Offset Management Plan

Ormeau Quarry Expansion
Prepared for Boral Resources (QLD) Pty Limited
6 December 2018

EPBC 2016/7797
Job No. 8354

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Declaration of Accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

The offence is punishable on conviction by imprisonment or a fine, or both.

I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

An extract of section 491 of the EPBC Act is attached.

Signed: 

Full Name: Russell Wilson

Organisation: Boral Resources (Qld) Ltd Pty

Date: 09/11/2018

491 Providing false or misleading information to authorised officer etc.

(1) A person is guilty of an offence if the person:
  (a) provides information or a document to another person (the ***recipient***); and
  (b) knows the recipient is:
    (i) an authorised officer; or
    (ii) the Minister; or
    (iii) an employee or officer in the Department; or
    (iv) a commissioner;
  performing a duty or carrying out a function under this Act or the regulations; and
  (c) knows the information or document is false or misleading in a material particular.

(2) The offence is punishable on conviction by imprisonment for a term not more than 1 year, a fine not more than 60 penalty units, or both.

Note: Subsection 4B(3) of the *Crimes Act 1914* lets a court fine a body corporate up to 5 times the maximum amount the court could fine a person under this subsection.

Executive summary

The Ormeau Quarry Expansion was referred under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) on 13 October 2016 and subsequently declared a "Controlled Action" requiring assessment by "Preliminary Documentation" pursuant to section 18 and 18A (*listed threatened species and communities*) (EPBC Act reference 2016/7797). Approval was issued on 14 February 2018. The trigger for the controlling provision was due to potential impacts on the Koala (*Phascolarctos cinereus*), which is listed as 'vulnerable' under the EPBC Act.

As part of the application process and in consultation with **Department of the Environment and Energy** (DoEE), an offset strategy was developed to compensate for the impacts from clearing 38 hectares of habitat critical to the survival of the Koala (Environmental Offset Strategy dated 31 January 2018 by Saunders Havill Group).

Condition 6 of the approval requires that the approval holder must submit an Offset Management Plan for the Minister's written approval. The Offset Management Plan must be prepared in accordance with the DoEE's Environmental Management Plan Guidelines, and the EPBC Act Environmental Offset Policy (2012) and include:

a) Detail of the offset area(s) required to address the loss of 38 hectares of koala habitat consistent with the Offset Strategy (Environmental Offset Strategy dated 31 January 2018 by Saunders Havill Group) or subsequent Offset Strategy described in Condition 4.
b) Detail of the proposed legal mechanism and timeframes for securing the offset area(s).
c) A map of the offset area(s) in relation to other habitats and biodiversity corridors.
d) Information about how the offset area(s) provide connectivity with other koala habitat and biodiversity corridors.
e) A description of the current condition (prior to any management activities) of the offset area(s), including baseline survey data.
f) A description of the management measures (including timing, frequency and longevity) that will be implemented, including discussion of how measures outlined take into account relevant conservation advice.
g) Performance and completion criteria for evaluating the management of the offset area(s), and detailed criteria that will trigger corrective actions.
h) A detailed program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria.
i) Potential risks to the successful implementation of the plan, and a description of the contingency measures that would be implemented to mitigate against these risks, including bushfire management plan and a pest species management plan.

The offset proposal included the dedication and rehabilitation of 77 hectares of vegetation constituting Koala habitat.

This Offset Management Plan has the purpose of providing high level guidance for the creation and implementation of offset mechanisms. The primary offset mechanisms include:

- The dedication as an offset of 77 hectares of vegetation constituting Koala habitat within the land identified on Cliff Barrons Road, Kingsholme.
- Rehabilitation and revegetation works to improve the condition of the offset area.
- Implementation of management plans for:
    - Weeds of national significance
    - Pest management (feral and unwanted dog usage)
    - Maintaining koala habitat
    - Bush fire
- Monitoring and reporting to ensure that the offset area achieves and maintains the completion criteria.
- Adaptive management is applied to mitigate unforeseen risks and incorporate new information as it becomes available.
- Putting in place legal mechanisms available through Queensland legislation to secure the offset area by a Voluntary Declaration.

The implementation of these offset mechanisms will create a self-sustaining, continuous conservation area of high quality Koala habitat.

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1. Introduction

The *Environmental Management Division* of **Saunders Havill Group** was engaged by **Boral Resources (QLD) Pty Ltd** to prepare an Offset Management Plan for the Ormeau Quarry Expansion, located at Kingsholme in South East Queensland. The proposal is for the 38 hectare expansion of the Ormeau Quarry.

The Ormeau Quarry Expansion was referred under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) on 13 October 2016 and subsequently declared a "Controlled Action" requiring assessment by "Preliminary Documentation" pursuant to section 18 and 18A (*listed threatened species and communities*) (EPBC Act reference 2016/7797). The trigger for the controlling provision was due to potential impacts on the Koala (*Phascolarctos cinereus*), which is listed as 'vulnerable' under the EPBC Act.

As part of the **Department of the Environment and Energy's** (DoEE) Preliminary Documentation requirements, a proposal was developed to compensate for the impacts from clearing 38 hectares of habitat critical to the survival of the Koala. This offset was approved by a delegate of the Minister as part of the EPBC Act approval for 2016/7797. The offset includes the dedication and rehabilitation of 77 hectares of vegetation constituting Koala habitat.

The project was approved under the EPBC Act subject to conditions on 16 February 2018 with effect until 8 November 2057. Condition 6 of the approval requires that the approval holder must submit an Offset Management Plan for the Minister's written approval. The Offset Management Plan must be prepared in accordance with the DoEE's Environmental Management Plan Guidelines, and the EPBC Act Environmental Offset Policy (2012) and include:

a) Detail of the offset area(s) required to address the loss of 38 hectares of koala habitat consistent with the Offset Strategy (Environmental Offset Strategy dated 31 January 2018 by Saunders Havill Group) or subsequent Offset Strategy described in Condition 4.
b) Detail of the proposed legal mechanism and timeframes for securing the offset area(s).
c) A map of the offset area(s) in relation to other habitats and biodiversity corridors.
d) Information about how the offset area(s) provide connectivity with other koala habitat and biodiversity corridors.
e) A description of the current condition (prior to any management activities) of the offset area(s), including baseline survey data.
f) A description of the management measures (including timing, frequency and longevity) that will be implemented, including discussion of how measures outlined take into account relevant conservation advice.
g) Performance and completion criteria for evaluating the management of the offset area(s), and detailed criteria that will trigger corrective actions.
h) A detailed program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria.

i) Potential risks to the successful implementation of the plan, and a description of the contingency measures that would be implemented to mitigate against these risks, including bushfire management plan and a pest species management plan.

The action cannot commence until the Offset Management Plan is approved by the Minister in writing and the offset area is legally secured.

This Offset Management Plan (OMP) has been developed to satisfy the requirements of the conditions of approval accompanying the controlled action determination and the *EPBC Act Environmental Offsets Policy (2012)* to guide the implementation and management of offset activities.

1.1. Offset site summary

The offset site is located on Boral-owned land at Cliff Barrons Road, Kingsholme (Lot 2 on RP15912) approximately 1.7 km north of the expansion site. The site context in relation to the expansion is shown Figure 1 and an aerial shown on Figure 2.

Table 1: Offset site summary

Address	Cliff Barrons Road, Kingsholme
Lot / Plan	L2/RP15912
Area	77 hectares
Tenure	Freehold
Local government area	Gold Coast City Council
Action commencement date	Third or Fourth Quarter 2018

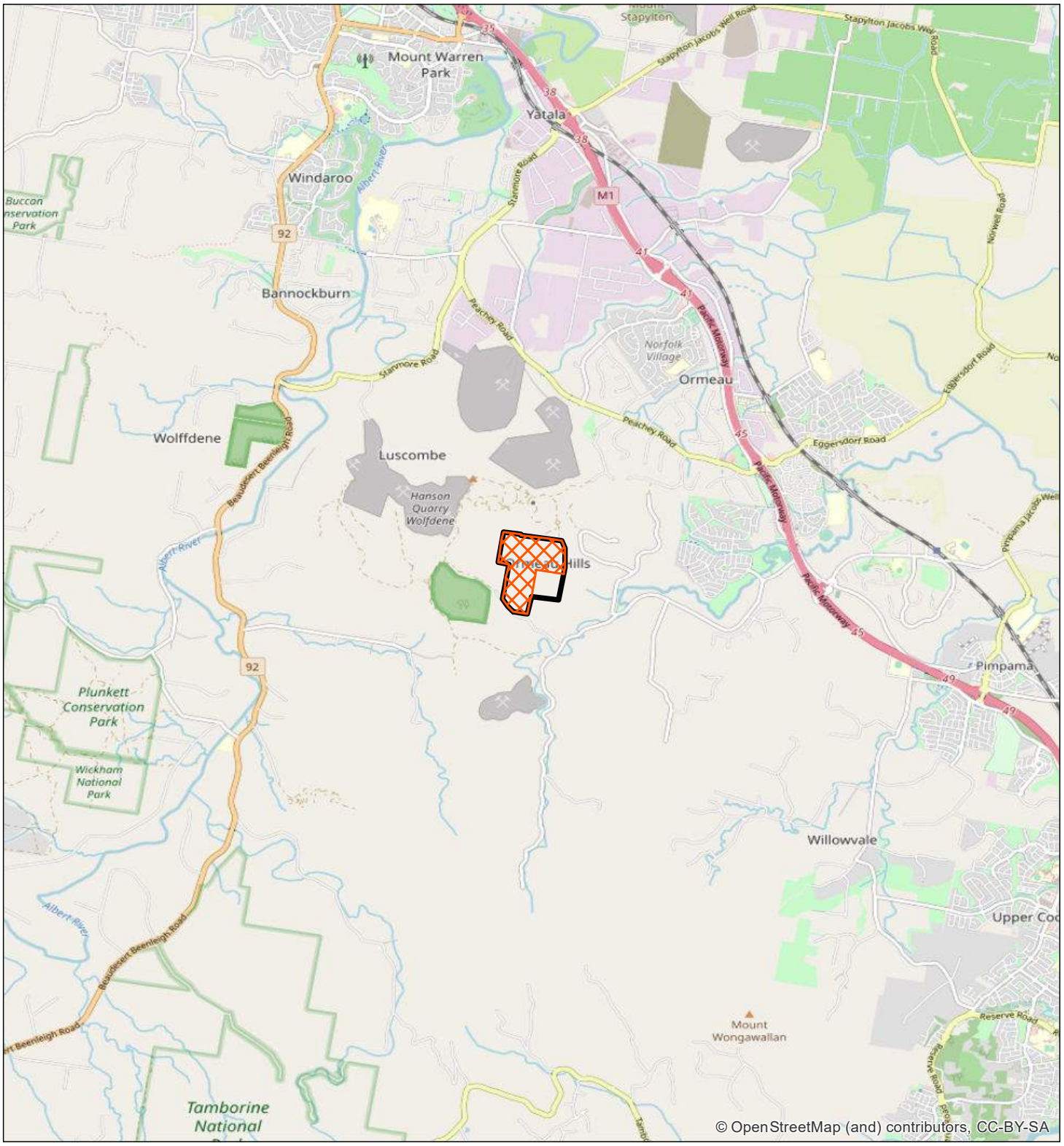
1.2. Environmental outcomes and objectives

In accordance with the EPBC Act approval, the environmental outcomes to be achieved through implementing the Offset Management Plan (OMP) for the offset area are:

- Maintain koala habitat quality across the offset site which is measured as a condition value of 8 out of 10.
- Rehabilitation and revegetation of disturbed non-remnant areas within the offset area.
- Implementation of a vegetation management plan to ensure the integrity of existing remnant vegetation is maintained.
- Facilitate adaptive management of the offset area including the nomination of milestone targets and a monitoring program.
- Annual compliance reporting detailing the implementation of management measures and achievement towards, and maintenance of, performance and completion criteria.

The management objectives for the offset area, in alignment with the EPBC Act Environmental Offsets Policy will:

- Deliver an overall conservation outcome that improves the viability of habitat for the koala.
- Provide a direct offset that is in proportion to the level of statutory protection that applies to koala habitat.
- Be of a size and scale proportionate to the residual impacts on koala habitat.
- Effectively account for and manage the risks of the offset not being successful with the required management timeframe.
- Provide a conservation gain additional to what is already required by a duty of care or to any environmental planning laws at any level of government.
- Be efficient, effective, timely, transparent, scientifically robust and reasonable with appropriate transparent governance arrangements in place for measuring, monitoring, auditing and enforcing the management of the offset area.



