# Appendix 4

# Ecological Assessment Additional Information prepared by Eco Logical Australia

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***Our reference: 14BRIECO-505***

27th November 2014

Dear Rob,

**Ecological Assessment Additional Information - Dowe's Quarry (DA2014/078).**

This additional information relates to Dowe's Quarry, via Tenterfield NSW Ecological Assessment and has been prepared in response to a request from the NSW Office of Environment and Heritage (OEH) relating to the Development Application (DA2014/078) for the proposed ongoing operation of Dowe's Quarry. OEH sought:

- additional assessment of habitat trees for several hollow-dependent threatened species;
- further assessment for an additional six threatened species to determine the potential impacts from the proposal; and
- an assessment of potential offset area(s) to compensate for the removal of native vegetation and threatened species impacted by the Proposal.

The development footprint is defined as the proposed extended extraction area (**Figure 1**). The total area of disturbance has been modified slightly as the proposed clay fines area has been reconfigured to avoid the four hollow-bearing trees that were to be impacted in this area in the initial figure in the EIS. Therefore, the Proposal will now result in the removal of only four hollow-bearing trees and the removal of 1.7 ha of native vegetation.

The following sections outline the methodology results obtained when compiling the requested information.

Methodology

OEH identified eight threatened species requiring additional ecological assessment; five species listed vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act) and three species listed under vulnerable under both the TSC Act and Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Targeted field surveys were undertaken over 2 days and consisted of the following:

- Assessment of hollow suitability for trees previously identified as habitat for the following species: Powerful Owl (*Ninox strenua*), Brush-tailed Phascogale (*Phascogale tapoatafa*) and Turquoise Parrot (*Neophema pulchella*)
- Targeted searches and additional assessment of micro-habitat (i.e. rock crevices) for Border Thick-tailed Gecko (*Uvidicolus sphyrurus* syn *Underwoodisaurus sphyrurus*)

- Assessment of mistletoe availability for Painted Honeyeater (*Grantiella picta*)
- Targeted searches for Austral Toadflax (*Thesium australe*) and host plant Kangaroo Grass (*Themeda australis*)
- Assessment of availability of raptor nests
- Nocturnal searches for Border Thick-tailed Gecko, Powerful Owl and Brush-tailed Phascogale.

The survey methods outlined for each species in the table below are based on OEH's response (DOC14/66858 DOC14/215840) dated 10th October 2014, a teleconference with OEH on 17th October 2014 and targeted survey guidelines (**Table 1**).

**Table 1. Threatened species requiring additional assessment and survey method**

| Species Name | Common Name | EPBC Act | TSC Act | Survey methods |
|---|---|---|---|---|
| **Fauna** | | | | |
| *Circus assimilis* | Spotted Harrier | - | V | Census at dawn/dusk (DEC 2004)<br>Assessment of availability of raptor nests |
| *Ninox strenua* | Powerful Owl | - | V | Spotlighting<br>Assessment of hollow suitability |
| *Phascogale tapoatafa* | Brush-tailed Phascogale | - | V | Spotlighting on foot (DEC 2004)<br>Assessment of hollow suitability |
| *Grantiella picta* | Painted Honeyeater | - | V | Census at dawn/dusk (DEC 2004)<br>Assessment of the availability of mistletoe |
| *Neophema pulchella* | Turquoise Parrot | - | V | Census at dawn/dusk -Per stratification unit (DEC 2004)<br>Assessment of hollow suitability |
| *Uvidicolus sphyrurus* | Border thick-tailed Gecko | V | V | Diurnal searches and spotlighting (SEWPaC 2011)<br>Assessment of micro-habitat (i.e. rock crevices) |
| **Flora** | | | | |
| *Thesium australe* | Austral Toadflax | V | V | Random meander (30 mins) (DEC 2004)<br>Targeted searches and mapping extent and relative abundance of *Themeda australis* , associated with *Thesium australe* |
| *Acacia macnuttiana* | McNutts Wattle | V | V | Random meander (30 mins) (DEC 2004) |

The assessment also considered additional threatened species that were listed in the information request but not identified as a particular concern during a teleconference with OEH. These species include the Masked Owl (*Tyto novaehollandiae*), Barking Owl (*Ninox connivens*), Sooty Owl (*Tyto tenebricosa*), Yellow-bellied Glider (*Petaurus australis*) and Squirrel Glider (*Petaurus norfolcensis*).

