areas of high nature conservation values or areas vulnerable to land degradation. As part of the Voluntary Declaration, vegetation management on the land is required to ensure loss of habitat values does not occur through intensification of weeds causing loss of connectivity, destruction of habitat via hot intensive fires, increased risk of mortality or injury by dog attack etc.). Once a declaration is made, it is registered on title and is binding on all current and future owners of the land until the intent and outcomes of the management plan have been achieved. The offset will be legally secured for the duration of the impact by an enduring security mechanism (such as a Nature Refuge under the *Nature Conservation Act 1992*). The offset has been designed to achieve substantial conservation gain over a large area to provide viable habitat for the Koala and Grey-headed Flying-fox. In order to deliver this effectively, operational management units (OMUs) have been determined in order to identify management actions suitable to different areas and existing habitat qualities within the overall offset. These are aimed at providing consistent habitat outcomes across the whole of the offset area. Management actions will commence once the VDec is in place. In relation to each OMU, the offset will provide a substantial and additional conservation gain which is additional to what is currently required. This is based on the following: ▪ **OMU-01 (Category B):** these are areas classified as 'Category B' under the *Vegetation Management Act 1999*. Vegetation which has been mapped as 'Category B' is not fully protected under a State code as there is a process which, if followed, could result in 'Category B' areas being cleared. Further, clearing is not the only threat. The OMP also considered management actions for other threatening processes which result in a risk of loss for Koala and Grey-headed Flying-fox habitat without the offset. ▪ **OMU-02 (Category C):** These are areas classified as 'Category C' under the *Vegetation Management Act 1999*. Vegetation which has been mapped as 'Category C' is not fully protected under a State code as there is a process which, if followed, could result in 'Category C' areas being cleared. Further, clearing is not the only threat. The OMP also considered management actions for other threatening processes in the context of risk of loss of Koala and Grey-headed Flying-fox habitat without the offset.	Section 3 – Implementation Objectives. Section 4.2 – Suitability as an offset. Section 6 Management Framework.

	▪ **OMU-03 (Category X):** These areas are classified as 'Category X' meaning there are no clearing controls under the *Vegetation Management Act 1999*; clearing of this area requires no permit to clear the regrowth.	
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	▪ **Efficient and Effective:** Design of a large, connected offset area and the OMP (particularly use of OMUs) will ensure efficient delivery of management actions over a large area. Proactive management and monitoring will ensure response actions are timely and focused. ▪ **Timely:** The mix of vegetation qualities and the scale of the offset provides for management to yield conservation gain in as short as possible time. Adaptive management processes will ensure that management actions are able to be adjusted to account for improvements in technologies, processes, academic understanding etc. ▪ **Transparent:** A clear monitoring and reporting framework has been established as part of the OMP). This provides for regular reporting to the DEE. ▪ **Scientifically Robust:** The proposed external offset area has been assessed by numerous suitably qualified individuals, management and monitoring actions will be conducted in collaboration with these and other groups to achieve enduring long-term outcomes that are beneficial for the local Koala and Grey-headed Flying-fox population. As part of QTFN's monitoring and reporting on the outcomes of the offset, they will feed into ongoing scientific research into the impact and effectiveness of a range of Koala and Grey-headed Flying-fox recover actions. ▪ **Reasonable:** The offset is reasonable being equivalent to the significant residual impact on Koala habitat. The offset design has been based upon achieving conservation outcomes for the Little Liverpool Range. The proposed offsite offset will provide greater connectivity within the Little Liverpool Range and enhance food and habitat necessary to support Koala and Grey-headed Flying-fox populations.	Section 9 Offset Area Reporting.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The OMP contains a detailed monitoring and reporting framework. The reporting framework sets out stated outcomes and associated performance indicators. These provide clear benchmarks as to the success or failure of actions. Response actions are also set out and these will also be reported. Contractual requirements between the proponent and the Queensland Trust for Nature (which will manage the offset) will account for compliance with the approval conditions. QTFN is a not for profit organisation and its strategic purpose is permanent conservation and	Section 9 Offset Area Reporting

	protection of strategic wildlife corridors. Critical to demonstrating that QTFN are aligning with this strategic goal is showing that QTFN are delivering offset areas in a way that achieves conservation gain. As part of the reporting, QTFN will provide information to the DEE that will transparently demonstrate compliance with the offset approval conditions and the progress towards successful delivery of the stated offset outcomes and habitat quality improvements.	

11. Appendices

Appendix A

Habitat Quality Data

Appendix B

Site Context GIS Data

Appendix C

QTFN Offset Management Plan

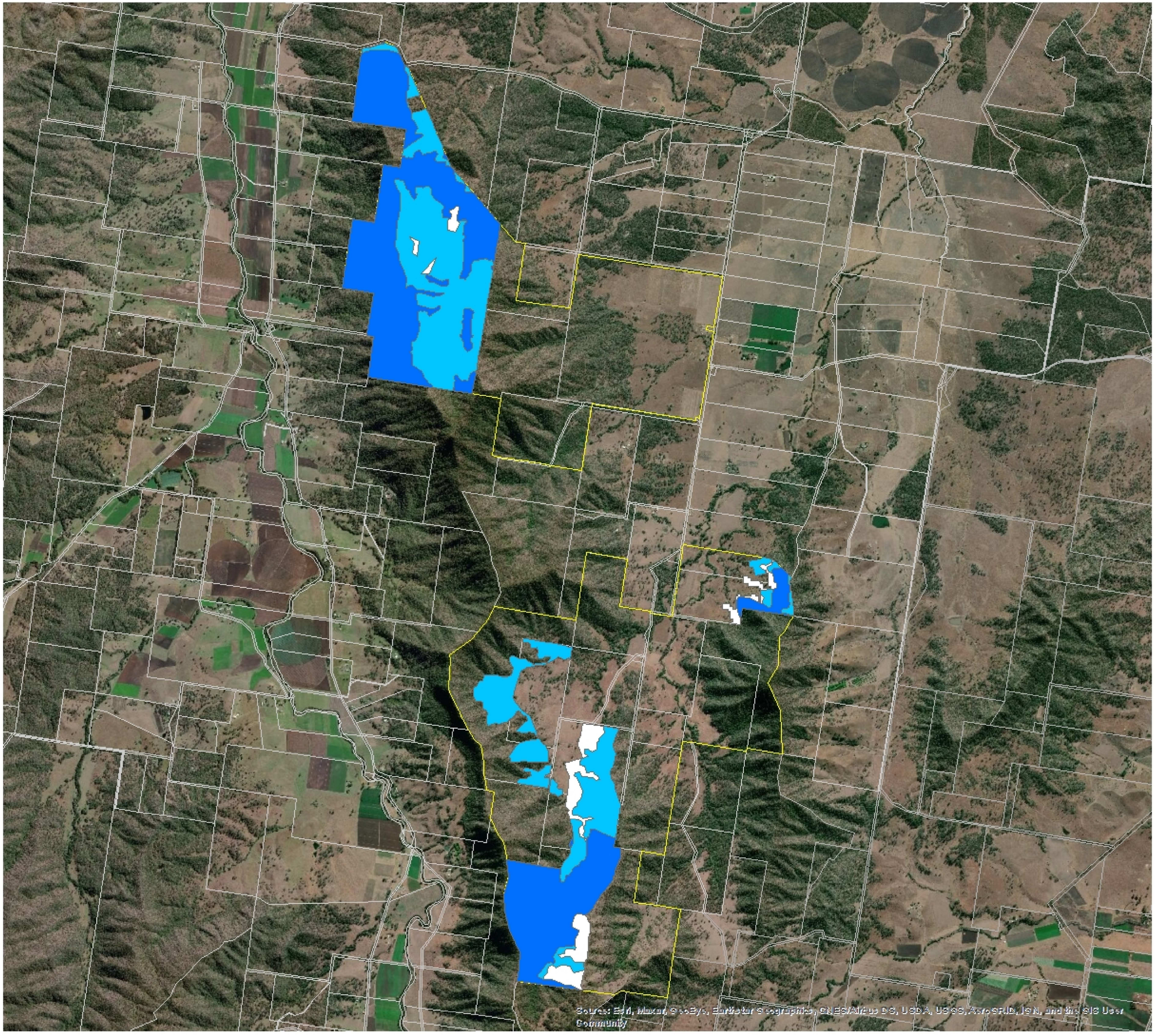
Appendix D

EPBC Calculator Sheets

Appendix A

Habitat Quality Data

Offset Management Units



Mirvac offset OMUs

1 cm = 400 meters

0 0.5 1 2

Kilometers

N

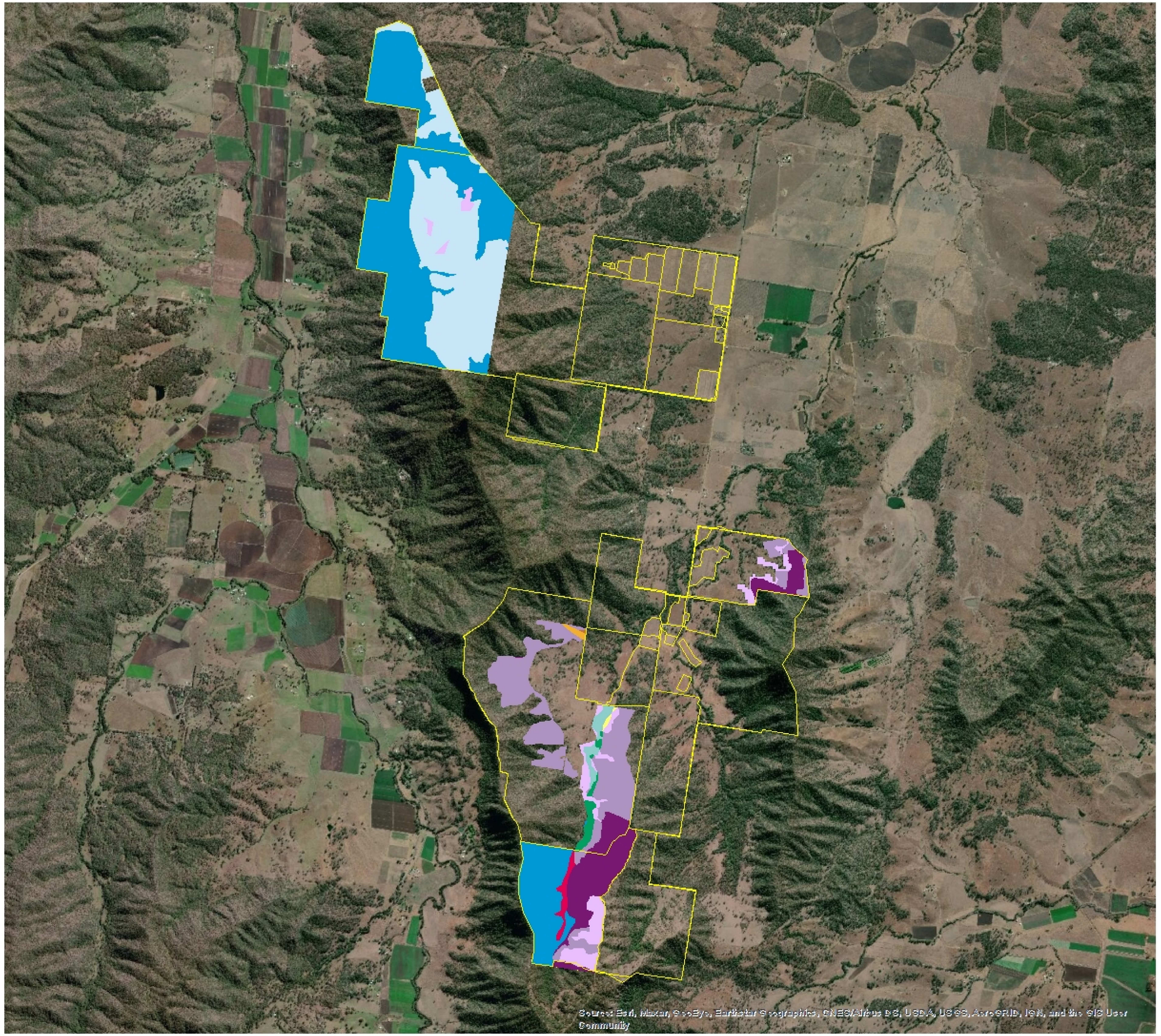
Legend

RVM_CAT

- OMU-1
- OMU-2
- OMU-3
- Arcona Boundary
- Cadastral_data_QLD_CADASTRE_DCDB

Author: QTFN
Date: 14/9/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Habitat Quality Assessment Units



QTFN

Mirvac offset Assessment Units

1 cm = 400 meters

0 0.5 1 2

Kilometers

N

Legend

Fence

AU

- AU01
- AU02
- AU03
- AU04
- AU05
- AU06
- AU07
- AU08
- AU09
- AU11
- AU12
- Aroona Boundary

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

MHQA Working Sheets

OFFSET - KOALA (YEAR 0 BASELINE)

SITE CONDITION

Habitat Transect Data Assessment

			OMU-01 (Category B - Remnant)							OMU-02 (Category C - Regrowth)												OMU-03 (Category X - Cleared)		
			AU02			AU03	AU05			AU01			AU04				AU06	AU07			AU08	AU09	AU11	AU12
			RE12.8.9			12.8.16	RE12.8.17			RE12.9-10.7			RE12.8.16				RE12.8.17	RE12.3.3			RE12.3.7	RE12.3.7 (cleared)	RE12.3.3 (cleared)	RE12.8.17 (cleared)
		Max score	BC02	BC07	Average	BC03	BC05	BC08	Average	BC01	BC14	Average	BC04	BC11	BC13	Average	BC06	BC09	BC12	Average	BC10	N/A (cleared)	N/A (cleared)	N/A (cleared)
					AU02	AU03			AU05			AU01				AU04	AU06			AU07	AU08	AU09	AU11	AU12
Recruitment of woody perennial species in EDL	Transect data		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	75%	0%	0%	0%	0%
	RE Benchmark				100%	100%			100%			100%				100%	100%			100%	100%	100%	100%	100%
	% of Benchmark				100%	100%			100%			100%				100%	100%			75%	0%	0%	0%	0%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			3	0	0	0	0
Native plant species richness - trees	Transect data		3	15	9	11	6	9	8	5	5	5	6	10	6	7	4	12	7	10	15	0	0	0
	RE Benchmark				10	7			7			3				7	7			5	10	10	5	7
	% of Benchmark				90%	157%			114%			167%				100%	57%			200%	150%	0%	0%	0%
	Habitat Quality Assessment Score	5			5	5			5			5				5	2.5			5	5	0	0	0
Native plant species richness - shrubs	Transect data		6	5	6	0	0	0	0	1	0	1	1	3	2	2	2	0	0	0	2	0	0	0
	RE Benchmark				12	7			5			5				7	5			4	10	10	4	5
	% of Benchmark				50%	0%			0%			20%				29%	40%			0%	20%	0%	0%	0%
	Habitat Quality Assessment Score	5			2.5	0			0			0				2.5	2.5			0	0	0	0	0
Native plant species richness - grasses	Transect data		3	3	3	8	6	9	8	13	6	10	7	6	13	9	7	9	9	9	3	0	0	0
	RE Benchmark				3	7			12			8				7	12			11	7	7	11	12
	% of Benchmark				100%	114%			67%			125%				129%	58%			82%	43%	0%	0%	0%
	Habitat Quality Assessment Score	5			5	5			2.5			5				5	2.5			2.5	2.5	0	0	0
Native plant species richness - forbs	Transect data		9	12	11	12	9	13	11	26	14	20	8	16	24	16	7	13	14	14	25	0	0	0
	RE Benchmark				30	29			27			26				29	27			24	30	30	24	27
	% of Benchmark				37%	41%			41%			77%				55%	26%			58%	83%	0%	0%	0%
	Habitat Quality Assessment Score	5			2.5	2.5			2.5			2.5				2.5	2.5			2.5	2.5	0	0	0
Tree emergent canopy height (m)	Transect data		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	RE Benchmark				na	na			na			na				na	na			na	na	na	na	na
	% of Benchmark				na	na			na			na				na	na			na	na	na	na	na
	Habitat Quality Assessment Score	5			na	na			na			na				na	na			na	na	na	na	na
Tree EDL canopy height (m)	Transect data		20	20	20	20	14	15	14.5	15	13	14	12	14	13	13	13	20	20	20	22	0	0	0
	RE Benchmark				27	20			19			21				20	19			27	16	16	27	19
	% of Benchmark				74%	100%			76%			67%				65%	68%			74%	138%	0%	0%	0%
	Habitat Quality Assessment Score	5			5	5			5			3				3	3			5	5	0	0	0
Tree sub-canopy canopy height (m)	Transect data		12	6	9	8	6	6	6	7	0	3.5	5	4	9	6	6	6	0	3	10	0	0	0
	RE Benchmark				14	8			10			10				8	10			12	11	11	12	10
	% of Benchmark				64%	100%			60%			35%				75%	60%			25%	91%	0%	0%	0%
	Habitat Quality Assessment Score	5			3	5			3			3				5	3			3	5	0	0	0
Tree canopy height (score)	Habitat Quality Assessment Score				4	5			4			3				4	3			4	5	0	0	0
Tree emergent canopy cover (%)	Transect data		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	RE Benchmark				na	na			na			na				na	na			na	na	na	na	na
	% of Benchmark				na	na			na			na				na	na			na	na	na	na	na
	Habitat Quality Assessment Score	5			na	na			na			na				na	na			na	na	na	na	na
Tree EDL canopy cover (%)	Transect data		77	100	88.5	62.6	65.4	65.6	65.5	46.4	45.6	46	48	49.5	36.8	45	27.7	57.2	57.4	57.3	56	0	0	0
	RE Benchmark				73	41			48			40				41	48			53	30	30	53	48
	% of Benchmark				121%	153%			136%			115%				109%	58%			108%	187%	0%	0%	0%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	0	0	0
Tree sub-canopy cover (%)	Transect data		45.6	13.6	29.6	25.2	12.2	15.3	13.75	0	0	0	5.6	18.7	31.1	18	0.7	16.4	0	8.2	55.9	0	0	0
	RE Benchmark				23	17			20			8				17	20			9	30	30	9	20
	% of Benchmark				129%	148%			69%			0%				109%	4%			91%	186%	0%	0%	0%
	Habitat Quality Assessment Score	5			5	5			5			0				5	0			5	5	0	0	0
Tree canopy cover (score)	Habitat Quality Assessment Score				5	5			5			2.5				5	2.5			5	5	0	0	0
Shrub canopy cover (%)	Transect data		24.4	17.5	20.95	10.3	1.3	3.1	2.2	9.8	2.8	6.3	0.3	1.1	1.2	1	2.3	0.2	0	0.1	1.2	0	0	0
	RE Benchmark				14	4			5			3				4	5			1	18	18	1	5
	% of Benchmark				150%	258%			44%			210%				22%	46%			10%	7%	0%	0%	0%
	Habitat Quality Assessment Score	5			5	3			3			3				3	3			3	0	0	0	0
Native perennial grass cover (%)	Transect data		2	1.4	1.7	14.6	44.4	41	42.7	28	40.8	34	66.4	47	68	60	28.2	37.2	46.4	41.8	2.6	0	0	0
	RE Benchmark				7	45			32			61				45	32			47	1	1	47	32
	% of Benchmark				24%	32%			133%			56%				134%	88%			89%	260%	0%	0%	0%
	Habitat Quality Assessment Score	5			1	1			5			3				5	3			3	5	0	0	0
Organic litter	Transect data		34.2	56.6	45.4	33.8	18.6	40.4	29.5	33.6	24.8	29	16.2	26	15.4	19	24.6	25.6	25.2	25.4	21.4	0	0	0
	RE Benchmark				51	21			21			20				21	21			34	54	54	34	21
	% of Benchmark				89%	161%			140%			146%				91%	117%			75%	40%	0%	0%	0%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	3	0	0	0
Large trees	Transect data		40	8	24	40	30	26	28	10	8	9	2	6	2	3	0	18	10	14	54	0	0	0
	RE Benchmark				51	34			24			18				34	24			24	221	221	24	24
	% of Benchmark				47%	118%			117%			50%				9%	0%			58%	24%	0%	0%	0%
	Habitat Quality Assessment Score	15			5	15			15			5				5	0			10	5	0	0	0
Coarse woody debris	Transect data		217	63	140	312.9	115.7	307	211.35	38	112	75	159.3	179	79	139	28	226	218	222	0	0	0	0
	RE Benchmark				706	592			234			272				592	234			445	667	667	445	234
	% of Benchmark				20%	53%			90%			28%				23%	12%			49.9%	0%	0%	0%	0%
	Habitat Quality Assessment Score	5			2	5			5			2				2	2			2	0	0	0	0
Non-native plant cover (%)	Transect data		40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
	RE Benchmark				N/A	N/A			N/A			N/A				N/A	N/A			N/A	N/A	N/A	N/A	N/A
	% of Benchmark				N/A	N/A			N/A			N/A				N/A	N/A			N/A	N/A	N/A	N/A	N/A
	Habitat Quality Assessment Score	10			3	3			3			3				3	3			3	3	3	3	3
Total		**80**			**50.00**	**59.50**			**60.00**			**44.00**				**52.00**	**36.50**			**48.00**	**36.00**	**3.00**	**3.00**	**3.00**

Benchmark	<	20%	20%	to	75%	>	75%
Score	0		3			5	

Benchmark	<	25%	25%	to	90%	>=	90%
Score	0		2.5			5	

Benchmark	<	25%	25%	to	90%	>=	90%
Score	0		2.5			5	

Benchmark	<	25%	25%	to	90%	>=	90%
Score	0		2.5			5	

Benchmark	<	25%	25%	to	90%	>=	90%
Score	0		2.5			5	

Benchmark	<	25%	25%	to	70%	>	70%
Score	0		3			5	

Benchmark	<	25%	25%	to	70%	>	70%
Score	0		3			5	

Benchmark	<	25%	25%	to	70%	>	70%
Score	0		3			5	

Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%
Score	0		2			3		5		

Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%
Score	0		2			3		5		

Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%
Score	0		2			3		5		

Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%
Score	0		3			3		5		

Benchmark	<	10%	10%	to	50%	50%	to	90%	>	90%
Score	0		1			3			5	

Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%
Score	0		3			3		5		

Benchmark	0%	>	0%	to	50%	>	50%	to	100%	>	100%
Score	0		5			10				15	

Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%
Score	0		2			2		5		

% weed cover	>	50%	>	25%	to	50%	>	5%	to	25%	<=	5%
Score	0		3				5				10	

Species Habitat Index Data Site Condition

		Max score	AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12
Quality and availability of food and foraging habitat	Habitat transect data (% of max. score)		63%	74%	75%	55%	65%	46%	60%	45%	4%	4%	4%
	Score	10	5	10	10	5	5	5	5	5	1	1	1
Quality and availability of shelter	Habitat transect data (% of max. score)		63%	74%	75%	55%	65%	46%	60%	45%	4%	4%	4%
	Score	10	5	10	10	5	5	5	5	5	1	1	1
Total		**20**	**10**	**20**	**20**	**10**	**10**	**10**	**10**	**10**	**2**	**2**	**2**
SITE CONDITION TOTAL		**100**	**60**	**79.5**	**80**	**54.0**	**62.0**	**46.5**	**58.0**	**46.0**	**5**	**5**	**5**
MHQA Weighted Score (30%)		**3**	**1.80**	**2.39**	**2.40**	**1.62**	**1.86**	**1.40**	**1.74**	**1.38**	**0.15**	**0.15**	**0.15**

Benchmark	<	33%	33%	to	67%	>	67%
Score	1		5			10	
Benchmark	<	33%	33%	to	67%	>	67%
Score	1		5			10	

SITE CONTEXT

Site Context - GIS Data

		Max score	OMU-01	OMU-02	OMU-03
Size of the patch (ha)	GIS data		>200	>200	>200
	Score	10	10	10	10
Connectedness (%)	GIS data		74.8%	74.8%	74.8%
	Score	5	4	4	4
Context (% remnant)	GIS data		71.6%	71.6%	71.6%
	Score	5	4	4	4
Ecological corridors	GIS data		Within (whole or part)	Within (whole or part)	Within (whole or part)
	Score	6	6	6	6
Total		**26**	**24**	**24**	**24**

Benchmark	<	5	5	to	25	>	25	to	100	>	100	to	200	>	200	>200
Score	0		2			5				7				10		10
Benchmark	0%	to	10%	>	10%	to	<	50%	50%	to	75%	>	75%	>	500	ha
Score	0			2					4			5		(not used)		
Benchmark	<	10%	10%	to	30%	>	30%	to	75%	>	75%					
Score	0		2			4				5						
Benchmark	Not within	Sharing a common boundary				Within (whole or part)										
Score	0	4				6										

Site Context - Species Habitat Index Data

		Max score	OMU-01	OMU-02	OMU-03
Role of site location to species overall population in the State	Value		Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival
	Score	5	4	4	4
Threats to species	Value		Moderate threat level	Moderate threat level	High threat level
	Score	15	7	7	1
Species mobility capacity	Value		Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Severely restricted (76-100% reduction)
	Score	10	7	7	1
Total		**30**	**18**	**18**	**6**
SITE CONTEXT TOTAL		**56**	**42**	**42**	**30**
MHQA Weighted Score (30%)		**3**	**2.25**	**2.25**	**1.61**

Benchmark	Not or unlikely to be critical to species' survival	Likely to be critical to species survival	Critical to species survival	
Score	1	4	5	
Benchmark	High threat level	Moderate threat level	Low threat level (i.e. likely to survive)	
Score	1	7	15	
Benchmark	Severely restricted (76-100% reduction)	Highly restricted (51-75% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)
Score	1	4	7	10

SPECIES STOCKING RATE

		Max score	OMU-01	OMU-02	OMU-03
Presence detected on or adjacent to site (neighbouring property with connected habitat)	Value		Yes - on site	Yes - on site	Yes - adjacent
	Score	10	10	10	5
Species usage of the site (habitat type and evidenced usage)	Value		Breeding	Breeding	Not habitat
	Score	15	15	15	0
Approximate density (per ha)	Value		Low	Low	0
	Score	30	10	10	0
Role/importance of species population on site (score from supplementary table below)	Value		30	30	0
	Score	15	10	10	0
Total		**70**	**45**	**45**	**5**
MHQA Weighted Score (40%)		**4**	**2.57**	**2.57**	**0.29**

Benchmark	No		Yes - adjacent		Yes - on site			
Score	0		5		10			
Benchmark	Not habitat		Dispersal	Foraging	Breeding			
Score	0		5	10	15			
Benchmark	0	Low	Med	High				
Score	0	10	20	30				
Benchmark	0	5	to	15	20	to	35	40 to 45
Score	0	5			10			15

Species Stocking Rate - Supplementary Table

		Max score	OMU-01	OMU-02	OMU-03
Key source population for breeding	Value		Possibly	Possibly	No
	Score	10	10	10	0
Key source population for dispersal	Value		Possibly	Possibly	No
	Score	5	5	5	0
Necessary for maintaining genetic diversity	Value		Possibly	Possibly	No
	Score	15	15	15	0
Near the limit of the species range	Value		No	No	No
	Score	15	0	0	0
Total		**45**	**30**	**30**	**0**

Benchmark	No	Yes	Possibly
Score	0	10	10
Benchmark	No	Yes	Possibly
Score	0	5	5
Benchmark	No	Yes	Possibly
Score	0	15	15
Benchmark	No	Yes	
Score	0	15	

MHQA SUMMARY

		AU02	AU03	AU05	AU01	AU04	AU06	AU07	AU08	AU09	AU11	AU12
Site Condition	**3**	**1.80**	**2.39**	**2.40**	**1.62**	**1.86**	**1.40**	**1.74**	**1.38**	**0.15**	**0.15**	**0.15**
Site Context	**3**	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**	**1.61**	**1.61**	**1.61**
Species Stocking Rate	**4**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**0.29**	**0.29**	**0.29**
TOTAL - Assessment Unit Habitat Assessment Scores	**10**	**6.62**	**7.21**	**7.22**	**6.44**	**6.68**	**6.22**	**6.56**	**6.20**	**2.04**	**2.04**	**2.04**
Assessment Unit Areas		**6.95**	**289.18**	**63.48**	**0.29**	**168.16**	**104.89**	**1.38**	**6.7**	**6.72**	**0.88**	**37.81**
OMU Area (total of Aus)			**359.61**				**281.42**				**45.41**	
Assessment Unit Weighting	**1**	**0.02**	**0.80**	**0.18**	**0.00**	**0.60**	**0.37**	**0.00**	**0.02**	**0.15**	**0.02**	**0.83**
Assessment Unit Weighted Scores	**NA**	**0.13**	**5.80**	**1.27**	**0.01**	**3.99**	**2.32**	**0.03**	**0.15**	**0.30**	**0.04**	**1.70**
OMU Site Modified Habitat Quality Score	**10**		**7.198**				**6.496**				**2.043**	
TOTAL - ROUNDED TO NEAREST WHOLE NUMBER	**10**		**7**				**6**				**2**	

OFFSET - KOALA (YEAR 20 MHQA)

SITE CONDITION

Habitat Transect Data Assessment

			OMU-01 (Category B - Remnant)							OMU-02 (Category C - Regrowth)												OMU-03 (Category X - Cleared)		
			AU02		AU03	AU05				AU01			AU04				AU06	AU07			AU08	AU09	AU11	AU12
			RE12.8.9		12.8.16	RE12.8.17				RE12.9-10.7			RE12.8.16				RE12.8.17	RE12.3.3			RE12.3.7	RE12.3.7 (cleared)	RE12.3.3 (cleared)	RE12.8.17 (cleared)
		Max score	BC02	BC07	Average	BC03	BC05	BC08	Average	BC01	BC14	Average	BC04	BC11	BC13	Average	BC06	BC09	BC12	Average	BC10	N/A (cleared)	N/A (cleared)	N/A (cleared)
					AU02	AU03			AU05			AU01				AU04	AU06			AU07	AU08	AU09	AU11	AU12
Recruitment of woody perennial species in EDL	Transect data		76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	RE Benchmark				100%	100%			100%			100%				100%	100%			100%	100%	100%	100%	100%
	% of Benchmark				76%	76%			76%			76%				76%	76%			76%	76%	76%	76%	76%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	5	5	5
Native plant species richness - trees	Transect data		9	9	9	7	7	7	7	3	3	3	7	7	7	7	7	5	5	5	9	9	5	7
	RE Benchmark				10	7			7			3				7	7			5	10	10	5	7
	% of Benchmark				90%	100%			100%			100%				100%	100%			100%	90%	90%	100%	100%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	5	5	5
Native plant species richness - shrubs	Transect data		3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	3	3	1	2
	RE Benchmark				12	7			5			5				7	5			4	10	10	4	5
	% of Benchmark				25%	29%			40%			40%				29%	40%			25%	30%	30%	25%	40%
	Habitat Quality Assessment Score	5			2.5	2.5			2.5			2.5				2.5	2.5			2.5	2.5	2.5	2.5	2.5
Native plant species richness - grasses	Transect data		3	3	3	7	11	11	11	8	8	8	7	7	7	7	11	10	10	10	7	2	3	3
	RE Benchmark				3	7			12			8				7	12			11	7	7	11	12
	% of Benchmark				100%	100%			92%			100%				100%	92%			91%	100%	29%	27%	25%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	2.5	2.5	2.5
Native plant species richness - forbs	Transect data		27	27	27	27	25	25	25	24	24	24	27	27	27	27	25	22	22	22	27	8	6	7
	RE Benchmark				30	29			27			26				29	27			24	30	30	24	27
	% of Benchmark				90%	93%			93%			92%				93%	93%			92%	90%	27%	25%	26%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	2.5	2.5	2.5
Tree emergent canopy height (m)	Transect data		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	RE Benchmark				na	na			na			na				na	na			na	na	na	na	na
	% of Benchmark				na	na			na			na				na	na			na	na	na	na	na
	Habitat Quality Assessment Score	5			na	na			na			na				na	na			na	na	na	na	na
Tree EDL canopy height (m)	Transect data		19	19	19	15	14	14	14	15	15	15	15	15	15	15	14	20	20	20	12	4	7	5
	RE Benchmark				27	20			19			21				20	19			27	16	16	27	19
	% of Benchmark				70%	75%			74%			71%				75%	74%			74%	75%	25%	26%	26%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	3	3	3
Tree sub-canopy canopy height (m)	Transect data		10	10	10	6	8	8	8	8	8	8	6	6	6	6	8	9	9	9	8	3	3	3
	RE Benchmark				14	8			10			10				8	10			12	11	11	12	10
	% of Benchmark				71%	75%			80%			80%				75%	80%			75%	73%	27%	25%	30%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	3	3	3
Tree canopy height (score)	Habitat Quality Assessment Score				5	5			5			5				5	5			5	5	3	3	3
Tree emergent canopy cover (%)	Transect data		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	RE Benchmark				na	na			na			na				na	na			na	na	na	na	na
	% of Benchmark				na	na			na			na				na	na			na	na	na	na	na
	Habitat Quality Assessment Score	5			na	na			na			na				na	na			na	na	na	na	na
Tree EDL canopy cover (%)	Transect data		37	37	37	21	24.1	24.1	24.1	21	21	21	21	21	21	21	24.1	26.6	26.6	26.6	15.1	3	5.3	4.8
	RE Benchmark				73	41			48			40				41	48			53	30	30	53	48
	% of Benchmark				51%	51%			50%			53%				51%	50%			50%	50%	10%	10%	10%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	2	2	2
Tree sub-canopy cover (%)	Transect data		12	12	12	9	10.1	10.1	10.1	5	5	5	9	9	9	9	10.1	4.6	4.6	4.6	15.1	3	0.9	2
	RE Benchmark				23	17			20			8				17	20			9	30	30	9	20
	% of Benchmark				52%	53%			51%			63%				53%	51%			51%	50%	10%	10%	10%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	2	2	2
Tree canopy cover (score)	Habitat Quality Assessment Score				5	5			5			5				5	5			5	5	2	2	2
Shrub canopy cover (%)	Transect data		8	8	8	2.1	2.6	2.6	2.6	1.6	1.6	2	2.1	2.1	2.1	2	2.6	0.51	0.51	0.51	9.1	9.1	0.51	2.51
	RE Benchmark				14	4			5			3				4	5			1	18	18	1	5
	% of Benchmark				57%	53%			52%			53%				53%	52%			51%	51%	51%	51%	50%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	5	5	5
Native perennial grass cover (%)	Transect data		7	7	7	41	29	29	29	55	55	55	41	41	41	41	29	43	43	43	0.91	0.51	24	16.1
	RE Benchmark				7	45			32			61				45	32			47	1	1	47	32
	% of Benchmark				100%	91%			91%			90%				91%	91%			91%	91%	51%	51%	50%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	3	3	3
Organic litter	Transect data		26	26	26	11	10.6	10.6	10.6	11	11	11	10.6	10.6	10.6	11	10.6	17.1	17.1	17.1	27.1	27.1	17.1	10.6
	RE Benchmark				51	21			21			20				21	21			34	54	54	34	21
	% of Benchmark				51%	52%			50%			55%				50%	50%			50%	50%	50%	50%	50%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	5	5	5
Large trees	Transect data		52	52	52	35	25	25	25	10	10	10	18	18	18	18	13	25	25	25	111	1	1	1
	RE Benchmark				51	34			24			18				34	24			24	221	221	24	24
	% of Benchmark				102%	103%			104%			56%				53%	54%			104%	50%	0%	4%	4%
	Habitat Quality Assessment Score	15			15	15			15			10				10	10			15	10	5	5	5
Coarse woody debris	Transect data		354	354	354	297	118	118	118	137	137	137	297	297	297	297	118	223	223	223	334	334	223	118
	RE Benchmark				706	592			234			272				592	234			445	667	667	445	234
	% of Benchmark				50%	50%			50%			50%				50%	50%			50.1%	50%	50%	50%	50%
	Habitat Quality Assessment Score	5			5	5			5			5				5	5			5	5	5	5	5
Non-native plant cover (%)	Transect data		4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%
	RE Benchmark				N/A	N/A			N/A			N/A				N/A	N/A			N/A	N/A	N/A	N/A	N/A
	% of Benchmark				N/A	N/A			N/A			N/A				N/A	N/A			N/A	N/A	N/A	N/A	N/A
	Habitat Quality Assessment Score	10			10	10			10			10				10	10			10	10	10	10	10
Total		**80**		**77.50**		**77.50**		**77.50**			**72.50**			**72.50**			**72.50**		**77.50**			**72.50**	**55.50**	**55.50**	**55.50**

Recruitment of woody perennial species in EDL	Benchmark	<	20%	20%	to	75%	>	75%																
	Score	0				3		5																
Native plant species richness - trees	Benchmark	<	25%	25%	to	90%	>=	90%																
	Score	0				2.5		5																
Native plant species richness - shrubs	Benchmark	<	25%	25%	to	90%	>=	90%																
	Score	0				2.5		5																
Native plant species richness - grasses	Benchmark	<	25%	25%	to	90%	>=	90%																
	Score	0				2.5		5																
Native plant species richness - forbs	Benchmark	<	25%	25%	to	90%	>=	90%																
	Score	0				2.5		5																
Tree emergent canopy height (m)	Benchmark	<	25%	25%	to	70%	>	70%																
	Score	0				3		5																
Tree EDL canopy height (m)	Benchmark	<	25%	25%	to	70%	>	70%																
	Score	0				3		5																
Tree sub-canopy canopy height (m)	Benchmark	<	25%	25%	to	70%	>	70%																
	Score	0				3		5																
Tree emergent canopy cover (%)	Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%													
	Score	0				2		3			5													
Tree EDL canopy cover (%)	Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%													
	Score	0				2		3			5													
Tree sub-canopy cover (%)	Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%													
	Score	0				2		3			5													
Shrub canopy cover (%)	Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%													
	Score	0				3		5																
Native perennial grass cover (%)	Benchmark	<	10%	10%	to	50%	50%	to	90%	>	90%													
	Score	0				1		3			5													
Organic litter	Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%													
	Score	0				3		5																
Large trees	Benchmark	0%	>	0%	to	50%	>	50%	to	100%	>	100%												
	Score	0				5			10			15												
Coarse woody debris	Benchmark	<	10%	10%	to	50%	>	200%	50%	to	200%													
	Score	0				2		5																
Non-native plant cover (%)	% weed cover	>	50%	>	25%	to	50%	>	5%	to	25%	<=	5%											
	Score	0				3			5			10												