Legend

Offset site

Offset area

Figure 1

Site Context

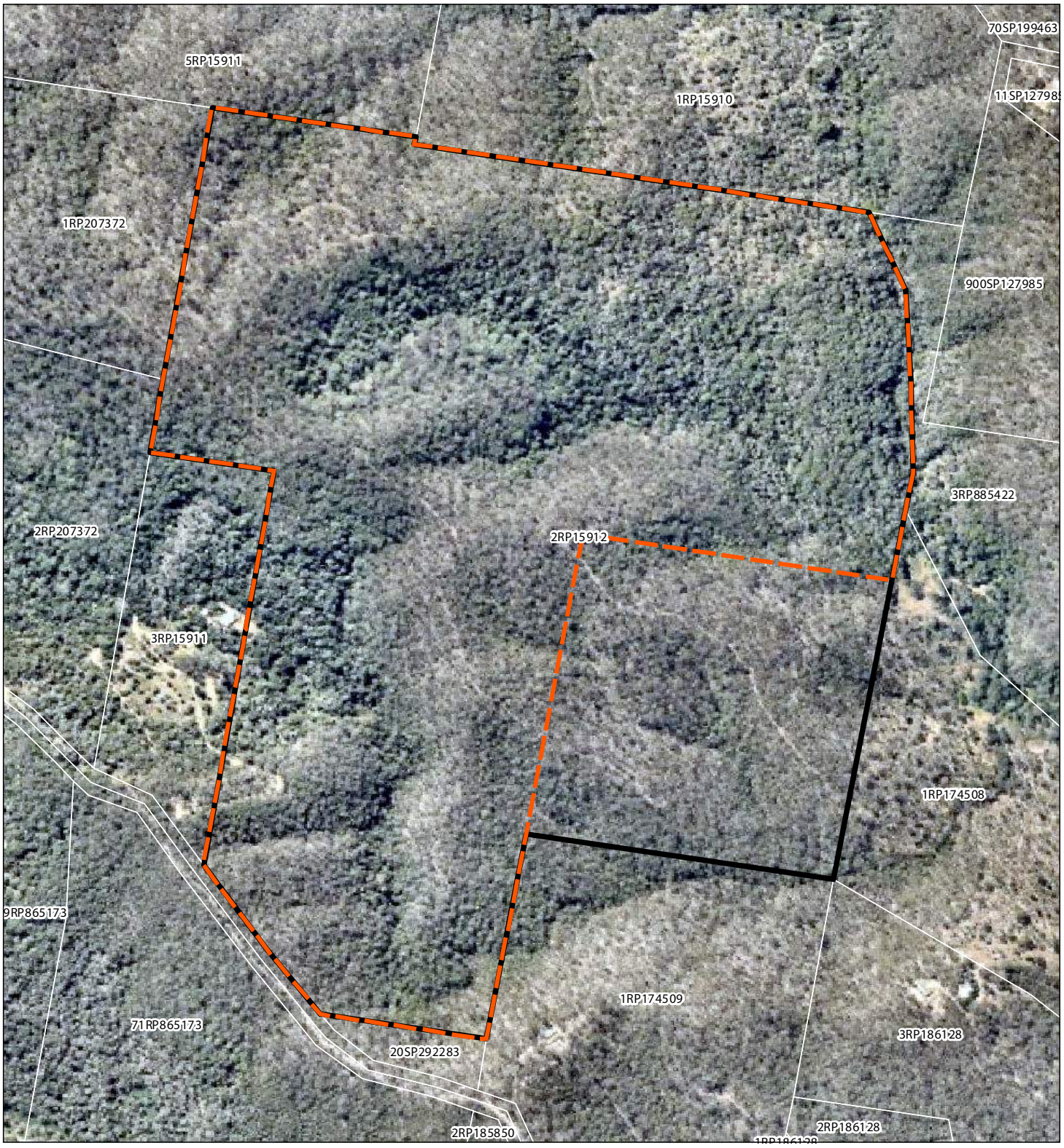
File ref. 8354 E Figure 1 Site Context B
Date *26/10/2018*
Project *Ormeau Quarry (EPBC No. 2016/7797)*

0 0.5 1 2 3 *km*

N

Scale (A4): 1:90,000 [GDA 1994 MGA Z56]

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2018)



Legend

- Offset site
- Offset area
- Qld DCDB

Figure 2

Site Aerial

File ref. 8354 E Figure 2 Site Aerial B
Date *26/10/2018*
Project *Ormeau Quarry (EPBC No. 2016/7797)*

0 50 100 200 300 *m*

Scale (A4): 1:8,000 [GDA 1994 MGA Z56]

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Layer Sources QLD GIS Layers (QLD Gov. Information Service 2018), Aerial (Nearmap 2017)

2. Offset property values

2.1. Bioregional context

Queensland has been sub-divided into thirteen (13) biogeographical areas to identify biodiversity features at a regional scale. The offset area is located in the south-east Queensland (SEQ) Bioregion. The SEQ Bioregion shares its western boundary with the Brigalow Belt Bioregion, and extends from the Border Ranges on the New South Wales border, north to the dry coastal corridor between Gladstone and Rockhampton (DEHP 2016). The McPherson Range borders the southern boundary of the bioregion while the Great Dividing Range is to the west. Ranges extend north south through the central region creating an altitudinal gradient from the coast. Small volcanic plugs remain in the landscape offering distinctive conditions for taxa and ecosystems (DEHP 2016). Large sand islands off the coast offer unique environments and create sheltered bays and passages within which marine and coastal plants and animals thrive (DEHP 2016).

2.2. Offset area values

The offset area forms part of the SEQ regional biodiversity corridor which spans from the Noosa headland in the north, down to Mount Barney and Lamington National Park on the Queensland border. The SEQ regional biodiversity corridor aims to encompass large tracts of vegetation, terrestrial connectivity, aquatic connectivity, species richness, diversity and refugia, ecosystem representation and uniqueness and climate resilience areas (Queensland Government 2017).

The SEQ biodiversity corridor forms part of the Great Eastern Ranges (GER) terrestrial corridor which extends from the mountains of Victoria to the Atherton Tablelands in far north Queensland (Mackay, Watson & Worboys 2010). The GER corridor provides habitat and movement for a range of species that have Federal, State and Local significance, supports significant cultural heritage values and offers scenic amenity and outdoor recreation opportunities (Mackay *et al*. 2010).

The offset area will conserve freehold land within the SEQ biodiversity corridor, linking habitat incorporating legally bound environmental offset areas associated with adjacent quarrying activities to the north and east with National Parks and reserves to the south. Without this linkage, the offset site is likely to have been developed into a quarry and would have further fragmented the SEQ regional biodiversity corridor. Further, this linkage provides a valuable contiguous habitat corridor, ensuring the possibility of habitat fragmentation is minimised and improving the connectivity of koala habitat within SEQ. The offset area possesses high conservation value and through the management actions proposed in this OMP, the property will provide biodiversity offsets that ensure an ecological gain on the residual impacts resulting from the impact site which aligns with offset principle 1 of the EPBC Act Environmental Offsets Policy.

2.3. Koala offset area calculation

As per condition 2 of the EPBC approval (2016/7797), the proponent must not clear more than 38 hectares of koala habitat within the project site. The Offset Assessment Guide calculator (DoEE 2012) was used in consultation with DoEE to identify 77 hectares of habitat critical to the survival of the koala is required to offset

the impact. The details of how this offset area was identified is outlined in the Environmental Offset Strategy which has been included as **Appendix A**.

The offset area calculation has been determined through the use of the Koala Habitat Assessment Tool (KHAT) scores for the impact site and proposed offset site, derived according to methodology in '*EPBC Act referral guidelines for the vulnerable koala*" (DoEE 2014). The key indicators for determining a koala habitat score of a land based impact site or an offset site are:

- Koala occurrence – Evidence of koala activity.
- Vegetation composition – Forest or woodland with two (2) or more known koala food tree species.
- Habitat connectivity – The area forms part of a contiguous landscape.
- Key existing threats – Evidence of koala mortality from vehicle strike or dog attack.
- Recovery value – Likelihood that the area is important for achieving the interim recovery objectives.

Implementation of the KHAT (DoEE 2014) to determine the quality of koala habitat at the impact and offset sites resulted in a score of 7 out of 10 for the impact site and a score of 8 out of 10 for the offset site. The offset site is expected to maintain a habitat quality score of 8 out of 10 for the lifetime of the offset through the implementation of rehabilitation and management measures over the period of EPBC Act approval and legally binding the land via a voluntary declaration (VDEC).

2.4. Koala habitat offset area

Evidence of koala was identified during ecological surveys utilising the Spot Assessment Technique (SAT) survey and scat meander as per Phillips & Callaghan (2011). The offset site is within a contiguous polygon of regional ecosystems mapped by the Department of Environment and Science (DES). The regional ecosystems within the offset site consist of two (2) 'least concern' (RE12.11.5 and RE12.11.3a) regional ecosystems. Refer to **Table 2** for the short technical descriptions of the regional ecosystems and **Figure 3** regional ecosystem mapping. The offset site is predominantly mapped as 'remnant' vegetation, with the dominance of *eucalyptus, corymbia* and *angophora* species ensuring the presence of suitable koala food and shelter trees.

Ecological field surveys were undertaken by Saunders Havill Group over 2 days in September and October 2015. Findings from the field surveys include:

The majority of the site is mapped as containing remnant vegetation consistent with the regional ecosystem mapping. Three regional ecosystems (RE12.11.3a, RE12.11.5 and RE12.11.10) are mapped as occurring within the subject site.

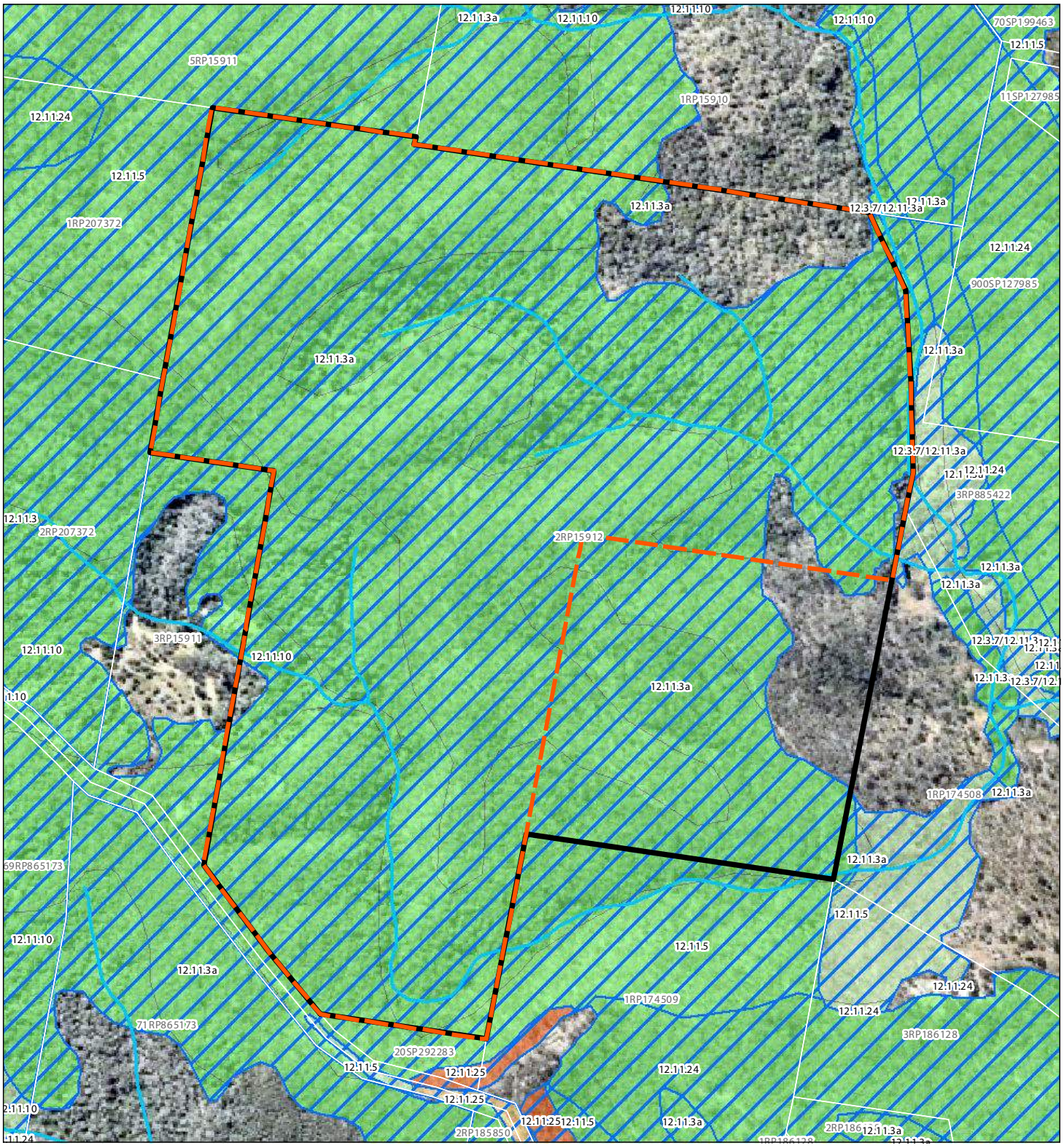
- Vegetation was dominated by Eucalyptus and Corymbia species and made up the largest proportion of vegetation within the assessment area.
- RE 12.11.10 was observed in the south western portion of the site. RE 12.11.10 is described as Notophyll vine forest +/- Araucaria cunninghamii on metamorphics +/- interbedded volcanics. This regional ecosystem is also associated with the "Lowland rainforest of Subtropical Australia" threatened ecological community.

- The area mapped as RE 12.11.10 also contained specimens of *Brachychiton sp*. (Mt Ormeau bottle tree) which is protected under the EPBC Act and *Macadamaia integrifolia* (Macadamia Nut) which is protected under State legislation.
- In general, the majority of the site is consistent with Eucalypt and Corymbia woodlands/forests that would be generally utilised by *Phascolarctos cinereus* (Koala). No koalas were spotted during surveys however numerous scats were observed in low densities throughout the site suggesting that resident koalas may be located within the investigation area.
- Weed infestation within the site was relatively low however patches of *Lantana camara* (Lantana) were observed in places which would impede koala movement.
- A number of old overgrown and eroded tracks traverse the ridgelines throughout the property. Evidence of historical logging was also observed in some locations.
- A number of these tracks and other areas through the site contain barbed wire fencing, which would impede fauna movement.
- Two (2) bitumen roads are located to the south and the east of the property.
- A few areas throughout the property contain non-remnant vegetation. The regrowth vegetation observed was consistent with vegetation associated with RE 12.11.3a/12.11.5.

Field surveys identified that non remnant areas contained vegetation in good condition that would be considered critical koala habitat as defined by the EPBC Act. The survey also found that, while generally in good condition, the site had been impacted in areas by logging, and weed incursion. Refer to **Appendix B** for the Offset Site Baseline Report including data from terrestrial habitat transects carried out at the site.

Table 2: Regional ecosystem short descriptions

Regional ecosystem community	VMA status	Short description
12.11.5	Least Concern	*Corymbia citriodora subsp. variegata woodland to open forest +/- Eucalyptus siderophloia/E. crebra, E. carnea, E. acmenoides, E. propinqua on metamorphics +/- interbedded volcanics.*
12.11.3a	Least Concern	*Lophostemon confertus +/- Eucalyptus microcorys, E. carnea, E. propinqua, E. major, E. siderophloia woodland. Occurs in gullies and exposed ridges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics.*
12.11.10	Least Concern	*Notophyll vine forest +/- Araucaria cunninghamii on metamorphics +/- interbedded volcanics.*
Non Remnant	None	*None*



Legend

- Offset site
- Offset area
- Qld DCDB
- VM Watercourses
- VM Essential Habitat
- VM Wetland

Regional Ecosystems mapping

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C area containing endangered regional ecosystems
- Category C area containing of concern regional ecosystems
- Category C area that is a least concern regional ecosystem

Figure 3

Regulated Vegetation Supporting Map

File ref. 8354 E Figure 3 RVSM B
Date *26/10/2018*
Project *Ormeau Quarry (EPBC No. 2016/7797)*

0 50 100 200 300 *m*

Scale (A4): *1:8,000* *[GDA 1994 MGA Z56]*

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Layer Sources *QLD GIS Layers (QLD Gov. Information Service 2018), Aerial (Nearmap 2017)*

3. Offset area management

3.1. Offset area management measures

This section describes the management actions and measures necessary to meet the identified environmental outcomes of the offset area. The management measures are designed to minimise the risks associated with key threatening processes to the koala and maintain the quality of the habitat within the offset area.