A desktop assessment was undertaken to identify potential offset areas containing the same vegetation type on land to the north of the impact site and owned by the same landowner. The proposed offset area was then selected after surveys confirmed the vegetation type as Forest Ecosystem 41 and due to its adjacency to Bald Rock National Park.

An assessment of the 13 offset principles for 'non major projects' in NSW was undertaken for all threatened species identified as being impacted by the Proposal. Biometric data of the proposed offset area was undertaken using Biobanking Assessment Methodology.

Results

*Ecological Assessment*

The field survey was undertaken over approximately 12 hours on the 28th and 30th October 2014 by senior ecologist, Brad Dreis. The daily weather conditions were fine and warm with maximum temperatures approximately 30°C. The night conditions were also fine and temperatures approximately 15°C.

Sixteen habitat trees with hollows were assessed for habitat suitability (**Table 2**); with particular focus on habitat trees 2, 3, 4 and 6 which are proposed to be removed as a result of the extended extraction area (**Figure 2**). An additional habitat tree, *Eucalyptus biturbinata* (Grey Gum), will be also removed. However, this tree does not have any hollows and its proposed removal is unlikely to occur for at least 10 years.

Habitat trees 2, 3, 4 and 6 all had small to medium branch hollows, with the exception of one trunk hollow recorded on habitat tree 3 (Grey Gum) (**Table 2**). The largest hollows were recorded on habitat tree 2, Grey Gum, and habitat tree 4, *Eucalyptus dalrympleana* (Mountain Gum), however, hollows did not exceed 25 cm in diameter. These hollows could provide potential nesting habitat for Turquoise Parrot. At the time of assessment, Musk Lorikeet (*Glossopsitta concinna*) were observed using the small hollow on habitat tree 4 (**Appendix A**) and Eastern Rosella (*Platycercus eximius*) were observed using hollows on these trees.

None of the hollows in trees 2, 3, 4 and 6 are likely to provide nesting values for the Powerful Owl as entrances were not greater than 45 cm (DEC 2006). The hollows are generally too small for the other threatened forest owls identified by OEH.

For the remaining habitat trees assessed within the Project Site, trees providing potential nesting habitat for Powerful Owl were located in the north-eastern section of the Project Site. Habitat tree 14 contained a stem' hollow of approximately 1 m diameter and four trees had branch hollows with an entrance >45 cm (**Table 2**). All of these trees are now outside of proposed impact area following the reconfiguration of the clay fines area.

Habitat trees 2, 3, 4 and 6 provide limited nesting habitat for the Brush-tailed Phascogale, and other hollow-dependent mammals, as they prefer to nest and shelter in hollows with entrances 2.5 - 4 cm wide (OEH 2014). Only one hollow within the size range was confirmed during the assessment, however, other small hollows may be present that were not obvious from the ground. This hollow was

located on habitat tree 9, *Eucalyptus deanei* (Mountain Blue Gum), which is outside the Project Site and immediately adjacent to the north-eastern perimeter (**Figure 2**).

Significant habitat values were not observed for either *Thesium australe* or Painted Honeyeater in the proposed extended extraction area (**Figure 3**). Although Kangaroo Grass, which is typically associated as a host plant for *Thesium australe*, was observed along the ridgeline in the proposed extended extraction area, only four tussocks were recorded and no evidence of *Thesium australe* was observed.

The Painted Honeyeater mainly feeds on mistletoe (*Amyema* spp.) that was recorded in *Allocasuarina littoralis* (Black She-Oak) trees located in the northern section of the Project Site but outside the proposed extended extraction area (**Figure 3**). No mistletoe was observed in any trees within the proposed extended extraction area.