Species Habitat Index Data Site Condition

Quality and availability of food and foraging habitat	Habitat transect data (% of max. score)		97%		97%	97%			91%	91%		91%	97%		91%	69%		69%						
	Score	10	10		10	10			10	10		10	10		10	10		10						
Quality and availability of shelter	Habitat transect data (% of max. score)		97%		97%	97%			91%	91%		91%	97%		91%	69%		69%						
	Score	10	10		10	10			10	10		10	10		10	10		10						
Total		**20**	20		20	20			20	20		20	20		20	20		20						

Quality and availability of food and foraging habitat	Benchmark	<	33%	33%	to	67%	>	67%																
	Score	1				5		10																
Quality and availability of shelter	Benchmark	<	33%	33%	to	67%	>	67%																
	Score	1				5		10																

SITE CONDITION TOTAL		**100**	**97.5**		**97.5**	**97.5**			**92.5**	**92.5**		**92.5**	**97.5**		**92.5**	**75.5**		**75.5**						
MHQA Weighted Score (30%)		**3**	**2.93**		**2.93**	**2.93**			**2.78**	**2.78**		**2.78**	**2.93**		**2.78**	**2.27**		**2.27**						

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	GIS data		>200			>200										>200								
	Score	10	10			10										10								
Connectedness (%)	GIS data		75.1%			75.1%										75.1%								
	Score	5	5			5										5								
Context (% remnant)	GIS data		30.1%			30.1%										30.1%								
	Score	5	4			4										4								
Ecological corridors	GIS data		Within (whole or part)			Within (whole or part)										Within (whole or part)								
	Score	6	6			6										6								
Total		**26**	**25**			**25**										**25**								

Size of the patch (ha)	Benchmark	<	5	5	to	25	>	25	to	100	>	100	to	200	>	200	>200							
	Score	0		2			5			7			10			10							
Connectedness (%)	Benchmark	0%	to	10%	>	10%	to	<	50%	50%	to	75%	>	75%	>	500	ha							
	Score	0		2			5			4			5			(not used)							
Context (% remnant)	Benchmark	<	10%	10%	to	30%	>	30%	to	75%	>	75%												
	Score	0		2			4			5														
Ecological corridors	Benchmark	Not within		Sharing a common boundary				Within (whole or part)																
	Score	0		4				6																

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State	Value		Critical to species survival			Critical to species survival										Critical to species survival								
	Score	5	5			5										5								
Threats to species	Value		Low threat level (i.e. likely to survive)			Low threat level (i.e. likely to survive)										Low threat level (i.e. likely to survive)								
	Score	15	15			15										15								
Species mobility capacity	Value		Minor restriction (0-25% reduction)			Minor restriction (0-25% reduction)										Minor restriction (0-25% reduction)								
	Score	10	10			10										10								
Total		**30**	**30**			**30**										**30**								

Role of site location to species overall population in the State	Benchmark	Not or unlikely to be critical to species' survival				Likely to be critical to species survival				Critical to species survival														
	Score	1				4				5														
Threats to species	Benchmark	High threat level								Moderate threat level				Low threat level (i.e. likely to survive)										
	Score	1								7				15										
Species mobility capacity	Benchmark	Severely restricted (76-100% reduction)								Highly restricted (51-75% reduction)								Moderately restricted (26-50% reduction)				Minor restriction (0-25% reduction)		
	Score	1								4								7				10		

SITE CONTEXT TOTAL		**56**	**55**			**55**										**55**								
MHQA Weighted Score (30%)		**3**	**2.95**			**2.95**										**2.95**								

SPECIES STOCKING RATE

Presence detected on or adjacent to site (neighbouring property with connected habitat)	Value		Yes - on site			Yes - on site										Yes - on site								
	Score	10	10			10										10								
Species usage of the site (habitat type and evidenced usage)	Value		Breeding			Breeding										Foraging								
	Score	15	15			15										10								
Approximate density (per ha)	Value		Med			Med										Low								
	Score	30	20			20										10								
Role/importance of species population on site (score from supplementary table below)	Value		30			30										30								
	Score	15	10			10										10								
Total		**70**	**55**			**55**										**40**								
MHQA Weighted Score (40%)		**4**	**3.14**			**3.14**										**2.29**								

Presence detected on or adjacent to site (neighbouring property with connected habitat)	Benchmark	No			Yes - adjacent			Yes - on site																
	Score	0			5			10																
Species usage of the site (habitat type and evidenced usage)	Benchmark	Not habitat			Dispersal			Foraging			Breeding													
	Score	0			5			10			15													
Approximate density (per ha)	Benchmark	0	Low	Med	High																			
	Score	0	10	20	30																			
Role/importance of species population on site (score from supplementary table below)	Benchmark	0	5	to	15	20	to	35	40	to	45													
	Score	0		5			10			15														

Species Stocking Rate - Supplementary Table

Key source population for breeding	Value		Possibly			Possibly										Possibly								
	Score	10	10			10										10								
Key source population for dispersal	Value		Possibly			Possibly										Possibly								
	Score	5	5			5										5								
Necessary for maintaining genetic diversity	Value		Possibly			Possibly										Possibly								
	Score	15	15			15										15								
Near the limit of the species range	Value		No			No										No								
	Score	15	0			0										0								
Total		**45**	**30**			**30**										**30**								

Key source population for breeding	Benchmark	No	Yes	Possibly																				
	Score	0	10	10																				
Key source population for dispersal	Benchmark	No	Yes	Possibly																				
	Score	0	5	5																				
Necessary for maintaining genetic diversity	Benchmark	No	Yes	Possibly																				
	Score	0	15	15																				
Near the limit of the species range	Benchmark	No	Yes																					
	Score	0	15																					

MHQA SUMMARY

Site Condition		**3**	**2.93**		**2.93**	**2.93**			**2.78**			**2.78**	**2.93**		**2.78**	**2.27**		**2.27**						
Site Context		**3**	**2.95**		**2.95**	**2.95**			**2.95**			**2.95**	**2.95**		**2.95**	**2.95**		**2.95**						
Species Stocking Rate		**4**	**3.14**		**3.14**	**3.14**			**3.14**			**3.14**	**3.14**		**3.14**	**2.29**		**2.29**						
TOTAL - Assessment Unit Habitat Assessment Scores		**10**	**9.01**		**9.01**	**9.01**			**8.86**			**8.86**	**9.01**		**8.86**	**7.50**		**7.50**						
Assessment Unit Areas			**6.95**		**289.18**	**63.48**			**0.29**			**168.16**			**104.89**	**1.38**		**6.72**		**0.88**	**37.81**			
(OMU Area (total of Au))					**359.61**								**281.42**							**45.41**				
Assessment Unit Weighting		**1**	**0.02**		**0.80**	**0.18**			**0.00**			**0.60**			**0.37**	**0.00**		**0.02**		**0.15**	**0.02**	**0.83**		
Assessment Unit Weighted Scores		**NA**	**0.17**		**7.25**	**1.59**			**0.01**			**5.30**			**3.30**	**0.04**		**0.21**		**1.11**	**0.15**	**6.24**		
OMU Site Modified Habitat Quality Score		**10**			**9.014**								**8.865**								**7.497**			
TOTAL - ROUNDED TO NEAREST WHOLE NUMBER		**10**			**9**								**9**								**7**			

OFFSET - GHFF (YEAR 0 BASELINE)

SITE CONDITION

Site Condition - Habitat Transect Data Assessment

			OMU-01 (Category B - Remnant)							OMU-02 (Category C - Regrowth)											OMU-03 (Category X - Cleared)		
			AU02			AU03	AU05			AU01			AU04				AU06	AU07			AU08	AU09	AU11	AU12
			RE12.8.9			RE 12.8.16	RE12.8.17			RE12.9-10.7			RE12.8.16				RE12.8.17	RE12.3.3			RE12.3.7	RE12.3.7 (cleared)	RE12.3.3 (cleared)	RE12.8.17 (cleared)
		Max score	BC02	BC07	Average AU02	BC03 AU03	BC05	BC08	Average AU05	BC01	BC14	Average AU01	BC04	BC11	BC13	Average AU04	BC06 AU06	BC09	BC12	Average AU07	BC10 AU08	N/A (cleared) AU09	N/A (cleared) AU11	N/A (cleared) AU12
Vegetation Condition	Value		Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category X / non-remnant	Category X / non-remnant	Category X / non-remnant
	Score	20			20	20			20			10				10	10			10	10	5	5	5
Species richness - canopy trees	Transect data		5	5	5	7	6	6	6	4	4	4	7	7	7	7	6	5	5	5	5	0	0	0
	Score	20			10	20			10			10				20	10			10	10	0	0	0
Flower scores (average)	Transect data		0.624	0.624	0.624	0.59571	0.666	0.666	0.666	0.6125	0.6125	0.6125	0.59571	0.59571	0.59571	0.59571	0.666	0.586	0.586	0.586	0.584	0	0	0
	Score	10			8	8			8			8				8	8			8	8	0	0	0
Timing of biological shortages	Food shortages	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0	0	0
	Pregnancy and birthing	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	0	0
	Lactation	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	0	0
	Mating and conception	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	0	0
	Migration paths	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	0	0
	Fruit industries	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	0	0
	Total Score (sum of above)	10			10	10			10			10				10	10			10	10	0	0	0
Quality of foraging habitat (trees >0.65 wt p*r)	Transect data		2	2	2	3	3	3	3	2	2	2	3	3	3	3	3	2	2	2	2	0	0	0
	Habitat Quality Assessment Score	20			5	5			5			5				5	5			5	5	0	0	0
Non-native plant cover (%)	Transect data		40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
	Score	20			5	5			5			5				5	5			5	5	5	5	5
Total		**100**			**100**	**68**			**58**			**48**				**58**	**48**			**48**	**48**	**10**	**10**	**10**
SITE CONDITION TOTAL		**100**			**58**	**68**			**58**			**48.0**				**58.0**	**48.0**			**48.0**	**48.0**	**10**	**10**	**10**
MHQA Weighted Score (40%)		**4**			**2.32**	**2.72**			**2.32**			**1.92**				**2.32**	**1.92**			**1.92**	**1.92**	**0.40**	**0.40**	**0.40**

Benchmark	Category X / non-remnant			Category C / regrowth			Category B / remnant
Score	5			10			20

Benchmark	0	1	to	3	4	to	6	>	6
Score	0		5			10		20	

Benchmark	0	0.01	to	0.25	0.26	to	0.50	0.51	to	0.75	0.76	to	1.00
Score	0		2			5			8			10	

Benchmark	0	1	to	3	4	to	6	>	6
Score	0		5			10		20	

Benchmark	>	50%	>	25%	to	50%	5%	to	25%	<	5%
Score	1		5			10			20		

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	GIS data		>200							>200											>200		
	Score	10	10							10											10		
Connectedness (active GHFF camps within 30km radius)	GIS data		2							2											2		
	Score	10	3							3											3		
Context (% GHFF foraging habitat within a 20km radius)	GIS data		45.02%							45.02%											45.02%		
	Score	10	6							6											6		
Ecological corridors	GIS data		Within (whole or part)							Within (whole or part)											Within (whole or part)		
	Score	10	10							10											10		
Total		**40**	**29**							**29**											**29**		

Benchmark	<	5	5	to	25	>	25	to	100	>	100	to	200	>	200	>200
Score	0		2			5			7			10			10	

Benchmark	<	1	1	to	3	4	to	6	>	6
Score	0		3			6		10		

Benchmark	<	10%	10%	to	30%	>	30%	to	75%	>	75%
Score	0		3			6			10		

Benchmark	Not within	Sharing a common boundary	Within (whole or part)
Score	0	6	10

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	Value		1							1											1		
	Score	10	5							5											5		
Threats to the species	Value		Moderate threat level							Moderate threat level											High threat level		
	Score	10	5							5											1		
Total		**20**	**10**							**10**											**6**		

Benchmark	<	1	1	to	3	>	3
Score	0		5		10		

Benchmark	High threat level	Moderate threat level	Low threat level (i.e. likely to survive)
Score	1	5	10

SITE CONTEXT TOTAL		**60**	**39**							**39**											**35**		
MHQA Weighted Score (30%)		**3**	**1.95**							**1.95**											**1.75**		

SPECIES STOCKING RATE

Large trees present	Transect data		40	8	24	40	30	26	28	10	8	9	2	6	2	3.0	0	18	10	14	54	0	0	0
	RE Benchmark				51	34			24			18				34	24			24	221	221	24	24
	% of Benchmark				47%	118%			117%			50%				9%	0%			58%	24%	0%	0%	0%
	Habitat Quality Assessment Score	15			5	15			15			5				5	0			10	5	0	0	0
Total		**15**	**5**			**15**			**15**	**5.00**			**5.00**				**0.00**	**10.00**			**5.00**	**0**	**0**	**0**
MHQA Weighted Score (30%)		**3**	**1.00**			**3.00**			**3.00**	**1.00**			**1.00**				**0.00**	**2.00**			**1.00**	**0.00**	**0.00**	**0.00**

Benchmark	0%	>	0%	to	50%	>	50%	to	100%	>	100%
Score	0		5			10			15		

MHQA SUMMARY

Site Condition		**4**	**2.32**			**2.72**			**2.32**			**1.92**				**2.32**	**1.92**			**1.92**	**1.92**	**0.40**	**0.40**	**0.40**
Site Context		**3**	**1.95**			**1.95**			**1.95**			**1.95**				**1.95**	**1.95**			**1.95**	**1.95**	**1.75**	**1.75**	**1.75**
Species Stocking Rate		**3**	**1.00**			**3.00**			**3.00**			**1.00**				**1.00**	**0.00**			**2.00**	**1.00**	**0.00**	**0.00**	**0.00**
TOTAL - Assessment Unit Habitat Assessment Scores		**10**	**5.27**			**7.67**			**7.27**			**4.87**				**5.27**	**3.87**			**5.87**	**4.87**	**2.15**	**2.15**	**2.15**
Assessment Unit Areas			**6.95**			**289.18**			**63.48**			**0.29**				**168.16**	**104.89**			**1.38**	**6.7**	**6.72**	**0.88**	**37.81**
OMU Area (total of Aus)			**359.61**							**281.42**												**45.41**		
Assessment Unit Weighting		**1**	**0.02**			**0.80**			**0.18**			**0.00**				**0.60**	**0.37**			**0.00**	**0.02**	**0.15**	**0.02**	**0.83**
Assessment Unit Weighted Scores		**NA**	**0.10**			**6.17**			**1.28**			**0.01**				**3.15**	**1.44**			**0.03**	**0.12**	**0.32**	**0.04**	**1.79**
OMU Site Modified Habitat Quality Score		**10**				**7.553**						**4.741**											**2.150**		
TOTAL - ROUNDED TO NEAREST WHOLE NUMBER		**10**				**8**						**5**											**2**		

OFFSET - GHFF (YEAR 20 MHQA)

			OMU-01 (Category B - Remnant)							OMU-02 (Category C - Regrowth)												OMU-03 (Category X - Cleared)		
			AU02			AU03	AU05			AU01			AU04				AU06	AU07			AU08	AU09	AU11	AU12
			RE12.8.9			RE 12.8.16	RE12.8.17			RE12.9-10.7			RE12.8.16				RE12.8.17	RE12.3.3			RE12.3.7	RE12.3.7 (cleared)	RE12.3.3 (cleared)	RE12.8.17 (cleared)
SITE CONDITION		Max score	BC02	BC07	Average AU02	BC03 AU03	BC05	BC08	Average AU05	BC01	BC14	Average AU01	BC04	BC11	BC13	Average AU04	BC06 AU06	BC09	BC12	Average AU07	BC10 AU08	N/A (cleared) AU09	N/A (cleared) AU11	N/A (cleared) AU12
Site Condition - Habitat Transect Data Assessment																								
Vegetation Condition	Value		Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant
	Score	20			20	20			20			20				20	20			20	20	20	20	20
Species richness - canopy trees	Transect data		7	7	7	7	7	7	7	4	4	4	7	7	7	7	7	4	4	4	4	7	4	7
	Score	20			20	20			20			10				20	20			10	10	20	10	20
Flower scores (average)	Transect data		0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
	Score	10			8	8			8			8				8	8			8	8	8	8	8
Timing of biological shortages	Food shortages	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	Pregnancy and birthing	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Lactation	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Mating and conception	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Migration paths	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Fruit industries	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Total Score (sum of above)	10			10	10			10			10				10	10			10	10	10	10	10
Quality of foraging habitat (trees >0.65 wt p*r)	Transect data		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Habitat Quality Assessment Score	20			5	5			5			5				5	5			5	5	5	5	5
Non-native plant cover (%)	Transect data		4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%
	Score	20			20	20			20			20				20	20			20	20	20	20	20
Total		**100**			**83**	**83**			**83**			**73**				**83**	**83**			**73**	**73**	**83**	**73**	**83**
SITE CONDITION TOTAL		**100**			**83**	**83**			**83**			**73.0**				**83.0**	**83.0**			**73.0**	**73.0**	**83**	**73**	**83**
MHQA Weighted Score (40%)		**4**			**3.32**	**3.32**			**3.32**			**2.92**				**3.32**	**3.32**			**2.92**	**2.92**	**3.32**	**2.92**	**3.32**

Benchmark	Category X / non-remnant										Category C / regrowth						Category B / remnant					
Score	5										10						20					
Benchmark	0	1	to	3	4	to	6	>	6													
Score	0		5			10			20													
Benchmark	0	0.01	to	0.25	0.26	to	0.50	0.51	to	0.75	0.76	to	1.00									
Score	0		2			5			8			10										

Benchmark	0	1	to	3	4	to	6	>	6													
Score	0		5			10			20													
Benchmark	>	50%	>	25%	to	50%	5%	to	25%	<	5%											
Score	1		5			10			20													

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	GIS data		>200							>200										>200		
	Score	10	10							10										10		
Connectedness (active GHFF camps within 30km radius)	GIS data		1							1										1		
	Score	10	3							3										3		
Context (% GHFF foraging habitat within a 20km radius)	GIS data		30.10%							30.10%										30.10%		
	Score	10	6							6												
Ecological corridors	GIS data		Within (whole or part)							Within (whole or part)										Within (whole or part)		
	Score	10	10							10										10		
Total		**40**	**29**							**29**										**29**		

Benchmark	<	5	5	to	25	>	25	to	100	>	100	to	200	>	200	>200
Score	0		2			5			7			10			10	
Benchmark	<	1	1	to	3	4	to	6	>	6						
Score	0		3			6			10							
Benchmark	<	10%	10%	to	30%	>	30%	to	75%	>	75%					
Score	0		3			6			10							
Benchmark	Not within		Sharing a common boundary			Within (whole or part)										
Score	0		6			10										

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	Value		1							1										1		
	Score	10	5							5										5		
Threats to the species	Value		Low threat level (i.e. likely to survive)							Low threat level (i.e. likely to survive)										Low threat level (i.e. likely to survive)		
	Score	10	10							10										10		
Total		**20**	**15**							**15**										**15**		

Benchmark	<	1	1	to	3	>	3															
Score	0		5			10																
Benchmark	High threat level															Moderate threat level		Low threat level (i.e. likely to survive)				
Score	1															5		10				

SITE CONTEXT TOTAL		**60**	**44**							**44**										**44**		
MHQA Weighted Score (30%)		**3**	**2.20**							**2.20**										**2.20**		

SPECIES STOCKING RATE

Large trees present	Transect data		52	52	52	35	25	25	25	10	10	10	18	18	18	18	13	25	25	25	111	1	1	1
	RE Benchmark				51	34			24			18				34	24			24	221	221	24	24
	% of Benchmark				102%	103%			104%			56%				53%	54%			104%	50%	0%	4%	4%
	Habitat Quality Assessment Score	15			15	15			15			10				10	10			15	10	5	5	5
Total		**15**	**15**			**15**		**15**			**10.00**			**10.00**			**10.00**	**15.00**			**10.00**	**5**	**5**	**5**
MHQA Weighted Score (30%)		**3**	**3.00**			**3.00**		**3.00**			**2.00**			**2.00**			**2.00**	**3.00**			**2.00**	**1.00**	**1.00**	**1.00**

Benchmark	0%	>	0%	to	50%	>	50%	to	100%	>	100%
Score	0		5			10			15		

MHQA SUMMARY

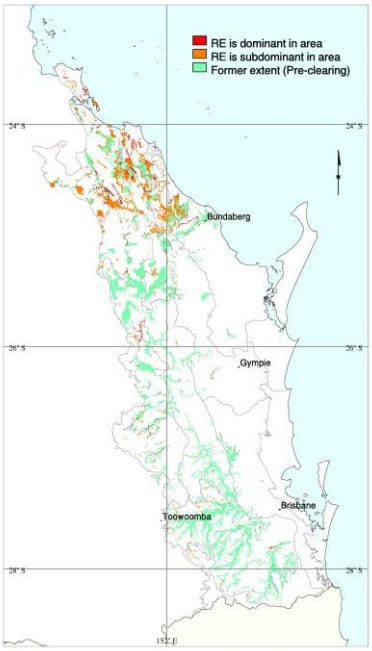
Site Condition		**4**	**3.32**			**3.32**		**3.32**			**2.92**			**3.32**			**3.32**	**2.92**			**2.92**	**3.32**	**2.92**	**3.32**
Site Context		**3**	**2.20**			**2.20**		**2.20**			**2.20**			**2.20**			**2.20**	**2.20**			**2.20**	**2.20**	**2.20**	**2.20**
Species Stocking Rate		**3**	**3.00**			**3.00**		**3.00**			**2.00**			**2.00**			**2.00**	**3.00**			**2.00**	**1.00**	**1.00**	**1.00**
TOTAL - Assessment Unit Habitat Assessment Scores		**10**	**8.52**			**8.52**		**8.52**			**7.12**			**7.52**			**7.52**	**8.12**			**7.12**	**6.52**	**6.12**	**6.52**
Assessment Unit Areas			**6.95**			**289.18**		**63.48**			**0.29**			**168.16**			**104.89**	**1.38**			**6.7**	**6.72**	**0.88**	**37.81**
OMU Area (total of Aus)			**359.61**														**281.42**					**45.41**		
Assessment Unit Weighting		**1**	**0.02**			**0.80**		**0.18**			**0.00**			**0.60**			**0.37**	**0.00**			**0.02**	**0.15**	**0.02**	**0.83**
Assessment Unit Weighted Scores		**NA**	**0.16**			**6.85**		**1.50**			**0.007337076**			**4.49**			**2.80**	**0.04**			**0.17**	**0.96**	**0.12**	**5.43**
OMU Site Modified Habitat Quality Score		**10**	**8.520**														**7.513**					**6.512**		
TOTAL - ROUNDED TO NEAREST WHOLE NUMBER		**10**	**9**														**8**					**7**		

Biocondition Benchmarks

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.3.3

Eucalyptus tereticornis woodland on Quaternary alluvium



Annie Kelly

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	5
		Shrub:	4
		Grass:	11
		Forbs and other:	24
Trees:	Tree canopy	Tree canopy median height (m):	27
		Tree canopy cover (%):	53
	Tree sub-canopy	Tree sub-canopy median height (m):	12
		Tree sub-canopy cover (%):	9
	Large trees	Large eucalypt tree dbh threshold (cm):	47
		Number of large eucalypt trees per hectare:	24
		Large non-eucalypt tree dbh threshold (cm):	na
		Number of large non-eucalypt trees per hectare:	na

Typical tree species: Eucalyptus tereticornis (blue gum), Angophora subvelutina (broad-leaved apple), Lophostemon suaveolens (swamp box), Allocasuarina torulosa (forest oak)

Shrubs:		Native shrub cover (%):	1

Typical shrub species: Acacia disparrima subsp. disparrima (southern salwood), Acacia maidenii (Maiden's wattle)

Ground cover (%):		Native perennial grass cover (%):	47
		Organic litter cover (%):	34

Typical ground cover species: Themeda triandra (kangaroo grass), Heteropogon contortus (black speargrass), Pteridium esculentum (common bracken), Imperata cylindrica (blady grass), Cymbopogon refractus (barbed-wire grass)

Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare: 445

Non-native plant cover 0

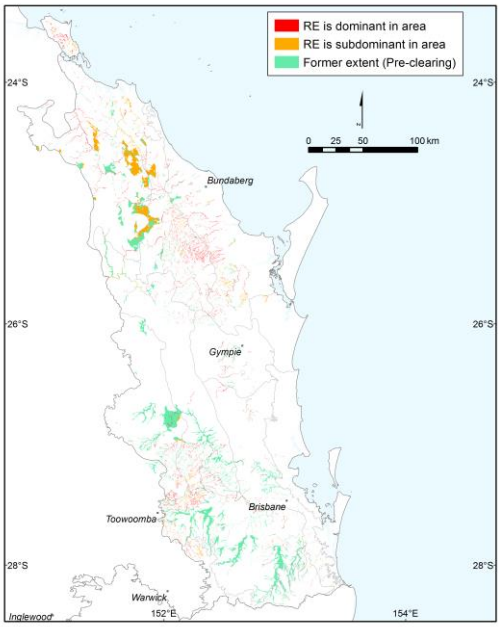
Typical non-native species: Opuntia stricta^ (smooth pest pear), Lantana camara^, Cyanthillium cinereum (vernonia)

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Users should refer to the regional ecosystem description database (REDD) and/or the technical description for more complete lists of characteristic species. Only the most frequently used common name is given. Other common names may be used in other regions. Declared pest species in Queensland are designated (^).

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.3.7

Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca spp. fringing woodland



Melinda Laidlaw

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	10
		Shrub:	10
		Grass:	7
		Forbs and other:	30
Trees:	Emergent canopy	Tree emergent canopy median height (m):	na
		Tree emergent canopy cover (%):	na
	Tree canopy	Tree canopy median height (m):	16
		Tree canopy cover (%):	30
	Tree sub-canopy	Tree sub-canopy median height (m):	11
		Tree sub-canopy cover (%):	30
	Large trees	Large eucalypt tree dbh threshold (cm):	53
		Number of large eucalypt trees per hectare:	1
		Large non-eucalypt tree dbh threshold (cm):	23
		Number of large non-eucalypt trees per hectare:	220

Typical tree species: Eucalyptus tereticornis (forest red gum), Melaleuca viminalis, Casuarina cunninghamiana (river sheoak), Waterhousea floribunda (weeping cherry)

Shrubs: Native shrub cover (%): 18

Typical shrub species: Pittosporum revolutum (yellow pittosporum), Breynia oblongifolia (coffee bush), Mallotus philippensis (red kamala)

Ground cover (%): Native perennial grass cover (%): 1

Organic litter cover (%): 54

Typical grass, forbs and other species: Lomandra hystrix (longleaf matrush), Oplismenus aemulus (creeping shade grass), Viola hederacea (ivy-leaf violet)

Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare: 667

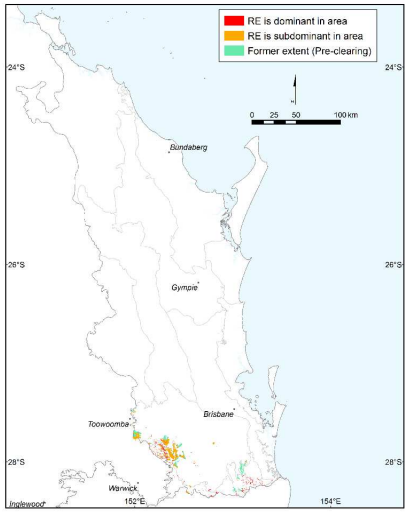
Non-native plant cover 0

Typical non-native species: Celtis sinensis^ (Chinese elm), Dolichandra unguis-cati^ (cats claw creeper), Lantana camara^ (lantana), Digitaria didactyla (blue couch), Bidens pilosa (cobblers pegs)

Benchmark based on: 1 reference site, a technical description and expert opinion **Benchmark reliability ranking:** moderate

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Shrub and ground strata may contain recruiting canopy species. 'Eucalypt' refers to species belonging to the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia. Users should refer to regional ecosystem technical descriptions for more complete lists of characteristic species. Common names can differ between regions. Declared pest species in Queensland are designated (^).

RE: 12.8.9	Lophostemon confertus open forest often with vine forest understorey ('wet sclerophyll'). Occurs on Cainozoic igneous rocks. Tends to occur mostly in gullies and on exposed ridges on basalt. (BVG1M: 8a)

BioCondition Attributes	Benchmark	Typical Species
Recruitment (%)	100	 
Tree Canopy Cover (%)	73	
Tree Subcanopy Cover (%)	23	
Native Shrub Cover (%)	14	
Large eucalypt tree DBH threshold (cm)	45	
Number of Large Eucalypt Trees (per ha)	46	
Large non-eucalypt tree DBH threshold (cm)	27	
Number of Large non-eucalypt Trees (per ha)	5	
Tree Canopy Height (m)	27	
Tree Subcanopy Height (m)	14	
Coarse Woody Debris (m/ha)	706	
Species Richness – Trees	10	*Lophostemon confertus, Allocasuarina torulosa, Argyrodendron actinophyllum, Cryptocarya erythroxylon, Eucalyptus microcorys, Eucalyptus propinqua, Hedraianthera porphyropetala, Polyscias elega*
Species Richness – shrubs	12	*Breynia oblongifolia, Croton acronychioides, Diospyros pentamera, Elaeodendron australe, Euroschinus falcatus, Guioa semiglauca, Litsea reticulata, Neolitsea dealbata, Olea panicu Pittosporum multiflorum, Polyscias sambucifolia, Psychotria loniceroides, Wilkiea huegeliana*
Species Richness – grasses	3	*Entolasia stricta, Imperata cylindrica, Oplismenus aemulus*
Species Richness - forbs and other	30	*Adiantum spp., Blechnum cartilagineum, Doodia aspera, Dioscorea transversa, Pseuderanthemum variabile, Tripladenia cunninghamii, Viola hederacea, Pyrrosia rupestris, Cissus ar Clematis glycinoides, Geitonoplesium cymosum, Smilax australis, Dianella caerulea, Lomandra confertifolia, Lomandra longifolia*
Ground cover – native perennial grass cover (%)	7	
Ground cover – organic litter (%)	51	
Non-native plant cover (%)	0	*Lantana camara*

Reliability ranking (* = low reliability; ***** highly reliable) ****

Benchmarks developed by the Queensland Herbarium, based on 6 Qld Herbarium CorVeg sites, an 2 equivalent RE benchmarks and expert opinion. May, 2020.

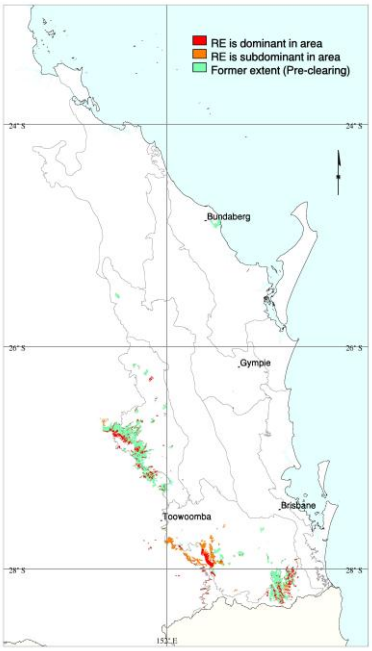
Selected typical species are those that characterise the ecosystem, community or stratum at Reference Sites. 'Eucalypt' refers to species belonging the the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia.

Queensland Government

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.8.16

Eucalyptus crebra +/- E. melliodora, E. tereticornis woodland on Cainozoic igneous rocks



Annie Kelly

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	7
		Shrub:	7
		Grass:	7
		Forbs and other:	29
Trees:	Tree canopy	Tree canopy median height (m):	20
		Tree canopy cover (%):	41
	Tree sub-canopy	Tree sub-canopy median height (m):	8
		Tree sub-canopy cover (%):	17
	Large trees	Large eucalypt tree dbh threshold (cm):	41
		Number of large eucalypt trees per hectare:	32
		Large non-eucalypt tree dbh threshold (cm):	30
		Number of large non-eucalypt trees per hectare:	2

Typical tree species: Eucalyptus crebra (narrow-leaved red ironbark), Eucalyptus melliodora (yellow box), Eucalyptus tereticornis (blue gum), Eucalyptus albens (white box)

Shrubs:		Native shrub cover (%):	4

Typical shrub species: Cassinia laevis (wild rosemary), Acacia spp., Exocarpos cupressiformis (native cherry)

Ground cover (%):		Native perennial grass cover (%):	45
		Organic litter cover (%):	21

Typical ground cover species: Cymbopogon refractus (barbed-wire grass), Poa labillardierei var. labillardierei (tussock grass), Themeda triandra (kangaroo grass)

Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare: 592

Non-native plant cover 0

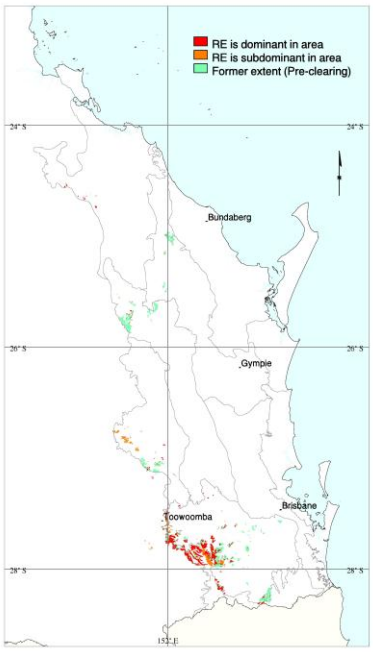
Typical non-native species: Lantana camara^, Gomphocarpus physocarpus (balloon cottonbush)

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Users should refer to the regional ecosystem description database (REDD) and/or the technical description for more complete lists of characteristic species. Only the most frequently used common name is given. Other common names may be used in other regions. Declared pest species in Queensland are designated (^).

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.8.17

Eucalyptus melanophloia +/- E. crebra, E. tereticornis, Corymbia tessellaris woodland on Cainozoic igneous rocks



Dan Ferguson

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	7
		Shrub:	5
		Grass:	12
		Forbs and other:	27
Trees:	Emergent canopy	Tree emergent canopy median height (m):	na
		Tree emergent canopy cover (%):	na
	Tree canopy	Tree canopy median height (m):	19
		Tree canopy cover (%):	48
	Tree sub-canopy	Tree sub-canopy median height (m):	10
		Tree sub-canopy cover (%):	20
	Large trees	Large eucalypt tree dbh threshold (cm):	38
		Number of large eucalypt trees per hectare:	24
		Large non-eucalypt tree dbh threshold (cm):	na
		Number of large non-eucalypt trees per hectare:	na

Typical tree species: Eucalyptus melanophloia (silver-leaved ironbark), Eucalyptus crebra (narrow-leaved red ironbark), Eucalyptus tereticornis (blue gum), Corymbia tessellaris (Moreton Bay ash), Corymbia intermedia (pink bloodwood)

Shrubs: Native shrub cover (%): 5

Typical shrub species: Alphitonia excelsa (soap tree), Psydrax odorata (shiny-leaved canthium), Acacia spp., Exocarpos cupressiformis (native cherry)

Ground cover (%): Native perennial grass cover (%): 32

Organic litter cover (%): 21

Typical ground cover species: Heteropogon contortus (black speargrass), Cymbopogon refractus (barbed-wire grass), Themeda triandra (kangaroo grass), Bothriochloa decipiens

Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare: 234

Non-native plant cover 0

Typical non-native species: Dichanthium aristatum (angleton grass), Lantana camara^, Passiflora spp., Bidens spp.

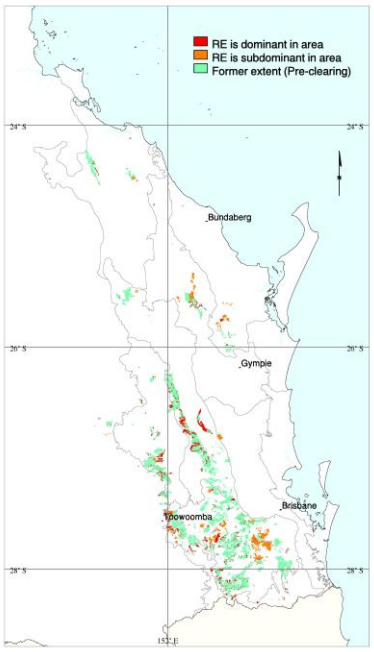
Benchmark based on: 3 reference sites, 1 Corveg site and expert opinion **Benchmark reliability ranking:** moderate

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Shrub and ground strata may contain recruiting canopy species. 'Eucalypt' refers to species belonging to the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia. Users should refer to regional ecosystem technical descriptions for more complete lists of characteristic species. Common names can differ between regions. Declared pest species in Queensland are designated (^).

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.9-10.7

Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora spp., E. melanophloia woodland on sedimentary rocks



Melanie Venz

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	3
		Shrub:	5
		Grass:	8
		Forbs and other:	26
Trees:	Emergent canopy	Tree emergent canopy median height (m):	na
		Tree emergent canopy cover (%):	na
	Tree canopy	Tree canopy median height (m):	21
		Tree canopy cover (%):	40
	Tree sub-canopy	Tree sub-canopy median height (m):	10
		Tree sub-canopy cover (%):	8
	Large trees	Large eucalypt tree dbh threshold (cm):	39
		Number of large eucalypt trees per hectare:	18
		Large non-eucalypt tree dbh threshold (cm):	na
		Number of large non-eucalypt trees per hectare:	na
	Typical tree species: Eucalyptus crebra (narrow-leaved red ironbark), Eucalyptus tereticornis (blue gum), Corymbia tessellaris (Moreton Bay ash), Angophora leiocarpa (rusty gum), Corymbia clarksoniana (grey bloodwood)		
Shrubs:		Native shrub cover (%):	3
	Typical shrub species: Acacia spp., Alphitonia excelsa (soap tree)		
Ground cover (%):		Native perennial grass cover (%):	61
		Organic litter cover (%):	20
	Typical ground cover species: Themeda triandra (kangaroo grass), Cymbopogon refractus (barbed-wire grass), Heteropogon contortus (black speargrass), Chloris divaricata, Bothriochloa decipiens		
Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:			272
Non-native plant cover			0
	Typical non-native species: Lantana camara^, Opuntia spp., Digitaria didactyla (Queensland blue couch), Dichanthium aristatum (angleton grass), Lantana montevidensis (creeping lantana)		

Benchmark based on: 3 reference sites, 6 Corveg sites and expert opinion **Benchmark reliability ranking:** high

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Shrub and ground strata may contain recruiting canopy species. 'Eucalypt' refers to species belonging to the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia. Users should refer to regional ecosystem technical descriptions for more complete lists of characteristic species. Common names can differ between regions. Declared pest species in Queensland are designated (^).