Although the management measures have been developed to achieve the required koala offset environmental outcomes as a priority, they will bring an overall improvement in the condition and quality of a wide range of native species present within the offset area.

The measures outlined below are deemed to be suitable given the listed status of the koala, the size and scale of the offset and the focus on priority management actions, which are efficient, effective, timely and transparent (i.e. able to be monitored and are auditable). Additionally, a number of these measures correspond to Priority Management Actions outlined in the *Approved Conservation Advice for Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory) (koala Northern Designatable Unit)* (Conservation Advice).

3.1.1 Management Action 1 – weeds of national significance (WONS) management plan

The control of weeds is fundamental to improving biodiversity and the ecological condition of the koala habitat within the offset area. The historical land uses across the offset area have resulted in the introduction, spread and persistence of a variety of environmental weeds (SHG 2017). Whilst there have been a wide variety of environmental weeds recorded across the site, the key species to be controlled in the offset area in regard to koala habitat values is *Lantana camara* (Lantana), a Weed of National Significance (WONS). The listing and prioritisation of WONS is a joint initiative of the States, Territories and Australian Government and their long-term control is of national interest.

It is not possible to remove lantana from the offset area on a single occasion, as there will be a persistent seed bank that can remain viable for long periods of time. Germination can occur rapidly after the parent plant has been removed due to increases in light and resource availability. It is therefore important that the offset area is revisited following the initial treatment for follow-up weed control and to prevent seed set and dispersal. Baseline weed mapping will be conducted before the weed removal program is initiated. Weed mapping is then to be conducted annually and reported in the Annual Compliance Report (ACR). The measures for the control of WONS, specifically Lantana will include:

- Baseline weed mapping for WONS will be conducted throughout the offset area and site specific treatment techniques developed depending on the location and extent of weed coverage within six months of commencement of the action.
- All identified WONS will be treated within 12 months of commencement of the action.

- WONS will be monitored and treated annually, including in 2019, until they are not observed on the property. Once WONS are not detected where they have previously been detected, every 2 years:
    - comprehensive monitoring for WONS will be conducted;
    - WONS that are reported or detected by comprehensive monitoring will be treated.
- A suitably qualified bush regeneration contractor will be engaged to undertake the necessary weed control.
- Control of infestations will utilise techniques that avoid disturbance to surrounding areas.

3.1.2 Management Action 2 – rehabilitation and regeneration management plan

Rehabilitation and regeneration is a key action that will improve existing koala habitat values within the offset area, while also expanding habitat values in areas that have been subject to weed infestation issues. It also is a Priority Management Action listed under "Habitat Loss, Disturbance and Modification" of the Conservation Advice for the koala. Rehabilitation aims to reinstate existing degraded areas and areas exposed as a result of management action 1 (weed removal), with koala food and shelter trees consistent with the mapped regional ecosystem in that specific location.

Within the mapped remnant areas, natural regeneration is preferred to reconstruction of the vegetation community (i.e. importation of soil, dense planting, etc). Where natural regeneration is unsuccessful minor infill planting will be implemented to facilitate recovery. Barbed wire will also be removed from fences located in areas of koala habitat, or areas where koala are likely to traverse. Evidence of rehabilitation and the success and survival rate will be reported annually within the ACR.

Management measures for rehabilitation and regeneration include:

- Baseline mapping to identify rehabilitation and regeneration areas and development of a rehabilitation plan specifying techniques and species to be utilised will be completed within 12 months of commencement of the action.
- Rehabilitation areas are to consist of one canopy tree per 10m², three shrubs per 10m² and one groundcover per 2m². Where natural regeneration is the preferred approach, infill planting will be implemented where regeneration has been unsuccessful after three years.
- All rehabilitation activities are to be carried out by a suitably qualified bush regeneration contractor.
- The plants reinstated in any particular location must be consistent with the mapped regional ecosystem or pre-clear regional ecosystem over that area.
- All rehabilitation is to commence within three years of commencement of the action. Regeneration areas that require infill planting will be identified and regeneration actions outlined in the third annual compliance report.

3.1.3 Management Action 3 – legally securing the offset area

A Voluntary Declaration will be placed over the offset area to legally secure the conservation use on the land prior to the action commencing. **Boral** will continue to manage the offset area for the life of the approval.

Legally securing the offset area is listed in the Conservation Advice as a Priority Management Action, under "Habitat Loss, Disturbance and Modification".

3.1.4 Management Action 4 – pest management (feral and unwanted dog usage) plan

Feral or unwanted domestic dogs have been identified as a key threatening process under the EPBC Act, and are confirmed as a direct predation risk to Koalas. Managing animal predation is listed as a Priority Management Action under the koala Conservation Advice. The control and prevention of invasive animal incursions is to be undertaken in accordance with the relevant legislation (such as the Commonwealth *Biosecurity (Consequential Amendments and Transitional Provisions) Act 2015* and the Queensland *Biosecurity Act 2014*) and to include the control of pest animals by legal methods by suitably qualified pest management contractor(s). Any required hazardous materials must be handled and stored in accordance with the material's safety data sheets and the Approved Code of Practice for the Storage and Handling of Dangerous Goods. Pest animal control is to be undertaken in a humane manner. Annual pest monitoring is to be reported and included in the ACR.

Management measures for the control of feral or unwanted domestic dogs across the offset area include:

- Baseline pest monitoring including motion activated cameras and scat analysis to identify evidence of feral or unwanted dogs (and other pest species), and development of a property wide feral animal management program specifying techniques (trapping, baiting, shooting) to be utilised will be completed within 12 months of commencement of the action.
- Annual pest monitoring by a suitably qualified pest management contractor, with evidence of pest animals GPS recorded. Where there is evidence of pest animals, targeted trapping and baiting programs will be implemented by an independent suitably qualified pest management contractor. Where annual monitoring does not identify any feral or pest species monitoring will reduce to 2 yearly.
- Where practical and appropriate, participate cooperatively in pest management planning and implementation with local land managers (government departments, local governments and utility providers) to ensure effective pest management in the locality of the offset area.
- Install appropriate signage informing the area is under feral control.

3.1.5 Management Action 5 – koala habitat quality management plan

The use of the habitat quality assessment methodology prepared by the Queensland Herbarium (DEHP 2017) provides a repeatable and consistent method for determining habitat quality specific to koalas. The method also utilises benchmark scores to ensure all sites measured are calibrated against a known standard. This calibration provides additional confidence and assurance in the accuracy of the method to score habitat quality.

A habitat quality monitoring assessment, including koala specific habitat attributes will be conducted in accordance with the published methodology (DEHP 2017) and by a suitably qualified environmental consultant. The habitat quality monitoring is to be undertaken at six (6) permanent transect locations established during baseline habitat quality score assessments within the koala offset area (refer to Appendix B).

The habitat quality assessment methodology suggests locations for transects should be selected considering mapped Regional Ecosystem (RE) polygons, and size of isolated vegetation patches (assessment units), etc. Sampling sites should be located in areas typical of the assessment unit. The size of the assessment unit guides the number of transects required, as follows:

- Assessment unit size: 0-50 ha = at least two sampling units
- Assessment unit size: 50-100 ha = three sampling units
- Assessment unit size: 100-500 ha = four sampling units
- Assessment unit size: 500-1,000 ha = five sampling units
- Assessment unit size: more than 1,000 ha = six sampling units

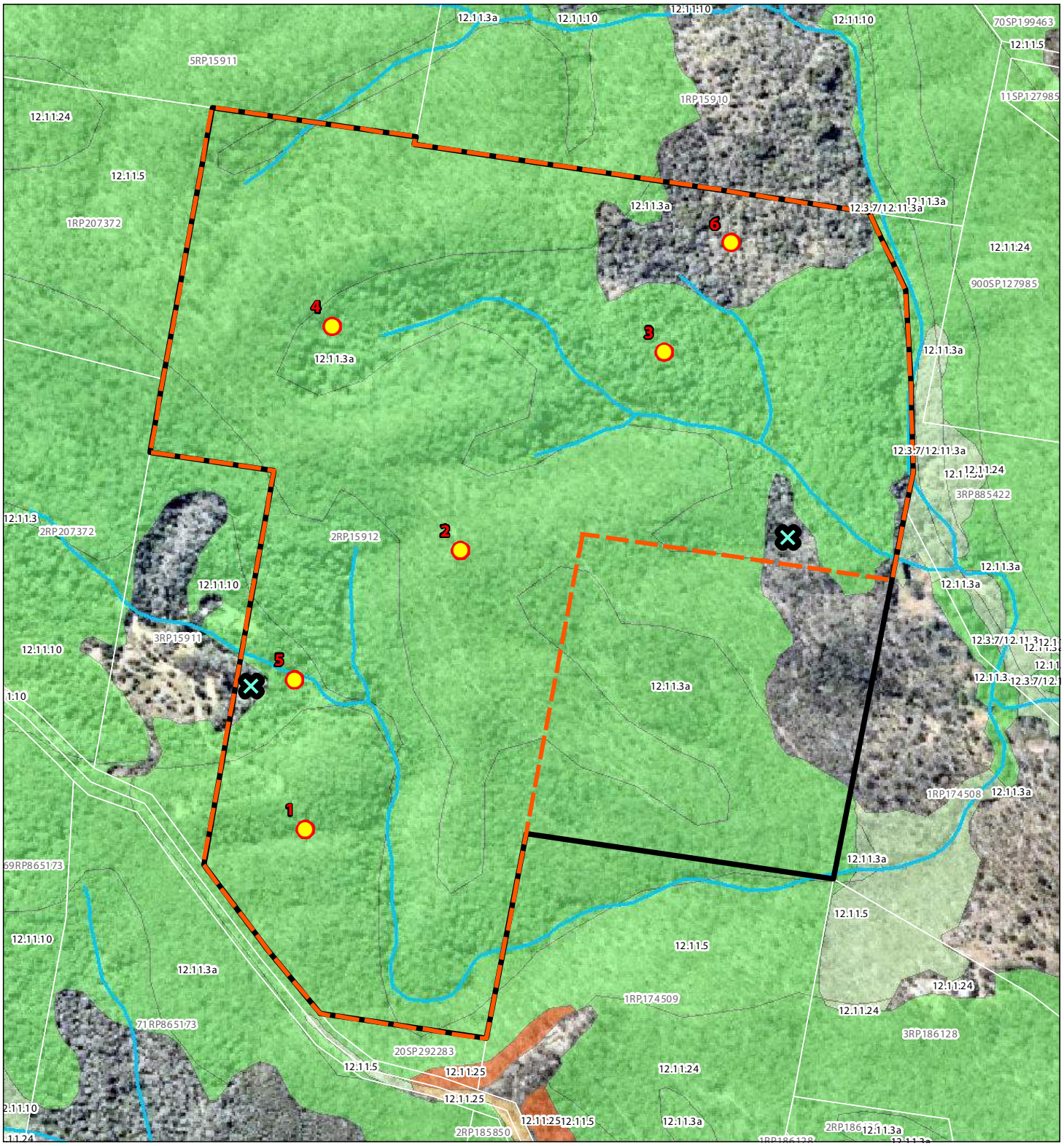
The total area of the offset site is 77 ha consisting of non-remnant vegetation and three REs, which are sized as follows:

- 32.6 ha of RE12.11.3a
- 37.5 ha of RE12.11.5
- 1.6 ha of RE12.11.10
- 5.3 ha of non-remnant vegetation

The regional ecosystems and non-remnant vegetation would each form assessment units. While the guidelines suggest two sample sites for each assessment unit RE 12.11.10 and non-remnant vegetation cover a small portion of the site making it impractical to have more than 1 habitat transect in these assessment units. Non-remnant vegetation is split over three separate geographic locations within the offset area therefore observation sites will be carried out in areas

Habitat quality monitoring will be undertaken annually for the first three (3) years and then once every five (5) years to determine if the target quality score has been maintained for the offset area over the EPBC Act period of approval (maintain a habitat quality score of eight (8)). The habitat quality monitoring is to be reported in the ACR every five (5) years or the subsequent year that the monitoring is completed.

Koala usage monitoring will be carried out as part of the habitat monitoring. Surveys will be carried out using the Spot Assessment Technique (SAT) at all six (6) permanent transect locations. Indicative transect and SAT locations are shown on **Figure 4**.



Legend

- Offset site
- Offset area
- Qld DCDB
- Habitat transects and koala SAT locations
- Habitat observation site
- VM Watercourses

Regional Ecosystems mapping

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C area containing endangered regional ecosystems
- Category C area containing of concern regional ecosystems
- Category C area that is a least concern regional ecosystem

Figure 4

Regulated Vegetation Supporting Map and Koala Transects

File ref. 8354 E Figure 4 RVSM and Koala B
Date *26/10/2018*
Project *Ormeau Quarry (EPBC No. 2016/7797)*

0 50 100 200 300 *m*

Scale (A4): *1:8,000* [*GDA 1994 MGA Z56*]

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saunders havill group

Layer Sources *QLD GIS Layers (QLD Gov. Information Service 2018), Aerial (Nearmap 2017)*

3.1.6 Management Action 6 – bush fire management plan

An Offset Area Bushfire Management Plan (BMP) will be developed within 12 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 Bushfire 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.

Management measures will be outlined in the BMP for the control of bush fire across the offset area but will include:

- Installation of firebreaks and fire trails.
- Annual inspection and maintenance of firebreaks and access tracks required to achieve compliance with Offset Area Bushfire Management Plan.
- Prescribed burning 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.
- Use of domestic livestock or other methods to reduce fuel loads in the event that a fire risk professional (e.g. representative of Queensland Rural Fire Service) and a suitably qualified environmental scientist deem that conditions are not suitable for an ecological burn and that grazing is appropriate to manage a high level of fire risk. Level of risk (and any need to repeat this grazing cycle) is to be re-assessed by the aforementioned professionals following the grazing event.

3.2. Risk assessment

A qualitative risk assessment which considers the risks of achieving the objectives and outcomes for the offset site is presented in **Table 3**. The risk assessment is completed in accordance with the EPBC Act Environmental Management Plan Guidelines (2014) and characterises risk as low, medium, high or severe, as derived from the likelihood (highly likely, likely, possible, unlikely, rare) and consequence (minor, moderate, high, major and critical) risk matrix.

The risk analysis assesses the risk of failure to achieve the OMPs management objectives. It is necessary to re-evaluate and modify the risk analysis and contingency measures throughout the period of EPBC Act approval, particularly if any unforeseen risks emerge or any negative outcomes identified are greater than expected.