The Border Thick-tailed Gecko was not observed during diurnal or nocturnal active searches which focussed on the rocky outcrops that occur along the ridgeline in the proposed quarry extension area (**Figure 3**). These outcrops consist of quartz and contain small crevices or cracks that reflect rapid cooling of the intruded quartz. The crannies or opened cracks would rarely spread more than a few millimetres. No exfoliating granite occurs on site to provide the preferred habitat for this species. Exfoliating granite is commonly present in the New England region. The species is also known to prefer areas with deep leaf litter (1 – 10 cm) which was not observed on the site. No other threatened reptiles were observed or considered likely to occur.

No raptor nests where observed in any of the habitat trees located in the Project Site.

**Table 2. Habitat trees assessed within the Project site, and immediate area**

| Tree | Species | Height (m) | DBH (cm) | Hollow type | Estimated Hollow size (cm) | Photo |
|---|---|---|---|---|---|---|
| 1 | *Eucalyptus biturbinata* (Grey Gum) | 28 | 120 | Branch | 30 x 30 |  |
| | | | | Branch | 20 x 25 |  |

| Tree | Species | Height (m) | DBH (cm) | Hollow type | Estimated Hollow size (cm) | Photo |
|---|---|---|---|---|---|---|
| | | | | Branch | 15 x 15 |  |
| | | | | Branch | 20 x 20 |  |
| 2 | Grey Gum | 30 | 90 | Branch | 15 x 15 |  |
| | | | | Branch | 25 x 20 |  |
| 3 | Grey Gum | 26 | 70 | Trunk | 15 x 20 |  |
| | | | | Branch | 10 x 10 |  |

| Tree | Species | Height (m) | DBH (cm) | Hollow type | Estimated Hollow size (cm) | Photo |
|---|---|---|---|---|---|---|
| 4 | *Eucalyptus dalrympleana* (Mountain Gum) | 25 | 60 | Branch | 25 x 15 |  |
| | | | | Branch | 15 x 15 |  |
| 6 | Grey Gum | 28 | 90 | Branch | 10 x 10 | |
| | | | | Branch | 15 x 15 |  |
| 8 | Mountain Gum | 27 | 130 | Branch | 25 x 20 |  |
| | | | | Branch | 20 x 20 |  |

| Tree | Species | Height (m) | DBH (cm) | Hollow type | Estimated Hollow size (cm) | Photo |
|---|---|---|---|---|---|---|
| | | | | Branch | 80 x 50 |  |
| 9 | Mountain Gum | 18 | 70 | Branch | 10 x 10 |  |
| | | | | Branch | 5 x 5 | |
| 10 | *Eucalyptus moluccana* (Grey Box) | 26 | 80 | Branch | 10 x 10 |  |
| | | | | Branch | 10 x 10 |  |
| | | | | Branch | 15 x 15 | |
| 11 | Grey Gum | 26 | 90 | Branch | 10 x 10 |  |
| 12 | Grey Gum | 25 | 100 | Branch | 15 x 15 |  |

| Tree | Species | Height (m) | DBH (cm) | Hollow type | Estimated Hollow size (cm) | Photo |
|---|---|---|---|---|---|---|
| 13 | Grey Gum | 29 | 100 | Branch | 50 x 50 |  |
| 14 | Grey Gum | 15 | 80 | Trunk | 50 x 90 |  |
| | | | | Stem | 40 x 1000 | |
| 15 | Mountain Gum | 25 | 85 | Branch | 15 x 10 |  |
| | | | | Branch | 40 x 30 |  |
| | | | | Branch | 15 x 15 |  |
| 16 | Grey Box | 23 | 70 | Branch | 20 x 20 |  |

| Tree | Species | Height (m) | DBH (cm) | Hollow type | Estimated Hollow size (cm) | Photo |
|---|---|---|---|---|---|---|
| 17 | Grey Gum | 29 | 90 | Branch | 50 x 80 |  |
| | | | | Trunk | 40 x 40 |  |
| 18 | Grey Gum | 26 | 80 | Branch | 10 x 10 |  |

*Potential ecological impacts*

The reconfiguration of the proposed clay fines area will result in reduced ecological impacts through the retention of an additional four hollow-bearing trees and reducing the removal of native vegetation. The Proposal will clear a total of 1.7 ha of Dry New England Blackbutt Open-forest (Forest Ecosystem 41) in the proposed extended extraction area.