Weed Report

SUMMARY OF UQ CONSERVATION MASTERS WEED ABUNDANCE SURVEYS

BACKGROUND

In mid-2019 The University of Queensland Conservation Masters program partnered with Queensland Trust for Nature to conduct weed surveys on QTFN's Aroona Station. This data was collected as a practical component within a research masters level program that was supervised by three professional botanists and spatial analysts (Rod Fensham, and Qld Herbarium, John Dwyer, UQ and Al Healy, UQ).

The data was collected in three steps:

1. Desktop assessment using remote sensed data;
2. Ground-truth field surveys across the entirety of Aroona south;
3. Rectified mapping and presentation of weed management strategies.

The program completed targeted field surveys of the whole of Aroona south across all Operational Management Units. The locations of field data collection was representative across all OMUs and AUs, in-line with previous ecological surveys. The survey effort far exceeded the previous BioCondition assessments from which QTFN have based estimates of weed condition on site and complement and update our understanding of weeds on the property.

BROAD SUMMARY OF RESULTS

The key points from data collected are:

- At least 44-ha of Broad-leaved Pepper, most of which is estimated at a high confidence. The species is present on 100% of catchments, covering >80% of each of the main creeks (Figure 1);
- At least 117-ha of Lantana, in areas of remnant, mature regrowth and cleared areas on hill slopes and within drainage lines. Density confirmed at >50% (Figure 2).
- High and medium confidence that Cats Claw Creeper was present in 85% of the sampled creek lines;
- 1-ha of intense Chinese Celtis, again focused in riparian areas;

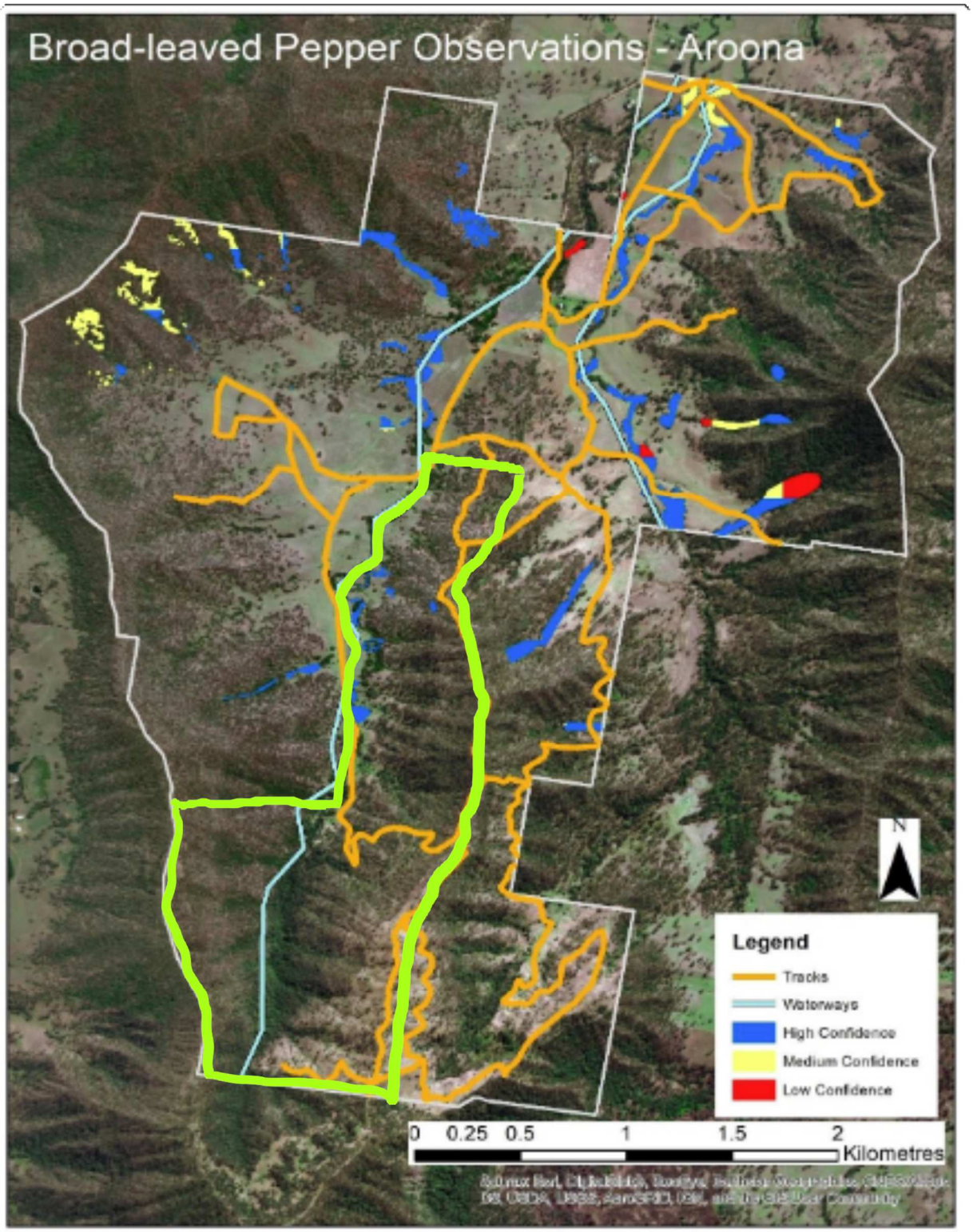


Figure 1. Map of Broad-leaved Pepper distribution on QTFN Aroona south excised from the Weed Management Strategy presented by Jeff Ikin as part of his fulfillment of Conservation Masters at The University of Queensland. Approximate offset boundary recorded in green.

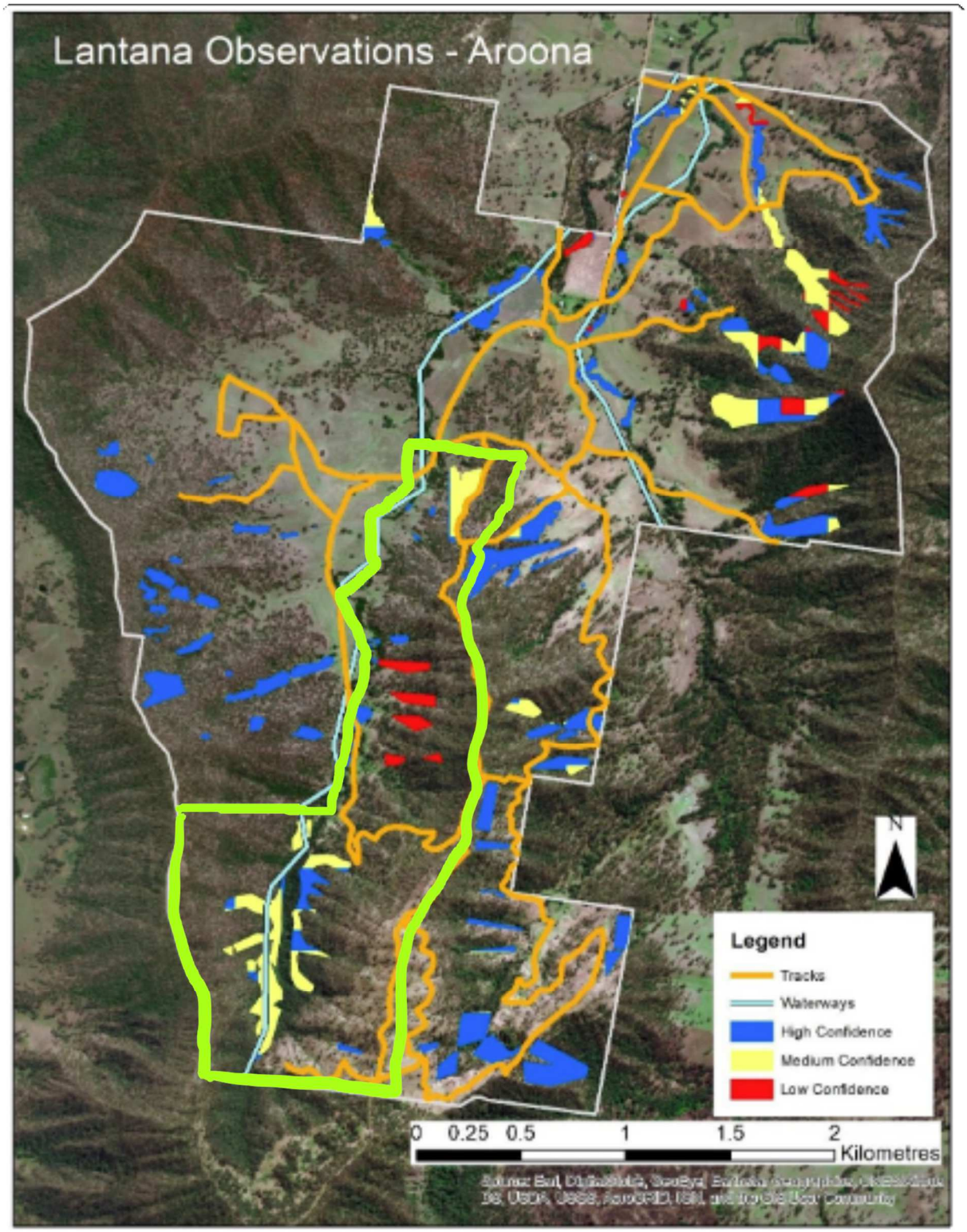


Figure 2. Map of *Lantana camara* distribution on QTFN Aroona south excised from the Weed Management Strategy presented by Jeff Ikin as part of his fulfillment of Conservation Masters at The University of Queensland. Approximate offset boundary recorded in green.

RELATING AND UPDATING PREVIOUS ESTIMATES OF WEED COVER AND THREATS TO KOALA

Prior to this analysis QTFN's understanding of weed cover and the threats it poses to threatened species (e.g. koala) was based on the BioCondition surveys of AusEcology conducted on-site in 2016. This new research significantly extends the sample effort and area of AusEcology's original works and updates the understanding of weed presence since this work three years ago.

Translating the results of The University of Queensland survey into the language and logic of the Terrestrial habitat scoring tool will be of great value. In the final report, overall confidence and level of weed infestation is summarised as follows:

"[H]igh confidence corresponds with visual confirmation of an infestation graded as >50% density, while a medium confidence corresponds with an area that given satellite information and visual confirmation in nearby areas is likely to contain >50% density of the invasive species. Low confidence areas are still believed to contain >50% density of the invasive species, however no groundtruthed confirmation exists for these locations."

Results relating to the Species Mobility Capacity:

- Of the 117ha of *Lantana camara* the majority is confirmed to be at a density of >50%.
    - Lantana is a known and documented habitat transforming weed that significantly impacts the mobility of koalas;
    - On Aroona Lantana infestations are primarily in vegetated areas in remnant or mature regrowth status and some areas of alluvial flats. Lantana in these areas has the potential to block the ongoing recruitment of koala food trees;
    - This data confirms with high confidence >50% coverage of Lantana in dense patches through most of Aroona's remnant and regrowing woodland and some parts of cleared alluvial plains.

- Of the 44ha of Broad-leaved Pepper the majority is confirmed to be at a density of >50%.
    - Broad-leaved Pepper chokes creek lines and is highly likely to block the movement of arboreal species like koala;
    - These creeks are where most koala sightings have been made on the property, and riparian areas are known wildlife corridors that foster movement in species;
    - This data confirms with high confidence >50% coverage of Broad-leaved Pepper on the vast majority of both of Aroona south's major creek lines.

CONCLUSION

Considering these results, QTFN recommends updating the Non-native plant cover scores to a 3. This score is a conservative estimate across the whole of property, with coverage at 50% (score 3, 26-50%). It is also recommended reinforce the Species mobility capacity score for koala on Aroona **as a Moderate restriction** (score 7, 26-50% reduction in movement).

Koala SAT Summary Table

SAT survey	AU	Land zone	Scats	% of Trees with Scats	Usage Level (East coast-LOW)	Usage Level (East coast-MEDHIGH)
SAT 1	AU1 – Remnant	8	Yes	3%	Low	Low
SAT 2	AU1 – Remnant	8	Yes	16%	High	Low
SAT 3	AU1 - Remnant	8	Yes	13%	High	Low
SAT 4	AU2 – Mature Regrowth	2	Yes	3%	Low	Low
SAT 5	AU2 – Mature Regrowth	2	Yes	13%	High	Low
SAT 6	AU3 – Mature Regrowth	8	No	-	No use	No use
SAT 7	AU3 – Mature Regrowth	8	Yes	10%	Medium	Low
SAT 8	AU3 – Mature Regrowth	8	No	-	No use	No use
SAT 9	AU4 – Mature Regrowth	9	No	-	No use	No use
SAT 10	AU4 – Mature Regrowth	9	No	-	No use	No use
Average across all vegetated sites		**5.8%**		**Medium**		**Low**
SAT 11	AU5 – Cleared	X	No	-	No use	No use
SAT 12	AU5 – Cleared	X	No	-	No use	No use
SAT 13	AU5 – Cleared	X	No	-	No use	No use
SAT 14	AU5 – Cleared	X	No	-	No use	No use

Koala SAT Raw Data

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T01	C. tesselaris		1	0.033333
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T02	C. tesselaris			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T03	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T04	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T05	C. tesselaris			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T06	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T07	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T08	C. tesselaris			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T09	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T10	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T11	E. melanophloia	1		
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T12	C. tesselaris			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T13	C. tesselaris			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T14	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T15	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T16	C. tesselaris			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T17	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T18	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T19	C. tesselaris			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T20	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T21	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T22	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T23	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T24	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T25	C. tesselaris			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T26	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T27	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T28	E. melanophloia			

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T29	E. melanophloia			
SAT 01	REMNANT	LZ08	-27.841119	152.413411	T30	E. melanophloia			
SAT 02	REMNANT	LZ08	-27.8352	152.4149	T01	E. crebra		5	0.166667
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T02	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T03	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T04	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T05	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T06	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T07	E. tereticornis	1		
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T08	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T09	C. tesselaris			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T10	E. tereticornis			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T11	C. tesselaris	1		
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T12	E. tereticornis			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T13	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T14	C. tesselaris			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T15	E. crebra	1		
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T16	E. tereticornis			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T17	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T18	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T19	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T20	E. crebra	1		
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T21	E. crebra	1		
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T22	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T23	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T24	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T25	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T26	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T27	E. melanophloia			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T28	E. crebra			
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T29	E. crebra			

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 02	REMNANT	LZ08	-27.8352	152.414943	T30	C. tesselaris			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T01	E. melanophloia		4	0.13
SAT 03	REMNANT	LZ08	-27.8393	152.439	T02	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T03	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T04	E. crebra	1		
SAT 03	REMNANT	LZ08	-27.8393	152.439	T05	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T06	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T07	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T08	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T09	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T10	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T11	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T12	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T13	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T14	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T15	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T16	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T17	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T18	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T19	E. melliodora	1		
SAT 03	REMNANT	LZ08	-27.8393	152.439	T20	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T21	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T22	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T23	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T24	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T25	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T26	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T27	E. melanophloia			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T28	E. melliodora			
SAT 03	REMNANT	LZ08	-27.8393	152.439	T29	E. melanophloia	1		
SAT 03	REMNANT	LZ08	-27.8393	152.439	T30	E. melanophloia	1		

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 04	MATREG	LZ03	-27.831399	152.414093	T01	E. tereticornis		1	0.033333
SAT 04	MATREG	LZ03	-27.831399	152.414093	T02	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T03	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T04	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T05	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T06	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T07	E. melanophloia			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T08	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T09	C. tesselaris			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T10	E. melanophloia	1		
SAT 04	MATREG	LZ03	-27.831399	152.414093	T11	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T12	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T13	C. tesselaris			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T14	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T15	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T16	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T17	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T18	E. melanophloia			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T19	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T20	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T21	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T22	C. tesselaris			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T23	C. tesselaris			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T24	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T25	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T26	E. melanophloia			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T27	E. melanophloia			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T28	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T29	E. tereticornis			
SAT 04	MATREG	LZ03	-27.831399	152.414093	T30	E. tereticornis			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T01	E. tereticornis		4	0.133333

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 05	MATREG	LZ03	-27.839745	152.422986	T02	E. tereticornis	1		
SAT 05	MATREG	LZ03	-27.839745	152.422986	T03	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T04	E. melanophloia			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T05	E. tereticornis	1		
SAT 05	MATREG	LZ03	-27.839745	152.422986	T06	E. tereticornis			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T07	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T08	E. melanophloia			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T09	E. tereticornis			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T10	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T11	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T12	E. tereticornis	1		
SAT 05	MATREG	LZ03	-27.839745	152.422986	T13	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T14	E. melanophloia			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T15	E. tereticornis	1		
SAT 05	MATREG	LZ03	-27.839745	152.422986	T16	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T17	E. tereticornis			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T18	E. melanophloia			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T19	E. melanophloia			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T20	E. tereticornis			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T21	E. melanophloia			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T22	E. tereticornis			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T23	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T24	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T25	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T26	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T27	E. tereticornis			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T28	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T29	E. crebra			
SAT 05	MATREG	LZ03	-27.839745	152.422986	T30	E. tereticornis			
SAT06	MATREG	LZ08	-27.85291	152.407734	T01	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T02	C. tessalaris			

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT06	MATREG	LZ08	-27.85291	152.407734	T03	C. tessalaris			
SAT06	MATREG	LZ08	-27.85291	152.407734	T04	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T05	C. tessalaris			
SAT06	MATREG	LZ08	-27.85291	152.407734	T06	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T07	E. melanophloia			
SAT06	MATREG	LZ08	-27.85291	152.407734	T08	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T09	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T10	C. tessalaris			
SAT06	MATREG	LZ08	-27.85291	152.407734	T11	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T12	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T13	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T14	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T15	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T16	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T17	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T18	C. tessalaris			
SAT06	MATREG	LZ08	-27.85291	152.407734	T19	E. melanophloia			
SAT06	MATREG	LZ08	-27.85291	152.407734	T20	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T21	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T22	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T23	E. melanophloia			
SAT06	MATREG	LZ08	-27.85291	152.407734	T24	E. siderophloia			
SAT06	MATREG	LZ08	-27.85291	152.407734	T25	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T26	C. tessalaris			
SAT06	MATREG	LZ08	-27.85291	152.407734	T27	C. tessalaris			
SAT06	MATREG	LZ08	-27.85291	152.407734	T28	E. crebra			
SAT06	MATREG	LZ08	-27.85291	152.407734	T29	E. Siderophloia			
SAT06	MATREG	LZ08	-27.85291	152.407734	T30	C. tesselaris			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T01	E. crebra		3	0.1
SAT 07	MATREG	LZ08	-27.807944	152.407128	T02	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T03	C. tesselaris			

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 07	MATREG	LZ08	-27.807944	152.407128	T04	E. crebra			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T05	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T06	E. crebra	1		
SAT 07	MATREG	LZ08	-27.807944	152.407128	T07	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T08	E. crebra			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T09	E. crebra	1		
SAT 07	MATREG	LZ08	-27.807944	152.407128	T10	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T11	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T12	E. crebra			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T13	E. crebra			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T14	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T15	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T16	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T17	E. crebra			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T18	C. tesselaris			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T19	E. tereticornis	1		
SAT 07	MATREG	LZ08	-27.807944	152.407128	T20	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T21	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T22	C. tesselaris			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T23	C. tesselaris			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T24	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T25	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T26	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T27	C. tesselaris			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T28	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T29	E. tereticornis			
SAT 07	MATREG	LZ08	-27.807944	152.407128	T30	E. tereticornis			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T01	E. melanophloia		0	0
SAT 08	MATREG	LZ08	-27.853251	152.413602	T02	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T03	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T04	E. crebra			

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 08	MATREG	LZ08	-27.853251	152.413602	T05	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T06	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T07	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T08	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T09	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T10	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T11	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T12	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T13	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T14	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T15	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T16	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T17	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T18	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T19	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T20	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T21	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T22	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T23	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T24	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T25	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T26	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T27	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T28	E. melliodora			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T29	E. melanophloia			
SAT 08	MATREG	LZ08	-27.853251	152.413602	T30	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T01	E. melanophloia		0	0
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T02	E. siderophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T03	E. crebra			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T04	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T05	E. crebra			

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T06	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T07	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T08	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T09	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T10	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T11	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T12	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T13	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T14	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T15	C. tesselaris			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T16	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T17	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T18	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T19	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T20	C. tesselaris			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T21	E. crebra			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T22	E. crebra			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T23	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T24	C. tesselaris			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T25	E. melanophloia			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T26	E. crebra			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T27	C. tesselaris			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T28	C. tesselaris			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T29	E. tereticornis			
SAT 09	MAT REG	LZ09	-27.801181	152.413736	T30	C. tesselaris			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T01	E. crebra		0	0
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T02	C. tesselaris			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T03	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T04	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T05	C. tesselaris			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T06	E. crebra			

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T07	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T08	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T09	E. siderophloia			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T10	C. tesselaris			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T11	C. tesselaris			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T12	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T13	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T14	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T15	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T16	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T17	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T18	E. melliodora			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T19	E. siderophloia			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T20	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T21	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T22	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T23	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T24	C. tesselaris			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T25	C. tesselaris			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T26	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T27	C. tesselaris			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T28	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T29	E. crebra			
SAT 10	MAT REG	LZ09	-27.77567	152.391934	T30	E. crebra			
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T01	E. melanophloia		0	0
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T02	E. melliodora			
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T03	E. melliodora			
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T04	E. melliodora			
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T05				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T06				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T07				

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T08				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T09				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T10				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T11				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T12				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T13				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T14				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T15				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T16				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T17				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T18				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T19				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T20				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T21				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T22				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T23				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T24				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T25				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T26				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T27				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T28				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T29				
SAT 11	CLEARED	LZ08	-27.86447	152.413285	T30				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T01	E. crebra		0	0
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T02	E. crebra			
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T03	E. crebra			
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T04				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T05				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T06				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T07				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T08				

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T09				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T10				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T11				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T12				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T13				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T14				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T15				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T16				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T17				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T18				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T19				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T20				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T21				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T22				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T23				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T24				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T25				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T26				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T27				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T28				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T29				
SAT 12	CLEARED	LZ08	-27.797933	152.417508	T30				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T01	E. crebra		0	0
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T02	E. crebra			
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T03	E. melanophloia			
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T04				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T05				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T06				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T07				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T08				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T09				

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T10				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T11				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T12				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T13				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T14				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T15				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T16				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T17				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T18				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T19				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T20				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T21				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T22				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T23				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T24				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T25				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T26				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T27				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T28				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T29				
SAT 13	CLEARED	LZ09	-27.797933	152.417508	T30				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T01	E. tereticornis		0	0
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T02	E. tereticornis			
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T03				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T04				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T05				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T06				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T07				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T08				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T09				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T10				

SITE	STATUS	LANDZONE	LATITUDE	LONGITUDE	TREE	SPECIES	SCAT	TOTAL%	AS%
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T11				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T12				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T13				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T14				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T15				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T16				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T17				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T18				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T19				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T20				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T21				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T22				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T23				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T24				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T25				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T26				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T27				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T28				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T29				
SAT 14	CLEARED	LZ03	-27.836857	-27.836857	T30				

Appendix B

Site Context GIS Data

Size of Patch

Size of patch was calculated by measuring the patch assessed and any directly connecting remnant or regrowth vegetation. Patch size across all OMUs was 10, with patches of vegetation recorded at > 200ha (refer plan next page).

Mirvac offset
Size of Patch

1 cm = 400 meters

0 0.5 1 2

Kilometers

N

Legend

- 20200827_AU_Mirvac
- Arcona Boundary

Regulated_vegetation_management_map

Representation: QLD_VEG_RVM_100K_CUR_Rep_1

- Category A area
- Category B area
- Category C area
- Category R area
- Category X area
- Water
- Area not categorised

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Connectedness

Connectedness was calculated by measuring the perimeter of the offset area and connection to remnant, regrowth or cleared areas. The connectedness of the offset will increase as vegetation is improved to remnant status through the actions identified in the Offset Management Plan. With the implementation of the offset and surrounding offset commitments, Connectedness will increase to a score of 5 (currently 74.79% will increase to > 75% - refer plan next page).

	Perimeter before offset (m)	**%**	**Perimeter connection after offset (m)**	**%**
Cat B	17,315	52.29 %	25,085	75.75%
Cat C	7,454	22.51 %	0	0%
Cat X	8,347	25.21 %	8,031	24.25%
Totals (Cat B & C)	24,769,000	74.79 %	25,085	75.75%

Mirvac offset Connectedness

1 cm = 400 meters

0 0.5 1 2

Kilometers

N

Legend

Connection

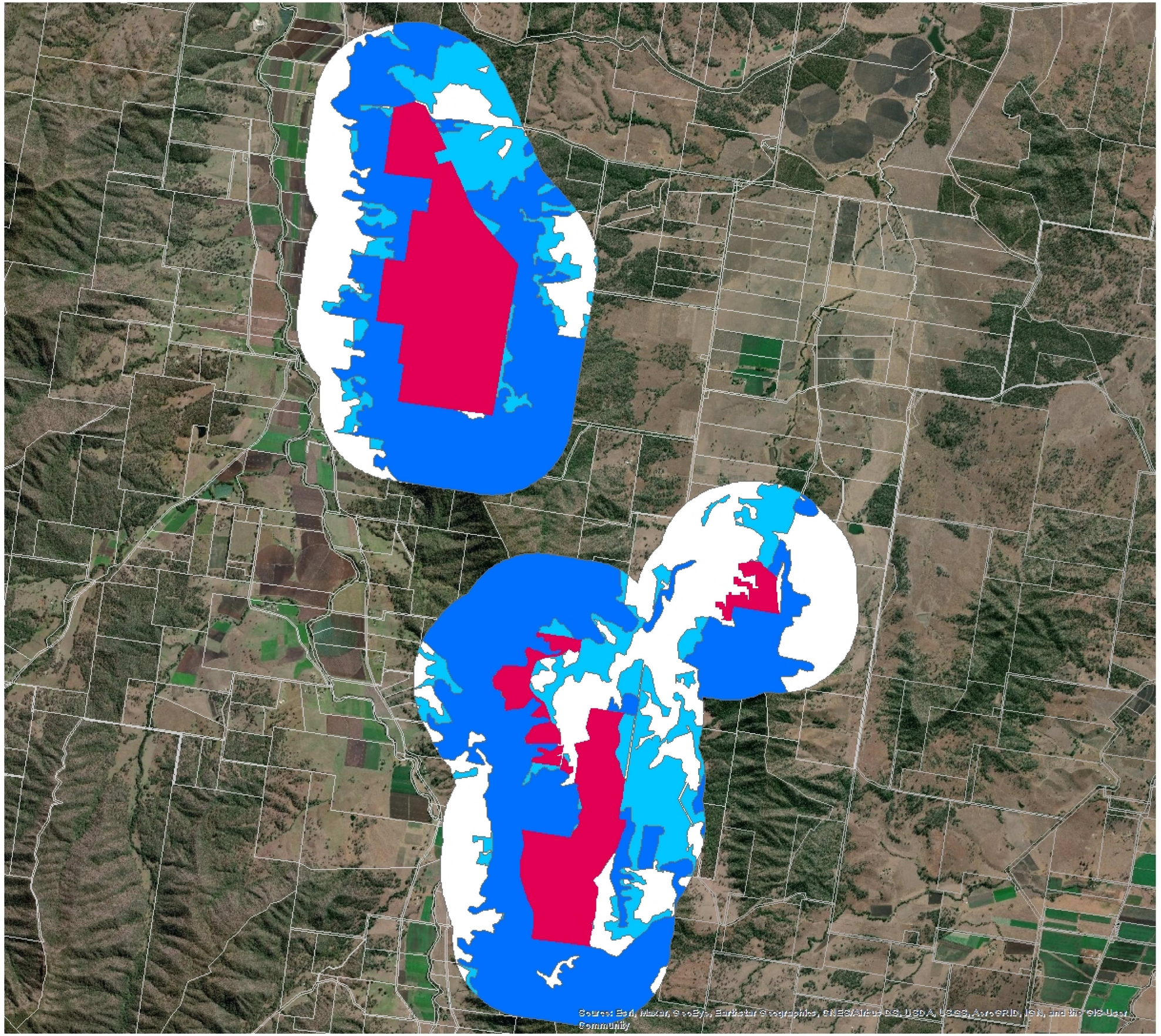
- Cat B (17,315m)
- Cat C (7,454m)
- Cat X (8,347m)
- Cadastral_data_QLD_CADASTRE_DCDB

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Context

Context was measured through calculating the available koala habitat within 1 km of the offset area (refer plan next page).

	Year 0 - Baseline		Year 20 – With Offset	
VMA	**Ha**	**%**	**Ha**	**%**
Cat X	1,127.88	28.36%	1,022.46	25.71%
Cat C	838.14	21.08%	564.14	14.18%
Cat B	2,010.44	50.56%	2,390.84	60.11%
Total (Cat B & C)	2,848.58	71.64%	2,954.98	74.29%



QTFN

Mirvac offset Context

1 cm = 450 meters

0 0.5 1 2

Kilometers

N

Legend

20200827_AU_Mirvac

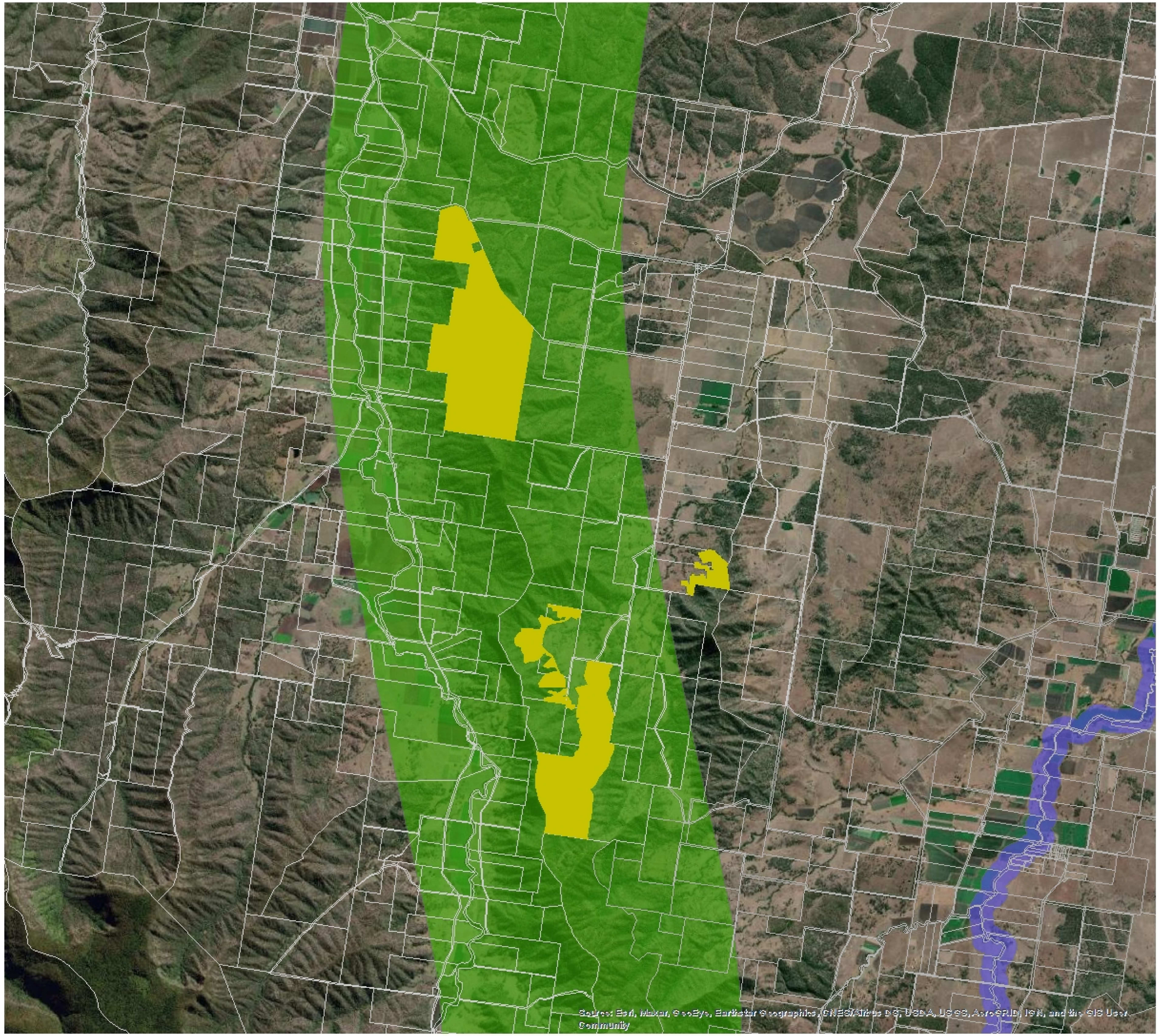
RVM_CAT

- Cat B (2,010.44ha)
- Cat C (838.14ha)
- Cat X (1,127.88ha)
- Cadastral_data_QLD_CADASTRE_DCDB

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Ecological Corridor

The site is located within an ecological corridor and so receives a score of 6 (refer plan next page).



QTFN

Mirvac offset Corridors

1 cm = 600 meters

0 0.75 1.5 3

Kilometers

N

Legend

- 20200827_AU_Mirvac
- Cadastral_data_QLD_CADASTRE_DCDB

SIGNIF

- Regional
- State

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

GHFF Roosts and Habitat

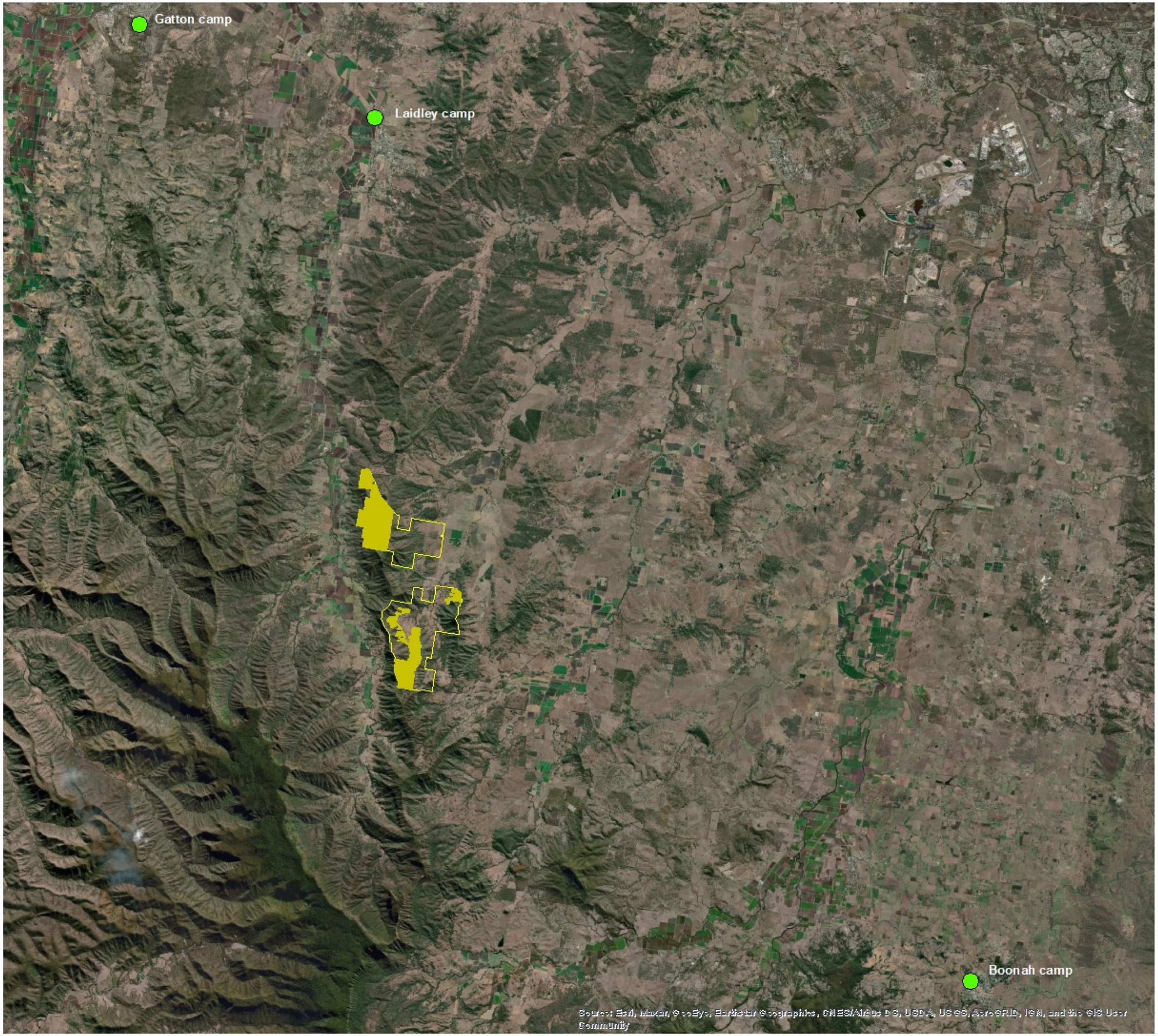
Camps:

Camp name	Level	Proximity to site
Boonah, Bicentennial Park	3	23.5km
Laidley, Laidley Plainlands road	2	24.5km
Gatton, Tenthill creek	2	26.3km

Refer plan next page.