During the first five (5) years of monitoring and annual compliance reporting, **SHG/Boral** will review management commitments in this plan, and if the review results in the need to revise the OMP, the plan will be revised and the DoEE informed in writing in accordance with the condition 12 of the approval. It is noted that events are only addressed once in the risk assessment under the most relevant management objective, however some events are likely to impact on multiple management objectives.

Table 3: Risk assessment for the management objectives

Management objective	Event or consequence*	Likelihood	Consequence	Risk level	Trigger	Contingency/s	Related monitoring activity
Maintain or improve habitat quality score	Unplanned fire causing degradation of habitat quality through the loss of native plant diversity and abundance within the offset area.	Unlikely	High	Medium	Unplanned fire outbreaks.	In the event of an unplanned fire adversely impacting the offset area, fire management measures will be reviewed in consultation with GCCC and Queensland Fire Services.	Ongoing during the monitoring and maintenance of the offset area and the annual monitoring of the replanting and regeneration.
	Unauthorised access and use of the offset area by 4WD, trail bikes and ATVs, resulting in degradation of habitat within the offset area.	Unlikely	Minor	Low	Evidence of unauthorised access, such as tracks, soil disturbances, rubbish, damaged barrier fencing or degradation to native vegetation.	Investigate the entry location, with GPS points and photographs noting tyre tracks and damage circumventing barrier structures. Repairable damage is to be remediated as soon as possible, however where a barrier is in disrepair and unable to prevent access, the barrier is to be replaced within 30 days of detection. Review and audit the control measures and the timing and frequency of the management actions.	Ongoing during the monitoring and maintenance of the offset area and the annual monitoring of the replanting and regeneration.
	Habitat quality score decreases from baseline score	Unlikely	Moderate	Low	Monitoring and ACR identifies that the habitat quality score has decreased from the baseline score, or an unplanned event causes significant damage to offset area.	Investigate cause of decrease in score. Repairable damage is to be remediated. Review and audit the control measures and the timing and frequency of the management actions. Replanting of lost stock to ensure specified densities are met.	Ongoing during the monitoring and maintenance of the offset area and annual monitoring.

Management objective	Event or consequence*	Likelihood	Consequence	Risk level	Trigger	Contingency/s	Related monitoring activity
Control WONS	Increase in WONS infestations, specifically Lantana.	Unlikely	Minor	Low	Annual weed mapping indicates that weed coverage percentage has increased by Year 5.	Investigate cause of WONS infestation. Remedial action will include revising the control measures for the species and revising the timing and frequency of the management action.	Annual weed monitoring.
	WONS infestations inhibiting the maintenance of ecological condition and habitat quality score.	Unlikely	Minor	Low	Annual weed mapping indicates that weed coverage percentage has increased by Year 5.	Investigate cause of WONS infestation. Remedial action will include revising the control measures for the species and revising the timing and frequency of the management action.	Annual weed monitoring.
Replanting and regeneration	High rainfall or flood events create exacerbated areas of erosion and degradation habitat quality in rehabilitation areas.	Possible	Minor	Low	Evidence of new sheet or gully erosion within the offset area. Or, the loss of revegetation stock utilised to stabilise identified erosion points.	Promote vegetation establishment and stabilisation through the use of alternative rehabilitation measures (i.e. jute matting). Replanting of lost stock to ensure specified densities are met.	Inspect access tracks, creek line crossings and internal creek lines within seven (7) days following high rainfall or flood events and when it is safe to do so.
	Newly planted areas do not establish as expected	Unlikely	Moderate	Low	Monitoring and ACR identifies that replanted areas are not achieving establishment criteria, or an unplanned event causes significant damage to vegetation.	Investigate cause of issue. Repairable damage is to be remediated as soon as possible. Review and audit the control measures and the timing and frequency of the management actions. Replanting of lost stock to ensure specified densities are met.	Ongoing during the monitoring and maintenance of the offset area and the annual monitoring of the replanting and regeneration.
Control predation	Presence of foxes, feral and unwanted dog usage within the offset area.	Unlikely	Moderate	Low	Annual pest monitoring indicates the presence of feral or unwanted dogs.	Increase the level of targeted trapping and baiting by a suitably qualified pest management	Annual pest monitoring and reporting.

Management objective	Event or consequence*	Likelihood	Consequence	Risk level	Trigger	Contingency/s	Related monitoring activity
						contractor. Review and audit the invasive animal control measures to evaluate their effectiveness and revise the measures accordingly.	
	Predation of koalas by feral or unwanted dogs.	Unlikely	Moderate	Low	Evidence of predation on Koala by dog, or annual pest monitoring indicates the presence of feral or unwanted dogs.	Increase the level of targeted trapping and baiting by a suitably qualified pest management contractor. Review and audit the invasive animal control measures to evaluate their effectiveness and revise the measures accordingly.	Annual pest monitoring and reporting.

3.3. Monitoring

The following program describes the monitoring activities that will occur within the offset area. The monitoring approach has been developed to assess success of the management actions to maintain the overall biodiversity and habitat values of the offset area.

The following monitoring methodologies have been designed to measure the effectiveness of the management actions in maintaining koala habitat quality.

The monitoring objectives directly relate to determining whether the management objectives are being achieved, that is, whether there has been:

- Ecological gain or maintenance within the koala offset area.
- WONS and pest animal activity as per **Section 3.4.1** and **Section 3.4.4**, successful controlling actions and subsequent benefit to the koala offset area.
- Increased habitat quality and if it has been maintained or improved, as per **Section 3.4.5**.

3.3.1 Management Action 1 monitoring

The presence of WONS in the offset area will be monitored annually commencing in 2019 until they are not observed, at which point monitoring will be carried out every 2 years. The monitoring will be undertaken during the same time of year, each year, to ensure that the timing is consistent and aligns with the baseline assessment. The following procedures will be implemented to ensure that the annual monitoring event aligns with the baseline monitoring methodology:

- GPS locate the presence of weeds either via a GPS waypoint or where a large weed infestation is present, create a GPS polyline and walk the extent of the infestation.
- On a field datasheet, detail the time of year of the monitoring event, list of observed WONS, photo location and direction and notes of any notable positive and/or negative changes in weed density and coverage.
- Carry the previous year's weed survey mapping, field datasheet and photos for noting changes in weed infestations and densities.
- Transfer GPS data to the necessary programs to generate weed survey mapping extent and collate all data in excel spreadsheets and save all digital photos to file for ongoing monitoring purposes.

3.3.2 Management Action 2 monitoring

The progress and success of the koala habitat rehabilitation will be monitored annually. The monitoring timing is dependent on the planting cycle of the engaged bush regeneration contractor. Once planting has been completed, the engaged suitably qualified environmental consultant will be notified. Photo point monitoring and GPS locational and extent survey will be utilised.

The co-ordinates of the initial photo monitoring will be recorded using the handheld GPS which will assist to locate the monitoring point when undertaking subsequent monitoring. Photo point monitoring is to be undertaken annually at the same time of the year, post the rehabilitation works.

The photos provide the baseline imagery to compare future photo point monitoring and to ensure the integrity of the fence. A record of the photos will be maintained which includes:

- GPS co-ordinates of the photo point.
- Date, time and number of each photo.
- Direction in which the photo was taken (north, south, east and west).

After each photo monitoring event, a GPS waypoint of the location of the rehabilitation and a GPS polyline of the extent will be recorded. The following elements will be noted on a field datasheet:

- The success of the rehabilitation stock (a physical count of alive plants in the ground).
- The average health of the rehabilitation stock.
- The average height of the rehabilitation stock.
- The presence of weeds within the rehabilitation extent.
- Natural regeneration of native species.

3.3.3 Management Action 3 monitoring

Management action 3 does not require any specific monitoring as the securing of the site as a legal offset is to be completed via a VDEC, and that registration date of the VDEC will be reported in each annual compliance report.

3.3.4 Management Action 4 monitoring

Pest animal management and monitoring will be undertaken in accordance with the *Biosecurity (Consequential Amendments and Transitional Provisions) Act 2015* (Cwlth) and the *Biosecurity Act 2014* (Qld), which, in general, require all reasonable and practical steps to prevent or minimise biosecurity risks; minimise the likelihood of causing a 'biosecurity event'; and the limitation of consequences if such an event is caused. The control of pest animals will be undertaken using legal methods, by suitably qualified pest management contractor(s). Pest animal control is to be undertaken in a humane manner.

The following pest animal monitoring methodology will be implemented:

- GPSs will be used to locate the presence of pest animals, in particular feral dogs via notable tracks or scats.
- Field datasheet will detail the time of year of the monitoring event, record observed pest animal scats or tracks, photo location and notes of any evidence of positive and/or negative changes in pest animal occurrence.

- Carry the previous year's pest animal survey mapping, field datasheet and photos for noting positive and/or negative changes in pest animal occurrences.
- Transfer GPS data to spatial data programs to generate pest animal occurrences and collate all data in excel spreadsheets and save all digital photos to file for ongoing monitoring and reporting purposes.
- Where pest animal presence is detected, targeted trapping and baiting programs will be implemented on completion of the monitoring program.

Annual pest monitoring will be reported and outcomes of that monitoring included in the ACR. The annual pest management report is to provide detail on detected pests, control efforts, and total trapped/baited individuals during the given management period and identified trends of the population of pest animals within the offset area.

3.3.5 Management Action 5 monitoring

For the first three (3) years and then every five (5) years after that a habitat quality monitoring assessment, including koala specific habitat attributes, will be conducted in accordance with the published methodology (DEHP 2017).

Thirteen field-based ecological condition indicators will be monitored to track the effectiveness and success of the management plan for the koala offset, including:

1. Recruitment of woody perennial species – includes koala canopy feed and shelter tree species.
2. Native plant species richness (trees, shrubs and grasses) – as an indicator of ecological succession and regeneration progress after mitigating ecosystem threats.
3. Tree canopy height – indicates progress towards ecological maturity and increases in Koala habitat availability.
4. Tree canopy cover – indicates progress towards ecological maturity and increases in Koala habitat availability.
5. Shrub canopy cover – indicates progress towards ecological maturity and increases in Koala habitat availability.
6. Native perennial grass cover – which supresses weeds and thereby encourages recruitment of juvenile eucalypt feed and shelter trees.
7. Organic litter cover – important for surface soil moisture retention, cycling of nutrients and providing interstitial spaces to enhance tree seed germination and growth and recruitment of canopy species including actively-growing Koala feed and shelter species.
8. Large trees per hectare – as a measure of important as shelter trees for Koalas and the production of seeds for recruitment.
9. Coarse woody debris per hectare – an increase relative to the benchmark could indicate a decline in canopy tree health / increase in senescence.

10. Invasive plant cover – which can compete with native plants for light, moisture and nutrients, especially recruiting koala food and shelter tree canopy species. Invasive plants can increase fuel load and change fire regimes and susceptibility to unplanned fires.
11. Quality and availability of food and foraging – e.g., Number, size and health of feed trees.
12. Quality and availability of shelter – e.g., Density and health of shelter trees.
13. Threats to species – e.g., Wild dog activity and the documented number of culled dogs.

Koala SAT surveys will also be carried out as part of this assessment.

3.3.6 Management action 6 monitoring – bush fire management plan

Monitoring requirements will be informed by the bush fire management plan and include regular review of access tracks, fire breaks, fuel loads and outcomes of controlled burns or other management techniques such as use of livestock.

3.4. Timeline for management, monitoring and reporting actions

The timing of management actions, performance review, risk management and responsibilities for the offset area will be undertaken in accordance with **Table 4** and **Table 5**.

Table 4: Timeline for the management actions, monitoring and reporting

Management action	Frequency and timing of action(s)	Monitoring	Responsible person(s) for activity
Management Action 1 - weeds of national significance (WONS) management plan			
***WONS, including Lantana camara* (Lantana) control**	Baseline weed mapping for WONS will be completed and treatment will commence in 2019. WONS will continue to be monitored and treated annually until they are not observed on the property.	Once the target has been achieved reviews will be carried out 2 yearly to ensure control measures are effective.	Suitably qualified bush regeneration contractor and Suitably qualified environmental consultant, as directed by the proponent (boral).
Management Action 2 - Rehabilitation and regeneration management plan			
Replanting and regeneration	Baseline mapping to identify rehabilitation and regeneration areas and development of a rehabilitation plan specifying techniques and species to be utilised will be completed within 12 months of commencement of the action.	Evidence of koala habitat rehabilitation and the success and survival rate will be monitored annually for at least the first 3 years after commencement of regeneration works.	Suitably qualified bush regeneration contractor and Suitably qualified environmental

Management action	Frequency and timing of action(s)	Monitoring	Responsible person(s) for activity
	All rehabilitation is to commence within three years of commencement of the action. Regeneration areas that require infill planting will be identified and regeneration actions outlined in the third annual compliance report.	If vegetation establishment is confirmed after three years monitoring will be carried out 5 yearly to ensure control measures are effective.	consultant, as directed by the proponent (boral).
Management Action 3 – legally secure the offset area			
Legally securing the offset area	A Voluntary Declaration (VDEC) will be placed over the offset area to legally secure the conservation use on the land. The VDEC will be secured before the action is to commence.	Not required.	Proponent (Boral).
Management Action 4 - pest management (feral and unwanted dog usage) plan			
Feral and unwanted dog control	Baseline monitoring to identify evidence of feral or unwanted dogs and development of a property wide feral animal management program will be completed within 12 months of commencement of the action. Annual pest monitoring, with evidence of pest animals GPS recorded. Where there is evidence of feral or unwanted dog activity trapping or baiting by a suitably qualified pest management contractor will be conducted.	Annual pest activity monitoring is to be reported and included in the ACR. Where there is evidence of pest animals, targeted trapping and baiting programs will be implemented by an independent suitably qualified pest management contractor. Where annual monitoring does not identify any feral or pest species monitoring will reduce to 2 yearly.	Suitably qualified pest management contractor and environmental consultant as directed by offset area manager.
Management Action 5 - koala habitat quality management plan			
Maintain koala habitat	Habitat quality monitoring is to be undertaken annually for the first three years and then once every five years to determine if the target quality score has been maintained for the offset area over the period of approval.	The habitat quality monitoring is to be reported in the ACR every five (5) years for the period of the EPBC Act approval.	Suitably qualified environmental consultant, as directed by the offset area manager.
Management Action 6 – bush fire management plan			
Protect the offset area from high intensity wild fires	Develop an Offset Area Bushfire Management Plan within 12 months of the offset being legally secured. Prescribed burning or other techniques undertaken in consultation with the Queensland Rural Fire Brigade to manage fuel loads.	Monitoring requirements will be informed by the bush fire management plan and include regular review of access tracks, fire breaks, fuel loads and outcomes of controlled burns or other	Proponent (Boral)

Management action	Frequency and timing of action(s)	Monitoring	Responsible person(s) for activity
		management techniques such as use of livestock.	