The four hollow-bearing trees in this area were assessed as providing potential breeding habitat for Turquoise Parrot and Brush-tailed Phascogale. Some of these hollows were occupied by other bird species during the survey (Musk Lorikeet and Eastern Rosella). These trees lacked suitably large (>45 cm) hollows which are required by the Powerful Owl for breeding.

Suitable habitat trees occur in the north-eastern section of the Project Site, however, these trees will no longer be impacted by the Proposal. Furthermore, several trees containing large hollows occur in the same patch of vegetation that extends outside of the Project Site.

Indirect impacts, such as noise and vibration, from quarrying activities are not expected to change from the current conditions. Therefore, no impacts to breeding habitat for Powerful Owl are expected to occur as a result of the quarry extension. A minor loss of foraging habitat (1.7 ha) will result but this is considered to be negligible given the availability of similar habitat in proximity to the Project Site.

The Border Thick-tailed Gecko could potentially be impacted by the removal of rocky outcrops along the ridgeline. Although the preferred habitat of this species does not occur on the Project Site

(exfoliating granite or deep leaf litter), the outcrops contain some small crevices or cracks that could provide suitable shelter for this species. However, given that the species was not recorded during targeted surveys, it is considered unlikely that the site provides important habitat for this species.

The removal of four hollow-bearing trees may impact on potential breeding habitat for Turquoise Parrot and Brush-tailed Phascogale. However, these potential impacts are considered to be minimal for the following reasons:

- A high abundance of hollow-bearing trees will remain in contiguous vegetation to the Project Site. Therefore, the availability of breeding resources in proximity is high
- Several hollows are currently being utilised by Musk Lorikeet and Eastern Rosella
- No evidence of either species has been recorded on the site during surveys
- Indirect impacts will be similar to the existing conditions which have been present since 1987 when the quarry commenced operations.

**Table 3. Summary of survey findings and potential impacts**

| Species | Findings |
|---|---|
| Powerful Owl | Suitable hollows for breeding occur on the Project Site, however, these are outside of the proposed impact area. These trees occur in proximity to current quarrying activities and are, therefore, subject to existing indirect impacts such as noise and vibration.<br>It is unlikely that the quarry extension will have any impacts on Powerful Owl other than the very minor loss of foraging habitat (1.7 ha). |
| Brush-tailed Phascogale | Small hollows occur in the four trees to be cleared, however, these were generally larger than the preferred hollow size (2.5 - 4 cm wide) for the Brush-tailed Phascogale. Furthermore some of these hollows are known to be currently utilised by Musk Lorikeet and Eastern Rosella.<br>There is also an abundance of hollow-bearing trees within contiguous vegetation to the Project Site. Therefore, the removal of these four trees is unlikely to have a significant impact on the Brush-tailed Phascogale. |
| Turquoise Parrot | Turquoise Parrot has not been recorded on the site, however, suitable open grassy woodland habitat occurs on site.<br>Hollow-bearing trees on site provide potential nesting values however suitable hollows were utilised by Musk Lorikeets and Eastern Rosellas. Therefore, impacts on the Turquoise Parrot are expected to be negligible. |
| Painted Honeyeater | Mistletoe was recorded on Black She-oak occurring in the northern section of the Project site. These areas will not be impacted by the proposed quarry extension.<br>No mistletoe was observed on any trees within the proposed quarry extension area and, therefore, the impacts to Painted Honeyeater are expected to be negligible. |
| Spotted Harrier | Spotted Harrier has not been recorded on the Project Site, however, suitable open grassy woodland habitat occurs on site. No raptor nests have been observed on site and none occur within the proposed quarry extension. Therefore, impacts on the Spotted Harrier are expected to be negligible. |
| Border Thick-tailed Gecko | The Border Thick-tailed Gecko was not observed during diurnal or nocturnal searches. Rocky outcrops occurring along the ridgeline in the |