OMU	Size of patch	Connected-ness	Context	Ecological corridors	Threats to species	Role of site location to species overall population
OMU-1	>200ha remnant vegetation	3 camps located within 30km	45%: GHFF foraging habitat within 20km	Site within an ecological corridor	Moderate level of threat	1 level 3 GHFF camp within 30km
OMU-2	>200ha remnant vegetation	3 camps located within 30km	45%: GHFF foraging habitat within 20km	Site within an ecological corridor	Moderate level of threat	1 level 3 GHFF camp within 30km
OMU-3	>200ha remnant vegetation	3 camps located within 30km	45%: GHFF foraging habitat within 20km	Site within an ecological corridor	High level of threat	1 level 3 GHFF camp within 30km

VMA	ha	%
Cat A	208	0.12
Cat B	65,279	36.91
Cat C	14,121	7.99
Water	111	0.06
Cat X	97,122	54.92
total	*176,841*	100.0



Mirvac offset
GHFF camp locations

1 cm = 1,726 meters

0 2.25 4.5 9

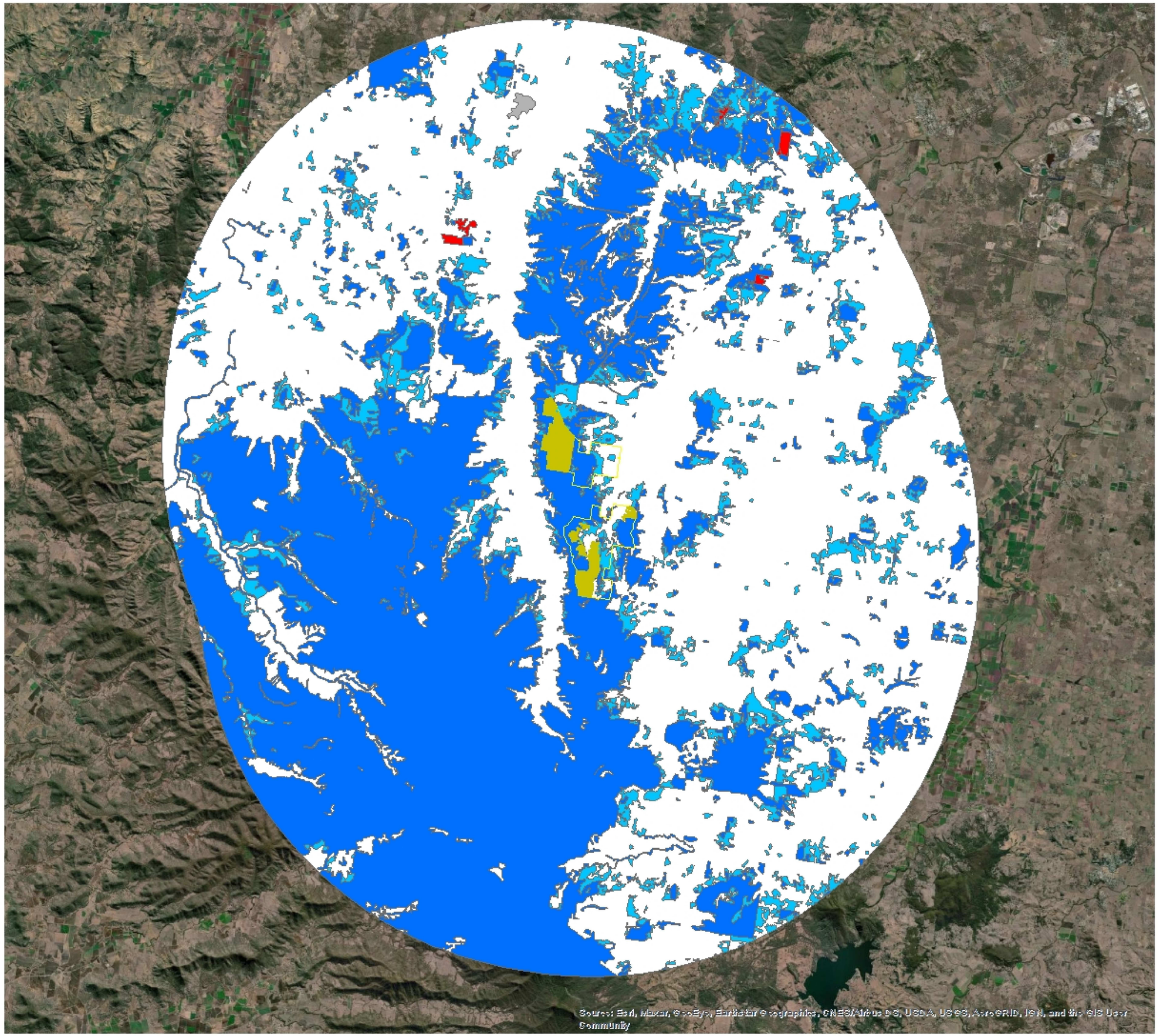
Kilometers

N

Legend

- 20200827_AU_Mirvac
- Aroona Boundary

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.



QTFN

Mirvac offset
GHFF habitat buffer

1 cm = 1,902 meters

0 2.5 5 10

Kilometers

N

Legend

- 20200827_AU_Mirvac
- Aroona Boundary

Mirvac_GHFF_buffer20km_clip

RVM_CAT

- Cat A (208ha)
- Cat B (64,974ha)
- Cat C (13,948ha)
- Water (111ha)
- Cat X (93,334ha)

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Appendix C

QTFN Offset Management Plan

QTFN
QUEENSLAND TRUST FOR NATURE

OFFSET MANAGEMENT PLAN

MIRVAC QUEENSLAND PTY LTD: EVERLEIGH

EPBC 2016/7817
September 2020

DOCUMENT CONTROL

REPORT TITLE	OFFSET MANAGEMENT PLAN
PROJECT	EPBC 2016/7817: EVERLEIGH, TEVIOT ROAD, GREENBANK
OFFSET LOCATION	AROONA, 338 ALPERS ROAD, MT MORT
PROPONENT	MIRVAC QLD PTY LTD

All information within this report is prepared for the exclusive use of Mirvac Queensland Pty Ltd in relation to EPBC 2016/7817 and is not to be used for any other purpose.

Queensland Trust for Nature accepts no responsibility for any use of or reliance upon the contents of this report by any third party. Reports or plans by others may be included within this Offset Management Plan to support the document.

Version	*Date*	*Prepared*	*Reviewed*	*Comment*
1.0 Modified Habitat Quality Assessment Framework	22/10/2019	Ecology Projects	Conservation Manager/EGM	
2.0 Update finalised offset area	17/2/2020	Ecology projects		Updated in-line with strategy document
2.1 Management additions	5/6/2020	Ecology projects		
2.2 updated area	7/7/2020	Ecology projects		
2.3 updated area	8/9/2020	Ecology projects		
2.4	23/9/2020	Ecology projects		Legal security mechanisms updated

PREPARED BY	FELICITY SHAPLAND	REVIEWED BY	CHRISTINA CORK
POSITION	ENVIRONMENTAL OFFICER	POSITION	GM OPERATIONS
SIGNED		SIGNED	
DATE	23/9/2020	DATE	23/9/2020

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Glossary of Terms

Acronym	Description
ACT	Australian Capital Territory
APZ	Asset Protection Zones
CoA	Commonwealth of Australia
DAF	Department of Agriculture and Fisheries
DoE	Department of the Environment (Former DEE; Commonwealth)
DEE	Department of the Environment and Energy (Commonwealth)
DES	Department of Environment and Science (QLD)
DSE	Department of Sustainability and the Environment
EHP	Department of Environment and Heritage Protection (Former DES; QLD)
EPA	Environmental Protection Agency
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GHFF	Grey-headed flying-fox (*Pteropus poliocephalus*)
GIS	Geographical Information Systems
LVRC	Lockyer Valley Regional Council
MHQA	Modified Habitat Quality Assessment
MNES	Matters of National Environmental Significance
NC Act	*Nature Conservation Act 1992*
NSW	New South Wales
OMP	Offset Management Plan
OMU	Operational Management Unit
Project	The Greenbank Development
Property	Aroona
Qld	Queensland
QTFN	Queensland Trust for Nature
RE	Regional Ecosystem
SEQ	South East Queensland
SRRC	Scenic Rim Regional Council
VM Act	*Vegetation Management Act 1999*

1 Executive Summary

Queensland Trust for Nature (QTFN) has been engaged by Mirvac Queensland Pty Limited (Mirvac) to provide an environmental offset to compensate for the loss of 230 ha of habitat critical to the survival of the koala and grey-headed flying-fox in accordance with the *Environment Protection and Biodiversity Conservation Act* (EPBC) Environmental Offsets Policy (2012).

This Offset Management Plan (OMP) forms part of a suite of documents, collectively the Offset Strategy.

Offset Strategy Technical Document 1 quantifies the total quantum of impact for both species as 138 hectares.

Offset Strategy Technical Document 2 quantifies the offset required for both species using EPBC Offsets Assessment Guide informed by:

- Offset Start score - Year 0 Baseline Modified Habitat Quality Assessment (MHQA);
- Offset Future "with offset" score - Year 20 Target MHQA;
- Balance EPBC calculator inputs (such as time to ecological benefit, risk of loss, confidence etc.)

The core scope of this OMP is to set out management actions and key performance indicators to achieve the Year 20 Target MHQA outcomes and to legally secure the offset for the duration of the impact (i.e. in perpetuity).

Key operative provisions of the OMP are:

- Clear and measurable MHQA key performance indicators for Years 0 (Baseline), 5, 10, 15 and 20 enclosed as Appendix E.
- Management actions and implementation program to achieve key performance indicators, as enclosed at Section 7 and Appendix C.

This OMP, in concert with the balance of the Offset Strategy, confirms that achieving the target KPIs will satisfy >100% of the offset requirement and meet the requirements of the EPBC Environmental Offsets Policy.

This OMP also provides monitoring and reporting requirements, risk assessment, processes for adaptive management, and responsibilities for aspects within.

2 Introduction

2.1 Project Background: Greenbank

The Greenbank development (herein the Project) is a residential master-planned community, supporting medium and low-density residential uses, a school, a neighbourhood centre and integrated open space and conservation areas. It is consistent with the planning controls under the Greater Flagstone Urban Development Area Development Scheme.

The Greater Flagstone Urban Development Area Development Scheme (PDA Development Scheme) provides for a significant population influx to the region with projections of 120,000 residents accommodated in more than 50,000 dwellings. The proposed master-planned residential development seeks to deliver numerous land uses including residential lots at various densities, a neighbourhood centre node encompassing health, retail and commercial uses, a school (approx. 7ha), conservation zone, regional sport and recreational parks,

neighbourhood and local parks, stormwater management (quality treatment and detention), roads, and utility services (e.g. water, sewer, electricity, communications, etc.).

The vision for the Project is to provide a vibrant mixed-use development for the growing Greater Flagstone community and incorporates educational, commercial, and recreational centres. The site is anticipated to be developed in stages.

The development impacts on Matters of National Environmental Significance (MNES). Offset areas are required to compensate for the residual adverse impacts of the action in relation to impacts on the koala *(Phascolarctos cinereus)* and grey-headed flying-fox (*Pteropus poliocephalus*) habitat. This Offset Management Plan (OMP) has been developed in order to comply with conditions of the EPBC Act approval which has been sought for EPBC2016/7817.

2.2 MNES impacts: Koala and grey-headed flying-fox

The koala is endemic to Australia and its distribution in Queensland ranges from all along the east coast (to Cooktown) into central Queensland. Koalas occupy a wide range of habitats, from temperate, sub-tropical and tropical forests, to woodland and semi-arid vegetation communities. The koala is a folivorous marsupial whose distribution is tied to its food source, the Eucalyptus forests in Australia. Koalas can occur in urban and rural settings with more dispersed food and shelter trees, or in regenerating native vegetation, as long as there are Eucalypt trees present.

A decline in the total population of the listed koala has been shown across its range, and particularly in South-east Queensland (SEQ) (Rhodes *et al.* 2015). In response to the increasing pressures on koalas in SEQ, in 2004 the species was listed as Vulnerable in the South East Queensland Bioregion under the *Queensland Nature Conservation Act 1992* (Queensland NC Act). Then, in 2012, the koala was recognised as a threatened species in Queensland, New South Wales and the Australian Capital Territory under the *Environmental Protection Biodiversity Conservation Act 1999* (EPBC).

The grey-headed flying-fox (herein the GHFF) is listed as Vulnerable under the EPBC Act. The GHFF has historically occupied forests and woodlands in the coastal lowlands, tablelands and slopes of south-eastern Australia, from Bundaberg in Queensland to Geelong in Victoria, with rare sightings outside its range. The primary known threat to the survival of the GHFF is loss and degradation of foraging and roosting habitat, as identified in the GHFF Recovery Plan (2017). Conflict with people, including disturbance in camps and mortality from actions to manage commercial fruit crops, is considered to be a moderate threat, but is increasing in urban areas.

2.3 Offset Areas: Overview

Management and protection of the proposed offset areas as set out in this OMP will ensure ecological gain for the residual impacts resulting from the Project. It will also ensure long-term ecological function of a broader network of wildlife corridors connected to the offset areas through the Little Liverpool Range, a large continuous and ecologically important habitat covering over 20,500 ha within a State significant corridor (EHP, 2016a).

The proposed offset will permanently secure **686.44ha** within the Little Liverpool Range, SEQ (Appendix A).

The proposed offset includes a range of vegetation communities, capturing six Regional Ecosystems, comprising remnant vegetation, high value regrowth and cleared areas. It will also provide long-term protection, conservation, and management of the subject Matters of National Environmental Significance:

- Documented populations of the koala (*Phascolarctos cinereus*) Vulnerable species (under EPBC Act 1999 and Queensland NC Act); and

- High quality habitat for the GHFF (*Pteropus poliocephalus*) Vulnerable species (under EPBC Act 1999 and Queensland NC Act).

2.4 OMP objective and outcomes

The objective of this Offset Management Plan (OMP) is to summarise existing habitat quality for the koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus)* present on the offset area and to recommend land management actions designed to achieve a net gain in koala and GHFF habitat quality.

This OMP identifies outcomes focused management actions, which will fulfil a statutory requirement, pursuant to the EPBC Act, for the provision of koala *(Phascolarctos cinereus)* and GHFF (*Pteropus poliocephalus*) habitat offset.

The outcomes sought by this plan will protect, restore, encourage the regeneration of habitat and conserve large, connected areas of koala and GHFF habitat, particularly populations that are genetically diverse and distinct and are free of disease or have very low incidence of disease.

2.5 Structure of the OMP

Section 1: Executive summary

Section 2: Introduction to the plan and offset position summary

Section 3: Implementation objectives

Section 4: Property context and offset suitability

Section 5: Offset Key Performance Indicators and Completion Criteria

Section 6: Management Framework

Section 7: Management Actions

Section 8: Other Compensatory Measures

Section 9: Offset Area Reporting

Section 10: Conclusion

Section 11: Consent

2.6 Regulatory and policy context

This document has been prepared taking into account the following technical guidelines and legislation:

- *EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DEE, 2014);*

- *Draft recovery plan for the grey-headed flying-fox Pteropus poliocephalus (DEE, 2017);*
- *EPBC Act Environmental offsets policy, 2012;*
- *Policy statement*: Advanced environmental offsets under the *Environment Protection and Biodiversity Conservation Act 1999;*
- *Vegetation Management Act 1999 (legally securing the offset through a Voluntary Declaration under Section 19F);*
- *Queensland Environmental Offsets Act 2014; and*
- *Queensland Environmental Offsets Regulation 2014.*

3 Implementation Objectives

3.1 Overarching objectives

Overall, implementation of this OMP will reduce key threats to the recovery of the koala and GHFF as described in the EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DoE, 2014) and the Draft Recovery Plan for grey-headed flying-fox 2017 (DEE, 2017). The objective of achieving net gain in habitat is described by the EPBC Act Environmental Offsets Policy (Doe, 2012a) and verified through use of the Offsets Assessment Guide (DoE, 2012b).

Management objectives have been developed to align with the requirements of the EPBC Act Environmental Offsets Policy. Actions will result in a net gain of the overall koala and GHFF habitat quality on the property. The management timeframe is set out in this OMP as twenty (20) years of management, maintenance, monitoring and reporting.

Environmental Offsets Policy Requirement	Delivery
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.	The offset area will directly contribute to the ongoing viability of the koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus*). Protection and management of the offset area in accordance with the OMP and associated activities will deliver an overall conservation outcome for a very large area of koala habitat and GHFF foraging habitat which is currently not managed or protected. Specifically, this will encourage regeneration and restoration of habitat that will contribute to a larger corridor, remove threats and encourage the use of improved and new areas of habitat by the species. These activities will result in improvements to the MHQA scores from the baseline. The offset will improve the viability of the koala: • In OMU1/Category B from a start quality of 7 to 9; • In Category C from a start quality of 6 to 9; and • In Category X areas from a start quality of 2 to 7. The offset will improve the viability of the GHFF: • In OMU1/Category B from a start quality of 8 to 9; • in OMU 2/Category C from a start quality of 5 to 8; and • in OMU3/Category X areas from a start quality of 2 to 7.
Suitable offsets must be built around direct offsets but may include other compensatory measures	The offsets is built around direct offsets and meets 120.70% and 102.03% of the offset requirements for the koala and GHFF, respectively, as determined using the EPBC Offsets Assessment Guide. The offset will be legally secured for the duration of the impact (refer Section 7.5 for detail). Securing and managing the offset area in accordance with the OMP will permanently protect the area from incompatible land uses and will contribute to the ongoing viability of South-east Queensland's koala and GHFF populations. It will also contribute to the long-term ecological function of a broader network of wildlife corridors connected to the offset areas through the Little Liverpool Range, a large continuous and ecologically important habitat covering over 20,500 ha within a State significant corridor.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	Assessment against EPBC Act Offsets Assessment Guide determined the probability of annual extinction of the koala and GHFF as 0.2%. This measurement was used in the Offset Assessment Guide, ensuring that the level of statutory protection that applies to the protected matter was taken into account. All threats set out in the Department's SPRAT Database and the EPBC Act referral guidelines for the vulnerable koala have been addressed in the OMP. In relation to GHFF, identified recovery actions have been addressed in the OMP.

Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	Through permanent protection and long-term management, the offset will deliver a conservation gain that adequately compensates for impacts on koala and GHFF habitat arising from the action. The total area to be permanently protected and managed is 686.44ha. This will compensate the 138 adjusted quantum impact hectares. The offset area delivered will satisfy the 90% minimum direct offset area requirement, delivering 120.70% and 102.03% for the koala and GHFF, respectively. Management actions set out in the OMP aim to protect and enhance koala and GHFF habitat which will substantially exceed the quality of the habitat originally impacted by the action. The offset area will provide: • Large area of well-managed koala and GHFF habitat connected with the Little Liverpool Range, a large continuous and ecologically important habitat covering over 20,500 ha within a State significant corridor. • Legal security for the duration of the impact (refer Section 7.5 for detail) • Long-term reduction of threats and a net gain in koala population density within the offset area. • Control of introduced predators to reduce impact on koala populations • Reduced risk of koala mortality or injury due to vehicle strike • Reduced risk of high intensity fire though management of fuel loads • Reduced risk of the spread of koala and vegetation diseases and or pathogens.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding	Confidence in the success of the offset has been assigned a value: • in Category B and C areas, 75%; and • in Category X areas, 70%. These scores are considered reasonably conservative given the detail and intensity of the management actions set out in the OMP. The score is supported by the design and management of the offset within a contiguous landscape with good connectivity of koala and GHFF habitat to the broader landscape. Operational management units have been determined in order to identify management actions suitable to different areas and existing habitat qualities within the overall offset. All OMUs are managed in a way that will achieve habitat scores of 9 for OMU1 and OMU2 and an 7 for OMU3 for the koala and a 9 for OMU1, an 8 for OMU2 and a 7 for OMU3 for the GHFF. Risks associated with offset delivery will be mitigated and managed by way of detailed management actions set out in the OMP. Management responses set out in the OMP are clearly framed against stated outcomes being to protect and conserve large, connected areas of koala and GHFF habitat able to support improving populations that are genetically diverse and free or with very low incidence of disease. The 75% score in Category B and C areas was given to allow for risks primarily relating to natural events such as flood, drought, severe storms etc (-10% confidence adjustment) and in respect of potential impacts of cattle grazing as a bushfire fuel reduction tool (further -15% confidence adjustment). The 70% score in Category X areas reflects the potential for risks to have greater impact on revegetated areas.
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	Legally securing the offset for the duration of the impact will ensure future owners are prohibited from clearing. Management beyond minimum legislative requirements is proposed across the whole area to ensure loss of habitat values does not occur through intensification of weeds causing loss of connectivity, destruction of habitat via hot intensive fires, increased risk of mortality or injury by dog attack etc.

Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	• Efficient and Effective: design of a large, connected offset area and the OMP (particularly use of OMUs) will ensure efficient delivery of management actions over a large area. Proactive management and monitoring will ensure response actions are timely and focused. • Timely: the mix of vegetation qualities and the scale of the offset provides for management to yield conservation gain in as short as possible time. The offset will be secured promptly following approval of the Offset Strategy and management processes under this OMP will commence following registration of the Voluntary Declaration (refer Section 7.5). Adaptative management processes will ensure that management actions are able to be adjusted to account for improvements in technologies, processes, academic understanding etc. • Transparent: a clear monitoring and reporting framework has been established as part of the OMP. This provides for regular reporting to the DEE. • Scientifically Robust: the proposed offsite offset area has been assessed by numerous qualified parties, including the Koala Ecology Group (University of Queensland), Ausecology and OWAD Environment Consultants. Ongoing management and monitoring actions will be conducted in collaboration with these and other groups to achieve enduring long-term outcomes that are beneficial for the local koala and GHFF population. As part of our own monitoring and reporting on the outcomes of the offset, we will feed into ongoing scientific research into the impact and effectiveness of a range of koala and GHFF recovery actions • Reasonable: The offset is reasonable being greater than the significant residual impact on koala habitat. The offset design has been based upon achieving conservation outcomes for the Little Liverpool Range. The proposed offsite offset will provide greater connectivity within the Little Liverpool Range and enhance food and habitat necessary to support koala and GHFF populations.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The OMP contains a detailed monitoring and reporting framework. The reporting framework sets out stated outcomes and associated performance indicators. These provide clear benchmarks as to the success or failure of actions. Response actions are also set out and these will also be reported. Contractual requirements as between the proponent and the Queensland Trust for Nature (which will manage the offset) will account for compliance with the approval conditions. QTFN is a not for profit organisation and its strategic purpose is permanent conservation and protection of strategic wildlife corridors. Critical to demonstrating that we are aligning with this strategic goal is showing that we are delivering offset areas in a way that achieves conservation gain. As part of our reporting, we will provide information to the DEE that will transparently demonstrate our compliance with the offset approval conditions and our progress towards successful delivery of the stated offset outcomes and habitat quality improvements.

3.2 Summary of outcomes

The offset will revegetate and restore 686.44ha of koala and grey-headed flying-fox habitat, including one 'Endangered' (RE12.3.3) and two 'Of Concern' (RE12.8.16 and RE 12.9-10.7) Regional Ecosystem (*VMA 1999*). Broadly, the outcomes from the management plan will result in a net gain in koala and grey-headed flying-fox habitat and a reduction in threats. Koala and grey-headed flying-fox habitat attributes are identified using the Modified Habitat Quality Assessment Tool (MHQA). These include a weighted assessment of:

- Site Condition (30% for koala, 40% for GHFF)
- Site Context (30% for koala and GHFF)
- Species Stocking Rate (40% for koala, 30% for GHFF)

Consideration has also been given to attributes of the Koala Habitat Assessment Tool (DEE, 2014), including:

- Occurrence
- Vegetation composition

- Habitat connectivity
- Attack by feral animals
- Vehicle strike
- Barriers to dispersal
- Fire (in particular high intensity fire)
- Introduction of spread of disease or pathogens
- Recovery value

4 Property context and offset suitability

4.1 Property location and description

The offsets are located within a 2000-hectare cattle farming property known as "Aroona" (Appendix C). The property was donated to the Queensland Trust for Nature in 2015. The Trust continues to operate the cattle grazing enterprise, which it will adapt in order to implement this OMP (*Table 3-1*).

Aroona is located approximately 20km south of the town of Grandchester (Appendix A). It lies within the Franklinvale catchment of the Moreton Basin sub-region of the South East Queensland bioregion. The property contains a mix of rocky outcrops along steep ridges, undulating hills, and alluvial flats. Aroona is situated within the Little Liverpool Range, a continuous and ecologically important tract of vegetation, covering over 20,500ha within a State Significant corridor (EHP, 2016a). The Little Liverpool range is connected to Main Range National Park, which is part of the World Heritage Gondwana Rainforest of Australia and extends 70 kilometres from the New South Wales border to the north of Cunningham's Gap (DEH, 2000).

Land use in the area is primarily agriculture and animal husbandry; consequently, the lower slopes have been fragmented and substantially degraded.

Table 4-1 – property details

Property details	
Property name:	Aroona
Tenure:	Freehold
Property Address:	338 Alpers Road, Mount Mort
Primary Local Government Area:	Ipswich City Council & Lockyer Valley Regional Council
Planning Scheme Zone:	ICC: Rural B and Rural E; LVRC: Rural Uplands
Offset area (ha):	Total offset area: 686.44 ha (Appendix C)
Offset Area title references:	Part of lot 54 on CC1018, Part lots 44 and 45 on CC32, Part of Lot 6 on RP21558, Part of lot 13 on RP21558, Part of lot 31 on CH312311, Part lot 216/CH311631, Part of 218 on CH311734, Part lot 222/CH311798, Part lot 30/CH312310, Part lot 64/CC552
Landholder details	
Registered Owner/s on Title: Landscapes Queensland Ltd as the Trustee for the Queensland Trust for Nature ACN 630 495 340	
Phone Number: 1300 601 669	**Mobile phone:** 0404 622 132
Email: steve@qtfn.org.au	**Contact person (if required):** Steve Lacey (CEO)
Postal Address: GPO Box 162, Brisbane, QLD 4001	

4.2 Suitability as an offset

The property is suitable for the implementation of this OMP and will deliver a tangible and measurable benefit for the koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus)*. Targeted land management actions will be implemented to result in a net gain in koala and GHFF habitat quality. Permanent legal protection of the offset areas from incompatible land uses will contribute to the ongoing viability of koala and GHFF in South-east Queensland (refer Section 7.5 for detail). . Appendix B shows the proposed offset area.

The location of the offset areas within the property will form several non-adjoining parcels within the property. Each area is sufficiently large to provide sustainable habitat independently, and the areas are connected by vegetated corridors which will allow animals to move across the landscape.

The offset areas comprise of a mix of six regional ecosystems, one listed as Endangered and two of which are listed as 'of concern' under the *VM Act 1999* (Table 3-2). Vegetation within the offset area is classified as either:

- Category B/remnant
- Category C/regrowth
- Category X/cleared and pasture areas

Table 4-2 – Vegetation within the offset areas

Regional Ecosystem	VMA category	Vegetation Management Act Class	Biodiversity Status	Short Description
12.3.3	Regrowth and Cleared	Endangered	Endangered	*Eucalyptus tereticornis* woodland on Quaternary alluvium
12.3.7	Regrowth and Cleared	Least concern	Of concern	*Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana* +/- Melaleuca spp. fringing woodland
12.8.9	Remnant	Least concern	No concern at present	*Lophostemon confertus open forest on Cainozoic igneous rocks*
12.8.16	Remnant and Regrowth	Of concern	Of concern	*Eucalptus crebra +/_ E. melliodora, E. tereticornis* woodland on Cainozoic igneous rocks
12.8.17	Remnant, Regrowth and Clearedd	Least concern	No concern at present	*Eucalyptus melanophloia +/- E. crebra, E. tereticornis, Corymbia tessellaris woodland on Cainozoic igneous rocks*
12.9 – 10.7	Regrowth	Of concern	Of concern	*Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora spp., E. melanophloia woodland on sedimentary rocks*

4.2.1 Koala habitat values

Property wide field surveys conducted by Ausecology ecological consultants in April and June 2016 confirmed suitability of Aroona for koala offset. Further confirmation has occurred through work conducted by the Trust and associated parties including ongoing regular scat surveys and deploying koala scat detection dogs in the greater area. Live koalas have been identified, and density surveys to determine koala occupancy and abundance were conducted across the property using the SAT method. The field surveys included tertiary and quaternary vegetation surveys, fauna habitat assessments, a night survey, high-level weed surveys and BioCondition Assessments in accordance with Eyre *et al.* (2015). Further detail in relation to the field surveys is presented in the report *Property Management Plan for the 'Aroona' Property, Mount Mort, Queensland* (Ausecology, 2016b).

The quality of habitat was assessed using the Modified Habitat Quality Assessment, adapted from the 'Guide to determining terrestrial habitat quality' under the Queensland Governments Environmental Offsets Policy (2017). The Guide is used to determine habitat quality scores to inform the impact assessment and determine any residual significant impacts on the Matter. The methodology divides the site into Assessment Units in accordance with the State Regional Ecosystem (REs) and vegetation types (remnant, regrowth and cleared), and derives quality scores from the site. A weighted average of the Assessment Units is used to obtain a final quality score for the impact (and offset site).

The Modified Habitat Quality Assessment (MHQA) is an adaptation of the DEHP Guide that better reflects the EPBC Offsets Policy requirements for determining quality scores. This includes consideration of the site condition, site context and species stocking rate.

Using the Modified Habitat Quality Assessment (MHQA) scoring, **a score of 2** was calculated for the currently cleared areas, **a score of 6** for the regrowth areas, and **a score of 7** for the remnant areas for the koala. A **score of 2** was calculated for the cleared areas, a **score of 5** for the regrowth areas and a **score of 8** for the remnant areas for the GHFF. Management actions will improve the MHQA score for both areas. Justifications of the MHQA scores is within the offset strategy document.

The combined results of the ecological assessments confirm that the offset areas contain or will contain high value habitat for koalas, and that it is therefore suitable for the purpose of functioning as a koala offset area.

4.2.2 Threats to koala habitat

Various threats to koala habitat were identified based on ecological field study (Ausecology 2016a). These threats directly relate to EPBC policy documents including the Koala Habitat Assessment Tool and the EPBC Act referral guidelines for the vulnerable koala. Threats present within the proposed offset area include:

- Vegetation condition – Weed incursion currently supressing recruitment of koala food and shelter trees, restricting movement of koalas and contributing to intense wildfire and the destruction of habitat
- High intensity fires directly and indirectly threatening koala survival
- Koala occurrence – relating to presence of koalas in the landscape;
- Vegetation composition - Potential risk of future clearing due to Regulated Vegetation Management classification (Category X) and associated permissible land uses;
- Habitat connectivity - Habitat fragmentation due to historic clearing/logging on the property;

- Attack by feral animals - Presence of feral pest animal such as foxes (*Vulpes vulpes*), wild dogs (*Canis lupis familiaris*) and cats (*Felis catus*) based on database records and recorded koala mortality possibly due to dogs/foxes.
- High intensity fires directly and indirectly threatening koala survival;
- Introduction of spread of disease or pathogens – including chlamydia and myrtle rust; and

The OMP management actions described in Section 7 aim to enhance koala habitat quality via the reduction of the threat level from each of the above-mentioned processes. Additional threats cited by the *EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (DoE, 2014) have also been addressed.

4.2.3 GHFF habitat values

The GHFF (*Pteropus poliocephalus*) is a canopy-feeding frugivore and nectivore. Patterns of use of food trees are complex and unpredictable, meaning the core habitat for GHFF is difficult to define (Duncan *et al.* 1999). This species has no adaptations for enduring periods of food shortage and migrates in response to the location and frequency of blossoms (Eby 1991; Eby and Lunney 2002; Spencer *et al.* 1991). They are known to commute daily to foraging areas, usually no more than 15km away from their roost site (Tidemann and Nelson 2004), though they are capable of night flights to feeding areas over 50km away (Eby, 1991; Parry-Jones and Augee, 1992). Heavy blossoming can result in the establishment of large colonies (e.g. 80,000 individuals in Parry-Jones and Augee, 1992), and high quality and abundant supply of food in a single location can modify the generally vagrant behaviour of the species, particularly in urban areas (Parry-Jones and Augee, 2001). GHFF also eat cultivated fruits, causing direct losses to horticulturalists (Ullio, 2002), however they prefer the nectar and pollen from native trees and attack commercial crops only when native sources are scarce (DEHP, 2017)

The GHFF is listed as vulnerable under the provisions of both the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Queensland Nature Conservation Act 1992* (NC Act). The species has a large established range between Bundaberg in Queensland to Melbourne in Victoria (DEHP, 2017). A decline of the total population has been shown across its range from surveys conducted in 1989 then during 1998-2001. The rate of decline is estimated at 30% (DEHP, 2001).

The offset area is a potential food resource for five colonies of GHFF, located between 8 and 15km away from the offset area (DEHP, 2016b). By overlaying state-based habitat quality mapping for GHFF included in the habitat assessment for the species (Figure 6.7, Eby and Law, 2008) it was confirmed that Aroona and its locality contains high value GHFF habitat. In this study, habitat was ranked as four categories, based on the presence of vegetation types with high-quality habitat trees. The Rank 1 and 2 habitat categories (highest) account for 1,444,000ha and 533,000ha respectively within South-east Queensland. High quality food sources for the species are productive, reliable and produce for lengthy periods of time. Eby and Law (2008) ranked all Eucalypts according to these parameters. Table 3-3 includes all those plants ranked as high quality, whether this species exists within the offset area, and the specific Regional Ecosystems (RE) that each occurs within.

The suitability of the property as an offset for GHFF habitat was determined through field surveys undertaken by Ausecology in April and June 2016. These surveys included tertiary and quaternary vegetation surveys and BioCondition Assessments in accordance with Eyre *et al.* (2015), and identified features of GHFF habitat as present, including a wide variety of eucalypt trees which flower at different times of the year in substantial quantities (Ausecology, 2016a). The regional ecosystems included in the offset area contain GHFF food trees as

dominant species, and high-value food tree species have been confirmed on site (Table 3.3). Justification for the improvement of GHFF habitat within the offset area is outlined in the offset strategy document.

*Table 4-3 Significant food plants included in the blossom diet of GHFF. Those with long-term data identified as highly significant plants marked with **. List of relevant regional ecosystems (RE) present within the offset area with food plants confirmed present (P) or to be planted during revegetation activities (R).*

Species	RE tree is present within	Present in OMU 1 or 2
FABACEAE		
***Castanospermum australe*	-	-
PROTEACEAE		
***Banksia integrifolia*	-	R
Grevillea robusta	-	-
MYRTACEAE		
Corymbia citriodora	12.3.3	P[1]
***C. gummifera*	-	-
C. intermedia	12.3.3 12.8.17 12.8.14	P
C. maculata	-	-
***C. variegata*	-	P
Eucalyptus andrewsii	-	-
E. camaldulensis	-	-
E. crebra *E. deanei*	12.8.16/12.8.17	P
E. moluccana	12.3.3 12.8.14	R
E. pilularis	-	-
E. robusta	-	R
E. saligna	-	-
E. seeana	-	-
***E. siderophloia*	12.3.3 12.8.14	P
***E. tereticornis*	12.3.3 12.3.7 12.8.14 12.8.16 12.8.17	P
Malaleuca quinquinervia	-	-
Syncarpia glomulifera	-	-
***Lophostemon confertus*	12.8.9	P

1. *Corymbia citriodora* sub. sp. *variegata* is present on-site, but it is not the sub-species specified by Eby & Law (2008) as the highest-quality food source *C. citriodora* sub. sp. *citriodora*

4.2.4 Threats to GHFF habitat

The GHFF Recovery Plan (DEE, 2017) lists multiple threats to GHFF populations. Threats that are identified on the offset area or assumed based on the ecological field study (Ausecology 2016a) include:

- Habitat loss and degradation due to historic clearing and lack of management;
- Habitat fragmentation due to historic clearing/logging on the property creates competition for food sources;

- High intensity fires indirectly threatening GHFF through the destruction of food resources; and
- Entanglement in barbed-wire fences.

Additional threats cited by the GHFF Recovery Plan include shooting and culling to protect commercial fruit trees, camp disturbance and electrocution from powerlines. These are not included as identified management actions in the OMP as they do not occur within the offset area. There are no commercial fruit trees and no powerlines. Camps have not been identified and relocation of a camp would be inconsistent with the land use and management of the property.

5 Offset Key Performance Indicators & Completion Criteria

5.1 MHQA Key Performance Indicators

MHQA KPIs are provided for each assessment unit for Year 0, 5, 10, 15 and 20 in Appendix E.

The Year 0 Baseline represents the current state of the offset and has been determined by field surveys and technical reports. Justifications for assigned values and scores have been provided in Technical Document 2.

Year 20 KPIs have been developed by specialists in environmental management and are considered reasonable and achievable outcomes within the 20-year management period, cognisant of the Year 0 Baseline attributes and subject to appropriate management actions. Justifications for Year 20 target MHQA KPIs have been provided in Technical Document 2 and supported by information within this OMP. Appropriate management actions are provided at Section 7. Achievement of Year 20 KPIs will be measured by completion of a MHQA for Koala and GHFF at Year 20.

Interim year KPIs (Year 5, 10, and 15) have been determined for each assessment unit by specialists in environmental management and set out reasonable expectations for the incremental improvement of the offset required to achieve the Year 20 KPIs. The KPIs seek to provide regular status checks of performance against stated targets and seek to provide all stakeholders with comfort that the offset is on track to meet the stated Year 20 targets. Achievement of KPIs will be measured by completion of a MHQA for koala and GHFF at each of the milestone years. Corrective actions and / or adaptive management processes will be triggered if interim year KPIs are not met.

5.2 Other (non-MHQA) Key Performance Indicators

Management actions enclosed at Section 7 include several key performance indicators which are not able to be properly represented within the MHQA KPIs. Such KPIs include items such as legally securing the offset, targeting zero incidence of wildfire, and zero incidence of koala mortality at the offset. The subject KPIs can be found in the Performance Indicators section of each management action.

5.3 Commencement of the Offset

The offset will commence on the date the offset is legally secured by Voluntary Declaration (VDec) under the *Vegetation Management Act 1999* (VDec to be registered prior to commencement of Stage 2 of the action).

Stage 2 of the action will not commence until the VDec is registered.

5.4 Completion of the Offset Management Period

The offset management period under this Offset Management Plan will be considered complete on satisfaction of the following criteria:

1. Year 20 MHQA KPIs have been achieved for both koalas and grey-headed flying-fox, and outcomes can be demonstrated to the Department; and

2. Legal security has been transferred to another enduring protection mechanism (such as a Nature Refuge or the most equivalent level of protection available at the time and as agreed by the Department).

Note that any legal security mechanism must be in place for the duration of the impact and legal security documentation should include the following:

- commitments that legal security of the offset area will be in place for the duration of the impact
- details of management activities to be undertaken to achieve and maintain the outcomes prescribed within the Offset Strategy for the koala and grey-headed flying-fox.

Should the completion criteria above not be met at the end of the proposed 20-year management period, Queensland Trust for Nature will engage with DAWE to determine suitable criteria for resolution and finalisation of the offset.