Table 5: OMP actions, timing and responsibilities

Action	Frequency and timing of action(s)	Responsible person(s) for activity
Baseline monitoring	Within 12 months of the action commencing	Suitably qualified environmental professional as directed by the Offset Area Manager.
OMP monitoring reporting as part of the ACR	Annually	Suitably qualified environmental professional as directed by the Offset Area Manager.
OMP review	Every three years or upon failure to meet performance criteria	Suitably qualified environmental professional as directed by the Offset Area Manager.
OMP auditing	Annually	Suitably qualified environmental professional as directed by the Offset Area Manager.
Risk management implementation	Annually	Suitably qualified environmental professional as directed by the Offset Area Manager.
Adaptive implementation program and contingency response	Annually	Suitably qualified environmental professional as directed by the Offset Area Manager.

3.5. Performance and completion criteria

3.5.1 Performance criteria

Monitoring results will be used to determine if the following performance criteria are met, as interim outcomes and targets, prior to completion criteria being achieved. These criteria provide an indication of the success of the management measures being implemented for koala habitat offsets, and serve as trigger values where failure to achieve will result in the implementation of corrective actions. Performance criteria are provided for each of the management actions, although it is noted management action 3 – legally securing the offset does not have any specific performance criteria:

<u>Management Action 1 – weeds of national significance (WONS) management plan</u>

- Baseline weed mapping completed for the offset site and a weed management strategy developed and implemented in 2019.

- All WONS identified on site to be treated within 12 months of the commencement of the action.
- WONS are treated until they are not observed on the Offset Site.

Management Action 2 - rehabilitation and regeneration management plan

- Baseline mapping of rehabilitation areas completed for the offset site and a rehabilitation strategy developed within 12 months of the commencement of the action.
- Rehabilitation to commence within 12 months of weeds being treated in non-remnant and remnant areas.
- Rehabilitation areas will have a 90% plant survival rate after 12 months of planting being carried out.
- Areas allowed to regenerate will display signs of native vegetation regrowth at rates expected for those species.

Management Action 3 - legally securing the offset

- A voluntary declaration will be placed over the offset prior to commencement of the action.

Management Action 4 – pest management (feral and unwanted dog usage) plan

- Baseline monitoring of feral or unwanted dogs completed for the offset site within 12 months of the commencement of the action and a management strategy developed.
- Feral or unwanted dogs will be minimised through ongoing monitoring and management.
- The pest management strategy will be updated annually based on the outcomes of monitoring.

Management Action 5 – maintain koala habitat quality

- Habitat quality monitoring will be completed annually for the first three years after commencement of the operation and every five years ongoing.
- Habitat quality will not reduce from the values identified in the baseline report. If a reduction occurs monitoring will continue annually until the values return to the baseline level.

Management Action 6 – bush fire management plan

- Fuel levels and burning regime maintained in accordance with Offset Area Bushfire Management Plan.
- Vegetation composition not negatively affected by fire regime.
- Offset area is legally secured as an area of High Conservation Value under section 19F of the Vegetation Management Act 1999

3.5.2 Completion criteria

Completion criteria for the offset site are as follows:

- WONS eradicated from the offset area.
- Rehabilitated areas are established and regenerate and mapped as remnant vegetation under the Vegetation Management Act 1999 or successor legislation.
- Dogs or evidence of dog presence are not detected on the offset area for a period of three years.
- Koala habitat quality remains at baseline levels or better for two consecutive five year monitoring events.

3.5.3 Corrective actions

If progression towards the completion criteria identified above are not met following annual compliance inspections and five (5) yearly habitat quality monitoring, the following corrective actions will be implemented:

- If pest animals are detected, the control measures and the timing and frequency of management measures will be increased and maintained at a higher rate of control until the completion criteria have been attained.
- Where unplanned fires or flooding occurs during the monitoring interval, any negative impacts to ecological score will be noted and compared to unaffected monitoring sites of previously the same quality and resulting potential weed infestations following disturbance will be managed to ensure the weed control completion criteria are achieved.
- Where koala habitat rehabilitation has a success rate below 90%, the active regeneration measures will be repeated until the completion criteria are achieved.

3.6. Adaptive management

An adaptive implementation program will be used to ensure uncertainty is reduced over time, and that completion criteria are attained and maintained over the period of approval. As more information becomes available following ongoing performance monitoring, the management and monitoring regime will be reviewed and revised to maximise the likelihood of attaining and maintaining the outcomes to be achieved by implementing the OMP. Any updates to the OMP which do not result in a material change to the environmental outcomes, performance and completion criteria will be made by **SHG/Boral** without the requirement of informing the DoEE. If material amendments likely to alter the environmental outcomes, or performance and completion criteria are proposed to the OMP, the amendments and justification for the contingency measures will be provided to the DoEE in writing.

Adaptive management will be used to incorporate changes in any of the following areas:

1. Assimilation of new data or information - such as, updates to conservation advice or new threat abatement plans relevant to the koala.

2. Project coordination and scheduling – to manage unforeseen disruptions to schedule such as inclement weather on contractor works for management actions and environmental consultant monitoring events.
3. Annual review of risks – to refresh the mitigation measures should new threats be identified or stochastic events such as unplanned fires or floods occur.
4. Annual review of management measure effectiveness – to increase the frequency or change the method of management actions where monitoring performance criteria are not met.
5. Contingency for unplanned incidents – such as stochastic events including unplanned fires or floods.

3.7. Annual compliance reporting

In accordance with EPBC Approval (EPBC 2016/7797), an annual compliance report will be prepared and published on the **Boral** website. The report will address the compliance with each of the conditions of approval, including any incident reports of undesirable impacts upon koalas (including Koala habitat), and any monitoring and management milestones achieved during the previous 12 months, including progress on key management measures, attainment of performance targets and completion criteria, and adaptive implementation outcomes. The compliance report will also address the effectiveness of the management measures and how the site is progressing against performance and completion criteria.

Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of the approval will be provided to DoEE at the time of publishing the compliance report.

4. Appendices

Appendix A: Environmental Offsets Strategy

Appendix B: Offset Site Baseline Report

Appendix A

Environmental Offsets Strategy

ENVIRONMENTAL OFFSET STRATEGY

INTRODUCTION AND DESCRIPTION OF THE ACTION

The *Environmental Management Division* of **Saunders Havill Group** (**SHG**) acting on behalf of **Boral Resources (QLD) Pty Limited** (**Boral**) have developed this **Environmental Offset Strategy** to provide details of the offset requirements under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for clearing koala habitat associated with the **Ormeau Quarry Expansion at Kingsholme (2016/7797)**.

The action relates to a 38 ha extension to the existing Ormeau Quarry, including approximately 38 ha of vegetation clearing. The existing quarry has been operating since 1979, with Boral operating it for over 20 years, and produces a range of aggregate and road base materials. The expansion is expected to allow the quarry to operate for more than 40 years and increase output from 700,000 tonnes per annum (tpa) to approximately 2,000,000 tpa, in line with recently approved State & Local Government land use approvals and Environmental Authorities.

An offset site has been identified to mitigate residual impacts on Koala habitat resulting from the expansion of Ormeau quarry. The offset site is located on Boral-owned land at Cliff Barrons Road, Kingsholme (Lot 2 on RP15912) approximately 1.7 km north of the expansion site.

This strategy assesses both the impact and offset sites using the following tools:

- EPBC Act environmental offsets policy;
- EPBC Acts referral guidelines for the vulnerable koala;
- How to use the offsets assessment guide; and
- The Offsets assessment guide spreadsheet.

The assessment of the impact and offset sites are outlined below.

IMPACT SITE

Residual Impacts

The quarry expansion is calculated as having a residual impact caused by the actual and functional loss of 38 hectares of habitat critical to the survival of the Koala. The site has been assessed as containing habitat with a value of 7 using the Habitat Assessment Tool.

Residual Impact: Removal of 38 hectares of critical habitat

Annual probability of extinction

The annual probability of extinction is an estimate of the average chance that a species or ecological community will be completely lost in the wild each year, given recent rates of decline. The annual probability of extinction is incorporated into the impact and offset calculation process as a discounting factor for aligning activities that occur at different points in time. This figure is derived from the International Union for the Conservation of Nature (IUCN) Red List for threatened species.

As the Koala is listed as 'Vulnerable' under the EPBC Act, an annual probability of extinction, based on ICUN category definitions, is 0.2%.

Impact Calculator

The Protected Matter Attribute relates to habitat critical to the survival of the Koala therefore the attribute the offset will be assessed against is "area of habitat". The impact calculator generates the total quantum of impact on habitat by multiplying the residual impact area by the quality of the habitat. As noted a residual impact of 38 hectares of critical Koala habitat will be removed as a result of the action.

The quality score for area of habitat is a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability. There are three components that contribute to the calculation of habitat quality: site condition, site context, and species stocking rates. However, the Koala Referral Guidelines include a habitat assessment tool which can be used to identify habitat values of a site specific to koalas. The Guidelines state "[the habitat assessment tool] can help you determine 'habitat quality' referred to in the offset calculator. [It] may be used instead of the three generic habitat quality categories found in the Offsets Assessment Guide and be applied once to the entire area of habitat being offset. [It] can also be used to calculate the starting quality of a proposed offset site and to estimate the future quality, with and without the proposed offset/management intervention".

As a result, the assessment tool has been used to develop habitat quality scores for the start and future habitat values parameters for the offset areas by comparing them to the impact area. **Table 1** provides a summary of the habitat assessment carried out for the impact area which was originally carried out for the EPBC Act referral and preliminary documentation reports.

Table 1: Koala Habitat Assessment Summary

Attribute	Score	Description
Koala occurrence	**+2** **Surveys indicate one or more Koalas may have been present within 2 km of the site within the last 2 years.**	Desktop Surveys A Wildlife Online search generated under the *Nature Conservation Act 1992* (QLD) (NCA) found 7 Koalas as being identified within a 2 km radius of the site. It is noted that wildlife online doesn't provide dates for the sightings therefore it is unknown whether any of these occurred in the last 2 years. A search of the **Koala Tracker** database did not find any positive sightings within 2 km of the site. Field Surveys During a 2006 field survey, **BAAM** recorded evidence of koala within the proposed quarry expansion area. Koala scats were also observed on the eastern section of the referral area during the 2016 field surveys by **Saunders Havill Group**. It is noted that only evidence of usage has been found and no koalas have ever been observed on the site.
Vegetation composition	**+2** **The site contains forest or woodland with 2 or more known koala food tree species in the canopy.**	Habitat assessments at the site identified both primary and secondary Koala food species within the expansion footprint and in surrounding areas. These primary and secondary species included *Eucalyptus siderophloia* (Grey Ironbark), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus major* (Grey Gum).
Habitat connectivity	**+1** **The impact area is an extension of the existing quarry.**	The site is relatively segregated from urban development and main roads and is located within a rural context. While it is part of a contiguous landscape greater than 500 hectares, the proposal is an extension off the already existing Boral quarry with four other quarries located within a 5 km radius. From a contextual point of view, the expansion will not result in the significant fragmentation of habitat areas in the broader landscape and is unlikely to impact on connectivity surrounding the quarry area. Given that the quarry already exists, the connectivity value of the site is reduced as it is to be located adjacent to the existing quarry site.
Key existing threats	**+1** **Little or no evidence of koala mortality from vehicle strike or dog**	Field surveys did not identify any evidence of dogs throughout the subject site, which is known to be one of the most significant threats to Koala injury and mortality. It is likely domestic dogs and other animals would occur commonly throughout adjoining properties given the rural nature of the area. The site is nearly 5 km from the nearest main road, being the pacific

Attribute	Score	Description
	attack at present in areas that score 1 or 2 for koala occurrence.	motorway. Upper Ormeau road provides the main access from the site to the motorway and has high vehicle usage including trucks used to haul product from the quarry. Records of koala vehicle strikes within the region (for example Ormeau and Coomera – Biolink 2007) were located however there is little evidence available immediately surrounding the site. This may be a reflection of the low usage of the site by koalas and prevalence of commercial uses surrounding the site. Most reported koala sightings are in highly populated or closely monitored locations such as urban areas and environmental reserves.
Recovery value	**+1** **It is uncertain whether the site is important in achieving interim recovery objectives.**	The interim recovery objectives for sites within the coastal geographical context are to "*Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are: genetically diverse/distinct; or free of disease or have a very low incidence of disease; or breeding (i.e. presence of back young or juveniles)*". While clearing will occur in areas providing Koala habitat, it is uncertain as to whether the protection of the vegetation will achieve the interim recovery objectives for coastal areas. This is due to the relatively high prevalence of disease of Koalas as well as the fact that these Koalas are not known to be genetically diverse from other Koalas in South East Queensland.
Total Score	**7**	**As the habitat score is greater than or equal to 5, the impact area is considered to provide Critical Habitat for the koala as defined by the EPBC referral guidelines.**

Impact area habitat quality: 7

Quantum of Impact

The residual impact area (38 hectares) and habitat quality (7/10) are multiplied to provide the total quantum of impact for the action. When the area and quality of critical habitat to be removed are combined the Total Quantum of impact is identified as 26.6 ha.

Total quantum of impact: 26.6 hectares

OFFSET SITE

Start Area and Quality of Offset

The proposed offset site is predominantly remnant vegetation with only a small area of the site mapped as non remnant. Ecological field surveys were undertaken by Saunders Havill Group over 2 days in September and October 2015. Findings from the field surveys include:

- The majority of the site is mapped as containing remnant vegetation consistent with the regional ecosystem mapping. Three regional ecosystems (RE12.11.3, RE12.11.5 and RE12.11.10) are mapped as occurring within the subject site.
- RE 12.11.3 and 12.11.5 were dominated by Eucalyptus and Corymbia species and made up the largest proportion of vegetation within the assessment area.
- RE 12.11.10 was observed in the south western portion of the site. RE 12.11.10 is described as Notophyll vine forest +/- Araucaria cunninghamii on metamorphics +/- interbedded volcanics. This regional ecosystem is also associated with the "Lowland rainforest of Subtropical Australia" threatened ecological community.
- The area mapped as RE 12.11.10 not only is a threatened ecological community but it also contained specimens of Brachychiton sp. (Mt Ormeau bottle tree – would need to be confirmed with the herbarium) which is protected under the EPBC Act and *Macadamaia integrifolia* (Macadamia Nut) which is protected under State legislation.
- In general, the majority of the site is consistent with Eucalypt and Corymbia woodlands/forests that would be generally utilised by *Phascolarctos cinereus* (Koala). No koalas were spotted during surveys however numerous scats were observed in low densities throughout the majority of the site suggesting that resident koalas may be located within the investigation area.
- Weed infestation within the site was relatively low and generally the vegetation was intact. Some patches of *Lantana camara* (Lantana) were observed throughout the site.
- A number of old overgrown and eroded tracks traverse the ridgelines throughout the property. Evidence of logging was also observed in some locations.
- A number of these tracks and other areas through the site contain barbed wire fencing, which would impede fauna movement.
- Two (2) bitumen roads are located to the south and the east of the property.
- A few areas throughout the property contain non-remnant vegetation. The regrowth vegetation observed was consistent with vegetation associated with RE 12.11.3/12.11.5.