| Species | Findings |
|---|---|
| | proposed quarry extension area contain small crevices or cracks that could provide potential shelter for the species.<br>However, no exfoliating granite or deep leaf litter (1 – 10 cm) occurs in the proposed extension area. Therefore, impacts to the Border Thick-tailed Gecko are expected to be minimal. |
| *Thesium australe* | Targeted searches identified only 4 tussocks of *Themeda australis* in the proposed quarry extension area. *Thesium australe* was not observed on any of these individuals. Given the low number of *Themeda australis* recorded in the impact area and the lack of presence of *Thesium australe* recorded, the proposed quarry extension will have no impact on this species. |
| McNutt's Wattle | Targeted searches confirmed that McNutt's Wattle does not occur on site. |

*Assessment of significance*

Statutory assessments, in accordance with s5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) Assessment of Significance (7 Part Test), have been undertaken for the following threatened species with the potential to occur in the Project Site (**Appendix B1-2**):

- Turquoise Parrot listed vulnerable under the TSC Act – potential to nest in hollow-bearing trees in the Project Site.

The Assessment of Significance for this species identified that the Proposal is unlikely to result in a significant impact for the following reasons:

- The Proposal would constitute a minor disturbance to potential Turquoise Parrot habitat containing hollow-bearing trees in the context of:
  - habitat still available within the Project Site;
  - extent of suitable breeding and foraging habitat immediately adjacent to the Project Site (north-eastern perimeter); and
  - extent of suitable breeding and foraging habitat within the surrounding landscape i.e. Girraween, Bald Rock and Basket Swamp National Parks (>10,000 ha).

For the Border Thick-tailed Gecko, the Proposal is unlikely to impact known critical habitat for the species (exfoliating granite outcrops) and no individuals were observed. Therefore the Proposal is unlikely to impact any of the significant criteria, primarily as it does not support an important population (nearest population is Girraween National Park) and does not contain habitat critical to the survival of this species (exfoliating granite). Therefore an Assessment of Significance was not considered to be required for this species.

*Proposed offset area*

<u>While the Proposal is not significant, an offset is proposed to compensate for the loss of habitat. Note that the offset has not been considered in the Assessment of Significance.</u>

The proposed offset area is adjacent to Bald Rock National Park (NP) (**Figure 4**). The area covers 6.4 ha and was identified as Forest Ecosystem 41 (New England Blackbutt) which is the same

vegetation type as the impact area. Biometric data indicated that the area is in good condition with the canopy dominated by *Eucalyptus campanulata* (New England Blackbutt), at an average height of 22 m. The canopy also included primary food trees for Koala: *Eucalyptus caliginosa* (Broad-leaved Stringybark) and *Eucalyptus dalrympleana* (Mountain Gum) (**Appendix C**). Hollow-bearing trees are also present in the proposed offset area. Two to three hollow-bearing trees were recorded in each Biometric plot (0.1 ha).

The area also contains large exfoliating granite boulders that are the preferred habitat for the Border Thick-tailed Gecko. This species is also known from the adjacent Bald Rock NP and nearby Girraween NP.

Based on the plot data for the offset site it will generate 10.15 credits/ha. This results in a required offset area of approx. 6.4 ha to generate the 65 credits that are required by the quarry impacts (**Table 4**).

**Table 4. Biometric offset calculations for native vegetation**

| | | Impact | | | Offset | | |
|---|---|---|---|---|---|---|---|
| **Veg Zone** | **Plant community type name** | **Area (ha)** | **Credits** | **Credits/ha** | **Area (ha)** | **Credits** | **Credits/ha** |
| 1 | New England Blackbutt - stringybark grassy forest the eastern New England Tableland Bioregion and NSW North Coast Bioregion | 1.12 | 65 | 58.04 | 6.40 | 65 | 10.15 |

Biometric credits have also been calculated for the threatened species identified in **Table 5**. Note that the Scarlet Robin (*Petroica boodang*) and Turquoise Parrot are ecosystem credit species and therefore included in the vegetation credit calculations. No additional credits are required for threatened fauna.