Note – there are numerous references in this Offset Management Plan and the Offset Strategy to the management period. Where any conflict exists between this Section 5.4 and other references to the management period, this Section 5.4 will prevail.

6 Management Framework

This section will outline the management framework to be implemented for the duration of the management period of twenty (20 years).

In order to address the area-based management objectives the offset areas have been delineated into Operational Management Units (OMUs), each with a defined set of management actions designed to progress the unit towards the objectives in the most efficient way possible, with the common objective to achieve a net gain in koala and GHFF habitat quality.

Critical elements of the OMP are:

- Legal protection of the existing remnant and mature regrowth koala and GHFF habitat from incompatible land management practices such as vegetation clearing, logging and grazing.
- Assisted natural regeneration of existing vegetation though active management of key threatening processes such as fire, weeds and feral pests.
- Revegetation and management of existing cleared areas to deliver a self-sustaining forest within the management period that is representative of pre-clearing Regional Ecosystems including the presence of koala and GHFF food and shelter trees.
- Reduction of threats to koala and GHFF.

The management actions will result in a net gain of the overall habitat quality for koala and GHFF over twenty (20) years of active management, maintenance, monitoring and reporting. Operational scheduling is outlined in Section 7, and tabulated in calendar format in Appendix C.

6.1 Management Approach

The delivery of the offset is over three main vegetation types, which are broken down into Operational Management Units (OMUs) to reflect the different actions required to reach the outcome (Appendix D). The OMUs reflect the Regulated Vegetation Management Maps:

- OMU-01: Remnant/Category B vegetation
- OMU-02: Regrowth/Category C vegetation
- OMU-03: Cleared pasture/Category X vegetation

Maps of the OMUs presented across the offset area are located in Appendix D.

6.1.1 OMU-01

Overall, OMU-01 is in average condition as per the 2016 ecological assessments (Ausecology, 2016a), resulting in MHQA scores between 50 and 60 out of a potential 80 for Site Condition using the MHQA tool. The management of this OMU will aim to enhance this score to a 77.5/80.

OMU specific actions include weed control, with a particular focus on *Lantana camara* (lantana), ecological burns, and fire management through the installation and maintenance of fire breaks and hazard reduction actions.

6.1.2 OMU-02

OMU-02 was mapped as Category C regrowth vegetation (non-remnant) with mid to high levels of weed infestation. Overall, OMU-02 is in average to degraded condition as 2016 ecological assessments (Ausecology, 2016a). Scores for Assessment Units within OMU2 ranged from 36 to 52 out of a potential 80. The management of this OMU will aim to enhance the score to between 72.5 and 77.5 for the Assessment Units. The vegetation will be managed to result in remnant status. This will be achieved through undertaking weed control actions (particularly focusing on *Lantana camara* (lantana) and *Schinus terebinthifolius* (broad-leaved pepper tree) treatment, which should increase the regeneration of the vegetation community associated species. In addition, management actions will include ecological burns to promote regeneration, and fire management through the installation and maintenance of fire breaks and potentially undertaking hazard reduction actions.

6.1.3 OMU-03

OMU-03 was mapped as non-remnant, dominated by cleared grazing paddocks with limited natural regeneration. The focus of management actions in this OMU will aim to increase the tree coverage across the site with particular focus on koala and GHFF food and habitat trees. Other management actions to be undertaken in this OMU are weed control, with a particular focus on *Lantana camara* (lantana) and *Schinus terebinthifolius* (broad-leaved pepper tree), protecting the area against a fire through the installation and maintenance of firebreaks and conducting hazard reduction burns in surrounding OMUs. Ecological burns followed by direct seeding will be conducted in some areas of OMU-03 as part of the revegetation plan. After planting and direct seeding, no ecological burns are recommended in this area, since this will negatively impact on the recently planted trees and shrubs.

Specific outcomes for OMU-03 include:

- Increase the tree coverage across the site with a particular focus on koala food and habitat trees
- Increase the connectivity between currently vegetated areas thereby facilitating the increased movement of koalas between the vegetated areas in the short-term and providing food and shelter trees in the medium to long-term.
- Reduce the density of lantana through increased tree and shrub competition.

6.2 Weed management

Lantana has the capacity to fuel forest fires, creating hotter and larger fires that native vegetation is unable to withstand (Berry et al 2011, DAF 2016). Until vegetation reaches large tree status, management is required to reduce overall weed species and ensure the improvement of koala habitat. Improvements to this vegetation category will be realised through increases in the large tree score, resulting in greater abundance of food and shelter habitat, the reduction in invasive weed species that limit koala movement and a reduction in other threatening processes. *Lantana camara* is widespread and present across all regional ecosystems and vegetation categories (see Photos below).

A detailed survey of weed coverage at Aroona was conducted in mid-2019 by the University of Queensland Conservation Masters researchers (Summary UQ 2019). The report used remote sensing data and ground truthed surveys to produce a detailed analysis about the level of lantana camara across the property. The results highlight:

- Over 117ha of lantana camara ground truthed onsite
- Of the 117ha known, the infestation density is >50% of coverage
- The data confirms with high confidence that >50% coverage through most of Aroona's remnant, regrowth and some parts of cleared alluvial plains.

Lantana camara is considered a key threatening process to koalas, impacting movement between trees and prolonging time spent on the ground, making them susceptible to predators (Paull et al 2019, The Honourable Leeanne Enoch 2019). The Queensland Draft Koala Strategy 2019-2024 lists koala habitat restoration, including removal of weeds, as a key priority, and these recommendations were developed at the advice of the koala expert panel (Queensland Government 2019). As well as presenting a barrier to movement, Lantana also changes the structure and health of the ecosystem, which will lead to a decline in the health and quality of koala food and habitat. Lantana is a transformer weed, that changes wildfire behaviour resulting in destruction of native trees (Berry et al 2011, DAF 2016). It also supresses eucalypt recruitment, both through its alleleopathic properties and its capacity to shade out other species. This prevents eucalypt recruitment, leading to an overall decline in habitat health if not managed (Threatened Species Scientific Committee, 2010). If eucalypt species cannot recruit, there will be no succession of vegetation, meaning the future health of the ecosystem is under threat.

There are currently no regulated state requirements at the offset site for controlling lantana camara, broad leaved pepper tree or Chinese elm. These weeds are the main threat to the movement of koalas. Under the Queensland *Biosecurity Act 2014*, *Lantana camara*, broad leaved pepper and Chinese elm are classified as a class 3 declared pest. Landholders are not required to control class 3 declared pest plants on their land. Weed management within the offset area will be additional to the current land management practices and align with the EPBC Environmental Offset Policy.

6.3 Broad regeneration strategies

OMU-01 & OMU-02 strategy is to focus on restoring ecological heath through the removal of weeds, removal of grazing pressure and through conducting ecological burns. Supplementary direct seeding and/or planting will occur if required. The strategy will deliver the stated outcomes within 20 years. More detail for the strategy is found in section 7.

OMU-03 areas are spilt into two broad management strategies:

1) *Active revegetation through planting around the creeks in the preclearing regional ecosystem 12.3.7.*

2) *Targeted burning followed by direct seeding in high and inaccessible country in preclearing regional ecosystem 12.8.17, 12.3.3 and 12.3.7.*

6.4 Introduced predator control

Wild dogs/dingoes, feral foxes and feral cats are restricted invasive animals under the Biosecurity Act 2014 and do not require specific control measures. It states “The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive animals under their control”. The adaptive predator control measures, rigorous monitoring and coordinated landscape approach that will be implemented at the offset site go far beyond the minimal requirement of reducing the risks associated with invasive animals.

Monitoring data indicates that introduced predators pose a significant threat to koalas in the offset area. Packs of wild dogs numbering up to nine individuals have been recorded in multiple locations on the site. Historically there has been no management of introduced predators due to the preference by previous landholder not to manage them. Potential mortality by fox/dog has been recorded on the site in June 2017 at long 152.415808 and lat -27.863353. An adult male koala was discovered deceased in apparently healthy condition. As part of the management program baseline monitoring will be undertaken on the property and a relative abundance

index calculated for wild dogs and foxes. Where post control surveys indicate that there has been a recurrence of wild dogs and/or foxes on the site, control measures will be actioned using methods (e.g. controlled shooting and/or trapping) as determined by a pest control professional in consideration of these monitoring results.

Monitoring will be conducted bi-annually using wildlife motion cameras. Cameras will be positioned along tracks at a height of 50 cm and south-facing, to maximise capture. Cameras will be in place for 40 nights for each survey. Opportunistic scat surveys will be conducted, and the scats analysed to determine the diet of predators.

Management and monitoring programs will be ongoing resulting in a decrease in relative introduced predators abundance index from the baseline and no recorded injury or death from feral animal attacks within the offset area. To ensure the sustainability of the threatened species populations, it is critical to ensure management outcomes are maximised. Management of feral animals will be coordinated at a landscape level beyond the bounds of the land owned by QTFN.

Table 6-1 provides a description of the OMUs, as well as an overview of the management objectives and KPIs for each. Specific management actions designed to achieve the OMU objectives are detailed in Section 7, and detailed monitoring and reporting against each action contained in Section 9.

Table 6-1 OMU description and management actions.

OMU	Total Area (ha)	VM Act Description	Regional Ecosystems present	Koala habitat quality score [1]		GHFF habitat quality score [2]		Management action	KPI
				Current	Future	Current	Future		
01 (AU2, AU3, AU5)	359.61	Cat B	12.8.9 12.8.16 12.8.17	7	9	8	9	1. Selective chemical / mechanical weed management 2. Ecological burns 3. Wildfire hazard reduction 4. Direct seeding where natural regeneration is lacking 5. Legal protection from incompatible uses 6. Monitoring and control of introduced predators 8. Koala species stocking rate survey	*For full KPI breakdown see Appendix E*

02 (AU1, AU4, AU6, AU7, AU8)	281.42	Cat C	12.8.16 12.8.17 12.3.7 12.3.3 12.9-10.7	6	9	5	8	1. Selective chemical / mechanical weed management 2. Ecological burns 3. Wildfire hazard reduction 4. Direct seeding where natural regeneration is lacking 5. Legal protection from incompatible uses 6. Monitoring and control of introduced predators 8. Koala species stocking rate survey	*For full KPI breakdown see Appendix E*
OMU	**Total Area (ha)**	**VM Act Description**	**Regional Ecosystems present**	**Koala habitat quality score [1]**		**GHFF habitat quality score [2]**			
				Current	**Future**	**Current**	**Future**		
03 (AU9, AU11, AU12)	45.41	Cat X	Preclear REs 12.3.7 12.3.3 12.8.17	2	7	2	7	1. Selective chemical / mechanical weed management 2. Ecological burns 3. Wildfire hazard reduction 4. Direct seeding where natural regeneration is lacking 5. Legal protection from incompatible uses	*For full KPI breakdown see Appendix E*

								6. Monitoring and control of introduced predators 7. Revegetation 8. Koala species stocking rate survey	

*1 Justification of scores in Offset strategy document. *2 Justification of scores in Offset strategy document.

6.5 Adaptive management

Given the extended management timeline, it is not possible or intended that this OMP will provide a detailed prescription of management actions. This OMP has been based on the current state of knowledge of species ecology and best practice habitat management approaches for koala and GHFF habitat.

It is anticipated that new techniques will become available over the course of the management period to monitor vegetation composition, koala absence/presence and abundance, weed presence etc. To account for this an adaptive management approach has been adopted to ensure future research and practise development can be integrated into management and monitoring actions. This will ensure best practice techniques can be adopted contemporaneously in a way that ensures delivery and measurement of stated offset outcomes.

Adaptive management refers to a way of managing natural resources where management actions are regularly reviewed and, if necessary, modified based on monitored changes in environmental condition and/or changes in base knowledge which underpins the original management approach.

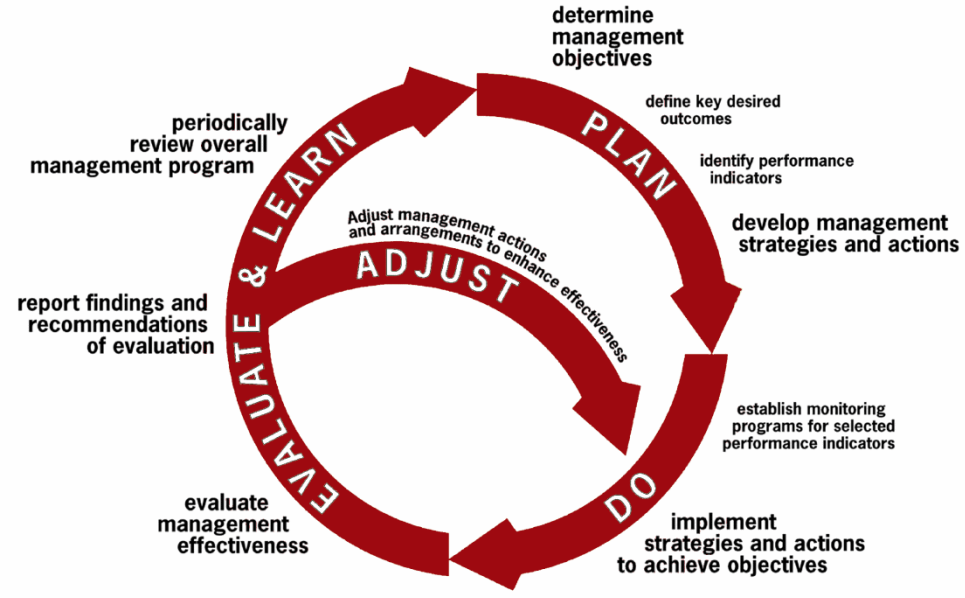

Figure 6-1 Adaptive management process (CSIRO)

7 Management actions

This section provides management actions proposed by specialists in environmental management and, once implemented, are expected to achieve the Year 20 and interim year MHQA KPIs enclosed at Appendix E. Each management action is numbered and referenced within the assessment unit KPIs. For example, where an assessment unit references management action 1, this means that implementation of management action 1 is expected to contribute to the Year 20 MHQA KPI outcome for a MHQA item. Multiple management actions may be referenced against the KPIs.

7.1 Management Action 1: Selective chemical / mechanical weed management

This section refers to activities conducted to improve the habitat of koala and grey-headed flying fox food tree species, specifically the chemical or mechanical treatment of weeds.

Table 7-1 Selective chemical / mechanical weed management

Attribute	Chemical / mechanical weed management
Outcome	▪ Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. ▪ Koala movement in offset areas not impacted by weed cover. ▪ All vegetation layers have excellent and continually improving structure and floristic diversity. ▪ Presence and recruitment of koala and GHFF food and shelter trees. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses. ▪ Domestic livestock excluded from offset area (but for hazard reduction purposes).
Actions	▪ Develop and implement a weed strategy, with a particular focus on weeds with particularly ability to impact on koala movement and structural vegetation composition (mainly Lantana camara and Schinus terebinthifolius), and under the Biosecurity Act 2014, to reduce weed cover to target thresholds. ▪ Undertake weed management according principles outlined in section 7.1 ▪ Note – Ecological burns will also assist in reducing non-native plant cover.
Performance Indicators	▪ Lantana camara and Schinus terebinthifolius cover is reduced across the offset area, and weeds are not impacting on the movement of koalas across the site and not negatively impacting on recruitment of koala and GHFF food and shelter trees. ▪ Year 5, 10, 15 and 20 assessment unit Non-native Plant Cover KPIs achieved (refer Appendix E)
Monitoring	▪ Annual surveys of non-native plant cover to ensure reduction across offset area. ▪ Surveys in-line with weed strategy. ▪ Repeated surveys of baseline data including 5 yearly habitat monitoring data as part of the Offset Area Management Plan.
Reporting	▪ Offset report issued annually. ▪ Monitoring results to be recorded in Offset Area Assessment Report. ▪ Submit all Offset Area Assessment Reports to Mirvac Queensland Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Mirvac Queensland Pty Ltd.
Corrective action	▪ If weed survey indicates weed cover is not reduced since previous survey, weed control program to be expanded/adapted to improve outcomes.
Management Period	▪ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the *Vegetation Management Act 1999* (refer Management Action 5)
Responsibility	▪ Queensland Trust for Nature

Weed Management implementation details

Weeds impacting on koala and GHFF habitat were observed to be moderate to high abundance throughout the Offset Area. Species include *Lantana camara* (lantana) and broad-leaved pepper (*Schinus terebinthifolius*). *Lantana camara* and *schinus terebinthifolius* are of concern to achieving the offset objectives and weed control efforts should focus on the removal of these species during optimum growing conditions Table 7-2).

It is recommended to start the *Lantana camara* control in the following order (in order of priority):

1. Cleared areas that are being revegetated and/or show significant regeneration.
2. Easy to access areas with low to medium infestations (start with areas with low infestation levels before moving to areas of medium infestation levels), to ensure that these areas are not getting worse in the future. Based on the landscape attributes, easy to access creek lines (which provide the best koala habitat based on the presence of *Eucalyptus tereticornis*) are to be treated first before treating other easy to access areas.
3. The remaining areas which will be harder to access. For the harder to access areas, creeklines with *Eucalyptus tereticornis* trees present should have precedence above the other remaining areas.

Infestations of *Schinus terebinthifolius* limited to creeklines of offset area. Recommended guidelines for the removal of *Schinus terebinthifolius* include the following:

1. Prioritise areas of low to medium infestation fringing creeklines to ensure these areas are not getting worse in the future. Based on landscape attributes, start towards the head of the catchment and work downstream.
2. Remaining/highly infested areas treated second. Creeklines containing *Eucalyptus tereticornis* placed in higher priority.

Table 7-2 Management details for Lantana camara and Schinus terebinthifolius

Management Objective	OMU	Operational details	Calendar month	Calendar month	Procedures or guidelines
Lantana camara	**1**	In order of priority as per Section 7.1	Jan	Jul	DAF weed species sheet and guidelines Herbicide label SEQ restoration framework: manual
	2		Feb	Aug	
	3		Mar	Sep	
			Apr	Oct	
			May	Nov	
			Jun	Dec	
Schinus terebinthifolius	**2**	In order of priority as per Section 7.1	Jan	Jul	DAF weed species sheet and guidelines Herbicide label SEQ restoration framework: manual
	3		Feb	Aug	
			Mar	Sep	
			Apr	Oct	
			May	Nov	
			Jun	Dec	

7.2 Management Action 2: Ecological burns

The management action 2 refers to activities conducted to improve the habitat of koala and grey-headed flying fox food tree species.

Table 7-3 Ecological burns

Attribute	Ecological burns
Outcome	▪ Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. ▪ Koala movement in offset areas not impacted by weed cover. ▪ All vegetation layers have excellent and continually improving structure and floristic diversity. ▪ Presence and recruitment of koala and GHFF food and shelter trees. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses. ▪ Domestic livestock excluded from offset area (but for hazard reduction purposes).
Actions	▪ Develop and implement a Fire Management Strategy with particular focus on Regional Ecosystem burning intervals and property fire history. ▪ Undertake ecological burns in accordance with principles outlined in this section.
Performance Indicators	▪ Year 5, 10, 15 and 20 assessment unit MHQA KPIs achieved (refer Appendix E) for: ○ Koala Site Condition ○ GHFF Site Condition ○ GHFF Species Stocking Rate
Monitoring	▪ Surveys conducted pre and post ecological burn to determine recovery gains. ▪ Repeated surveys of baseline data including 5 yearly habitat monitoring data as part of the Offset Area Management Plan.
Reporting	▪ Offset report issued annually. ▪ Monitoring results and location of ecological burns to be recorded in Offset Area Assessment Report. ▪ Submit all Offset Area Assessment Reports to Mirvac Queensland Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Mirvac Queensland Pty Ltd.
Corrective action	▪ If MHQA assessments indicated scores are not meeting predicted KPIs, management expanded to improve outcomes.
Management Period	▪ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the *Vegetation Management Act 1999* (refer Management Action 5)
Responsibility	▪ Queensland Trust for Nature

Ecological burning implementation details

Table 7-4 summarises the fire management guidelines recommended by the Queensland Government in relation to ecological burning for the Regional Ecosystem present at the site. These are mostly in line with the fire interval, intensity and strategy as per Fire Management Plan (QTFN, 2018).

Table 7-4 Queensland government Regional Ecosystem fire management guidelines

Regional Ecosystem	Queensland Government fire management guidelines
12.3.3	**SEASON**: Summer to late-autumn. **INTENSITY**: Low. **INTERVAL**: 3-6 years. **STRATEGY**: Aim to burn 40-60% of any given area. Spot ignition in cooler or moister periods encourages mosaics. **ISSUES**: Control of weeds is a major focus of planned burning in most areas. Maintain ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas.
12.3.7	**STRATEGY**: Avoid intentionally burning this fringe vegetation. Burn surrounding ecosystems in conditions that would minimise fire incursion. **ISSUES**: Protection relies on broad-scale management of surrounding country. However, fire exclusion is not necessary. *Casuarina cunninghamiana* is sensitive to fire and germination after fire is typically low. Triggers unrelated to fire appear to maintain a healthy ecosystem. Issues with lantana and other weeds may result from fire and other disturbance.
12.8.9	**SEASON**: Late summer to autumn. **INTENSITY**: Moderate to high. **INTERVAL**: Minimum 20 years, maximum unknown, requiring further research. **STRATEGY**: Needs disturbance to maintain RE structure (eucalypt overstorey, rainforest dominated but mixed species understorey). It is unlikely that mosaic burns will be achievable because fire would most likely be of higher intensity (i.e., likely to be a wildfire) and is only likely to occur at long intervals (at least 20+ years) during prolonged dry periods. In exceptional circumstances, different localities containing this ecosystem could be burnt to ensure a continuum of habitat availability across the broader landscape. Using this strategy maximises the probability of spatial mosaics in the landscape. **ISSUES**: Operationally there will be many areas of wet sclerophyll that cannot be safely burnt, and will only burn in wildfire. There is evidence that suggests that infrequent high intensity fires sustain the eucalypt overstorey. Wet sclerophyll has been shown to be a moving ecotone between vine forest and moist/dry sclerophyll.
12.8.16	**SEASON**: Summer to late-autumn. **INTENSITY**: Low. **INTERVAL**: 3-6 years. **STRATEGY**: Aim to burn 40-60% of any given area. Spot ignition in cooler or moister periods encourages mosaics. **ISSUES**: A grassy system is especially important for species such as the eastern bristlebird and its habitat. Control of weeds is a major focus of planned burning in most areas. Maintain ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas.
12.8.17	**SEASON**: Summer to late-autumn. **INTENSITY**: Low. **INTERVAL**: 3-6 years. **STRATEGY**: Aim to burn 40-60% of any given area. Spot ignition in cooler or moister periods encourages mosaics. **ISSUES**: Control of weeds is a major focus of planned burning in most areas. Maintain ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas.
12.9-10.7	**SEASON**: Summer to winter. **INTENSITY**: Low to moderate. **INTERVAL**: 4-25 years. **STRATEGY**: Aim for 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 should maintain a mosaic of grassy and shrubby understoreys. Control of weeds is a major focus of planned burning in most areas. Careful thought should be given to maintaining ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas. Variability in season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics.

Ecological burns are to be undertaken during optimum burning conditions to ensure a slow cool burn. The appropriate permits will need to be applied for before starting a burn. It is recommended to burn the areas in a mosaic pattern wherever possible. Before undertaking a burn, the site will need to be prepared, which can involve, but is not limited to the following (not in order of priority):

- Install and/or upgrade fire breaks (using a grader and/or dozer depending on the terrain);
- Clear the firebreaks of any significant debris (using rake hoes, blowers etc);

- Clear any trees in proximity to fire breaks that have the potential to fall onto the fire breaks during a fire thereby potentially blocking safe access
- Rake around any significant habitat trees that have dead wood at the base where fire can travel up the trunk;
- Rake around dead stags that can provide habitat for fauna;

Ecological burning will form a key part in assisting natural regeneration. Management and burn strategy for each of the OMUs are as follows:

- OMU-01/OMU-02: Ecological burn with follow up weed treatment. Timing: First burn to occur in year 2-3 depending on weather conditions, with future burns occurring according to the recommended fire regime.
- OMU-03: Fire exclusion in planted areas around sensitive REs. Cool burn followed by direct seeding to promote regeneration in other areas. Follow-up weed treatment as required. Timing: Year 1-2 depending on weather conditions, with future burns occurring according to the recommended fire regime once trees are fully established.

Monitoring

A fuel hazard assessment (Overall fuel hazard assessment guide methodology) will be conducted on a twice-yearly basis by a suitably qualified environmental manager. Post fire monitoring will occur within 3 months of a burn being undertaken. Follow-up monitoring will occur within 12 months of the original burn.

7.3 Management action 3: Wildfire hazard reduction

The management action 3 refers to activities conducted to reduce the risk of wildfire to the Koala and GHFF, both from direct and indirect impacts to the subject MNES (direct mortality and indirect impact on habitat and food trees).

Table 7-5 Wildfire hazard reduction

Attribute	Wildfire hazard reduction
Outcome	▪ No high-intensity fires occur within the offset area. ▪ No koala or GHFF mortality or injury resulting from fire.
Actions	▪ Incorporate the offset area into the property Fire Management Plan within six (6) months of the offset being legally secured, for the purpose of protecting the offset area from high intensity wildfires as well as for conducting ecological burns with the aim to enhance biodiversity in line with the Regional Ecosystem Description Database fire management guideline. The property Fire Management Plan will be prepared by a suitably qualified professional and will detail: 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 and biodiversity outcomes sought for the offset area. ▪ Hazard reduction action will take place to reduce fuel loads based on Overall Fuel Hazard Assessment (Hines et al 2010). Hazard reduction action to follow flowchart outlined in Section 7.3 ▪ Install firebreaks and fire trails (access tracks). ▪ Prescribed burning will be undertaken in consultation with, and under the guidance of the Queensland Rural Fire Brigade and in compliance with the *Fire and Emergency Services Act 1990*. ▪ Inspect firebreaks and access tracks, undertake any maintenance required to achieve compliance with Fire Management Plan.
Performance Indicators	▪ No recorded high-intensity fires in the offset area. ▪ No recorded injury or death from fire. ▪ Implementation of Fire Management Plan reduces fuel levels. ▪ Vegetation composition not negatively affected by fire regime. ▪ Minimise the risk of koala and GHFF mortality within the offset area due to prescribed burning. ▪ Year 5, 10, 15 and 20 assessment unit MHQA KPIs achieved (refer Appendix E) for: ○ Koala Site Condition ○ Koala threat level ○ GHFF Site Condition ○ GHFF threat level ○ GHFF Species Stocking Rate
Monitoring	▪ To be informed by the property Fire Management Plan. ▪ Fuel hazard monitoring will occur on a twice-yearly basis by suitably qualified environmental manager.
Reporting	▪ Report on prescribed burn results (area covered, any potential negative impact, intensity of burn, learnings) ▪ Report any high intensity (wildfire) to the relevant authorities and report on any impact on the offset area.

	▪ Monitoring results and maintenance log will be detailed within the Offset Area Assessment Reports. ▪ Submit all Offset Area Assessment Reports to Mirvac Queensland Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Mirvac Queensland Pty Ltd.
Corrective action	▪ If a wildfire occurs in the offset area, the following actions will be taken by the landowner: ▪ Be prepared to engage in fire control. ▪ Repair any fire breaks and access tracks. ▪ Stay informed through the Rural Fire Service. ▪ Assess damage caused by the wildfire and monitor for natural regeneration. Monitoring to occur 3-6 months post event or after the next wet weather event (whichever is sooner). ▪ Where natural regeneration is failing to thrive, assist natural regeneration through direct seeding and planting where required to restore healthy ecosystem as outlined in Section 7.3 ▪ Incorporate burnt area into fire management plan.
Management Period	▪ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the *Vegetation Management Act 1999* (refer Management Action 5)
Responsibility	▪ Queensland Trust for Nature

Fuel hazard and fire management implementation details

Fire management of the offset area is critical in achieving the intended outcomes and conservation gains over the 20 year management period. Managing the vegetation to promote natural regeneration and reduce the impacts of uncontrolled wildfire within the offset area will ensure management objectives are achieved.

QTFN's proactive fire management to date has assisted in averting devastating wildfire impacts on the property. The 2019/2020 summer of wildfires saw a wildfire pull up just short of the property boundary when it reached an area of previously burnt fuel. Ensuring that the offset area has a strong fire management strategy and that the impacts of lantana camara in increasing intensity of fires are managed is key to ensuring the health of koala and GHFF habitat. With over 80% of koala habitat impacted nationally by the 2019/2020 fire season (Australia Koala Foundation 2020), the importance of fire management in reducing key threatening for the species is high. Three strategies are related to fire management at the offset site:

- Conduct ecological burns;
- Undertake hazard reduction action through burning and grazing to reduce biomass; and
- Fire exclusion.

The Sections below briefly summarise each of the above strategies. The offset will be regularly assessed for fire fuel loads.

Hazard reduction actions

Hazard management is required to reduce the overall biomass within the offset area to prevent large, uncontrolled and destructive wildfires, and crown fires which have detrimental impacts on koalas and koala and grey-headed flying-fox habitat. To date, QTFN's proactive fire management has assisted in averting devastating wildfire impacting on the property. The 2019/2020 summer of wildfires saw a wildfire pull up just short of the property boundary when it reached an area of

previously burnt fuel. Ensuring that hazard reduction actions occur is a top priority in managing the offset area for koala and GHFF habitat.

Instead of conducting a full ecological burn through a larger area of the offset, hazard reduction action can be undertaken to reduce the locally abundant fire fuel loads and in turn reducing the risk of a high intensity wildfire spreading throughout the offset. Hazard reduction actions will be conducted through a combination of hazard reduction burns and grazing. A hazard reduction action will be used around fire exclusion zones to reduce the risk of any fire getting into these zones (i.e. revegetation zones).

Triggers for when hazard reduction actions are required will be determined using the Overall Fuel Hazard Assessment Guide (DSE, 2010). Fuel hazard assessments will be undertaken on a twice-yearly basis by a qualified environmental manager, with hazard reduction actions occurring if the Overall Fuel Hazard is determined to be High, Very High, or Extreme.

Fuel hazard reduction actions will be determined in accordance with the decision flowchart (Figure 7-1)

Grazing will only occur within the offset area as a hazard reduction tool when an action is required. Grazing may be used as a tool until it has been assessed that fuel loads have been reduced to Low or Moderate according to the Overall Fuel Hazard Assessment. Monitoring and reporting of grazing impact will be rigorously documented and include the use of monthly forage and pasture reports. The use of grazing as a hazard reduction action will not occur in OMU-3 until koala and GHFF food and habitat trees are established. Specific management actions to occur in OMU-3 include:

- Ensuring that all livestock are excluded from planting/revegetation area for a minimum of 5 years, or until a suitably qualified independent expert has determined that planted koala and grey-headed flying-fox feed trees are of sufficient size to withstand impact from cattle.
- Providing the Department with a report from the suitably qualified independent expert verifying that planted koala and grey-headed flying-fox feed trees are of sufficient size to withstand impact from cattle.

There are currently no regulated sustainable grazing requirements in Queensland except for in the Great Barrier Reef Region. The accepted minimum practice agricultural standards for grazing focuses on retaining and improving ground cover and land condition to minimise soil loss. The minimal grazing proposed under the OMP is to occur solely for the purposes of fuel load reduction and minimizes soil loss. Grazing for short periods once or twice a year will not impact on the habitat improvements proposed.

Multiple papers support the use of grazing in supporting good natural regeneration where grazing is used intermittently and lightly (See grazing literature review) (Dorrough and Moxham 2005; Semple and Koen 2001). Additionally, grazing reduces competition from exotic pastures and shrubs, where competition from introduced species markedly reduces regeneration and Eucalypt recruitment (Lunt 2005, Semple and Koen, 2003 and Dorrough and Moxham 2005).

All management actions proposed are additional to current practices within the offset areas and align with the EPBC Environmental Offset Policy.

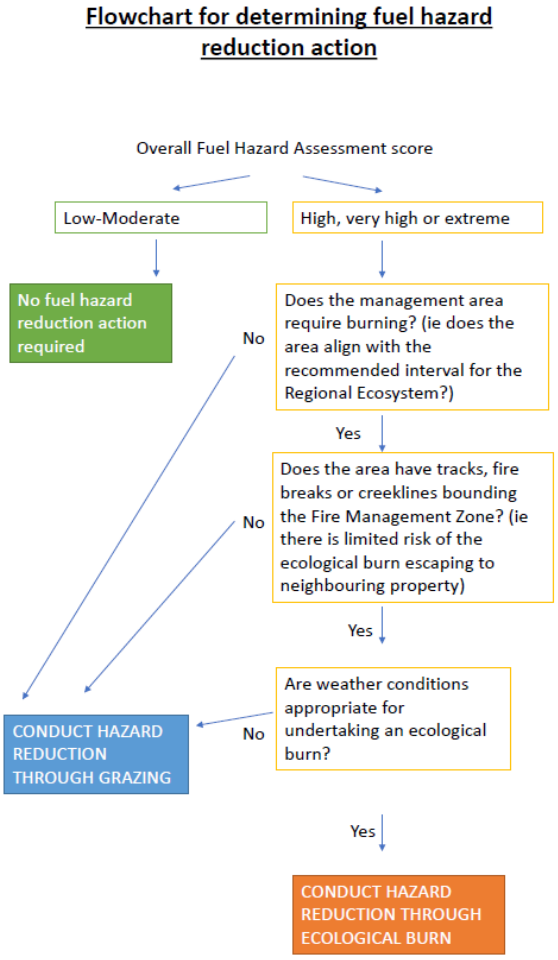

Figure 7-1: flowchart for determining fuel hazard options

Fire exclusion

Fire is to be excluded from some areas across the property as per list below:

- For Regional Ecosystem 12.3.7 it is recommended to avoid intentionally burning this fringe vegetation. Surrounding vegetation communities can be burnt to minimise fire incursion. Although fire does not necessarily need to be excluded, a fire could exacerbate the Lantana camara weed infestation issues.
- Revegetated areas. Areas where revegetation is being undertaken contain trees that are not sufficiently well grown to withstand an ecological burn/wildfire. It is recommended to protect these revegetation areas from fire through various operational actions:
  - Regularly monitor fire fuel load;
  - Install and maintain fire breaks in and around the revegetation zones;
  - Slash tracks regularly to keep grass load (and therefore fuel load) load along tracks;
  - Conduct a hazard reduction burn in surrounding area.
  - Asset Protection Zones (APZ) such as sheds/farm buildings, infrastructure such as bores and watering points and dwellings.

7.4 Management action 4: Direct seeding where natural regeneration is lacking

The management action 4 refers to activities conducted to improve the habitat of koala and grey-headed flying fox food tree species through direct seeding.

Table 7-6 Supplementary direct seeding

Attribute	Supplementary direct seeding
Outcome	▪ Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. ▪ Koala movement in offset areas not impacted by weed cover. ▪ All vegetation layers have excellent and continually improving structure and floristic diversity. ▪ Presence and recruitment of koala and GHFF food and shelter trees. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses. ▪ Domestic livestock excluded from offset area (but for hazard reduction purposes).
Actions	▪ Conduct direct seeding of native species in areas where natural regeneration not occurring. ▪ Species mix to be representative of Preclear Regional Ecosystem
Performance Indicators	▪ Year 5, 10, 15 and 20 assessment unit MHQA KPIs achieved (refer Appendix E) for: ○ Koala Site Condition ○ GHFF Site Condition ○ GHFF Species Stocking Rate ▪ Livestock are excluded from offset area other than for the purposes of hazard reduction actions. ▪ Large offset areas are legally secured.
Monitoring	▪ Repeated surveys of baseline data including 5 yearly MHQA habitat monitoring data and annual observational data as part of the Offset Area Management Plan.
Reporting	▪ Offset report issued annually. ▪ Monitoring data including MHQA transect included in 5 year reports. ▪ Submit all Offset Area Assessment Reports to Mirvac Queensland Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Mirvac Queensland Pty Ltd.
Corrective action	▪ If MHQA transects indicate Koala and GHFF habitat less than performance indicators, implement additional supplementary direct seeding, weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth.
Management Period	▪ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the *Vegetation Management Act 1999* (refer Management Action 5)
Responsibility	▪ Queensland Trust for Nature

Broad vegetation management and implementation

In the context of broader offset management, management of vegetation would focus on maintaining or enhancing the offset values of the vegetated areas. The site is divided into three broad groups: remnant, regrowth and cleared (revegetated) areas, based on structural features. The following broad vegetation management activities will be conducted across all OMU's:

- Facilitate natural regeneration by removal of weeds, management of fire regimes and reduction of grazing pressure;
- Retain live trees and shrubs (only to be cleared for property maintenance and thinning as necessary to remove weeds, protect property, establish and maintain boundary fencing, and to establish and maintain firebreaks and fire trails in accordance with an Offset Area Fire Management Plan);
- Retain stags and dead shrubs; and
- Retain fallen logs, leaf litter and other woody debris.

The extent and abundance of food tree species in OMU-01 and OMU-02 will be measured through the increase in both canopy and recruitment. This will be done through carrying out Habitat Quality Transects to assess against baseline data. Milestone surveys to measure the success of the revegetation will occur every 5 years.

Where it is measured that recruitment koala and GHFF food trees is not meeting Regional Ecosystem benchmarks, supplementary direct seeding will be undertaken. This involves direct seeding of an appropriate mix of species, either into a recently burn area or with good weather condition (good soil moisture content).

7.5 Management action 5: Legal protection from incompatible land uses

The management action 5 refers to the legal mechanisms for protecting the offset area, including koala and grey-headed flying fox food tree species.

Table 7-7 Legal protection

Attribute	Legal protection
Outcome	▪ Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. ▪ Koala movement in offset areas not impacted by weed cover. ▪ All vegetation layers have excellent and continually improving structure and floristic diversity. ▪ Presence and recruitment of koala and GHFF food and shelter trees. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses. ▪ In accordance with the requirements of the EPBC Environmental Offsets Policy, the offset site will be legally secured for the duration of the impact.
Actions	▪ Legally secure the offset area by way of voluntary declaration under the *Vegetation Management Act 1999* prior to commencement of Stage 2 of the action. ▪ The voluntary declaration will be in place for the duration of the impact, or until such time as another enduring protection mechanism (such as a Nature Refuge under the *Nature Conservation Act 1992*) has been formally registered on title and evidence of this has been provided to the Department. Note that this commitment should also be clearly stated in the legal security documentation. ▪ Note that any legal security mechanism must be in place for the duration of the impact and legal security documentation should include the following: o commitments that legal security of the offset area will be in place for the duration of the impact o details of management activities to be undertaken to achieve and maintain the outcomes prescribed within the Offset Strategy for the koala and grey-headed flying-fox.
Performance Indicators	▪ Large offset areas for koala and GHFF habitat protected for the duration of the impact.
Monitoring	▪ Provision of legal security mechanism(s) to proponent.
Reporting	▪ Evidence of registration on title of the voluntary declaration to be provided to the Department prior to commencement of Stage 2 of the action. ▪ Evidence of registration on title of an enduring protection mechanism (such as a Nature Refuge) to be provided to the Department prior to the end of the approval period.