Field surveys identified that non remnant areas contained vegetation in good condition that would be considered critical koala habitat as defined by the EPBC Act. The survey also found that, while generally in good condition, the site had been impacted in areas by logging, agricultural practices and weed incursion.

Photo 1: Lantana Infestation of the offset site

Table 2 provides a summary of the assessment carried out using the habitat assessment tool.

Table 2: Koala Habitat Assessment Summary

Attribute	Score
Koala occurrence	**+2** Desktop investigations did not identify any koalas within 2 km of the site in the last 2 years. SAT surveys found low levels of usage throughout the site.
Vegetation composition	**+2** The site contains forest or woodland with 2 or more known koala food tree species in the canopy.
Habitat connectivity	**+2** The offset area currently sits within a large, contiguous patch of vegetation ≥ 500 ha. The patch is surrounded by a number of uses with the potential to result in further impacts including three quarries, urban and rural residential estates and agricultural land however most of these areas do not currently have approval for clearing under the various Local, State and Federal planning and legislative frameworks. The exception to this is the Wolffdene Quarry extension (2014/7384), which has all required approvals and is located to the north of the site.

Attribute	Score
Key existing threats	**+1** Field surveys did not identify any evidence of dogs throughout the subject site, which is known to be one of the most significant threats to Koala injury and mortality. It is likely domestic dogs and other animals would occur commonly throughout adjoining properties given the rural nature of the area. Records of koala vehicle strikes within the region (for example Ormeau and Coomera – Biolink 2007) were located however there is little evidence available immediately surrounding the site. This may be a reflection of the low usage of the site by koalas and prevalence of commercial uses surrounding the site. Most reported koala sightings are in highly populated or closely monitored locations such as urban areas and environmental reserves.
Recovery value	**+1** It is uncertain whether the site is important in achieving interim recovery objectives, which are to "*Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are: genetically diverse/distinct; or free of disease or have a very low incidence of disease; or breeding (i.e. presence of back young or juveniles*)".
Total Score	**8**

The site is identified as having a habitat value of 8 indicating it is in good condition but shows minor signs of disturbance that could be improved through rehabilitation works.

Start area and quality: 8/10

Future Quality without the Offset
The site is mapped as a Key Resource Area under the State Planning Policy and is within the Extractive Resources – Resource Area / processing area overlay under the GCCC Planning Scheme. An EPBC Act controlled action approval (Ref No. 2007/3772) has also been obtained for the site for a proposed quarry use however it has not yet been acted upon. Furthermore an application for extractive industry has previously been lodged for local and State government approvals, however was withdrawn due to a change in ownership.

If the site is not protected through an offset agreement it is highly likely applications for resource extraction would be progressed with activities likely to commence within the next 5 – 10 years.

While there is significant potential for clearing to occur at the site as a result of extraction activities, this is addressed in the 'risk of loss without offset'. Therefore, the future quality without the offset is likely to remain the same as the current quality.

Future quality without offset: 8/10

Future Quality with the Offset
The quality of the proposed offset area 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.

Land within the offset area will be proactively managed in order to enhance its ecological value. This will include rehabilitation and revegetation in certain areas through:

- Protection of existing vegetation and minimisation of risks to protected areas from adjoining operational works;
- Control of weed species; and

- Implementation of a Vegetation Management Plan to ensure the integrity of the existing vegetation is maintained.

While environmental management and monitoring programs proposed for the site will improve the habitat values for koalas by improving koala habitat on the site, when assessed using the koala assessment habitat tool no additional value is attributed for the proposed on ground works.

Future quality with offset: 8/10

Risk of loss without offset
For reasons already outlined under 'future quality without the offset' risk of loss without offset is considered to be high.

Remnant vegetation on the site is mapped as 'least concern' under the *Vegetation Management Act 1999* and located within a Key Resource Area and agricultural zoning therefore both extractive and agricultural uses would be considered a 'relative purpose' for clearing and allowed under the VMA. It is acknowledged that it is unlikely approval would be given for clearing of the entire site however the Commonwealth Government has provided approval for the quarry. While this approval has not been acted on it has effect until July 2045 and if the site is not used as an offset Boral are likely to progress Local and State government approvals for the quarry use within the next five years.

An application for extractive industry was previously lodged for local and State government approvals however was withdrawn due to change in ownership. Notwithstanding this, extractive industry on the Site is supported at both a State and local Council level with the site included in the Key Resource Area under the State Planning Policy and the Extractive Resources Overlay under the GCCC Planning Scheme. It is possible that approvals could be obtained in a 2 year period if extraction activities were planned.

In addition to the likely quarry use various exemptions and accepted development provisions also apply for clearing in agricultural and extractive areas that would allow clearing of several hectares of remnant vegetation without any further approval. As an example relevant exemptions under the VMA are listed in **Table 3**.

Table 3: VMA exemptions relevant to the Offset site

Clearing Purpose	Details
Establish new infrastructure	Clearing to construct necessary built infrastructure where the total clearing extent and the extent of the infrastructure does not exceed 2ha. Clearing to source construction timber to establish necessary infrastructure on the land.
Fences, roads or tracks	Clearing to establish a necessary fence, road or vehicular track to a maximum width of 10m.
Fire management line	Clearing for a necessary fire management line to a maximum width of 10m.
Firebreaks	Clearing to establish or maintain a necessary firebreak to protect infrastructure (other than fences, roads and tracks) to a maximum width of 20m or 1.5 times the height of the tallest adjacent tree, whichever is the greater.
Hazardous fuel load reduction	Clearing by fire to reduce hazardous fuel load under the Fire and Emergency Services Act 1990.
Maintain existing infrastructure	Clearing necessary to maintain existing infrastructure, including buildings, fences, roads and watering points.

Clearing Purpose	Details
	Clearing to source construction timber to maintain existing infrastructure on the land.
Risk to people or infrastructure	Clearing necessary to remove or reduce the imminent risk the vegetation poses to people or infrastructure.

As a result of the above a risk of loss without offset of 50% has been applied. This is considered conservative as if the site is not utilised as an offset the quarry use is highly likely to be progressed. The fragmentation caused by the clearing will also impact on vegetation surrounding the site reducing its habitat value for koalas. This also reflects the generally high potential for clearing to be carried out on the site whether for agricultural or extraction purposes if not protected.

Risk of loss without offset: 50%

Risk of loss with offset
As a result of the offset dedication, it is highly unlikely that the areas natural values will be lost because:

- Negotiations will be undertaken to legally secure the offset site so that land cannot be used for other purposes, including the approved extraction use; and
- The offset land is substantial in size and width and robust enough to withstand periodical impacts of bushfire, weed incursion, and native and feral species impacts.

Overall, the risk of loss with the offset is considered to be negligible therefore a value of 2% has been given to this parameter.

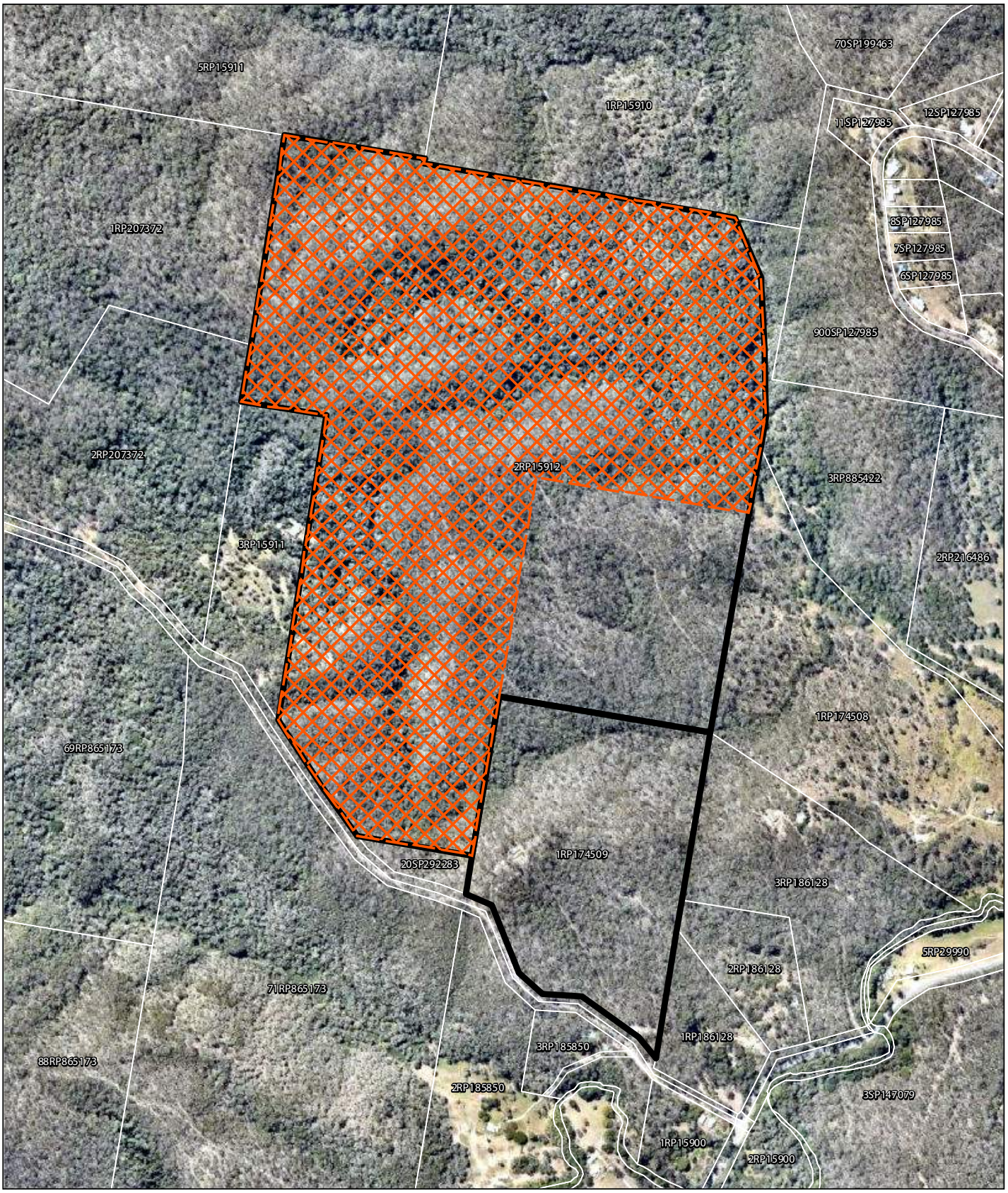
Risk of loss with offset: 2%

Confidence in result
A confidence result of 90% has been given to the averted loss attributes. The 'How to Use the Offsets Assessment Guide" provided on DoEEs website states: "*For the averted loss component, confidence in result captures the level of certainty about the strength and effectiveness of the proposed risk-mitigation measures and the capacity of these measures to mitigate the risk of loss of the site*". Protecting the offset area through a voluntary declaration or similar provides a high level of confidence that that no part of the offset site will be lost. In addition, given existing approvals over the site and the wide range of clearing that can be carried out under exemption, there can be high level of confidence that at least a portion of the site will be cleared if not protected through the offset.

A confidence result of 75% has been given to the future quality attributes. Boral is a large, viable, experienced and award winning business entity who have track record of compliance with approval conditions and in particular rehabilitation of their quarry sites and buffer land. As such there can be a high level of confidence that the measures implemented on site will be carried out effectively. Boral have no influence on clearing on surrounding land as a result of other uses such as agriculture and extraction. As the additional values are associated with the enhancement of corridors and connective habitat for Koalas confidence has been reduced to 75%. As can be seen on Plan 1 protection and enhancement of the proposed offset site will provide connectivity to existing conservation areas.

Confidence in Results – risk of loss: 90%
Confidence in Results – future quality: 75%

Based on the inputs described above, approximately 77 ha of the site at Kingsholme would provide a relative net offset for impacts at the Ormeau site using the EPBC Offset assessment guide calculator. A copy of the completed EPBC Offset Calculator is included as Attachment 1.



Legend

- Qld DCDB
- Offset Site DCDB
- Proposed offset area (77 ha)

Figure 1

Ormeau Quarry - Offsite Site

File ref. 8354 E Figure 1 Offset Area Op1 B
Date *1/02/2018*
Project *Ormeau Quarry*

0 50 100 200 300 *m*

N

Scale (A4): 1:10,000 [GDA 1994 MGA Z56]

BORAL

saunders havill group

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2017)

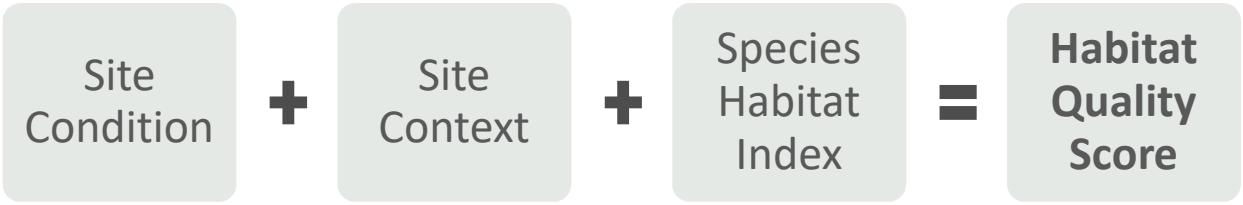
Appendix B

Offset Site Baseline Report

1. Habitat Quality Assessment Method

The habitat quality assessment methodology prepared by the Queensland Herbarium (DEHP 2017) was utilised to assess habitat values of the Kingsholme Offset Site. The methodology provides a repeatable and consistent method for determining habitat quality.