**Table 5. Biometric offset calculations for threatened species**

| | Impact | | | Offset | | |
|---|---|---|---|---|---|---|
| **Species** | **Area (ha)** | **Credits** | **Credits/ ha** | **Area (ha)** | **Credits** | **Credits/ ha** |
| Border Thick-tailed Gecko (*Underwoodisaurus sphyrurus*) | 0.5 | 6 | 12.00 | 0.85 | 6 | 7.1 |
| Brush-tailed Phascogale (*Phascogale tapoatafa*) | 1.12 | 22 | 19.64 | 3.10 | 22 | 7.1 |
| Koala (*Phascolarctos cinereus*) | 1.12 | 29 | 25.89 | 4.08 | 29 | 7.1 |
| Squirrel Glider (*Petaurus norfolcensis*) | 1.12 | 25 | 22.32 | 3.52 | 25 | 7.1 |

**Table 6. OEH principles for the use of biodiversity offsets in NSW**

| No | Principle | Outcome |
|---|---|---|
| 1 | Impacts must be avoided first by using prevention and mitigation measures | The proposed disturbance footprint has been revised to reduce the impacts to native vegetation and particularly hollow-bearing trees and now retains an additional four hollow-bearing trees in the north-eastern section of the Project Site. These trees provide the best quality habitat for hollow-dependent fauna, particularly for large species such as the Powerful Owl. |
| 2 | All regulatory requirements must be met | Proposed offset area is for only one proposed development consent (DA2014/078). |
| 3 | Offsets must never reward ongoing poor performance. | The vegetation within the proposed offset area has been managed by the current owner and his family for over 50 years. The area is in very good condition and managed with consideration to the adjacent Bald Rock National Park. Ongoing management of the area will maintain and where possible improve the biodiversity values and condition of this area. |
| 4 | Offsets will complement other government programs | The proposed offset area is adjacent to Bald Rock NP and would complement incentives for private landholders to improve conservation objectives for the region, particularly on land adjacent to National Parks. |
| 5 | Offsets must be underpinned by sound ecological principles. | The condition and location of the proposed offset area meets the following ecological principles:<br>- Vegetation structure contains compositional elements of elevated biodiversity and functionality (contains primary food trees suitable for the Koala)<br>- Enhances the biodiversity at a regional scale due to its connectivity to Bald Rock NP<br>- Considers the conservation status with the vegetation community identified as Forest Ecosystem 41 (New England Blackbutt)<br>- Its proximity to Bald Rock NP would ensure long term viability and functionality of biodiversity<br>Given the current condition of the proposed offset area, it could immediately be secured and managed to maintain conservation value for biodiversity. |
| 6 | Offsets should aim to result in a net improvement in biodiversity over time | The proposed offset area is 6.4 ha in size which represents a ratio of 1:4 from the impact. Management of the area will maintain and improve the condition of this area. Given its current condition and adjacency to Bald Rock NP, there will be no time-lag effects.<br>A Plan of Management will be prepared for the offset area and describe the management actions to improve the condition of the offset area. |
| 7 | Offsets must be enduring – they must offset the impact of the development for the period that the impact occurs | The Applicant is willing to enter into a conservation agreement or similar covenant for the nominated offset area, legally binding the land in perpetuity. |