Attribute	Legal protection
	▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Mirvac Queensland Pty Ltd.
Corrective action	▪ Offset non-compliant without legal security. Await legal security before proceeding. ▪ Should designation as a Nature Refuge not be available at the end of the management period (e.g. due to legislative change), a similar alternate mechanism is to be agreed between the offset provider and the department.
Management Period	▪ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the *Vegetation Management Act 1999*
Responsibility	▪ Queensland Trust for Nature

Voluntary declaration (VDec)

The *Vegetation Management Act 1999* (VMA) provides a voluntary process to protect areas of native vegetation not otherwise protected by the VMA. This process is referred to as a voluntary declaration or a VDec. VDecs can be used to protect areas of high nature conservation values or areas vulnerable to land degradation. A VDec can also be used to secure areas of land to satisfy statutory offset requirements and to secure exchange areas under the VMA and other legislation.

A request for a VDec must be accompanied by a management plan that outlines the activities required to achieve the management intent and outcomes.

Nature Refuge

The Minister and the Landholder enter into a conservation agreement. The Agreement binds the State, the Landholder, the Landholder's successors in title and other persons with an interest in the Land to the agreement.

The Nature Refuge Agreement identifies significant values of the land and specific Management Conditions relating to the management and maintenance of these values. In the case of the Nature Refuge to be registered at Aroona, these values will be identified as koala and grey-headed flying-fox and habitat and threats to each species.

Note – there are numerous references in this Offset Management Plan and the Offset Strategy to legally securing the offset. Where any conflict exists between this Management Action 5 and other references to legally securing the offset, this management action will prevail.

Implementation of legal protection

The offset will be legally secured by way of voluntary declaration under the Vegetation Management Act 1999 which will be registered prior to commencement of Stage 2 of the action and will remain in place for the duration of the management period. In accordance with specified completion criteria, the offset will be legally secured as a Nature Refuge under the *Nature Conservation Act 1992* prior to the end of the management period to ensure the offset is secured for the duration of the impact (i.e. in perpetuity). Should designation as a Nature Refuge not be available at the end of the management period (e.g. due to legislative change), a similar alternate mechanism is to be agreed between the offset provider and the Department.

Note – there are numerous references in this Offset Management Plan and the Offset Strategy to legally securing the offset. Where any conflict exists between this Management Action 5 and other references to legally securing the offset, this management action will prevail.

7.6 Management action 6: Monitoring and control of introduced predators

The management action 6 refers to activities conducted to reduce the threat of introduced predators to the koala.

Table 7-8 Monitoring and control of introduced predators

Attribute	Monitoring and control of introduced predators
Outcome	▪ No koala mortality or injury by introduced predator attack.
Actions	▪ Conduct a baseline survey to establish introduced predator abundance and location on the property. This can be undertaken through the use of remote motion-activated cameras and/or identification of scats. Activities outlined in section 7.6. ▪ Establish a Relative Abundance Index and confidence intervals around associated population trends. ▪ Implement introduced predator control program. The control program and techniques (trapping, baiting, shooting) will be informed based on the results of the abundance surveys. Where practical, 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. ▪ Conduct follow-up monitoring and implement further control efforts if feral animals recur. Implement adaptive management techniques if initial control techniques are not working effectively. ▪ Install appropriate hazard signage informing that the offset area is under introduced predator control. ▪ Set-up a community engagement program including but not limited to interpretive signs, fact sheets and community presentations with the aim to raise community awareness and encourage responsible pet ownership. ▪ Directly input into the Little Liverpool Range Strategy for controlling introduced predators across the Range.
Performance Indicators	▪ Year 5, 10, 15 and 20 assessment unit MHQA KPIs achieved (refer Appendix E) for Koala Threat Level ▪ Management and reduction in abundance of introduced predators ▪ No increase in relative introduced predator abundance index from baseline. ▪ No recorded injury or death from introduced predator attacks within the offset area.
Monitoring	▪ Monitoring of the presence of introduced predators through the use of remote motion-activated cameras; ▪ Survey the site to record the presence/absence of signs of introduced predator (sightings, killings and/or scats and tracks). ▪ Establishment and maintenance of register documenting injured/killed koalas and any observed koala/ introduced predator interactions.
Reporting	▪ Offset Area Assessment Reports to include all introduced predator survey data. ▪ Offset Area Assessment Reports to include all records of koala injury or death related to introduced predator attacks.

	▪ Submit all Offset Area Assessment Reports to Mirvac Queensland Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Mirvac Queensland Pty Ltd.
Corrective action	▪ Should the initial and ongoing introduced predator control measures not result in a reduction of introduced predator numbers (compared to baseline survey), introduced predator program to be expanded/adapted to improve outcomes. ▪ Any incidence of koala injury/mortality resulting from introduced predator attack will initiate supplementary monitoring and control measures. ▪ In the event that a koala is found injured, transport immediately to a local vet, or suitably qualified and experienced wildlife carer.
Management Period	▪ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the *Vegetation Management Act 1999* (refer Management Action 5)
Responsibility	▪ Queensland Trust for Nature

Introduced predator control

Baseline monitoring will be undertaken on the property and a relative abundance index calculated for wild dogs and foxes. Potential mortality by fox/dog has been recorded on the site in June 2017 at long 152.415808 and lat -27.863353. An adult male koala was discovered deceased in apparently healthy condition. Where post control surveys indicate that there has been a recurrence of wild dogs and/or foxes on the site, control measures will be actioned using methods determined by a pest control professional but will focus on soft-jaw trapping and shooting.

Methodology

Monitoring will be conducted bi-annually using wildlife motion cameras. Cameras will be positioned along tracks at a height of 50cm and south-facing, to maximise capture. Cameras will be in place for 40 days for each survey. Regular transects for scat collection will be conducted. Predator scats are sent to a professional laboratory and analysed for content. This aids in determining dietary shifts in feral carnivores over time.

Results from the camera monitoring will be used to establish a Relative Abundance Index. This will be used as a baseline from which to measure reduction in feral carnivores over and after control efforts.

Control efforts will be coordinated with neighbouring landholders to maximise the success of efforts. This will be facilitated by the Little Liverpool Range Initiative, which coordinates land-management activities across the range.

7.7 Management action 7: Revegetation

The management action 7 refers to activities conducted to improve the habitat of koala and grey-headed flying fox food tree species through revegetation. Revegetation activities will occur in OMU-3 cleared areas.

Table 7-9 Revegetation

Attribute	Revegetation
Outcome	▪ Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. ▪ Koala movement in offset areas not impacted by weed cover. ▪ All vegetation layers have excellent and continually improving structure and floristic diversity. ▪ Presence and recruitment of koala and GHFF food and shelter trees. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses. ▪ Domestic livestock excluded from offset area (but for hazard reduction purposes).
Actions	▪ Implement a revegetation program in cleared areas using best practice techniques with tree and shrub species representative of the pre-clearance Regional Ecosystem including koala and GHFF food and shelter trees (see Appendix G for proposed species list). Revegetation details outlined in section 7.7. ▪ Exclude livestock from areas undergoing revegetation activities ▪ Legally secure the offset area
Performance Indicators	▪ 80% survival of seedlings. ▪ Year 5, 10, 15 and 20 assessment unit MHQA KPIs achieved (refer Appendix E) for: ○ Koala Site Condition ○ GHFF Site Condition ○ GHFF Species Stocking Rate ▪ Livestock are excluded from offset area other than for the purposes of hazard reduction actions (hazard reduction using livestock only to occur when OMU3 areas reach a height able to withstand the introduction of cattle). ▪ Large offset areas are legally secured
Monitoring	▪ Annual surveys of revegetation area to ensure plant survival. ▪ Repeated surveys of baseline data including 5 yearly MHQA habitat monitoring data and annual observational data as part of the Offset Area Management Plan.
Reporting	▪ Offset report issued annually. ▪ Monitoring data including MHQA transect included in 5 year reports. ▪ Submit all Offset Area Assessment Reports to Mirvac Queensland Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Mirvac Queensland Pty Ltd.
Corrective action	▪ If MHQA transects indicate Koala and GHFF habitat less than performance indicators, implement additional supplementary

Attribute	Revegetation
	planting, direct seeding, weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth.
Management Period	▪ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the *Vegetation Management Act 1999* (refer Management Action 5)
Responsibility	▪ Queensland Trust for Nature

Revegetation activities

Revegetation will occur in cleared areas (OMU-03) through a combination of planting and direct seeding to create a self-sustaining vegetation resembling the pre-clearance Regional Ecosystem/s present on the site. Plant species appropriate for the REs are listed in Appendix G . Seed and plants will be sourced from locally collected/propagated stock to increase the likelihood of survival and preference by koala and GHFF. Species are suitable for both koala food and habitat trees and grey-headed flying-fox food and habitat trees. Revegetation will exclude areas of infrastructure, gazetted roads, and tracks.

Maintenance of the planted areas will be conducted according to the following schedule:

- Erection of fencing (if required, some areas already bounded by fences) to exclude cattle from planted areas;
- Watering of planted trees immediately following planting, where required, to improve early stage survival in dry conditions;
- Application of broad-spectrum herbicide (glyphosate) around planted trees to reduce competition from grasses and broad-leaf weeds and improve survival and performance of planted trees;
- Undertaking survival assessments across all planted areas to identify areas of low survival;
- Infill area preparation and planting in identified areas of low survival to enhance successful vegetation establishment across the site;
- Annual firebreak and access track slashing prior to fire season to provide improved access for fire management and response activities.

Maintenance of direct seeded areas will be conducted according to the schedule:

- Direct seeding after ecological burn to increase the germination rate of the seeds;
- Application of broad-spectrum herbicide (glyphosate) for regrowth lantana after the ecological burn;
- Annual firebreak and access track slashing prior to fire season to provide improved access for fire management and response activities.

7.8 Management action 8: Koala Species Stocking Rate survey

Table 7-10 describes factors relating to the Species Stocking Rate of koalas within the offset area.

Koala occurrence refers to whether evidence is present that koalas have used the site over a particular time period and/or within a particular distance from the site. Based on scat evidence at least one koala that has used the site within the last 2 years. However, for the cleared areas, it is anticipated that koalas could traverse these, but these won't be used for foraging. The objective of this OMP across all OMUs in relation to koala occurrence is to improve koala occurrence score over the long-term for the currently vegetated areas, and to increase the koala occurrence score for the currently cleared areas through active revegetation and regrowth management.

Table 7-10 Koala Species Stocking Rate survey

Attribute	Koala SSR
Outcome	▪ Net gain in koala population density on the property. ▪ Koala occurrence on currently cleared areas.
Actions	▪ Undertake koala density/occurrence surveys using SAT methodology (Phillips and Callaghan 2011) within the offset area ▪ Repeated surveys to be undertaken at 5-year intervals. ▪ Koala SAT surveys to be undertaken by a suitably qualified ecologist with extensive experience with koala surveys.
Performance Indicators	▪ Year 5, 10, 15 and 20 assessment unit MHQA KPIs achieved (refer Appendix E) for Koala Species Stocking Rate
Monitoring	▪ Record opportunistic koala sightings inclusive of scat findings (location and date). ▪ Undertake SAT surveys at 5-yearly intervals.
Reporting	▪ Incorporate the koala density survey results within the relevant Offset Area Assessment Report (in the year conducted). ▪ Incorporate opportunistic koala sightings into Offset Area Assessment Reports. ▪ Submit all Offset Area Assessment Reports to Mirvac Queensland Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Mirvac Queensland Pty Ltd.
Corrective action	▪ If koala densities are not maintained or are significantly reduced, then an assessment needs to be undertaken by a koala expert in relation to the potential cause/s and remediation actions undertaken where feasible through the implementation of adaptive management.
Management Period	▪ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the *Vegetation Management Act 1999* (refer Management Action 5)
Responsibility	▪ Queensland Trust for Nature

Koala monitoring implementation

Koala monitoring will be carried out across the offset site to report on the effectiveness of the management actions. The actions associated with koala monitoring will ensure an increase in the quality and availability of koala habitat, a reduction in threats across the site (through removal of weeds and reduction in feral predators)

and an overall increase in koala abundance and activity. This increase in koala abundance and activity will be monitored through multiple survey methodologies, summarised below.

Table 7-11 Methodology for monitoring koalas

Methodology	Frequency	Characteristic monitored	Result
Opportunistic observations	Annually	Scat monitoring, wildlife camera observations, and opportunistic searches	Demonstrated presence and usage of koalas across the offset area.
SAT surveys (Phillips and Callaghan 2011)	5-yearly, at year 5, 10, 15 and 20	SAT monitoring, recording the presence of koala scats under food and habitat trees. Survey will record activity and abundance of koalas.	Demonstrated increase in koala density and abundance through an increase in scats recorded during SAT
Intensive population surveys using methodology modified from Ellis et al (1995) and Ellis et al (2015). Method involves capturing, conducting health assessments by a wildlife vet including age, body mass, reproductive health and signs of koala disease. Health assessments can be used to determine if koalas are breeding through: - Presence of pouch young, pouch use or lactation (females) - Size and activity of sternal gland (males) - Chlamydial swabs, indicating disease levels within a breeding population In addition to capturing individuals, surveying will include nocturnal spotlighting, acoustic listening for male bellowing and camera trapping. Surveys are timed to maximise when joeys are dependent on their mothers as pouch or back young. The presence of observable young makes it possible to estimate the proportion of adult females breeding and to monitor breeding rates over time (Rhodes et al 2015).	At years 5, 10, 15 and 20	Surveys are designed to detect koala breeding within the offset area. Data collected will show evidence of breeding through back/pouch young, used pouches and male bellowing records.	Demonstrated use of the offset site for breeding purposes.

7.9 Management Action 9: Cattle Grazing Management

The management action 9 refers to activities to reduce the risk of cattle grazing to the Koala and GHFF, noting that cattle grazing may only occur in the offset area as a wildfire hazard fuel reduction tool in accordance with *Management Action 3 – Wildfire hazard reduction.*

Table 7-12 Cattle Grazing Management

Attribute	Cattle Grazing Management
Outcome	▪ No cattle grazing within the offset area other than for wildfire hazard fuel reduction in accordance with Management Action 3 – Wildfire hazard reduction. ▪ Vegetation composition not negatively affected by cattle grazing
Actions	▪ Cattle grazing to be used only as a wildfire hazard fuel reduction tool in accordance with Management Action 3 – Wildfire hazard reduction. ▪ Exclude cattle from revegetation areas (e.g. by fencing) until, in the opinion of an environmental management specialist, cattle grazing is assessed as unlikely to negatively affect vegetation composition. ▪ Only permit grazing at the Aroona Offset Site for the purposes of bushfire hazard reduction. ▪ Ensure that all livestock are excluded from planting/revegetation area for a minimum of 5 years, or until a suitably qualified independent expert has determined that planted koala and grey-headed flying-fox feed trees are of sufficient size to withstand impact from cattle. ▪ Provide the Department with a report from the suitably qualified independent expert verifying that planted koala and grey-headed flying-fox feed trees are of sufficient size to withstand impact from cattle. ▪ Ensure that any grazing is managed so as to prevent the risk of injury or mortality of Koalas.
Performance Indicators	▪ No material adverse impacts to target habitat quality improvement outcomes. ▪ Vegetation composition not negatively affected by cattle grazing ▪ Year 5, 10, 15 and 20 MHQA KPIs achieved (refer Appendix E) for: ○ Koala Site Condition ○ GHFF Site Condition
Monitoring	▪ Overall Fuel Hazard Assessments conducted bi-annually, with results to be included in the annual Offset Area Assessment Reports ▪ Annual assessment of cattle grazing impacts (if any), with findings and adaptive management actions to be included in the annual Offset Area Assessment Reports ▪ MHQA survey at milestone years 5, 10, 15 and 20.
Reporting	▪ Annual Offset Area Assessment Reports to include assessment of cattle grazing impacts (if any), and any adaptive management processes implemented. ▪ Before each annual anniversary of the date when the Offset Site is legally secured, until the end of Year 5, and thereafter before each fifth anniversary of the date when the Offset Site is legally secured, the approval holder must submit to the Department a monitoring report in respect of the period since the

Attribute	Cattle Grazing Management
	period covered by the previous report or since the date when the Aroona Offset Site was legally secured, which includes: ○ an analysis of how cattle grazing at the Offset Site has facilitated and/or impacted the achievement of outcomes prescribed in the Offset Strategy. ○ frequency, duration and location of grazing, and stock density for each grazing period; ○ details of any injury or mortality of individual Koalas; ○ the timing and frequency of monitoring undertaken; and ○ details of corrective actions already undertaken and/or proposed to be undertaken in the event of injury or mortality of individual Koalas as a result of grazing, and/or if monitoring demonstrates the outcomes prescribed in the Offset Strategy have not been achieved.
Corrective action	▪ If target vegetation composition is negatively affected by cattle grazing, implement adaptive management actions which may include: ○ Additional cattle exclusion areas ○ Additional re-vegetation / rehabilitation in areas negatively affected by cattle grazing ○ Reduce intensity of grazing for fuel reduction purposes ○ Exclude cattle from the offset area. ▪ Corrective actions must be identified and implemented if any injury or mortality of individual Koalas occur as a result of grazing, and/or if monitoring demonstrates the habitat quality improvement outcomes are not achievable.
Management Period	▪ The greater of: ○ 20 years, commencing on the date when the offset is legally secured by way of voluntary declaration under the Vegetation Management Act 1999 (refer Management Action 5); and ○ The duration of the approval
Responsibility	▪ Queensland Trust for Nature

Cattle grazing management implementation details

Fire management of the offset area is critical in achieving the intended outcomes and conservation gains over the 20-year management period. Wildfire fuel reduction is an important aspect of fire management and fuel reduction by cattle grazing is considered appropriate where applied in accordance with *Management Action 3 – Wildfire hazard reduction*.

While not proposed within the offset area, it is acknowledged that intense cattle grazing has potential to negatively affect vegetation composition. For this reason, low impact grazing for short periods is proposed to reduce fuel loads under *Management Action 3*. Under no circumstances will the offset area be grazed outside of this management action.

In the offset area, conservation outcomes are prioritised over commercial grazing objectives and low intensity cattle grazing is used only for the purpose of bushfire fuel reduction where applied in accordance with Management Action 3 – Wildfire hazard reduction.

Given perceived potential for negative impacts on vegetation composition, regular annual monitoring and reporting is proposed to ensure any possible negative impacts are identified early and management processes are appropriately adapted to ensure conservation outcomes are achieved.

Cattle grazing within this offset can provide opportunity to study outcomes and management processes so that learnings can be shared with stakeholders and applied to future offsets. Such learnings may assist in promoting conservation outcomes within agricultural land holdings where an appropriate balance between agricultural and conservation outcomes can be demonstrated. Such learnings may also provide stakeholders with greater confidence that bushfire hazard fuel reduction by cattle grazing can be achieved without compromising conservation outcomes.

8 Other Compensatory Measures

The offset for the EPBC 2016/7817 referral is designed to a high-quality offset for both koala and GHFF. At the completion of the management period QTFN will secure the offset areas as part of the Aroona Nature Refuge under the provision of the *Nature Conservation Act*, with ongoing management and monitoring actions based on this OMP. A Nature Refuge is one of Queensland's highest levels of enduring protection and will ensure ongoing security in perpetuity for the koala and GHFF. Refer Section 7.5 - Management Action 5 for further information on how the offset is to be legally secured.

Coordinating research and education

QTFN is a founding member of the Little Liverpool Range Initiative (LLRI), established in July 2016 to encourage sustainable management of the Range's conservation values through a coordinated network of land managers. The range covers an area 20,000 hectares and encompasses a variety of private landholders, local government and organisation stakeholders. The LLRI's partners include Ipswich City Council, Scenic Rim Regional Council, Lockyer Valley Regional Council, Somerset Regional Council, The Turner Family Foundation, Queensland Trust for Nature and Healthy Land and Water. The LLRI employs a coordinating officer, a position jointly funded by Ipswich City Council, QTFN and The Turner Family Foundation, which sits within Ipswich City Council. The officer position is funded for the next 3 years, and the role is to ensure the outcomes of the initiative are met, including coordinating land management activities, pest and weed management and helping to support locally rare and threatened species. QTFN will work closely with the coordinating officer to ensure management actions, including trapping and shooting, will be timed to coincide with neighbouring management actions to maximise outcome in feral predator control. The Initiative has the support of four councils, and will ensure positive environmental outcomes across a broader landscape than the offset area. Further details on the LLRI can be found on their website (https://www.llri.com.au).

To ensure the sustainability of the threatened species populations, it is critical to implement a range of recovery actions to improve their habitat. By leveraging excellent on-ground outcomes for a relatively small amount of funds, we are able to maximise the positive impact of collective conservation land management.

9 Offset Area Reporting

The offset area reporting consists of three main components:

- Operational reporting;
- Reporting of monitoring results; and
- Final reporting.

9.1 Operational reporting

Any on-ground activities undertaken on the offset area is to be recorded, in the form of a Daily Work Report, either by QTFN staff or its contractors. It is recommended to spatially represent these activities in order to visualise the work undertaken. The following work should be recorded and spatially represented (with additional suggestions made):

- Weeds sprayed: recording species, location and number of hectares treated (using a 100x100m grid system across the property). The recording of the herbicide used to control the weed is a requirement under the ACDC Act.
- Tracks graded and/or slashed. Tracks are to be numbered and divided into 100m sections, so exact locations can be recorded.
- Revegetation actions undertaken on spatially represented revegetation areas.
- Ecological burns and hazard reductions burns.
- Cattle grazing.

Operational activities are to be presented in the Offset Area Assessment Report (for the individual offset agreements).

9.2 Reporting of monitoring results

All monitoring results are to be presented in the Offset Area Assessment Report on an annual basis as per the offset agreement. Reports are to be submitted to Mirvac Queensland Pty Ltd within three months of the anniversary of the registration of the Voluntary Declaration under the *Vegetation Management Act 1999* (refer Section 7.5 – Management Action 5).

The report should include the following as a minimum:

- Koala survey results (survey report and spatial representation of all findings (including opportunistic sightings)).
- MHQA results will be presented and compared against the Queensland Herbarium benchmarks as well as the baseline survey results. Koala and grey-headed flying-fox food and habitat tree presence will be detailed. MHQA transects to be conducted every 5 years
- Selective chemical/mechanical weed management including location of treatment area
- Ecological burns conducted within the reporting timeframe

- Wildfire hazard reduction actions conducted within the offset area
- Revegetation activities, including location of plantings, supplementary plantings and direct seeding
- Wild dog, feral cat and fox observations (opportunistic or scientific) will be detailed in the report and spatially represented
- Any koala injuries/deaths from interaction with wild dogs/feral cats and foxes, as well as vehicles strikes will be detailed and spatially represented. Vehicle strike incidents will also be reported to the Local Government authority (currently Beaudesert Regional Council) and the relevant State Government (currently the Queensland Government Department of Environment and Science)
- Any signs of koalas affected by any disease to be recorded.
- Location, extent and associated purpose of any vegetation clearing within the offset area will be detailed and spatially represented (firebreaks, fencelines etc)
- Changes to site connectivity will be detailed and spatially represented
- Cattle grazing activities

9.3 Final reporting

The final reporting for the offset agreement, to meet the conditions of the EPBC Act approval, is to be undertaken at the end of the agreed period. In addition to the standard reporting outlined in section 9.2, the final report will include an assessment using the Modified Habitat Quality Assessment transect data in comparison to the predicted outcomes gained by 20 years.

10 Conclusion

This OMP has been developed with the objective to summarise existing habitat quality for the koala (*Phascolarctos cinereus*) and grey-headed flying fox (*Pteropus poliocephalus*) present on the offset area and to recommend land management actions designed to achieve a net gain in koala and GHFF habitat quality.

The cleared areas offer an opportunity to achieve the most significant increase in koala and GHFF habitat quality since currently there are no food and shelter trees present. Revegetating this area with the appropriate vegetation will provide for future koala and GHFF habitat and an increase in connectivity and context. Weed control, fire management and feral animal management across the property also represent significant programs of work to be undertaken under the OMP. These combined actions will result in improvements to the quality of the koala and GHFF habitat compared to baseline levels, as well as a significant reduction in risk to the resident populations in the long term.

Implementation of management actions specified in this OMP should result in a significant discernible increase in the quality of koala and GHFF habitat. The OMP has been written in a way that it allows for adaptive management when monitoring indicates that the target outcomes are not in line with expectations. The management term proposed in the OMP is twenty (20) years.

11 Consent

11.1 Administering authority

SIGNED by the Queensland Department of Natural Resources Mines and Energy to indicate approval of the Offset Management Plan.

Name:…… Signature:……..

Witness name:…… Signature:……..

Date: ……

11.2 Landholder

The landowner agrees:

1. Any non-compliance with the requirements of this Offset Management Plan shall be constitute to 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 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 resulting 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 or part of it, the landholder hereby agrees, where the management plan area is identified as Category X, Category C or Category B 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 the Offset Management Plan.

The landowner(s) acknowledge:

5. That before the State will agree to the release of this Offset Management Plan, the State must be satisfied that the objectives and activities contained in the Offset Management Plan have been achieved.

The landowner(s) note:

6. All reports, notices or requests for amendment in relation to this Offset Management Plan must be in writing to:

   Department of Environment and Energy
   GPO Box 787
   Canberra ACT 2601
   Australia

SIGNED by the Directors for the Landscapes Queensland Limited as trustee for Queensland Trust for Nature, being the current owner(s) of the abovementioned property to indicate that the terms of this Offset Management Plan including responsibilities under the Offset Management Plan, have been read, understood and accepted.

Director: Signature:……..

Director: Signature:……..

Date:……..

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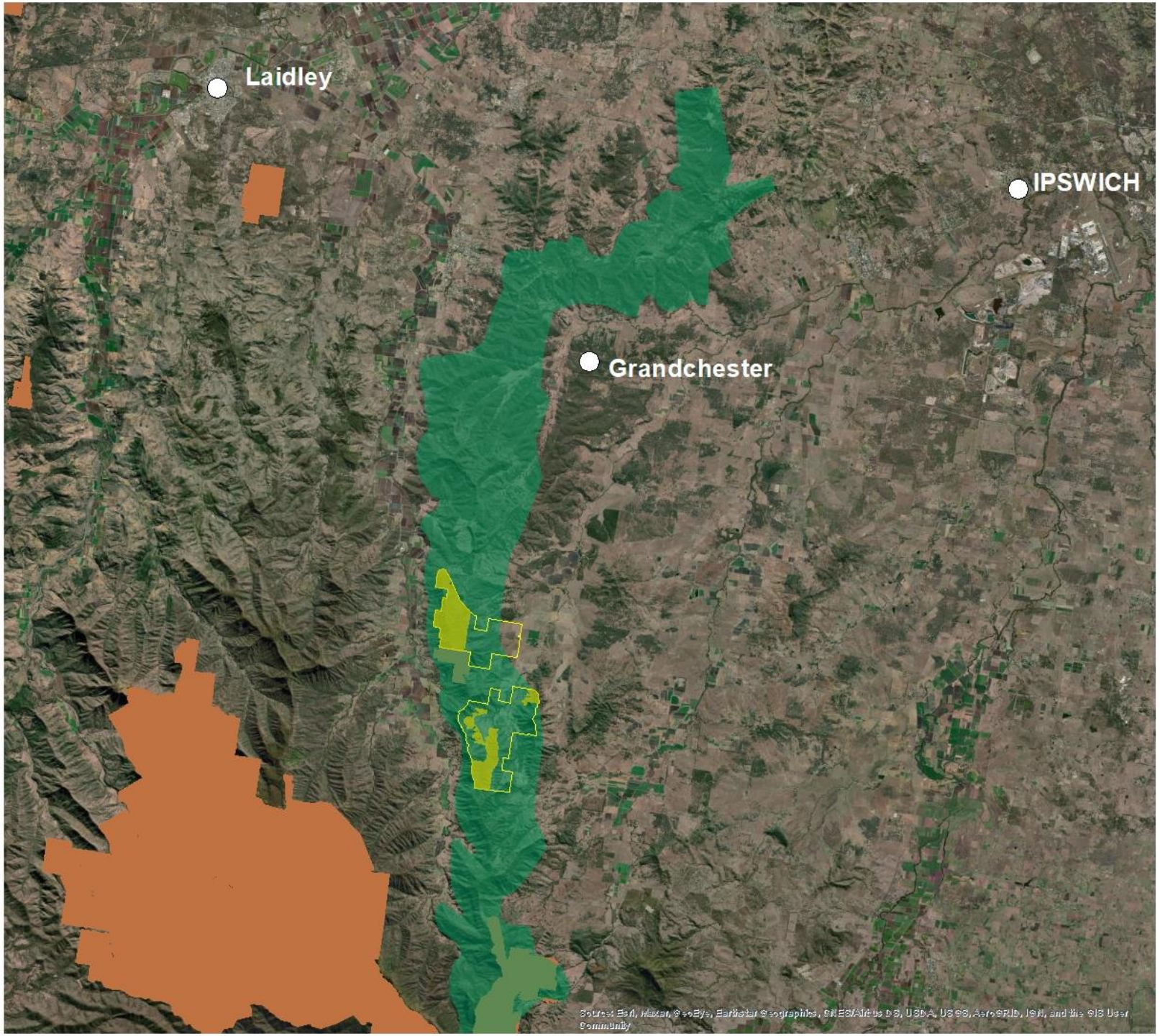
Appendix A – Locality map



QTFN

Mirvac offset Locality

1 cm = 1,719 meters

0 2.25 4.5 9

Kilometers

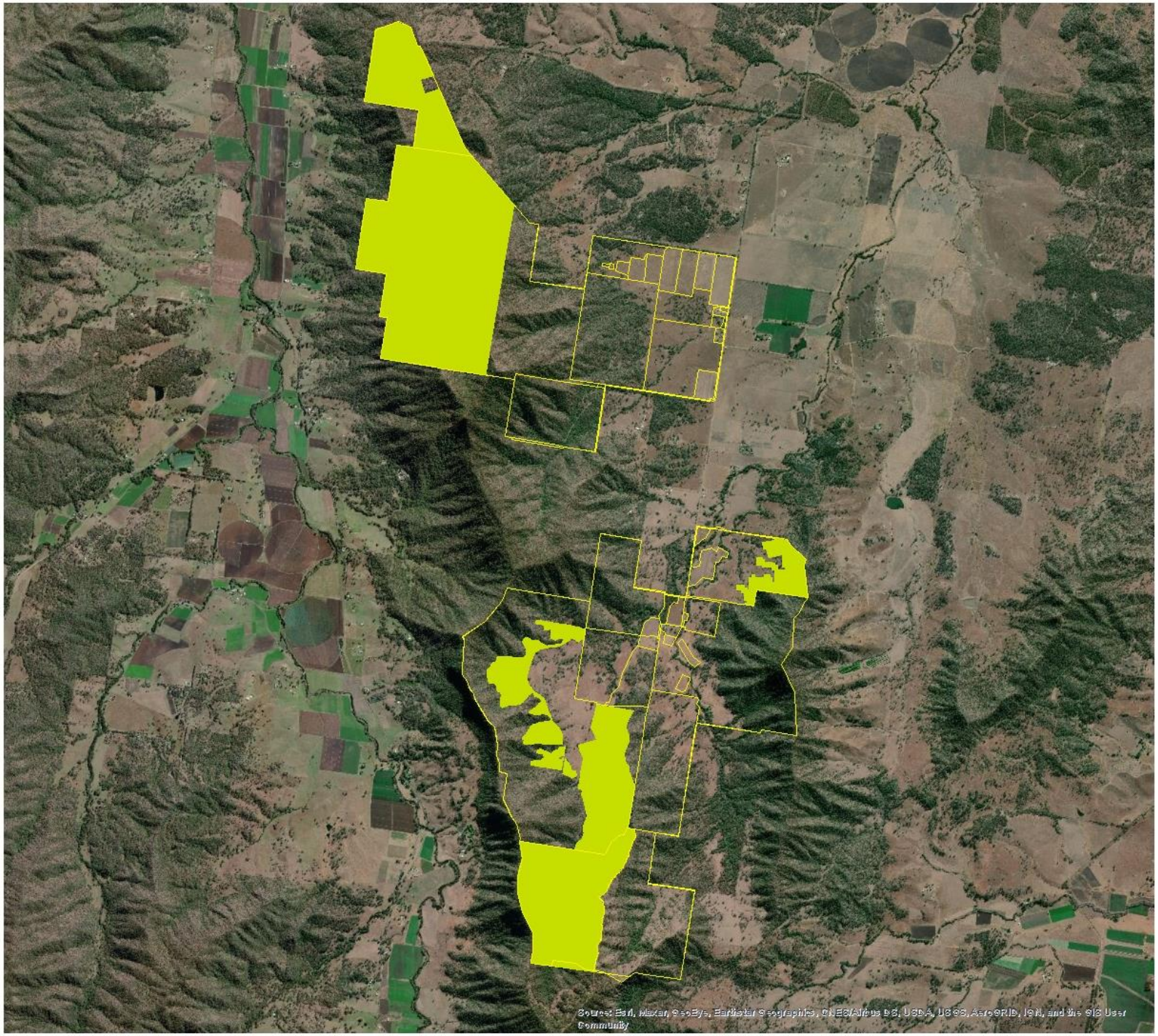
N

Legend

- 20200827_AU_Mirvac
- Aroona Boundary
- Little Liverpool Range
- Protected_areas

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Appendix B – EPBC 2016/7817 proposed map



QTFN

Mirvac offset location

1 cm = 400 meters

0 0.5 1 2

Kilometers

N

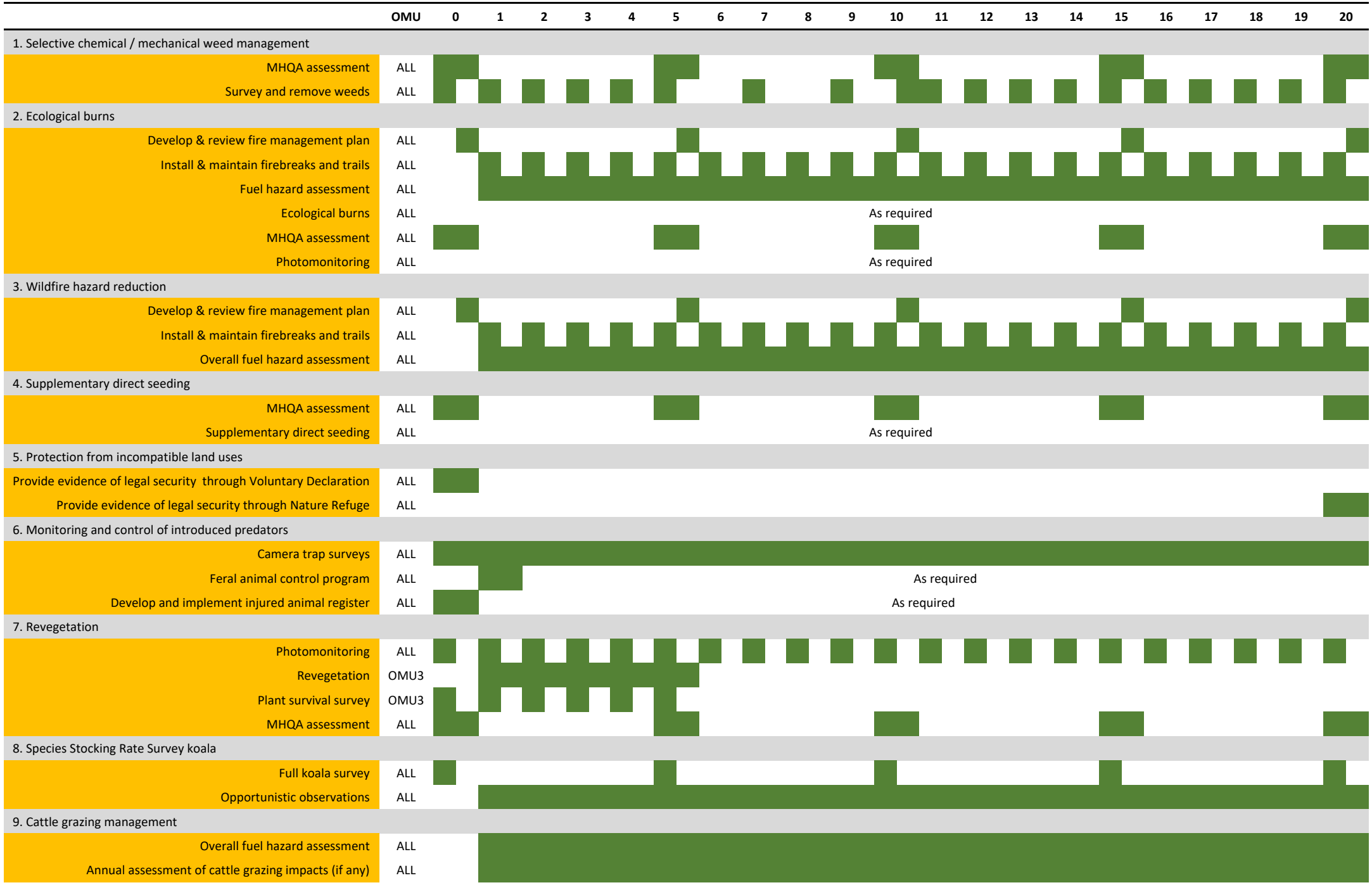
Legend

- Fence
- AU_Mirvac_20200525_v4
- Aroona Boundary

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

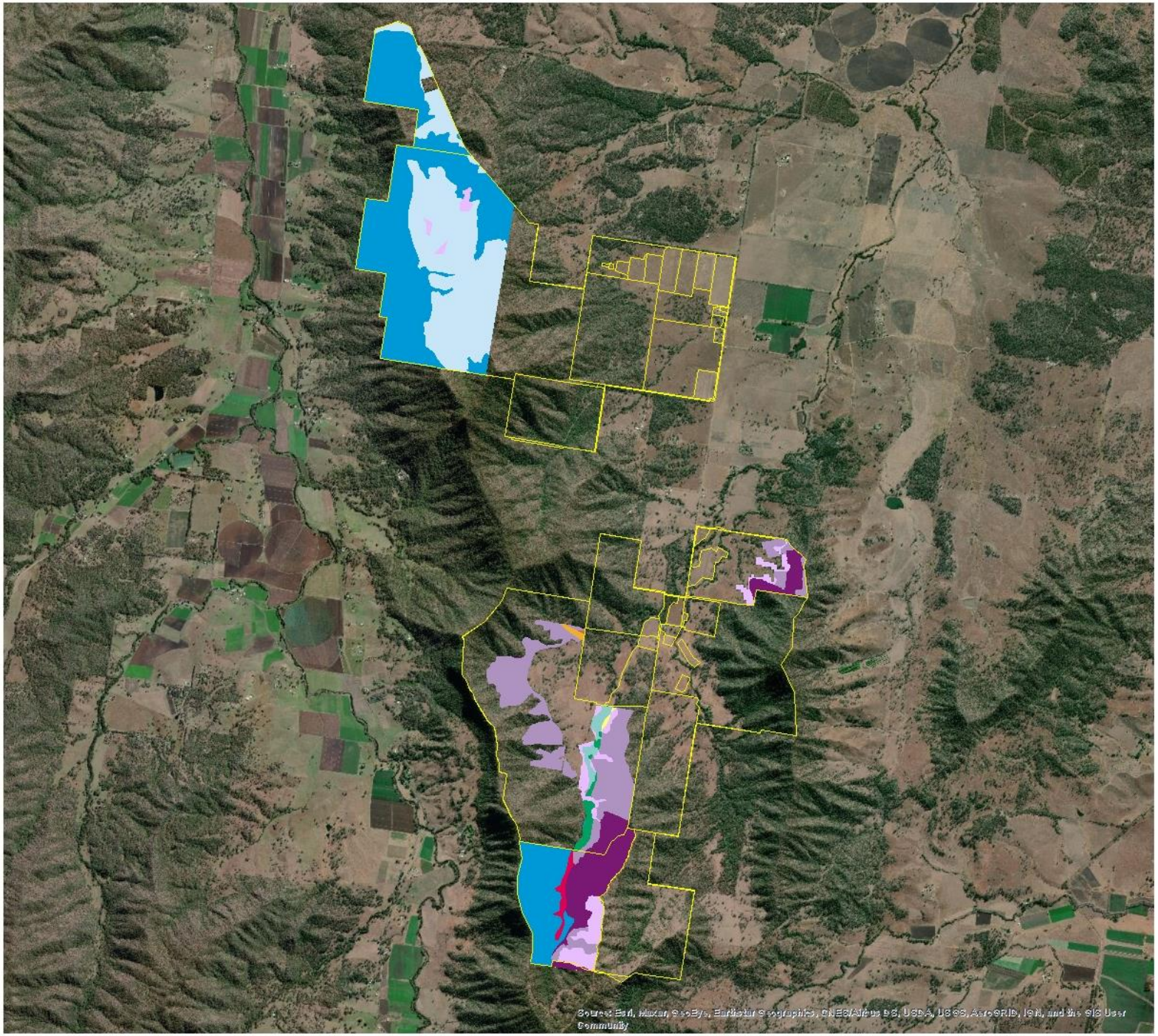
Appendix C - Tabulated management schedule