To accurately assess the habitat values the site needs to be broken into Habitat Assessment Units based on prevailing Regional Ecosystems and other ecological and topographical features. Within each Habitat Assessment Unit, Site Condition, Site Context and the Species Habitat Index are determined based on field transects and observations and desktop studies. In a general sense, it is the scores for each of these attributes that are combined to determine the site's overall Habitat Quality Score. Refer to the schematic below.

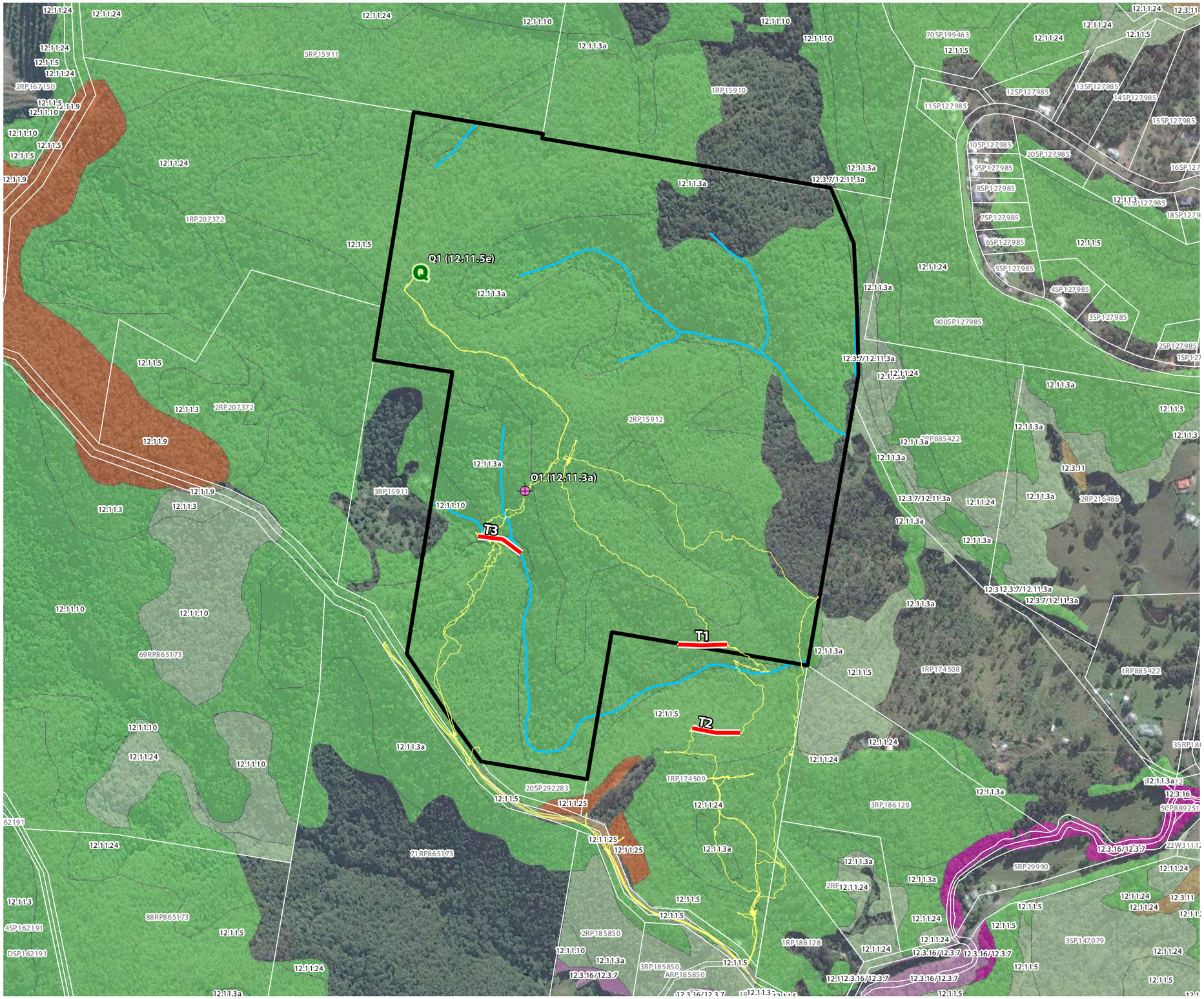


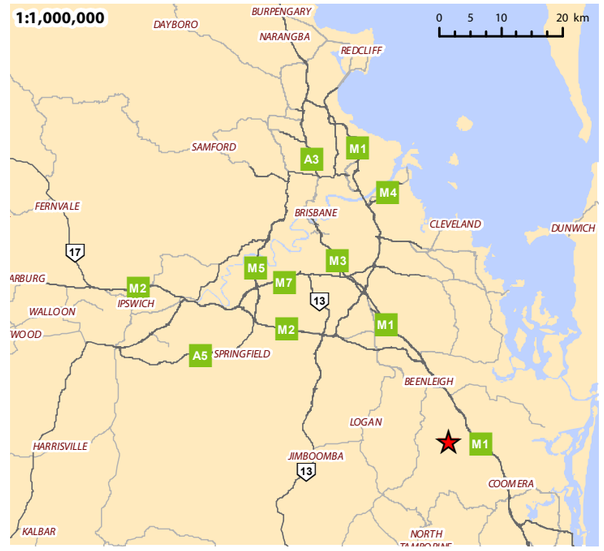
1.1. Habitat Assessment Units

The site was divided into three Habitat Assessment Units (refer to **Table 1** and **Plan 1**). A single transect has been conducted within each Habitat Assessment Unit. The purpose of the transects are to determine attribute scores for Site Condition and to also provide the necessary information to complete additional assessments.

Table 1: Habitat Assessment Unit Descriptions

Habitat Assessment Unit	Area (ha)	Status	Regional Ecosystem	Description
AU1	32.6	Least Concern Remnant	12.11.3	Eucalyptus siderophloia, E. propinqua +/- E. microcorys, Lophostemon confertus, Corymbia intermedia, E. acmenoides open forest on metamorphics +/- interbedded volcanics
AU2	37.5	Least Concern Remnant	12.11.5	Corymbia citriodora subsp. variegata woodland to open forest +/- Eucalyptus siderophloia/E. crebra, E. carnea, E. acmenoides, E. propinqua on metamorphics +/- interbedded volcanics
AU3	1.6	Least Concern Remnant	12.11.10	Notophyll vine forest +/- Araucaria cunninghamii on metamorphics +/- interbedded volcanics





Legend

- Offset Site
- Mapped watercourse (onsite)
- Vegetation Transects
- Quaternary Site
- Observation Site
- Tracklog

0 50 100 200 300 400 500 m

N

saunders havill group

BORAL

APPROVED COMPANY ISO 9001 Quality Management Systems QMS

APPROVED COMPANY ISO 14001 Environmental Management Systems QMS

ISSUES:

Issue	Date	Description	Drawn	Checked
A	20/10/2015	Prelim Draft	AL	SM
B	9/12/2016	Additional Surveys	TC	SM
C	26/10/2018	Job no. changed	TC	SM

Upper Ormeau Road, Ormeau Hills

Field Survey

Date | 26/10/2018
Scale | 1:8,000 @ A3
Coordinate System | GDA 1994 MGA Zone 56
Projection | Transverse Mercator
Client | Boral Construction Materials Ltd
Project | Ormeau Hills Offsets
Address/RPD | 2RP15912
Sources | QLD GIS Layers (QLD Gov. Info Services 2015), Aerial (Nearmap, 2015)

Plan 1

SHG File
8354 E 01 Field Survey OMH C

1.2. Site Condition

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, compared to the expected range for a relatively undisturbed community.

The following components of Site Condition were assessed, compared to benchmarks and assigned a score within each Habitat Assessment Unit on-site:

1. Recruitment of Woody Species
2. Tree Species Richness
3. Shrub Species Richness
4. Grass Species Richness
5. Forb Species Richness
6. Tree Canopy Height
7. Tree Canopy Cover
8. Shrub Canopy Cover
9. Native Perennial Grass Cover
10. Organic Litter
11. Large Trees
12. Coarse Woody Debris
13. Weed Cover

1.3. Species Habitat Index

The Species Habitat Index measures the capacity of a site to support a species and requires field survey data, available modelling and current species records. The index represents an analysis of the quality and availability of habitat for the species, and the likelihood of continued existence of the species at the site.

The Species Habitat Index consists of the following attributes assessed and assigned a score within each Habitat Assessment Unit on-site:

1. Threats to Species
2. Quality and Availability of Food and Foraging Habitat
3. Quality and Availability of Shelter
4. Species Mobility Capacity
5. Role of Site Location to Overall Population

Koala habitat values have been assessed for the site.

1.4. Habitat Quality Score

To determine each assessment area's **Habitat Quality Score**, the scores for each attribute listed above are averaged across transects and summed to provide the *Habitat Quality Score (measured)* for each of the Habitat Assessment Units. These scores are then compared to the maximum attainable (*Habitat Quality Score max*) to calculate the *Assessment Unit Habitat Quality Score* for each assessment unit. These scores are then weighted according to the relative size of each Habitat Assessment Unit before being summed to give the overall Area **Habitat Quality Score** rounded to the nearest whole number.

2. Habitat Quality Results

2.1. Assessment Unit 1

The Habitat Quality Score (measured) for Assessment Unit 1 was derived from one data transect and an observation survey point (refer to **Plan 1** and photos below). A walkover of the site confirmed the transect was representative of RE12.11.3 condition throughout most of the site.

Assessment Unit 1 Transect

Photos

2.2. Assessment Unit 2

The Habitat Quality Score (measured) for Assessment Unit 1 was derived from one data transect and a quaternary vegetation survey point (refer to **Plan 1** and photos below). A walkover of the site confirmed the transect was representative of RE12.11.5 condition throughout most of the site.

Assessment Unit 2 Transect

Photos	
	
	

2.3. Assessment Unit 3

The Habitat Quality Score (measured) for Assessment Unit 1 was derived from one data transect (refer to Plan 1 and photos below). A walkover of the site confirmed the transect was representative of RE12.11.10 condition throughout most of the site.

Assessment Unit 3 Transect

Photos

2.4. Overall Habitat Quality Score

Using the assessment template, the Habitat Quality Score for the Impact Area on site was determined to be **7.64** (refer to **Attachment A**).

Attachment A

Habitat Transect Data

Habitat Quality Site Assessment Template.....

PLEASE NOTE - YELLOW INDICATES AN AUTO POPULATED FIELD

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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 C - Site Data

Property	Kingsholme Offset Site	Date	

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
1	32.6	12.11.3	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.

Datum					
WGS 84 ☐	0m Mark	Zone	Easting	Northing	
GDA 94 ☑		56			
	50m Mark	Zone	Easting	Northing	
		56			
Plot bearing			Recorders	Andrew Craig	

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

Eucalyptus siderophloia and E. propinqua open forest +/- E. microcorys, Lophostemon confertus, Corymbia intermedia, E. biturbinata, E. acmenoides, E. tereticornis, E. moluccana, Angophora leiocarpa, Syncarpia verecunda with vine forest species and E. grandis or E. saligna in gullies. Eucalyptus pilularis and E. tindaliae sometimes present e.g. mid D'Aguilar Range, Conondale Range. Occurs predominantly on hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics.

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

Tree species richness:			
Total number of species	9		
Scientific Name	*Lophostemon confertus*	Common Name	
Scientific Name	*E. major*	Common Name	
Scientific Name	*E. siderophloia*	Common Name	
Scientific Name	*E. carnea*	Common Name	
Scientific Name	*E. microcorys*	Common Name	
Scientific Name	*C. citriadora*	Common Name	
Scientific Name	*C. intermedia*	Common Name	
Scientific Name	*E. dura*	Common Name	
Scientific Name	*E. crebra*	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	14		
Scientific Name	*Hymenosporum flavum*	Common Name	*L. confertus*
Scientific Name	*Acacia concurrens*	Common Name	*Tabernaemontana sp.*
Scientific Name	*A. littoralis*	Common Name	*C. citriadora*
Scientific Name	*Cassinia sp.*	Common Name	*C. intermedia*
Scientific Name	*A. leiocalyx*	Common Name	
Scientific Name	*A. excelsa*	Common Name	
Scientific Name	*Hovea sp.*	Common Name	
Scientific Name	*A. leiocarpa*	Common Name	
Scientific Name	*A. littoralis*	Common Name	
Scientific Name	*A. disparrima*	Common Name	

Grass species richness:			
Total number of species	1		
Scientific Name	*Themeda triandra*	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	

Forbs and others (non grass ground) species richness:			
Total number of species	9		
Scientific Name	*Laxmannia compacta*	Common Name	
Scientific Name	*Lomandra multiflora*	Common Name	
Scientific Name	*Geodorum densiflorum*	Common Name	
Scientific Name	*Eustrphus latifolius*	Common Name	
Scientific Name	*Dianella caerulea*	Common Name	
Scientific Name	*Cheilanthes distans*	Common Name	
Scientific Name	*Bursaria spinosa*	Common Name	
Scientific Name	*Geitonoplesium cymosum*	Common Name	
Scientific Name	*Desmodium intortum*	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 - Non-Native Plant Cover: (*list species below)

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

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

Total Length of Course Woody Debris (Meters):	1160.00		
1		26	

2		27	
3		28	
4		29	
5		30	
6		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 G - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Native perennial grass cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	9.00%	6.00%	3.00%	13.00%	7.00%	19.00%

Organic Litter	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	70.00%	56.00%	64.00%	63.00%	85.00%	47.00%

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

Eucalypt Large tree DBH benchmark used :	45cm	Non- Eucalypt Large tree DBH benchmark used:	n/a
Number of large eucalypt trees:	26	Number of large non eucalypt trees:	0
Total Number Large Trees:	26		

Median Tree Canopy Height Measurements	Canopy:	26.00	Sub-canopy:	8.50	Emergent:	0.00

Number of ecologically dominant layer species regenerating:	85

Part I - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	89.60%	Sub-canopy:	44.60%	Emergent:	0.00%
Shrub canopy cover %	48.40%					

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

Part J - Site Context Score

ATTRIBUTE	Size of Patch	Connectedness	Context	Distance to Permanent Water	Ecological Corridors
DESCRIPTION	4 - 101-200ha	3 - 50%-75% connection	4 - >75% remnant	3 - 1-3km	3 - Within (whole or part)
SCORE	7	4	5	5	6

DOES THIS ASSESSMENT UNIT ALSO CONTAIN A SPECIES HABITAT REQUIREMENT.