Table C-1 – Scheduling of management actions



MHQA assessment	ALL	
REPORTING		
Reporting on performance indicators in all attributes	ALL	

Appendix D - Operational Management Unit



QTFN

Mirvac offset Assessment Units

1 cm = 400 meters

0 0.5 1 2

Kilometers

N

Legend

Fence

AU

- AU01
- AU02
- AU03
- AU04
- AU05
- AU06
- AU07
- AU08
- AU09
- AU11
- AU12
- Aroona Boundary

Author: QTFN
Date: 27/8/2020
Source: Cadastral Boundaries, Data supplied by QSpatial http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Appendix E – Assessment Unit KPIs

KPIs and Management Actions

AU02

OMU-01

RE12.8.5

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
KOALA							
SITE CONDITION							
Habitat Transect Data Assessment							
Recruitment of woody perennial species in EDL	0	100% recruitment (100% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - trees	0	9 species (90% of benchmark)	≥9 species (≥90% of benchmark)	≥9 species (≥90% of benchmark)	≥9 species (≥90% of benchmark)	≥9 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - shrubs	0	6 species (50% of benchmark)	3-11 species (25-90% of benchmark)	3-11 species (25-90% of benchmark)	3-11 species (25-90% of benchmark)	3-11 species (25-90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - grasses	0	3 species (100% of benchmark)	≥3 species (≥90% of benchmark)	≥3 species (≥90% of benchmark)	≥3 species (≥90% of benchmark)	≥3 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - forbs	2.5	11 species (37% of benchmark)	8-26 species (25% to <90% of benchmark)	8-26 species (25% to <90% of benchmark)	≥27 species (≥90% of benchmark)	≥27 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	na
Tree EDL canopy height (m)	0	20m (74% of benchmark)	>18.9m (>70% of benchmark)	>18.9m (>70% of benchmark)	>18.9m (>70% of benchmark)	>18.9m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy canopy height (m)	2	9m (64% of benchmark)	3.5-9.8m (25% to 70% of benchmark)	>9.8m (>70% of benchmark)	>9.8m (>70% of benchmark)	>9.8m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy height (score)	1	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	na
Tree EDL canopy cover (%)	0	88.5% (121% of benchmark)	36.5%-146% (50% to 200% of benchmark)	36.5%-146% (50% to 200% of benchmark)	36.5%-146% (50% to 200% of benchmark)	36.5%-146% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy cover (%)	0	29.6% (129% of benchmark)	11.5%-36.5% (50% to 200% of benchmark)	11.5%-36.5% (50% to 200% of benchmark)	11.5%-36.5% (50% to 200% of benchmark)	11.5%-36.5% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy cover (score)	0	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	0	20.95% (150% of benchmark)	7.0%-28.0% (50% to 200% of benchmark)	7.0%-28.0% (50% to 200% of benchmark)	7.0%-28.0% (50% to 200% of benchmark)	7.0%-28.0% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Native perennial grass cover (%)	4	1.7% (24% of benchmark)	3.5%-6.3% (50% to 90% of benchmark)	3.5%-6.3% (50% to 90% of benchmark)	>6.3% (>90% of benchmark)	>6.3% (>90% of benchmark)	1, 2, 3, 4, 5, 9
Organic litter	0	45.4 (89% of benchmark)	25.5-102.0 (50% to 200% of benchmark)	25.5-102.0 (50% to 200% of benchmark)	25.5-102.0 (50% to 200% of benchmark)	25.5-102.0 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Large trees	10	24 (47% of benchmark)	26-51 (>50% to 100% of benchmark)	26-51 (>50% to 100% of benchmark)	>52 (>100% of benchmark)	>52 (>100% of benchmark)	1, 3, 5, 9
Coarse woody debris	3	140 (20% of benchmark)	71-353 (10-50% of benchmark)	71-353 (10-50% of benchmark)	354-1,412 (>50% to 200% of benchmark)	354-1,412 (>50% to 200% of benchmark)	2, 3, 5, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
Species Habitat Index Data Site Condition							
Quality and availability of food and foraging habitat	5	Moderate (63% of habitat transect data maximum score)	Moderate (33%-67% of habitat transect data maximum score)	Moderate (33%-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
Quality and availability of shelter	5	Moderate (63% of habitat transect data maximum score)	Moderate (33%-67% of habitat transect data maximum score)	Moderate (33%-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 8
Threats to species	8	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 2, 3, 5, 6
Species mobility capacity	3	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6
SPECIES STOCKING RATE							
Presence detected on or adjacent to site (neighbouring property with connected habitat)	0	Yes - on site	Yes - on site	Yes - on site	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	0	Breeding	Breeding	Breeding	Breeding	Breeding	8
Approximate density (per ha)	10	Low (10.7% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	0	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 8
Species Stocking Rate - Supplementary Table							
Key source population for breeding	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Key source population for dispersal	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Necessary for maintaining genetic diversity	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 8
GHFF							
SITE CONDITION							
Site Condition - Habitat Transect Data Assessment							
Vegetation Condition	0	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	1, 2, 3, 4, 5, 9
Species richness - canopy trees	10	5 species	4-6 species	4-6 species	4-6 species	>6 species	1, 2, 3, 4, 5, 9
Flower scores (average)	0	0.624	0.51-0.75	0.51-0.75	0.51-0.75	0.51-0.75	1, 2, 3, 4, 5, 9
Timing of biological shortages	0	2.5	2.5	2.5	2.5	2.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	10	10	10	10	10	1, 2, 3, 4, 5, 9
Quality of foraging habitat (trees >0.65 wt p*r)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	5	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 3, 4, 5
SPECIES STOCKING RATE							
Large trees present	10	24 (47% of benchmark)	26-51 (>50% to 100% of benchmark)	26-51 (>50% to 100% of benchmark)	≥52 (>100% of benchmark)	≥52 (>100% of benchmark)	1, 3, 5

KPIs and Management Actions

AU03

OMU-01

RE12.8.1(

KOALA

SITE CONDITION

Habitat Transect Data Assessment

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Recruitment of woody perennial species in EDL	0	100% recruitment (100% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - trees	0	11 species (157% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - shrubs	2.5	0 species (0% of benchmark)	2-6 species (25-90% of benchmark)	2-6 species (25-90% of benchmark)	2-6 species (25-90% of benchmark)	2-6 species (25-90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - grasses	0	8 species (114% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - forbs	2.5	12 species (41% of benchmark)	8-26 species (25-90% of benchmark)	8-26 species (25-90% of benchmark)	≥27 species (≥90% of benchmark)	≥27 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	na
Tree EDL canopy height (m)	0	20m (100% of benchmark)	>14m (>70% of benchmark)	>14m (>70% of benchmark)	>14m (>70% of benchmark)	>14m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy canopy height (m)	0	8m (100% of benchmark)	>5.6m (>70% of benchmark)	>5.6m (>70% of benchmark)	>5.6m (>70% of benchmark)	>5.6m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy height (score)	0	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	na
Tree EDL canopy cover (%)	0	62.6% (153% of benchmark)	20.5%-82% (50% to 200% of benchmark)	20.5%-82% (50% to 200% of benchmark)	20.5%-82% (50% to 200% of benchmark)	20.5%-82% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy cover (%)	0	25.2% (148% of benchmark)	8.5%-34% (50% to 200% of benchmark)	8.5%-34% (50% to 200% of benchmark)	8.5%-34% (50% to 200% of benchmark)	8.5%-34% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy cover (score)	0	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	2	10.3% (258% of benchmark)	>8% (>200% of benchmark)	2%-8% (50% to 200% of benchmark)	2%-8% (50% to 200% of benchmark)	2%-8% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Native perennial grass cover (%)	4	14.6% (32% of benchmark)	>22.5%-40.5% (>50%-90% of benchmark)	>22.5%-40.5% (>50%-90% of benchmark)	>40.5% (>90% of benchmark)	>40.5% (>90% of benchmark)	1, 2, 3, 4, 5, 9
Organic litter	0	33.8 (161% of benchmark)	10.5%-42% (50% to 200% of benchmark)	10.5%-42% (50% to 200% of benchmark)	10.5%-42% (50% to 200% of benchmark)	10.5%-42% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Large trees	0	40 (118% of benchmark)	>34 (>100% of benchmark)	>34 (>100% of benchmark)	>34 (>100% of benchmark)	>34 (>100% of benchmark)	1, 3, 5, 9
Coarse woody debris	0	312.9 (53% of benchmark)	296-1,184 (50% to 200% of benchmark)	296-1,184 (50% to 200% of benchmark)	296-1,184 (50% to 200% of benchmark)	296-1,184 (50% to 200% of benchmark)	2, 3, 5, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

Species Habitat Index Data Site Condition

Quality and availability of food and foraging habitat	0	High (74% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
Quality and availability of shelter	0	High (74% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 8
Threats to species	8	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 2, 3, 5, 6
Species mobility capacity	3	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6

SPECIES STOCKING RATE

Presence detected on or adjacent to site (neighbouring property with connected habitat)	0	Yes - on site	Yes - on site	Yes - on site	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	0	Breeding	Breeding	Breeding	Breeding	Breeding	8
Approximate density (per ha)	10	Low (10.7% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	0	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 8

Species Stocking Rate - Supplementary Table

Key source population for breeding	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Key source population for dispersal	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Necessary for maintaining genetic diversity	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 8

GHFF

SITE CONDITION

Site Condition - Habitat Transect Data Assessment

Vegetation Condition	0	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	1, 2, 3, 4, 5, 9
Species richness - canopy trees	0	7 species	>6 species	>6 species	>6 species	>6 species	1, 2, 3, 4, 5, 9
Flower scores (average)	0	0.596	0.51-0.75	0.51-0.75	0.51-0.75	0.51-0.75	1, 2, 3, 4, 5, 9
Timing of biological shortages	0	2.5	2.5	2.5	2.5	2.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	10	10	10	10	10	1, 2, 3, 4, 5, 9
Quality of foraging habitat (trees >0.65 wt p*r)	0	3	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	5	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 3, 4, 5

SPECIES STOCKING RATE

Large trees present	0	40 (118% of benchmark)	≥35 (>100% of benchmark)	≥35 (>100% of benchmark)	≥35 (>100% of benchmark)	≥35 (>100% of benchmark)	1, 3, 5

KPIs and Management Actions

AU05

OMU-01

RE12.8.17

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
KOALA							
SITE CONDITION							
Habitat Transect Data Assessment							
Recruitment of woody perennial species in EDL	0	100% recruitment (100% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - trees	0	8 species (114% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - shrubs	2.5	0 species (0% of benchmark)	2-4 species (25-90% of benchmark)	2-4 species (25-90% of benchmark)	2-4 species (25-90% of benchmark)	2-4 species (25-90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - grasses	2.5	8 species (67% of benchmark)	3-10 species (>25 to 90% of benchmark)	3-10 species (>25 to 90% of benchmark)	≥11 species (≥90% of benchmark)	≥11 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - forbs	2.5	11 species (41% of benchmark)	7-24 species (>25 to 90% of benchmark)	7-24 species (>25 to 90% of benchmark)	≥25 species (≥90% of benchmark)	≥25 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	na
Tree EDL canopy height (m)	0	14.5m (76% of benchmark)	>13.3m (>70% of benchmark)	>13.3m (>70% of benchmark)	>13.3m (>70% of benchmark)	>13.3m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy canopy height (m)	2	6m (60% of benchmark)	2.5-7m (25% to 70% of benchmark)	>7m (>70% of benchmark)	>7m (>70% of benchmark)	>7m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy height (score)	1	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	na
Tree EDL canopy cover (%)	0	65.5% (136% of benchmark)	24%-96% (50% to 200% of benchmark)	24%-96% (50% to 200% of benchmark)	24%-96% (50% to 200% of benchmark)	24%-96% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy cover (%)	0	13.75% (69% of benchmark)	10%-40% (50% to 200% of benchmark)	10%-40% (50% to 200% of benchmark)	10%-40% (50% to 200% of benchmark)	10%-40% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy cover (score)	0	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	2	2.2% (44% of benchmark)	0.5%-<2.5% (10% to <50% of benchmark)	2.5%-10% (50% to 200% of benchmark)	2.5%-10% (50% to 200% of benchmark)	2.5%-10% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Native perennial grass cover (%)	0	42.7% (133% of benchmark)	>28.8% (>90% of benchmark)	>28.8% (>90% of benchmark)	>28.8% (>90% of benchmark)	>28.8% (>90% of benchmark)	1, 2, 3, 4, 5, 9
Organic litter	0	29.5 (140% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Large trees	0	28 (117% of benchmark)	>24 (>100% of benchmark)	>24 (>100% of benchmark)	>24 (>100% of benchmark)	>24 (>100% of benchmark)	1, 3, 5, 9
Coarse woody debris	0	211.35 (90% of benchmark)	117-468 (50% to 200% of benchmark)	117-468 (50% to 200% of benchmark)	117-468 (50% to 200% of benchmark)	117-468 (50% to 200% of benchmark)	2, 3, 5, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
Species Habitat Index Data Site Condition							
Quality and availability of food and foraging habitat	0	High (75% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
Quality and availability of shelter	0	High (>75% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 8
Threats to species	8	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 2, 3, 5, 6
Species mobility capacity	3	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6
SPECIES STOCKING RATE							
Presence detected on or adjacent to site (neighbouring property with connected habitat)	0	Yes - on site	Yes - on site	Yes - on site	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	0	Breeding	Breeding	Breeding	Breeding	Breeding	8
Approximate density (per ha)	10	Low (10.7% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	0	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 8
Species Stocking Rate - Supplementary Table							
Key source population for breeding	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Key source population for dispersal	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Necessary for maintaining genetic diversity	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 8
GHFF							
SITE CONDITION							
Site Condition - Habitat Transect Data Assessment							
Vegetation Condition	0	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	Category B / remnant	1, 2, 3, 4, 5, 9
Species richness - canopy trees	10	6 species	>6 species	>6 species	>6 species	>6 species	1, 2, 3, 4, 5, 9
Flower scores (average)	0	0.666	0.51-0.75	0.51-0.75	0.51-0.75	0.51-0.75	1, 2, 3, 4, 5, 9
Timing of biological shortages	0	2.5	2.5	2.5	2.5	2.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	10	10	10	10	10	1, 2, 3, 4, 5, 9
Quality of foraging habitat (trees >0.65 wt p*r)	0	3	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	5	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 3, 4, 5
SPECIES STOCKING RATE							
Large trees present	0	28 (117% of benchmark)	≥25 (>100% of benchmark)	≥25 (>100% of benchmark)	≥25 (>100% of benchmark)	≥25 (>100% of benchmark)	1, 3, 5

KPIs and Management Actions

AU01

OMU-02

RE12.9-10.

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
KOALA							
SITE CONDITION							
Habitat Transect Data Assessment							
Recruitment of woody perennial species in EDL	0	100% recruitment (100% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - trees	0	5 species (167% of benchmark)	≥3 species (≥90% of benchmark)	≥3 species (≥90% of benchmark)	≥3 species (≥90% of benchmark)	≥3 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - shrubs	2.5	1 species (20% of benchmark)	2-5 species (25 to 90% of benchmark)	2-4 species (25 to 90% of benchmark)	≥5 species (≥90% of benchmark)	≥5 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - grasses	0	10 species (125% of benchmark)	≥8 species (≥90% of benchmark)	≥8 species (≥90% of benchmark)	≥8 species (≥90% of benchmark)	≥8 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - forbs	2.5	20 species (77% of benchmark)	7-23 species (25 to 90% of benchmark)	7-23 species (25 to 90% of benchmark)	≥24 species (≥90% of benchmark)	≥24 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy height (m)	2	14m (67% of benchmark)	5.25 - 14.7m (25-70% of benchmark)	>14.7m (>70% of benchmark)	>14.7m (>70% of benchmark)	>14.7m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy canopy height (m)	2	3.5m (35% of benchmark)	2.5 - 7.0m (25-70% of benchmark)	>7.0m (>70% of benchmark)	>7.0m (>70% of benchmark)	>7.0m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy height (score)	2	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy cover (%)	0	46% (115% of benchmark)	20%-80% (50% to 200% of benchmark)	20%-80% (50% to 200% of benchmark)	20%-80% (50% to 200% of benchmark)	20%-80% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy cover (%)	5	0% (0% of benchmark)	0.8% to >4% (10% to <50% of benchmark)	4% to 16% (50% to 200% of benchmark)	4% to 16% (50% to 200% of benchmark)	4% to 16% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy cover (score)	2.5	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	2	6.3% (210% of benchmark)	1.5% to 6.0% (50% to 200% of benchmark)	1.5% to 6.0% (50% to 200% of benchmark)	1.5% to 6.0% (50% to 200% of benchmark)	1.5% to 6.0% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Native perennial grass cover (%)	2	34% (56% of benchmark)	30.5% - 54.9% (50% to 90% of benchmark)	30.5% - 54.9% (50% to 90% of benchmark)	>54.9% (>90% of benchmark)	>54.9% (>90% of benchmark)	1, 2, 3, 4, 5, 9
Organic litter	0	29 (146% of benchmark)	10 - 40 (50% to 200% of benchmark)	10 - 40 (50% to 200% of benchmark)	10 - 40 (50% to 200% of benchmark)	10 - 40 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Large trees	5	9 (50% of benchmark)	1 - 9 (>0% to 50% of benchmark)	10 -18 (>50% to 100% of benchmark)	10 -18 (>50% to 100% of benchmark)	10 -18 (>50% to 100% of benchmark)	1, 3, 5, 9
Coarse woody debris	3	75 (28% of benchmark)	28 to <136 (10 to <50% of benchmark)	28 to <136 (10 to <50% of benchmark)	136 - 544 (50% to 200% of benchmark)	136 - 544 (50% to 200% of benchmark)	2, 3, 5, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
Species Habitat Index Data Site Condition							
Quality and availability of food and foraging habitat	5	Moderate (65% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
Quality and availability of shelter	5	Moderate (65% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 8
Threats to species	8	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 2, 3, 5, 6
Species mobility capacity	3	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6
SPECIES STOCKING RATE							
Presence detected on or adjacent to site (neighbouring property with connected habitat)	0	Yes - on site	Yes - on site	Yes - on site	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	0	Breeding	Breeding	Breeding	Breeding	Breeding	8
Approximate density (per ha)	10	Low (8.7% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	0	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 8
Species Stocking Rate - Supplementary Table							
Key source population for breeding	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Key source population for dispersal	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Necessary for maintaining genetic diversity	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 8
GHFF							
SITE CONDITION							
Site Condition - Habitat Transect Data Assessment							
Vegetation Condition	10	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category B / remnant	Category B / remnant	1, 2, 3, 4, 5, 9
Species richness - canopy trees	0	4 species	4 to 6 species	4 to 6 species	4 to 6 species	4 to 6 species	1, 2, 3, 4, 5, 9
Flower scores (average)	0	0.6125	0.51 to 0.75	0.51 to 0.75	0.51 to 0.75	0.51 to 0.75	1, 2, 3, 4, 5, 9
Timing of biological shortages	0	2.5	2.5	2.5	2.5	2.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	10	10	10	10	10	1, 2, 3, 4, 5, 9
Quality of foraging habitat (trees >0.65 wt p*r)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	5	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 3, 4, 5
SPECIES STOCKING RATE							
Large trees present	5	9 (50% of benchmark)	1 - 9 (>0% to 50% of benchmark)	10 -18 (>50% to 100% of benchmark)	10 -18 (>50% to 100% of benchmark)	10 -18 (>50% to 100% of benchmark)	1, 3, 5

KPIs and Management Actions

AU04

OMU-02

RE12.8.1(

KOALA

SITE CONDITION

Habitat Transect Data Assessment

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Recruitment of woody perennial species in EDL	0	100% recruitment (100% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - trees	0	7 species (100% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - shrubs	0	2 species (29% of benchmark)	2-6 species (25-90% of benchmark)	2-6 species (25-90% of benchmark)	2-6 species (25-90% of benchmark)	2-6 species (25-90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - grasses	0	9 species (129% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - forbs	2.5	16 species (55% of benchmark)	8-26 species (25-90% of benchmark)	8-26 species (25-90% of benchmark)	≥27 species (≥90% of benchmark)	≥27 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy height (m)	2	13m (65% of benchmark)	5-14m (25% to 70% of benchmark)	>14m (>70% of benchmark)	>14m (>70% of benchmark)	>14m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy canopy height (m)	0	6m (75% of benchmark)	>5.6m (>70% of benchmark)	>5.6m (>70% of benchmark)	>5.6m (>70% of benchmark)	>5.6m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy height (score)	1	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy cover (%)	0	45% (109% of benchmark)	20.5%-82% (50% to 200% of benchmark)	20.5%-82% (50% to 200% of benchmark)	20.5%-82% (50% to 200% of benchmark)	20.5%-82% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy cover (%)	0	18% (109% of benchmark)	8.5%-34% (50% to 200% of benchmark)	8.5%-34% (50% to 200% of benchmark)	8.5%-34% (50% to 200% of benchmark)	8.5%-34% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy cover (score)	0	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	2	1% (22% of benchmark)	0.4%-<8% (10% to <50% of benchmark)	2%-8% (50% to 200% of benchmark)	2%-8% (50% to 200% of benchmark)	2%-8% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Native perennial grass cover (%)	0	60% (134% of benchmark)	>40.5% (>90% of benchmark)	>40.5% (>90% of benchmark)	>40.5% (>90% of benchmark)	>40.5% (>90% of benchmark)	1, 2, 3, 4, 5, 9
Organic litter	0	19 (91% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Large trees	5	3 (9% of benchmark)	0-17 (0% to 50% of benchmark)	0-17 (0% to 50% of benchmark)	18-34 (>50%-100% of benchmark)	18-34 (>50%-100% of benchmark)	1, 3, 5, 9
Coarse woody debris	3	139 (23% of benchmark)	60-<296 (10-<50% of benchmark)	60-<296 (10-<50% of benchmark)	296-1,184 (50%-200% of benchmark)	296-1,184 (50%-200% of benchmark)	2, 3, 5, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

Species Habitat Index Data Site Condition

Quality and availability of food and foraging habitat	5	Moderate (65% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
Quality and availability of shelter	5	Moderate (65% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 8
Threats to species	8	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 2, 3, 5, 6
Species mobility capacity	3	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6

SPECIES STOCKING RATE

Presence detected on or adjacent to site (neighbouring property with connected habitat)	0	Yes - on site	Yes - on site	Yes - on site	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	0	Breeding	Breeding	Breeding	Breeding	Breeding	8
Approximate density (per ha)	10	Low (8.7% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	0	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 8

Species Stocking Rate - Supplementary Table

Key source population for breeding	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Key source population for dispersal	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Necessary for maintaining genetic diversity	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 8

GHFF

SITE CONDITION

Site Condition - Habitat Transect Data Assessment

Vegetation Condition	10	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category B / remnant	Category B / remnant	1, 2, 3, 4, 5, 9
Species richness - canopy trees	0	7 species	>6 species	>6 species	>6 species	>6 species	1, 2, 3, 4, 5, 9
Flower scores (average)	0	0.596	0.51-0.75	0.51-0.75	0.51-0.75	0.51-0.75	1, 2, 3, 4, 5, 9
Timing of biological shortages	0	2.5	2.5	2.5	2.5	2.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	10	10	10	10	10	1, 2, 3, 4, 5, 9
Quality of foraging habitat (trees >0.65 wt p*r)	0	3	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	5	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 3, 4, 5

SPECIES STOCKING RATE

Large trees present	5	3 (9% of benchmark)	0-17 (0% to 50% of benchmark)	0-17 (0% to 50% of benchmark)	18-34 (>50%-100% of benchmark)	18-34 (>50%-100% of benchmark)	1, 3, 5

AU06

OMU-02

RE12.8.17

KOALA

SITE CONDITION

Habitat Transect Data Assessment

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Recruitment of woody perennial species in EDL	0	100% recruitment (100% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - trees	2.5	4 species (57% of benchmark)	2-6 species (25% to <90% of benchmark)	2-6 species (25% to <90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - shrubs	0	2 species (40% of benchmark)	2-4 species (25% to <90% of benchmark)	2-4 species (25% to <90% of benchmark)	2-4 species (25% to <90% of benchmark)	2-4 species (25% to <90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - grasses	2.5	7 species (58% of benchmark)	3-10 species (25% to <90% of benchmark)	3-10 species (25% to <90% of benchmark)	≥11 species (≥90% of benchmark)	≥11 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - forbs	2.5	7 species (26% of benchmark)	7-24 species (25% to <90% of benchmark)	7-24 species (25% to <90% of benchmark)	≥25 species (≥90% of benchmark)	≥25 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy height (m)	2	13m (68% of benchmark)	4.75-13.3m (25% to 70% of benchmark)	>13.3m (>70% of the benchmark)	>13.3m (>70% of the benchmark)	>13.3m (>70% of the benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy canopy height (m)	2	6m (60% of benchmark)	2.5-7m (25% to 70% of benchmark)	>7m (>70% of the benchmark)	>7m (>70% of the benchmark)	>7m (>70% of the benchmark)	1, 2, 3, 4, 5, 9
Tree canopy height (score)	2	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy cover (%)	0	27.7% (58% of benchmark)	24%-96% (50% to 200% of benchmark)	24%-96% (50% to 200% of benchmark)	24%-96% (50% to 200% of benchmark)	24%-96% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy cover (%)	5	0.7% (4% of benchmark)	2%-<10% (10% to <50% of benchmark)	10%-40% (50% to 200% of benchmark)	10%-40% (50% to 200% of benchmark)	10%-40% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy cover (score)	2.5	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	2	2.3% (46% of benchmark)	0.5%-<2.5% (10% to <50% of benchmark)	2.5%-10% (50% to 200% of benchmark)	2.5%-10% (50% to 200% of benchmark)	2.5%-10% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Native perennial grass cover (%)	2	28.2% (88% of benchmark)	16%-28.8% (50%-90% of benchmark)	16%-28.8% (50%-90% of benchmark)	>28.8% (>90% of benchmark)	>28.8% (>90% of benchmark)	1, 2, 3, 4, 5, 9
Organic litter	0	24.6 (117% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Large trees	10	0 (0% of benchmark)	0 (0% of benchmark)	0-12 (0% to 50% of benchmark)	13-24 (>50% to 100% of benchmark)	13-24 (>50% to 100% of benchmark)	1, 3, 5, 9
Coarse woody debris	3	28 (12% of benchmark)	23.4-<117 (10% to <50% of benchmark)	23.4-<117 (10% to <50% of benchmark)	117-468 (50%-200% of benchmark)	117-468 (50%-200% of benchmark)	2, 3, 5, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

Species Habitat Index Data Site Condition

Quality and availability of food and foraging habitat	5	Moderate (46% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
Quality and availability of shelter	5	Moderate (46% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 8
Threats to species	8	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 2, 3, 5, 6
Species mobility capacity	3	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6

SPECIES STOCKING RATE

Presence detected on or adjacent to site (neighbouring property with connected habitat)	0	Yes - on site	Yes - on site	Yes - on site	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	0	Breeding	Breeding	Breeding	Breeding	Breeding	8
Approximate density (per ha)	10	Low (8.7% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	0	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 8

Species Stocking Rate - Supplementary Table

Key source population for breeding	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Key source population for dispersal	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Necessary for maintaining genetic diversity	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 8

GHFF

SITE CONDITION

Site Condition - Habitat Transect Data Assessment

Vegetation Condition	10	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category B / remnant	Category B / remnant	1, 2, 3, 4, 5, 9
Species richness - canopy trees	10	6 species	>6 species	>6 species	>6 species	>6 species	1, 2, 3, 4, 5, 9
Flower scores (average)	0	0.666	0.51-0.75	0.51-0.75	0.51-0.75	0.51-0.75	1, 2, 3, 4, 5, 9
Timing of biological shortages	0	2.5	2.5	2.5	2.5	2.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	10	10	10	10	10	1, 2, 3, 4, 5, 9
Quality of foraging habitat (trees >0.65 wt p*r)	0	3	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

SITE CONTEXT

Site Context - GIS Data

Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5

Site Context - Species Habitat Index Data

Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	5	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 3, 4, 5

SPECIES STOCKING RATE

Large trees present	10	0 (0% of benchmark)	0 (0% of benchmark)	0-12 (0% to 50% of benchmark)	13-24 (>50% to 100% of benchmark)	13-24 (>50% to 100% of benchmark)	1, 3, 5

KPIs and Management Actions

AU07

OMU-02

RE12.3.3

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
KOALA							
SITE CONDITION							
Habitat Transect Data Assessment							
Recruitment of woody perennial species in EDL	2	75% (75% of benchmark)	20% to 75% (20% to 75% of benchmark)	20% to 75% (20% to 75% of benchmark)	20% to 75% (20% to 75% of benchmark)	>75% (>65% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - trees	0	10 species (200% of benchmark)	≥5 species (≥90% of benchmark)	≥5 species (≥90% of benchmark)	≥5 species (≥90% of benchmark)	≥5 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - shrubs	2.5	0 species (0% of benchmark)	2-3 species (25% to 90% of benchmark)	2-3 species (25% to 90% of benchmark)	≥4 species (≥90% of benchmark)	≥4 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - grasses	2.5	9 species (82% of benchmark)	3-9 species (25-<90% of benchmark)	3-9 species (25-<90% of benchmark)	≥10 species (≥90% of benchmark)	≥10 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - forbs	2.5	14 species (58% of benchmark)	6-21 species (25-<90% of benchmark)	6-21 species (25-<90% of benchmark)	≥22 species (≥90% of benchmark)	≥22 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy height (m)	0	20m (74% of benchmark)	>18.9m (>70% of benchmark)	>18.9m (>70% of benchmark)	>18.9m (>70% of benchmark)	>18.9m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy canopy height (m)	2	3m (25% of benchmark)	3.0 - 8.4m (25% to 70% of benchmark)	>8.4m (>70% of benchmark)	>8.4m (>70% of benchmark)	>8.4m (>70% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy height (score)	1	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy cover (%)	0	57.3% (108% of benchmark)	26.5% to 106% (50% to 200% of benchmark)	26.5% to 106% (50% to 200% of benchmark)	26.5% to 106% (50% to 200% of benchmark)	26.5% to 106% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy cover (%)	0	8.2% (91% of benchmark)	4.5% to 18% (50% to 200% of benchmark)	4.5% to 18% (50% to 200% of benchmark)	4.5% to 18% (50% to 200% of benchmark)	4.5% to 18% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy cover (score)	0	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	2	0.1% (10% of benchmark)	0.1%-<0.5% (10% to <50% of benchmark)	0.5% to 2% (50% to 200% of benchmark)	0.5% to 2% (50% to 200% of benchmark)	0.5% to 2% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Native perennial grass cover (%)	2	41.8% (89% of benchmark)	23.5% to 42.3% (>50%-90% of benchmark)	23.5% to 42.3% (>50%-90% of benchmark)	>42.3% (>90% of benchmark)	>42.3% (>90% of benchmark)	1, 2, 3, 4, 5, 9
Organic litter	0	25.4 (75% of benchmark)	17 to 68 (50% to 200% of benchmark)	17 to 68 (50% to 200% of benchmark)	17 to 68 (50% to 200% of benchmark)	17 to 68 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Large trees	5	14 (58% of benchmark)	13 to 24 (>50%-100% of benchmark)	13 to 24 (>50%-100% of benchmark)	>24 (>100% of benchmark)	>24 (>100% of benchmark)	1, 3, 5, 9
Coarse woody debris	3	222 (49.9% of benchmark)	45 to 222 (10% to 50% of benchmark)	45 to 222 (10% to 50% of benchmark)	223 to 890 (>50% to 200% of benchmark)	223 to 890 (>50% to 200% of benchmark)	2, 3, 5, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
Species Habitat Index Data Site Condition							
Quality and availability of food and foraging habitat	5	Moderate (46% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
Quality and availability of shelter	5	Moderate (46% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 8
Threats to species	8	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 2, 3, 5, 6
Species mobility capacity	3	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6
SPECIES STOCKING RATE							
Presence detected on or adjacent to site (neighbouring property with connected habitat)	0	Yes - on site	Yes - on site	Yes - on site	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	0	Breeding	Breeding	Breeding	Breeding	Breeding	8
Approximate density (per ha)	10	Low (8.7% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	0	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 8
Species Stocking Rate - Supplementary Table							
Key source population for breeding	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Key source population for dispersal	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Necessary for maintaining genetic diversity	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 8
GHFF							
SITE CONDITION							
Site Condition - Habitat Transect Data Assessment							
Vegetation Condition	10	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category B / remnant	Category B / remnant	1, 2, 3, 4, 5, 9
Species richness - canopy trees	0	5 species	4-6 species	4-6 species	4-6 species	4-6 species	1, 2, 3, 4, 5, 9
Flower scores (average)	0	0.586	0.51 - 0.75	0.51 - 0.75	0.51 - 0.75	0.51 - 0.75	1, 2, 3, 4, 5, 9
Timing of biological shortages	0	2.5	2.5	2.5	2.5	2.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	10	10	10	10	10	1, 2, 3, 4, 5, 9
Quality of foraging habitat (trees >0.65 wt p*r)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	5	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 3, 4, 5
SPECIES STOCKING RATE							
Large trees present	5	14 (58% of benchmark)	13 to 24 (>50%-100% of benchmark)	13 to 24 (>50%-100% of benchmark)	>24 (>100% of benchmark)	>24 (>100% of benchmark)	1, 3, 5

KPIs and Management Actions

AU08

OMU-02

RE12.3.7

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
KOALA							
SITE CONDITION							
Habitat Transect Data Assessment							
Recruitment of woody perennial species in EDL	5	0% (0% of benchmark)	20%-75% recruitment (20% to 75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - trees	0	15 species (150% of benchmark)	≥9 species (≥90% of benchmark)	≥9 species (≥90% of benchmark)	≥9 species (≥90% of benchmark)	≥9 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - shrubs	2.5	2 species (20% of benchmark)	3-8 species (25% to <90% of benchmark)	3-8 species (25% to <90% of benchmark)	3-8 species (25% to <90% of benchmark)	3-8 species (25% to <90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - grasses	2.5	3 species (43% of benchmark)	2-6 species (25% to <90% of benchmark)	2-6 species (25% to <90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Native plant species richness - forbs	2.5	25 species (83% of benchmark)	8-26 species (25% to <90% of benchmark)	8-26 species (25% to <90% of benchmark)	≥27 species (≥90% of benchmark)	≥27 species (≥90% of benchmark)	1, 2, 3, 4, 5, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy height (m)	0	22m (138% of benchmark)	>11.2m (>70% of the benchmark)	>11.2m (>70% of the benchmark)	>11.2m (>70% of the benchmark)	>11.2m (>70% of the benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy canopy height (m)	0	10m (91% of benchmark)	>7.7m (>70% of the benchmark)	>7.7m (>70% of the benchmark)	>7.7m (>70% of the benchmark)	>7.7m (>70% of the benchmark)	1, 2, 3, 4, 5, 9
Tree canopy height (score)	0	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	1, 2, 3, 4, 5, 9
Tree EDL canopy cover (%)	0	56% (187% of benchmark)	15%-60% (50% to 200% of benchmark)	15%-60% (50% to 200% of benchmark)	15%-60% (50% to 200% of benchmark)	15%-60% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree sub-canopy cover (%)	0	55.9% (186% of benchmark)	15%-60% (50% to 200% of benchmark)	15%-60% (50% to 200% of benchmark)	15%-60% (50% to 200% of benchmark)	15%-60% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Tree canopy cover (score)	0	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	5	1.2% (7% of benchmark)	1.8%-<9% (10% to <50% of benchmark)	9%-36% (50% to 200% of benchmark)	9%-36% (50% to 200% of benchmark)	9%-36% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Native perennial grass cover (%)	0	2.6% (260% of benchmark)	>0.9% (>90% of benchmark)	>0.9% (>90% of benchmark)	>0.9% (>90% of benchmark)	>0.9% (>90% of benchmark)	1, 2, 3, 4, 5, 9
Organic litter	2	21.4 (40% of benchmark)	5.4-<27 (10% to <50%)	27-108 (50% to 200% of benchmark)	27-108 (50% to 200% of benchmark)	27-108 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 9
Large trees	5	54 (24% of benchmark)	0-110 (0% to 50% of benchmark)	111-221 (>50% to 100% of benchmark)	111-221 (>50% to 100% of benchmark)	111-221 (>50% to 100% of benchmark)	1, 3, 5, 9
Coarse woody debris	5	0 (0% of benchmark)	66.7-<333.5 (10% to <50% of benchmark)	66.7-<333.5 (10% to <50% of benchmark)	333.5-1,334 (50%-200% of benchmark)	333.5-1,334 (50%-200% of benchmark)	2, 3, 5, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
Species Habitat Index Data Site Condition							
Quality and availability of food and foraging habitat	5	Moderate (45% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
Quality and availability of shelter	5	Moderate (45% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 8
Threats to species	8	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 2, 3, 5, 6
Species mobility capacity	3	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6
SPECIES STOCKING RATE							
Presence detected on or adjacent to site (neighbouring property with connected habitat)	0	Yes - on site	Yes - on site	Yes - on site	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	0	Breeding	Breeding	Breeding	Breeding	Breeding	8
Approximate density (per ha)	10	Low (8.7% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	Medium (22.5% - 32.84% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	0	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 8
Species Stocking Rate - Supplementary Table							
Key source population for breeding	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Key source population for dispersal	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Necessary for maintaining genetic diversity	0	Possibly	Possibly	Possibly	Possibly	Possibly	1, 2, 3, 4, 5, 6, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 8
GHFF							
SITE CONDITION							
Site Condition - Habitat Transect Data Assessment							
Vegetation Condition	10	Category C / regrowth	Category C / regrowth	Category C / regrowth	Category B / remnant	Category B / remnant	1, 2, 3, 4, 5, 9
Species richness - canopy trees	0	5 species	4-6 species	4-6 species	4-6 species	4-6 species	1, 2, 3, 4, 5, 9
Flower scores (average)	0	0.584	0.51-0.75	0.51-0.75	0.51-0.75	0.51-0.75	1, 2, 3, 4, 5, 9
Timing of biological shortages	0	2.5	2.5	2.5	2.5	2.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	1.5	1.5	1.5	1.5	1.5	1, 2, 3, 4, 5, 9
	0	10	10	10	10	10	1, 2, 3, 4, 5, 9
Quality of foraging habitat (trees >0.65 wt p*r)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9
SITE CONTEXT							
Site Context - GIS Data							
Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5
Site Context - Species Habitat Index Data							
Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	5	Moderate threat level	Moderate threat level	Low threat level	Low threat level	Low threat level	1, 3, 4, 5
SPECIES STOCKING RATE							
Large trees present	5	54 (24% of benchmark)	0-110 (0% to 50% of benchmark)	111-221 (>50% to 100% of benchmark)	111-221 (>50% to 100% of benchmark)	111-221 (>50% to 100% of benchmark)	1, 3, 5

KPIs and Management Actions

AU09

OMU-03

RE12.3.7 (cleared)

KOALA

SITE CONDITION

Habitat Transect Data Assessment

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Recruitment of woody perennial species in EDL	5	0% (0% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - trees	5	0 species (0% of benchmark)	3-8 species (25-<90% of benchmark)	≥9 species (≥90% of benchmark)	≥9 species (≥90% of benchmark)	≥9 species (≥90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - shrubs	2.5	0 species (0% of benchmark)	3-8 species (25-<90% of benchmark)	3-8 species (25-<90% of benchmark)	3-8 species (25-<90% of benchmark)	3-8 species (25-<90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - grasses	2.5	0 species (0% of benchmark)	2-6 species (25-<90% of benchmark)	2-6 species (25-<90% of benchmark)	2-6 species (25-<90% of benchmark)	2-6 species (25-<90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - forbs	2.5	0 species (0% of benchmark)	8-26 species (25-<90% of benchmark)	8-26 species (25-<90% of benchmark)	8-26 species (25-<90% of benchmark)	8-26 species (25-<90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	na
Tree EDL canopy height (m)	3	0m (0% of benchmark)	0-<4m (<25% of benchmark)	4-11.2m (25% to 70% of benchmark)	4-11.2m (25% to 70% of benchmark)	4-11.2m (25% to 70% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree sub-canopy canopy height (m)	3	0m (0% of benchmark)	0-<2.75m (<25% of benchmark)	2.75-7.7m (25% to 70% of benchmark)	2.75-7.7m (25% to 70% of benchmark)	2.75-7.7m (25% to 70% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree canopy height (score)	3	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	na
Tree EDL canopy cover (%)	2	0% (0% of benchmark)	<3% (<10% of benchmark)	<3% (<10% of benchmark)	3%-<15% (10% to <50% of benchmark)	3%-<15% (10% to <50% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree sub-canopy cover (%)	2	0% (0% of benchmark)	<3% (<10% of benchmark)	<3% (<10% of benchmark)	3%-<15% (10% to <50% of benchmark)	3%-<15% (10% to <50% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree canopy cover (score)	2	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	5	0% (0% of benchmark)	1.8%-<9% (10% to <50% of benchmark)	9%-36% (50% to 200% of benchmark)	9%-36% (50% to 200% of benchmark)	9%-36% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native perennial grass cover (%)	3	0% (0% of benchmark)	0.1%-<0.5% (10% to <50% of benchmark)	0.5%-0.9% (50% to 90% of benchmark)	0.5%-0.9% (50% to 90% of benchmark)	0.5%-0.9% (50% to 90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Organic litter	5	0 (0% of benchmark)	5.4-<27 (10% to <50%)	5.4-<27 (10% to <50%)	27-108 (50% to 200% of benchmark)	27-108 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 7, 9
Large trees	5	0 (0% of benchmark)	0-110 (0% to 50% of benchmark)	0-110 (0% to 50% of benchmark)	0-110 (0% to 50% of benchmark)	0-110 (0% to 50% of benchmark)	1, 3, 5, 7, 9
Coarse woody debris	5	0 (0% of benchmark)	<66.7 (<10% of benchmark)	66.7-<333.5 (10% to <50% of benchmark)	333.5-1,334 (50%-200% of benchmark)	333.5-1,334 (50%-200% of benchmark)	2, 3, 5, 7, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

Species Habitat Index Data Site Condition

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Quality and availability of food and foraging habitat	9	Low (4% of habitat transect data maximum score)	Low <33% of habitat transect data	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 7, 9
Quality and availability of shelter	9	Low (4% of habitat transect data maximum score)	Low <33% of habitat transect data	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 7, 9

SITE CONTEXT

Site Context - GIS Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5, 7
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5, 7

Site Context - Species Habitat Index Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 7, 8
Threats to species	14	High threat level	Moderate threat level	Moderate threat level	Moderate threat level	Low threat level	1, 2, 3, 5, 6, 7
Species mobility capacity	9	Severely restricted (76-100% reduction)	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6, 7

SPECIES STOCKING RATE

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Presence detected on or adjacent to site (neighbouring property with connected habitat)	5	Yes - adjacent	Yes - adjacent	Yes - adjacent	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	10	Not habitat	Not habitat	Not habitat	Foraging	Foraging	8
Approximate density (per ha)	10	0	0	0	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	10	0 (refer SSR Supplementary Table)	0 (refer SSR Supplementary Table)	0 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 7, 8

Species Stocking Rate - Supplementary Table

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Key source population for breeding	10	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Key source population for dispersal	5	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Necessary for maintaining genetic diversity	15	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 7, 8

GHFF

SITE CONDITION

Site Condition - Habitat Transect Data Assessment

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Vegetation Condition	15	Category X / non-remnant	Category X / non-remnant	Category X / non-remnant	Category C / regrowth	Category B / remnant	1, 2, 3, 4, 5, 7, 9
Species richness - canopy trees	20	0 species	0 species (no canopy developed)	0 species (no canopy developed)	>6 species (canopy developed)	>6 species (canopy developed)	1, 2, 3, 4, 5, 7, 9
Flower scores (average)	8	0	0 (no canopy developed)	0 (no canopy developed)	0.51-0.75 (canopy developed)	0.51-0.75 (canopy developed)	1, 2, 3, 4, 5, 7, 9
Timing of biological shortages	2.5	0	0 - no canopy developed	0 - no canopy developed	2.5	2.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	10	0	0 - no canopy developed	0 - no canopy developed	10	10	1, 2, 3, 4, 5, 7, 9
Quality of foraging habitat (trees >0.65 wt p*r)	5	0	0 (no canopy developed)	0 (no canopy developed)	1-3	1-3	1, 2, 3, 4, 5, 7, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

SITE CONTEXT

Site Context - GIS Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5, 7
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 7
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5, 7

Site Context - Species Habitat Index Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	9	High threat level	Moderate threat level	Moderate threat level	Moderate threat level	Low threat level	1, 3, 4, 5

SPECIES STOCKING RATE

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Large trees present	5	0 (0% of benchmark)	0-110 (0% to 50% of benchmark)	0-110 (0% to 50% of benchmark)	0-110 (0% to 50% of benchmark)	0-110 (0% to 50% of benchmark)	1, 3, 5, 7

KPIs and Management Actions

AU11

OMU-03

RE12.3.3 (cleared)

KOALA

SITE CONDITION

Habitat Transect Data Assessment

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Recruitment of woody perennial species in EDL	5	0% (0% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - trees	5	0 species (0% of benchmark)	2-4 species (25-<90% of benchmark)	≥5 species (≥90% of benchmark)	≥5 species (≥90% of benchmark)	≥5 species (≥90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - shrubs	2.5	0 species (0% of benchmark)	1-3 species (25-<90% of benchmark)	1-3 species (25-<90% of benchmark)	1-3 species (25-<90% of benchmark)	1-3 species (25-<90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - grasses	2.5	0 species (0% of benchmark)	3-9 species (25-<90% of benchmark)	3-9 species (25-<90% of benchmark)	3-9 species (25-<90% of benchmark)	3-9 species (25-<90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - forbs	2.5	0 species (0% of benchmark)	6-21 species (25-<90% of benchmark)	6-21 species (25-<90% of benchmark)	6-21 species (25-<90% of benchmark)	6-21 species (25-<90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	na
Tree EDL canopy height (m)	3	0m (0% of benchmark)	0-<6.75m (<25% of benchmark)	6.75-18.9m (25% to 70% of benchmark)	6.75-18.9m (25% to 70% of benchmark)	6.75-18.9m (25% to 70% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree sub-canopy canopy height (m)	3	0m (0% of benchmark)	0-<3m (<25% of benchmark)	3-8.4m (25% to 70% of benchmark)	3-8.4m (25% to 70% of benchmark)	3-8.4m (25% to 70% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree canopy height (score)	3	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	na
Tree EDL canopy cover (%)	2	0% (0% of benchmark)	<5.3% (<10% of benchmark)	<5.3% (<10% of benchmark)	5.3%-<26.5% (10% to <50% of benchmark)	5.3%-<26.5% (10% to <50% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree sub-canopy cover (%)	2	0% (0% of benchmark)	<0.9% (<10% of benchmark)	<0.9% (<10% of benchmark)	0.9%-<4.5% (10% to <50% of benchmark)	0.9%-<4.5% (10% to <50% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree canopy cover (score)	2	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	5	0% (0% of benchmark)	0.1%-<0.5% (10% to <50% of benchmark)	0.5%-2% (50% to 200% of benchmark)	0.5%-2% (50% to 200% of benchmark)	0.5%-2% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native perennial grass cover (%)	3	0% (0% of benchmark)	4.7%-<23.5% (10% to <50% of benchmark)	23.5%-42.3% (50% to 90% of benchmark)	23.5%-42.3% (50% to 90% of benchmark)	23.5%-42.3% (50% to 90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Organic litter	5	0 (0% of benchmark)	3.4-<17 (10% to <50%)	3.4-<17 (10% to <50%)	17-68 (50% to 200% of benchmark)	17-68 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 7, 9
Large trees	5	0 (0% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	1, 3, 5, 7, 9
Coarse woody debris	5	0 (0% of benchmark)	<44.5 (<10% of benchmark)	44.5-<222.5 (10% to <50% of benchmark)	222.5-890 (50%-200% of benchmark)	222.5-890 (50%-200% of benchmark)	2, 3, 5, 7, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

Species Habitat Index Data Site Condition

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Quality and availability of food and foraging habitat	9	Low (4% of habitat transect data maximum score)	Low <33% of habitat transect data	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 7, 9
Quality and availability of shelter	9	Low (4% of habitat transect data maximum score)	Low <33% of habitat transect data	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 7, 9

SITE CONTEXT

Site Context - GIS Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5, 7
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5, 7

Site Context - Species Habitat Index Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 7, 8
Threats to species	14	High threat level	Moderate threat level	Moderate threat level	Moderate threat level	Low threat level	1, 2, 3, 5, 6, 7
Species mobility capacity	9	Severely restricted (76-100% reduction)	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6, 7

SPECIES STOCKING RATE

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Presence detected on or adjacent to site (neighbouring property with connected habitat)	5	Yes - adjacent	Yes - adjacent	Yes - adjacent	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	10	Not habitat	Not habitat	Not habitat	Foraging	Foraging	8
Approximate density (per ha)	10	0	0	0	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	10	0 (refer SSR Supplementary Table)	0 (refer SSR Supplementary Table)	0 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 7, 8

Species Stocking Rate - Supplementary Table

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Key source population for breeding	10	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Key source population for dispersal	5	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Necessary for maintaining genetic diversity	15	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 7, 8

GHFF

SITE CONDITION

Site Condition - Habitat Transect Data Assessment

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Vegetation Condition	15	Category X / non-remnant	Category X / non-remnant	Category X / non-remnant	Category C / regrowth	Category B / remnant	1, 2, 3, 4, 5, 7, 9
Species richness - canopy trees	10	0 species	0 species (no canopy developed)	0 species (no canopy developed)	4-6 species (canopy developed)	4-6 species (canopy developed)	1, 2, 3, 4, 5, 7, 9
Flower scores (average)	8	0	0 (no canopy developed)	0 (no canopy developed)	0.51-0.75 (canopy developed)	0.51-0.75 (canopy developed)	1, 2, 3, 4, 5, 7, 9
Timing of biological shortages	2.5	0	0 - no canopy developed	0 - no canopy developed	2.5	2.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	10	0	0 - no canopy developed	0 - no canopy developed	10	10	1, 2, 3, 4, 5, 7, 9
Quality of foraging habitat (trees >0.65 wt p*r)	5	0	0 (no canopy developed)	0 (no canopy developed)	1-3	1-3	1, 2, 3, 4, 5, 7, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

SITE CONTEXT

Site Context - GIS Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5, 7
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 7
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5, 7

Site Context - Species Habitat Index Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	9	High threat level	Moderate threat level	Moderate threat level	Moderate threat level	Low threat level	1, 3, 4, 5

SPECIES STOCKING RATE

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Large trees present	5	0 (0% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	1, 3, 5, 7

KPIs and Management Actions

KOALA

SITE CONDITION

Habitat Transect Data Assessment

	AU12 OMU-03 RE12.8.17 (cleared) Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Recruitment of woody perennial species in EDL	5	0% (0% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	>75% recruitment (>75% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - trees	5	0 species (0% of benchmark)	2-6 species (25% to <90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	≥7 species (≥90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - shrubs	2.5	0 species (0% of benchmark)	2-4 species (25% to <90% of benchmark)	2-4 species (25% to <90% of benchmark)	2-4 species (25% to <90% of benchmark)	2-4 species (25% to <90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - grasses	2.5	0 species (0% of benchmark)	3-10 species (25% to <90% of benchmark)	3-10 species (25% to <90% of benchmark)	3-10 species (25% to <90% of benchmark)	3-10 species (25% to <90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native plant species richness - forbs	2.5	0 species (0% of benchmark)	7-24 species (25% to <90% of benchmark)	7-24 species (25% to <90% of benchmark)	7-24 species (25% to <90% of benchmark)	7-24 species (25% to <90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree emergent canopy height (m)	na	na	na	na	na	na	na
Tree EDL canopy height (m)	3	0m (0% of benchmark)	<4.75m <25% of benchmark height	4.75-13.3m (25% to 70% of benchmark)	4.75-13.3m (25% to 70% of benchmark)	4.75-13.3m (25% to 70% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree sub-canopy canopy height (m)	3	0m (0% of benchmark)	<2.5m (<25% of benchmark)	2.5-7m (25% to 70% of benchmark)	2.5-7m (25% to 70% of benchmark)	2.5-7m (25% to 70% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree canopy height (score)	3	Score uplift (if any) is the average of score uplift for 2 items above					
Tree emergent canopy cover (%)	na	na	na	na	na	na	na
Tree EDL canopy cover (%)	2	0% (0% of benchmark)	<4.8% (<10% of benchmark)	<4.8% (<10% of benchmark)	4.8% to <24% (10% to <50% of benchmark)	4.8% to <24% (10% to <50% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree sub-canopy cover (%)	2	0% (0% of benchmark)	<2% (<10% of benchmark)	2%-<10% (10% to <50% of benchmark)	2%-<10% (10% to <50% of benchmark)	2%-<10% (10% to <50% of benchmark)	1, 2, 3, 4, 5, 7, 9
Tree canopy cover (score)	2	Score uplift (if any) is the average of score uplift for 2 items above					
Shrub canopy cover (%)	5	0% (0% of benchmark)	0.5%-<2.5% (10% to <50% of benchmark)	2.5%-10% (50% to 200% of benchmark)	2.5%-10% (50% to 200% of benchmark)	2.5%-10% (50% to 200% of benchmark)	1, 2, 3, 4, 5, 7, 9
Native perennial grass cover (%)	3	0% (0% of benchmark)	3.2%-<16% (10% to <50% of benchmark)	16%-28.8% (50%-90% of benchmark)	16%-28.8% (50%-90% of benchmark)	16%-28.8% (50%-90% of benchmark)	1, 2, 3, 4, 5, 7, 9
Organic litter	5	0 (0% of benchmark)	2.1-<10.5 (10% to <50% of benchmark)	2.1-<10.5 (10% to <50% of benchmark)	10.5-42 (50% to 200% of benchmark)	10.5-42 (50% to 200% of benchmark)	1, 2, 3, 4, 5, 7, 9
Large trees	5	0 (0% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	1, 3, 5, 7, 9
Coarse woody debris	5	0 (0% of benchmark)	<23.4 (<10% of benchmark)	23.4-<117 (10% to <50% of benchmark)	117-468 (50%-200% of benchmark)	117-468 (50%-200% of benchmark)	2, 3, 5, 7, 9
Non-native plant cover (%)	7	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

Species Habitat Index Data Site Condition

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Quality and availability of food and foraging habitat	9	Low (4% of habitat transect data maximum score)	Low <33% of habitat transect data	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 7, 9
Quality and availability of shelter	9	Low (4% of habitat transect data maximum score)	Low <33% of habitat transect data	Moderate (33-67% of habitat transect data maximum score)	Moderate (33-67% of habitat transect data maximum score)	High (>67% of habitat transect data maximum score)	1, 2, 3, 4, 5, 7, 9

SITE CONTEXT

Site Context - GIS Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Size of the patch (ha)	0	>200ha	>200ha	>200ha	>200ha	>200ha	1, 2, 3, 4, 5, 7
Connectedness (%)	1	74.8%	50% to 75%	50% to 75%	50% to 75%	>75%	1, 2, 3, 4, 5
Context (% remnant)	0	71.6%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5, 7

Site Context - Species Habitat Index Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Role of site location to species overall population in the State	1	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Likely to be critical to species survival	Critical to species survival	1, 2, 3, 4, 5, 7, 8
Threats to species	14	High threat level	Moderate threat level	Moderate threat level	Moderate threat level	Low threat level	1, 2, 3, 5, 6, 7
Species mobility capacity	9	Severely restricted (76-100% reduction)	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	1, 2, 3, 4, 5, 6, 7

SPECIES STOCKING RATE

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Presence detected on or adjacent to site (neighbouring property with connected habitat)	5	Yes - adjacent	Yes - adjacent	Yes - adjacent	Yes - on site	Yes - on site	8
Species usage of the site (habitat type and evidenced usage)	10	Not habitat	Not habitat	Not habitat	Foraging	Foraging	8
Approximate density (per ha)	10	0	0	0	Low (>0 to <22.5% of trees with scats)	Low (>0 to <22.5% of trees with scats)	8
Role/importance of species population on site (score from supplementary table below)	10	0 (refer SSR Supplementary Table)	0 (refer SSR Supplementary Table)	0 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	30 (refer SSR Supplementary Table)	1, 2, 3, 4, 5, 6, 7, 8

Species Stocking Rate - Supplementary Table

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Key source population for breeding	10	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Key source population for dispersal	5	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Necessary for maintaining genetic diversity	15	No	No	No	Possibly	Possibly	1, 2, 3, 4, 5, 6, 7, 8
Near the limit of the species range	0	No	No	No	No	No	1, 2, 3, 4, 5, 6, 7, 8

GHFF

SITE CONDITION

Site Condition - Habitat Transect Data Assessment

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Vegetation Condition	15	Category X / non-remnant	Category X / non-remnant	Category X / non-remnant	Category C / regrowth	Category B / remnant	1, 2, 3, 4, 5, 7, 9
Species richness - canopy trees	20	0 species	0 species (no canopy developed)	0 species (no canopy developed)	>6 species (canopy developed)	>6 species (canopy developed)	1, 2, 3, 4, 5, 7, 9
Flower scores (average)	8	0	0 (no canopy developed)	0 (no canopy developed)	0.51-0.75 (canopy developed)	0.51-0.75 (canopy developed)	1, 2, 3, 4, 5, 7, 9
Timing of biological shortages	2.5	0	0 - no canopy developed	0 - no canopy developed	2.5	2.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	1.5	0	0 - no canopy developed	0 - no canopy developed	1.5	1.5	1, 2, 3, 4, 5, 7, 9
	10	0	0 - no canopy developed	0 - no canopy developed	10	10	1, 2, 3, 4, 5, 7, 9
Quality of foraging habitat (trees >0.65 wt p*r)	5	0	0 (no canopy developed)	0 (no canopy developed)	1-3	1-3	1, 2, 3, 4, 5, 7, 9
Non-native plant cover (%)	15	40%	5%-25%	5%-25%	<5%	<5%	1, 2, 9

SITE CONTEXT

Site Context - GIS Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Size of the patch (ha)	0	>200	>200	>200	>200	>200	1, 2, 3, 4, 5, 7
Connectedness (active GHFF camps within 30km radius)	0	2	1-3	1-3	1-3	1-3	1, 2, 3, 4, 5, 7
Context (% GHFF foraging habitat within a 20km radius)	0	45.02%	>30% to 75%	>30% to 75%	>30% to 75%	>30% to 75%	1, 2, 3, 4, 5
Ecological corridors	0	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	Within (whole or part)	1, 2, 3, 4, 5, 7

Site Context - Species Habitat Index Data

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Role of site location to species overall population in the State (active level 3 GHFF camps within a 30km radius)	0	1	1-3	1-3	1-3	1-3	
Threats to the species	9	High threat level	Moderate threat level	Moderate threat level	Moderate threat level	Low threat level	1, 3, 4, 5

SPECIES STOCKING RATE

	Score Uplift	Year 0 Baseline	Year 5 KPI	Year 10 KPI	Year 15 KPI	Year 20 KPI	Management Action
Large trees present	5	0 (0% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	0-12 (0% to 50% of benchmark)	1, 3, 5, 7

Appendix G - Revegetation plant list

Seed and plants to be sourced from locally collected/propagated stock.

Canopy Species (>30m)

Corymbia citriodora subsp. variegata
C. clarksoniana
C. tessellaris
C. intermedia
C. tessellaris
Eucalyptus crebra
E. acmenoides
E. moluccana
E. melanophloia
E. major
E. siderophloia
E. tereticornis

Midstorey Species (10-30m)

Lophostemon confertus
L. suaveolens
Brachychiton populeneous
Angophora leiocarpa
An. subvelutina
Allocasuarina cunninghamiana
Al. torulosa
Al. littoralis
Al. luehmanii
Melaleuca bracteata
Erythrina vespertilio

Understorey Species (<10m)

Exocarpos cupressiformis
Alphitonia excelsa
Acacia irrorata
A. concurrens
A. disparima
A. falcata
A. fimbriata
A. leiocalyx
A. melanoxylon
A. maidenii
A. salicina
Melaleuca viminalis

Appendix H – Risk assessment framework

RISK ASSESSMENT AND MANAGEMENT

Risk framework

		Consequence (C)				
		Minor	**Moderate**	**High**	**Major**	**Critical**
Likelihood (L)	**Highly Likely**	**Medium**	**High**	**High**	**Severe**	**Severe**
	Likely	**Low**	**Medium**	**High**	**High**	**Severe**
	Possible	**Low**	**Medium**	**Medium**	**High**	**Severe**
	Unlikely	**Low**	**Low**	**Medium**	**High**	**High**
	Rare	**Low**	**Low**	**Low**	**Medium**	**High**

Likelihood and consequence

Qualitative measure of likelihood (how likely is it that this event/circumstances will occur after management actions have been put in place/are being implemented)	
Rare (R)	May occur in exceptional circumstances
Unlikely (U)	Could occur but considered unlikely or doubtful
Possible (P)	Might occur during the life of the project
Likely (L)	Will probably occur during the life of the project
Highly likely (HL)	Is expected to occur in most circumstances
Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor (MI)	Minor risk of failure to achieve the plan's objectives. Results in short term delays to achieving plan objectives, implementing low cost, well characterised corrective actions.
Moderate (Mod)	Moderate risk of failure to achieve the plan's objectives. Results in short term delays to achieving plan objectives, implementing well characterised, high cost/effort corrective actions.
High (H)	High risk of failure to achieve the plan's objectives. Results in medium-long term delays to achieving plan objectives, implementing uncertain, high cost/effort corrective actions.
Major (Maj)	The plan's objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies.

Critical (C)	The plan's objectives are unable to be achieved, with no evidenced mitigation strategies.

Risk assessment and management

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
Selective chemical / mechanical weed treatment	Failure to control weeds	• Develop and implement a weed strategy, with a particular focus on weeds listed with particularly ability to impact on koala movement and structural vegetation composition (mainly Lantana camara and Schinus terebinthifolius), and under the Biosecurity Act 2014, to reduce weed cover to target thresholds. • Undertake weed management according principles outlined in section 7.1	**U**	**Mod**	**LOW**	• Annual surveys of non-native plant cover to ensure reduction across offset area. Surveys in-line with weed strategy. • Repeated surveys of baseline data including 5 yearly habitat monitoring data as part of the Offset Area Management Plan.	If weed survey indicates weed cover is not reduced since previous survey, weed control program to be expanded/adapted to improve outcomes.
Ecological burns	Failure to improve habitat for koala and GHFF	• Develop and implement a Fire Management Strategy with particular focus on Regional Ecosystem burning intervals and property fire history.	**U**	**Mod**	**LOW**	▪ Surveys conducted pre and post ecological burn to determine recovery gains. ▪ Repeated surveys of baseline data including 5 yearly habitat monitoring	If MHQA assessments indicated scores are not meeting predicted KPIs, management expanded to improve outcomes.

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
		• Undertake ecological burns in accordance with principles outlined in Section 7.				data as part of the Offset Area Management Plan.	
Wildfire hazard reduction	Loss of koala and GHFF habitat through catastrophic wildfire	• Incorporate the offset area into the property Fire Management Plan within six (6) months of the offset being legally secured, for the purpose of protecting the offset area from high intensity wildfires as well as for conducting ecological burns with the aim to enhance biodiversity in line with the Regional Ecosystem Description Database fire management guideline. The property Fire Management Plan will be prepared by a suitably qualified professional and will detail: 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	**P**	**Mod**	**MED**	• To be informed by the property Fire Management Plan. • Fuel hazard monitoring will occur on a twice yearly basis by suitably qualified environmental manager.	If a wildfire occurs in the offset area, the following actions will be taken by the landowner: ▪ Be prepared to engage in fire control. ▪ Repair any fire breaks and access tracks. ▪ Stay informed through the Rural Fire Service. ▪ Assess damage caused by the wildfire and monitor for natural regeneration. Monitoring to occur 3-6 months post event or after the next wet weather event (whichever is sooner). ▪ Where natural regeneration is failing to thrive, assist natural regeneration through direct seeding and planting where required to restore healthy ecosystem as outlined in Section 7.3

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
		guidelines and biodiversity outcomes sought for the offset area. • Hazard reduction action will take place to reduce fuel loads based on Overall Fuel Hazard Assessment (Hines et al 2010). Hazard reduction action to follow flowchart outlined in Section 7.3. • Install firebreaks and fire trails (access tracks). • Prescribed burning will be undertaken in consultation with, and under the guidance of the Queensland Rural Fire Brigade and in compliance with the Fire and Emergency Services Act 1990 • Inspect firebreaks and access tracks, undertake any maintenance required to achieve compliance with Fire Management Plan.					▪ Incorporate burnt area into fire management plan.
Supplementary direct seeding	Failure to improve habitat of koala and GHFF	Conduct direct seeding of native species in areas where natural regeneration not occurring. Species mix to be representative of Preclear Regional Ecosystem	**U**	**Mod**	**LOW**	Repeated surveys of baseline data including 5 yearly MHQA habitat monitoring data and annual observational data as part of the Offset Area Management Plan.	If MHQA transects indicate Koala and GHFF habitat less than performance indicators, implement additional supplementary direct seeding, weed control, fertiliser, amelioration or other management

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
							actions necessary to stimulate tree growth
Legal protection from incompatible land uses	Failure to legally secure approved offset site Legislative reform prejudices proposed tenure arrangements for offset properties.	Legally secure the offset area by way of voluntary declaration under the *Vegetation Management Act 1999*. At the completion of the Offset Management Period (20 years) legally secure the property with an enduring protection mechanism (such as a Nature Refuge under the *Nature Conservation Act 1992.*)	**R**	**Mod**	**LOW**	Provision of legal security mechanism to proponent.	Offset non-compliant without legal security. Await legal security before proceeding.
Monitoring and control of introduced predators	Failure to reduce the threat of introduced predators to the koala	• Conduct a baseline survey to establish introduced predator abundance and location on the property. This can be undertaken through the use of remote motion-activated cameras and/or identification of scats. Activities outlined in section 7.6. • Establish a Relative Abundance Index and confidence intervals around associated population trends. • Implement introduced predator control program. The control	**U**	**Mod**	**LOW**	• Monitoring of the presence of introduced predators through the use of remote motion-activated cameras; • Survey the site to record the presence/absence of signs of introduced predator (sightings, killings and/or scats and tracks). • Establishment and maintenance of register documenting injured/killed koalas and any observed	▪ Should the initial and ongoing introduced predator control measures not result in a reduction of introduced predator numbers (compared to baseline survey), introduced predator program to be expanded/adapted to improve outcomes. ▪ Any incidence of koala injury/mortality resulting from introduced predator attack will initiate

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
		program and techniques (trapping, baiting, shooting) will be informed based on the results of the abundance surveys. Where practical, 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. • Conduct follow-up monitoring and implement further control efforts if feral animals recur. Implement adaptive management techniques if initial control techniques are not working effectively. • Install appropriate hazard signage informing that the offset area is under introduced predator control. • Set-up a community engagement program including but not limited to interpretive signs, fact sheets and community presentations with the aim to raise community awareness and encourage responsible pet ownership.				koala/ introduced predator interactions.	supplementary monitoring and control measures. ▪ In the event that a koala is found injured, transport immediately to a local vet, or suitably qualified and experienced wildlife carer.

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
		• Directly input into the Little Liverpool Range Strategy for controlling introduced predators across the Range.					
Revegetation	Failure to increase koala and GHFF food and habitat	• Implement a revegetation program in cleared areas using best practice techniques with tree and shrub species representative of the pre-clearance Regional Ecosystem including koala and GHFF food and shelter trees (see Appendix H for proposed species list). Revegetation details outlined in section 7.7. • Exclude livestock from areas undergoing revegetation activities • Legally secure the offset area by way of voluntary declaration under the Vegetation Management Act 1999.	**U**	**Mod**	**LOW**	• Annual surveys of revegetation area to ensure plant survival. • Repeated surveys of baseline data including 5 yearly MHQA habitat monitoring data and annual observational data as part of the Offset Area Management Plan.	If MHQA transects indicate Koala and GHFF habitat less than performance indicators, implement additional supplementary planting, direct seeding, weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth.
Koala species stocking rate survey	Failure to measure an increase in koala species stocking rate	▪ Undertake koala density/occurrence surveys using SAT methodology (Phillips and Callaghan 2011) within the offset area ▪ Repeated surveys to be undertaken at 5-year intervals.	**P**	**Mod**	**MED**	Record opportunistic koala sightings inclusive of scat findings (location and date). Undertake SAT surveys at 5-yearly intervals.	If koala densities are not maintained or are significantly reduced, then an assessment needs to be undertaken by a koala expert in relation to the potential cause/s and remediation actions undertaken where feasible through the implementation of adaptive management.

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
		• Koala SAT surveys to be undertaken by a suitably qualified ecologist with extensive experience with koala surveys. • Legally secure the offset area by way of voluntary declaration under the Vegetation Management Act 1999.					
Cattle grazing management	Adverse impact on MHQA scores resulting from inappropriate cattle grazing	▪ Cattle grazing to be used only as a wildfire hazard fuel reduction tool in accordance with Management Action 3 – Wildfire hazard reduction. ▪ Exclude cattle from revegetation areas (e.g. by fencing) until, in the opinion of an environmental management specialist, cattle grazing is assessed as unlikely to negatively affect vegetation composition. ▪ Only permit grazing at the Aroona Offset Site for the purposes of bushfire hazard reduction. ▪ Ensure that all livestock are excluded from planting/revegetation area for a minimum of 5 years, or	**U**	**Mod**	**LOW**	▪ Overall Fuel Hazard Assessments conducted bi-annually, with results to be included in the annual Offset Area Assessment Reports ▪ Annual assessment of cattle grazing impacts (if any), with findings and adaptive management actions to be included in the annual Offset Area Assessment Reports ▪ MHQA survey at milestone years 5, 10, 15 and 20.	▪ Cease cattle grazing if being undertaken ▪ Repeat surveys to monitor recovery (increase in MHQA scores attributed to impact of cattle) ▪ If recovery failing to occur, introduce supplementary direct seeding/planting if necessary

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
		until a suitably qualified independent expert has determined that planted koala and grey-headed flying-fox feed trees are of sufficient size to withstand impact from cattle. ▪ Provide the Department with a report from the suitably qualified independent expert verifying that planted koala and grey-headed flying-fox feed trees are of sufficient size to withstand impact from cattle. ▪ Ensure that any grazing is managed so as to prevent the risk of injury or mortality of koalas.					

Appendix D

EPBC Calculator Sheets

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Phascolarctos cinereus
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	230.00	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	138.00	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	138.00	Adjusted hectares	Refer to accompanying documentation	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	359.61	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	35.96	90%	32.36	31.10	74.63	54.08%	No	
									Future area without offset (adjusted hectares)	323.6	**Future area with offset (adjusted hectares)**	359.6								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**7**	**Future quality with offset (scale of 0-10)**	**9**	2.00	75%	1.50	1.44				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	138	74.63	54.08%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Phascolarctos cinereus
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	230.00	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	138.00	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	138.00	Adjusted hectares	Refer accompanying documentation	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	281.42	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	28.14	90%	25.33	24.34	76.66	55.55%	No	
									Future area without offset (adjusted hectares)	253.3	**Future area with offset (adjusted hectares)**	281.4								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**9**	3.00	75%	2.25	2.16				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	138	76.66	55.55%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

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Matter of National Environmental Significance	
Name	Phascolarctos cinereus
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	230.00	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	138.00	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	138.00	Adjusted hectares	Refer accompanying documentation	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	45.41	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00	15.27	11.07%	No	
									Future area without offset (adjusted hectares)	45.4	**Future area with offset (adjusted hectares)**	45.4								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**2**	**Future quality without offset (scale of 0-10)**	**2**	**Future quality with offset (scale of 0-10)**	**7**	5.00	70%	3.50	3.36				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	138	15.27	11.07%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Pteropus poliocephalus
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	230.00	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	138.00	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	138.00	Adjusted hectares	Refer accompanying documentation	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	359.61	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	35.96	90%	32.36	31.10	51.31	37.18%	No	
									Future area without offset (adjusted hectares)	323.6	**Future area with offset (adjusted hectares)**	359.6								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**8**	**Future quality with offset (scale of 0-10)**	**9**	1.00	75%	0.75	0.72				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	138	51.31	37.18%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Pteropus poliocephalus
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	230.00	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	138.00	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	138.00	Adjusted hectares	Refer accompanying documentation	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	281.42	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	28.14	90%	25.33	24.34	74.22	53.79%	No	
									Future area without offset (adjusted hectares)	253.3	**Future area with offset (adjusted hectares)**	281.4								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**5**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**8**	3.00	75%	2.25	2.16				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	138	74.22	53.79%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Pteropus poliocephalus
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	230.00	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	138.00	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	138.00	Adjusted hectares	Refer accompanying documentation	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	45.41	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00	15.27	11.07%	No	
									Future area without offset (adjusted hectares)	45.4	**Future area with offset (adjusted hectares)**	45.4								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**2**	**Future quality without offset (scale of 0-10)**	**2**	**Future quality with offset (scale of 0-10)**	**7**	5.00	70%	3.50	3.36				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	138	15.27	11.07%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**