YES ☑ **PLEASE COMPLETE SPECIES HABITAT INDEX DETAILS BELOW AND THEN ATTACH LANDSCAPE PHOTOS AND SUBMIT AS DIRECTED**

NO ☐ **PLEASE ATTACH LANDSCAPE PHOTOS BELOW AND SUBMIT AS DIRECTED**

Part K - Species Habitat Attributes

Species Habitat Attributes

No	Species Name	CommonName	NCA Status	Attributes	Threats to species	Quality and availability of food and foraging habitat	Quality and availability of shelter	Species mobility capacity	Role of site location to overall population
1	Phascolarctos cinereus	koala	SL	Description	*3 - Low threat level*	*3 - High*	*3 - High*	*3 - Moderately restricted (26 – 50% reduction)*	2 - Likely to be critical to species' survival
				Score	15	10	10	7	4
2				Description					
				Score					
3				Description					
				Score					
4				Description					
				Score					
5				Description					
				Score					
6				Description					
				Score					
7				Description					
				Score					
8				Description					
				Score					
9				Description					
				Score					
10				Description					
				Score					
				Maximum Score	15.00	10.00	10.00	7.00	4.00

Habitat Quality Site Assessment Template.....

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Habitat Quality Assessment Unit Score Sheet

Part C - Site Data

Property	Kingsholme Offset Site	Date	

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
2	37.5	12.11.5	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.

Datum		0m Mark	Zone	Easting	Northing
WGS 84	☐		56		
GDA 94	☑	50m Mark	Zone	Easting	Northing
			56		
Plot bearing			Recorders	Andrew Craig	

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

Corymbia citriodora subsp. variegata open forest to woodland, usually including Eucalyptus siderophloia/E. crebra (sub coastal ranges), E. propinqua and E. acmenoides or E. carnea. Other species that may be present and abundant locally include Corymbia intermedia, C. trachyphloia subsp. trachyphloia, Eucalyptus tereticornis, E. microcorys, E. portuensis, E. helidonica, E. major, E. longirostrata, E. biturbinata, E. moluccana and Angophora leiocarpa. Lophostemon confertus often present in gullies and as a sub-canopy or understorey tree. Mixed understorey of grasses, shrubs and ferns. Occurs on hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics.

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

Tree species richness:			
Total number of species	9		
Scientific Name	*Corymbia citriodora*	Common Name	
Scientific Name	*Eucalyptus major*	Common Name	
Scientific Name	*Lophostemon confertus*	Common Name	
Scientific Name	*E. acmenoides*	Common Name	
Scientific Name	*E. tindaliae*	Common Name	
Scientific Name	*C. intermedia*	Common Name	
Scientific Name	*E. tereticornis*	Common Name	
Scientific Name	*E. siderophloia*	Common Name	
Scientific Name	*E. carnea*	Common Name	
Scientific Name		Common Name	

Shrub species richness:			
Total number of species	7		
Scientific Name	*Acacia concurrens*	Common Name	
Scientific Name	*A. littoralis*	Common Name	
Scientific Name	*unidentified Acacia sp.*	Common Name	
Scientific Name	*Cassinia sp.*	Common Name	
Scientific Name	*A. leiocalyx*	Common Name	
Scientific Name	*A. excelsa*	Common Name	
Scientific Name	*Hovea sp.*	Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	3		
Scientific Name	*Themeda triandra*	Common Name	
Scientific Name	*Imperata cylindrica*	Common Name	
Scientific Name	*Cymbopogon refractus*	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	8		
Scientific Name	*Laxmannia compacta*	Common Name	*B. oblongifolia*
Scientific Name	*Lomandra multiflora*	Common Name	
Scientific Name	*Geodorum densiflorum*	Common Name	
Scientific Name	*Eustrphus latifolius*	Common Name	
Scientific Name	*Dianella caerulea*	Common Name	
Scientific Name	*Cheilanthes distans*	Common Name	
Scientific Name	*Bursaria spinosa*	Common Name	

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

Total percentage cover within plot	12.50%		
Scientific Name	*Lantana camara*	Common Name	
Scientific Name	*Bidens pilosa*	Common Name	
Scientific Name	*Passiflora suberosa*	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 F - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	810.00		
1		26	
2		27	
3		28	
4		29	
5		30	
6		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 G - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Native perennial grass cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
						6.70%

Organic Litter	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
						78.30%

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

Eucalypt Large tree DBH benchmark used :	45cm	Non- Eucalypt Large tree DBH benchmark used:	45cm
Number of large eucalypt trees:		Number of large non eucalypt trees:	
Total Number Large Trees:	24		

Median Tree Canopy Height Measurements	Canopy:	23.00	Sub-canopy:	12.00	Emergent:	0.00

Number of ecologically dominant layer species regenerating:	64

Part I - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	73.10%	Sub-canopy:	37.50%	Emergent:	0.00%
Shrub canopy cover %	13.80%					

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

Part J - Site Context Score

ATTRIBUTE	Size of Patch	Connectedness	Context	Distance to Permanent Water	Ecological Corridors
DESCRIPTION	4 - 101-200ha	3 - 50%-75% connection	4 - >75% remnant	3 - 1-3km	3 - Within (whole or part)
SCORE	7	4	5	5	6

DOES THIS ASSESSMENT UNIT ALSO CONTAIN A SPECIES HABITAT REQUIREMENT.

YES ☑ **PLEASE COMPLETE SPECIES HABITAT INDEX DETAILS BELOW AND THEN ATTACH LANDSCAPE PHOTOS AND SUBMIT AS DIRECTED**

NO ☐ **PLEASE ATTACH LANDSCAPE PHOTOS BELOW AND SUBMIT AS DIRECTED**

Part K - Species Habitat Attributes

Species Habitat Attributes

No	Species Name	CommonName	NCA Status	Attributes	Threats to species	Quality and availability of food and foraging habitat	Quality and availability of shelter	Species mobility capacity	Role of site location to overall population
1	Phascolarctos cinereus	koala	SL	Description	*3 - Low threat level*	*3 - High*	*3 - High*	*4 - Minor restriction (0 – 25% reduction)*	2 - Likely to be critical to species' survival
				Score	15	10	10	10	4
2				Description					
				Score					
3				Description					
				Score					
4				Description					
				Score					
5				Description					
				Score					
6				Description					
				Score					
7				Description					
				Score					
8				Description					
				Score					
9				Description					
				Score					
10				Description					
				Score					
				Maximum Score	15.00	10.00	10.00	10.00	4.00

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 C - Site Data

Property	Kingsholme offset site	Date	

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
3	1.6	12.11.10	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.

Datum		0m Mark	Zone	Easting	Northing
WGS 84	☐		56		
GDA 94	☑	50m Mark	Zone	Easting	Northing
			56		
Plot bearing			Recorders	Andrew Craig	

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

Notophyll and notophyll/microphyll vine forest +/- Araucaria cunninghamii. Characteristic species include Argyrodendron trifoliolatum, Argyrodendron sp. (Kin Kin W.D.Francis AQ81198), Backhousia subargentea, Dissiliaria baloghioides, Brachychiton discolor, Beilschmiedia obtusifolia, Diospyros pentamera, Grevillea robusta, Gmelina leichhardtii and Ficus macrophylla forma macrophylla. Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics.

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

Tree species richness:			
Total number of species	14		
Scientific Name	*Macadamaia integrifolia*	Common Name	*Backhousia subargentea*
Scientific Name	*Lophostemon confertus*	Common Name	*Grevillea robusta*
Scientific Name	*Eucalyptus major*	Common Name	*Ficus macrophylla*
Scientific Name	*Eucalyptus micorcorys*	Common Name	*Polyscias elegans*
Scientific Name	*Corymbia intermedia*	Common Name	
Scientific Name	*Argyrodendron sp.*	Common Name	
Scientific Name	*E. propinqua*	Common Name	
Scientific Name	*E. tereticornis*	Common Name	
Scientific Name	*Argyrodendron trifoliolatum*	Common Name	
Scientific Name	*Araucaria cunninghamii*	Common Name	

Shrub species richness:			
Total number of species	12		
Scientific Name	*Brachychiton sp.*	Common Name	*A. littoralis*
Scientific Name	*Flindersia schottiana*	Common Name	*Cheilanthes distans*
Scientific Name	*Cordyline stricta*	Common Name	
Scientific Name	*Smilax australis*	Common Name	
Scientific Name	*Cassinia sp.*	Common Name	
Scientific Name	*A. leiocalyx*	Common Name	
Scientific Name	*A. excelsa*	Common Name	
Scientific Name	*Hovea sp.*	Common Name	
Scientific Name	*A. leiocarpa*	Common Name	
Scientific Name	*A. littoralis*	Common Name	

Grass species richness:			
Total number of species	3		
Scientific Name	*Themeda triandra*	Common Name	
Scientific Name	*Imperata cylindrica*	Common Name	
Scientific Name	*Cymbopogon refractus*	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	10		
Scientific Name	*Laxmannia compacta*	Common Name	*Geitonoplesium cymosum*
Scientific Name	*Lomandra multiflora*	Common Name	*Desmodium intortum*
Scientific Name	*Geodorum densiflorum*	Common Name	*Eustrephus sp.*
Scientific Name	*Eustrphus latifolius*	Common Name	
Scientific Name	*Dianella caerulea*	Common Name	
Scientific Name	*Cheilanthes distans*	Common Name	
Scientific Name	*Bursaria spinosa*	Common Name	

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

Total percentage cover within plot	30.00%		
Scientific Name	*Lantana camara*	Common Name	
Scientific Name	*Bidens pilosa*	Common Name	
Scientific Name	*Passiflora suberosa*	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 F - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters):	260.00		
1		26	
2		27	
3		28	
4		29	
5		30	
6		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 G - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Native perennial grass cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
						24.00%

Organic Litter	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
						36.00%

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

Eucalypt Large tree DBH benchmark used :	45	Non- Eucalypt Large tree DBH benchmark used:	45
Number of large eucalypt trees:		Number of large non eucalypt trees:	8
Total Number Large Trees:	8		

Median Tree Canopy Height Measurements	Canopy:	22.00	Sub-canopy:	12.00	Emergent:	30.00

Number of ecologically dominant layer species regenerating:	57

Part I - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	71.00%	Sub-canopy:	12.00%	Emergent:	65.00%
Shrub canopy cover %	10.00%					

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

Part J - Site Context Score

ATTRIBUTE	Size of Patch	Connectedness	Context	Distance to Permanent Water	Ecological Corridors
DESCRIPTION	4 - 101-200ha	3 - 50%-75% connection	4 - >75% remnant	3 - 1-3km	3 - Within (whole or part)
SCORE	7	4	5	5	6

DOES THIS ASSESSMENT UNIT ALSO CONTAIN A SPECIES HABITAT REQUIREMENT.

YES ☑ **PLEASE COMPLETE SPECIES HABITAT INDEX DETAILS BELOW AND THEN ATTACH LANDSCAPE PHOTOS AND SUBMIT AS DIRECTED**

NO ☐ **PLEASE ATTACH LANDSCAPE PHOTOS BELOW AND SUBMIT AS DIRECTED**

Part K - Species Habitat Attributes

Species Habitat Attributes

No	Species Name	CommonName	NCA Status	Attributes	Threats to species	Quality and availability of food and foraging habitat	Quality and availability of shelter	Species mobility capacity	Role of site location to overall population
1	Phascolarctos cinereus	koala	SL	Description	*3 - Low threat level*	*3 - High*	*3 - High*	*3 - Moderately restricted (26 – 50% reduction)*	2 - Likely to be critical to species' survival
				Score	15	10	10	7	4
2				Description					
				Score					
3				Description					
				Score					
4				Description					
				Score					
5				Description					
				Score					
6				Description					
				Score					
7				Description					
				Score					
8				Description					
				Score					
9				Description					
				Score					
10				Description					
				Score					
				Maximum Score	15.00	10.00	10.00	7.00	4.00

Habitat Quality Final Summary Template

Case Reference	
Project Name	
Total Area	71.7

PART	Habitat Quality Attributes	Requirement	Assessment Unit Number 1	2	3	4	5	6	7	8	9	10
	Assessment Unit Area (ha)	Area (ha)	32.6	37.5	1.6	0	0	0	0	0	0	0
	Regional Ecosystems	RE	12.11.3	12.11.5	12.11.10							
	Bioregion	Bioregion	Southeast Queensland	Southeast Queensland	Southeast Queensland							
1	Site Condition Attributes											
	1. Recruitment of woody perennial species	Score	5	3	3							
	2. Native plant species richness											
	- Trees	Score	5	5	5							
	- Shrubs	Score	5	5	5							
	- Grasses	Score	3	5	5							
	- Forbs	Score	3	5	3							
	3. Tree canopy height											
	- Canopy layer	Score	5	5	5							
	- Sub-Canopy Layer	Score	5	5	5							
	- Emergent Layer	Score			5							
	Average Score	Average Score	5	5	5							
	4. Tree canopy cover											
	- Canopy layer	Score	5	5	5							
	- Sub-Canopy Layer	Score	3	5	5							
	- Emergent Layer	Score			5							
	Average Score	Average Score	4	5	5							
	5. Shrub canopy cover	Score	3	5	5							
	6. Native perennial grass cover	Score	5	1	5							
	7. Organic litter	Score	5	5	5							
	8. Large trees	Score	5	10	10							
	9. Coarse woody debris	Score	2	5	5							
	10. Weed cover	Score	5	5	5							
2	Site Context Attributes											
	11. Size of patch (fragmented)	Score	7	7	7							
	12. Connectedness (fragmented)	Score	4	4	4							
	13. Context (fragmented)	Score	5	5	5							
	14. Distance from water (intact)	Score	5	5	5							
	15. Ecological corridors	Score	6	6	6							
3	Species Habitat Index											
	16. Threats to species	Score	15	15	15							
	17. Quality and availability of food and foraging habitat	Score	10	10	10							
	18. Quality and availability of shelter	Score	10	10	10							
	19. Species mobility capacity	Score	7	10	7							
	20. Role of site location to overall population in the State.	Score	4	4	4							

Habitat Quality Score (measured)	128.00	140.00	139.00								
Habitat Quality Score (max)	176.00	176.00	176.00								
Assessment Unit Area (ha)	32.60	37.50	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Assessment Unit Habitat Quality Score	7.27	7.95	7.90								
Size weighting	0.45	0.52	0.02								
Weighted Assessment Unit Habitat Quality Score	3.31	4.16	0.18								
FINAL TOTAL HABITAT QUALITY SCORE	**7.64**										

Administrative Information

Name of Assessment Officer		Date	
Organisation/Company Name			
Project Name			
Phone Number		Email	