| No | Principle | Outcome |
|---|---|---|
| 8 | Offsets should be agreed prior to the impact occurring | The Applicant is willing to enter into a legal commitment for the proposed conservation agreement or covenant for the nominated offset area within 12 months of the receipt of development consent. |
| 9 | Offsets must be quantifiable – the impacts and benefits must be reliably estimated | Both the impact area and proposed offset area have been assessed by a Senior Ecologist using the Biometric method and additional habitat assessment based on the likelihood of threatened species and communities occurring. The Ecological Assessment Report detailed the following:<br>- Area of impact (1.7 ha)<br>- Potential impact to ecological values (primarily Koala habitat and vegetation removal in New England Blackbutt community containing four trees with small-medium sized hollows)<br>- Impact area is in the vicinity of >10,000 ha of protected area<br>- None of the threatened species which are known, or have the potential to occur, will be significantly impacted by the Proposal<br>- Management actions will include both fauna, topsoil and weed management; as well as, specific management for Koalas<br>The assessment of the proposed offset site indicated that:<br>- The current management of the offset site i.e. already has high conservation significance and can be secured through a conservation agreement or covenant, demonstrates that it will be securely managed for biodiversity outcomes<br>- A Plan of Management will be prepared for the offset area and describe the management actions to improve the condition of the offset area.<br>- The proposed offset area is partially grazed and can be managed to have greater biodiversity outcomes. Biodiversity outcomes will be rapidly achieved given proximity to Bald Rock NP. |
| 10 | Offsets must be targeted | The proposed offset are was targeted as it was in:<br>- the same vegetation community (New England Blackbutt) and containing Koala food trees: Broad-leaved Stringybark and Mountain Gum<br>- similar condition to impact site<br>- adjacent to Bald Rock NP |
| 11 | Offsets must be located appropriately | The proposed offset area is located in proximity to the impact site (2.75 km) and adjacent to Bald Rock NP. |
| 12 | Offsets must be supplementary | Area is managed for grazing and has not been managed under another scheme. |
| 13 | Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or contracts | The Applicant is agreeable to a conservation agreement or covenant to ensure that actions will be carried out to achieve biodiversity outcomes. |

Conclusions

The key findings presented in the additional information are as follows:

- A change in the proposed footprint has reduced direct impacts to only the proposed extended extracted area. This will result in the proposed clearing of 1.7 ha of native vegetation. Direct impacts will now result in the removal of four hollow-bearing trees.
- The assessment of hollows in 16 habitat trees across the Project Site indicated that the four habitat trees with hollows within the proposed extended extracted area are not suitable for the Powerful Owl due to their small size. The Turquoise Parrot and Brush-tailed Phascogale may potentially use these hollows, however, several are known to be currently occupied by Musk Lorikeet and Eastern Rosella. Therefore, the removal of these four trees is considered unlikely to result in a significant impact to these species, particularly given the abundance of hollow-bearing trees within and surrounding the Project Site that would remain undisturbed.
- Additional habitat assessments indicated that rocky outcrops along the ridgeline in the proposed extended extraction area may provide habitat values for the Border Thick-tailed Gecko. However, these areas lack critical habitat features (exfoliating granite and deep leaf litter) and, therefore, the statutory assessments indicate that the Proposal will not result in a significant impact to this species due to lack of critical habitat and the area does not support an important population.
- Several trees on the Project Site (outside of the disturbance footprint) and adjacent vegetation (particularly the north-eastern perimeter) contain numerous trees providing large hollows that provide potential breeding habitat for the Powerful Owl. These trees will be retained.
- Contiguous vegetation to the Project Site contains abundant hollow-bearing trees. Therefore, the removal of four trees is unlikely to have a significant impact on hollow dependent fauna.
- Overall, the indirect impacts from the existing operation of Dowe's Quarry has already reduced the habitat values of the both the proposed extended extraction area and adjacent Project Site through noise and vibration. Given the proximity to other areas of high quality habitat outside the Project Site (i.e. hollow-bearing trees and granite outcrops), threatened species are likely to occur in these areas. These areas are also furthest from the proposed extended extraction area (e.g. north-eastern perimeter).

The proposed offset area was targeted as:

- it is in the same vegetation community (New England Blackbutt) as the impact area and contains Koala food trees: Broad-leaved Stringybark and Mountain Gum;
- has similar condition to the impact area and is currently managed for biodiversity outcomes, minimising time-lag effect;
- is in an area adjacent to Bald Rock NP; and
- the Applicant is willing enter into a conservation agreement or covenant, legally binding the offset area in perpetuity.

The assessment against the 13 principles for biodiversity offsets (OEH 2014) demonstrates that the proposed offset area is appropriate to offset any biodiversity impacts from the Proposal.

Yours sincerely,

**Brad Dreis**
**Senior Ecologist**




**Figure 1 Project site**

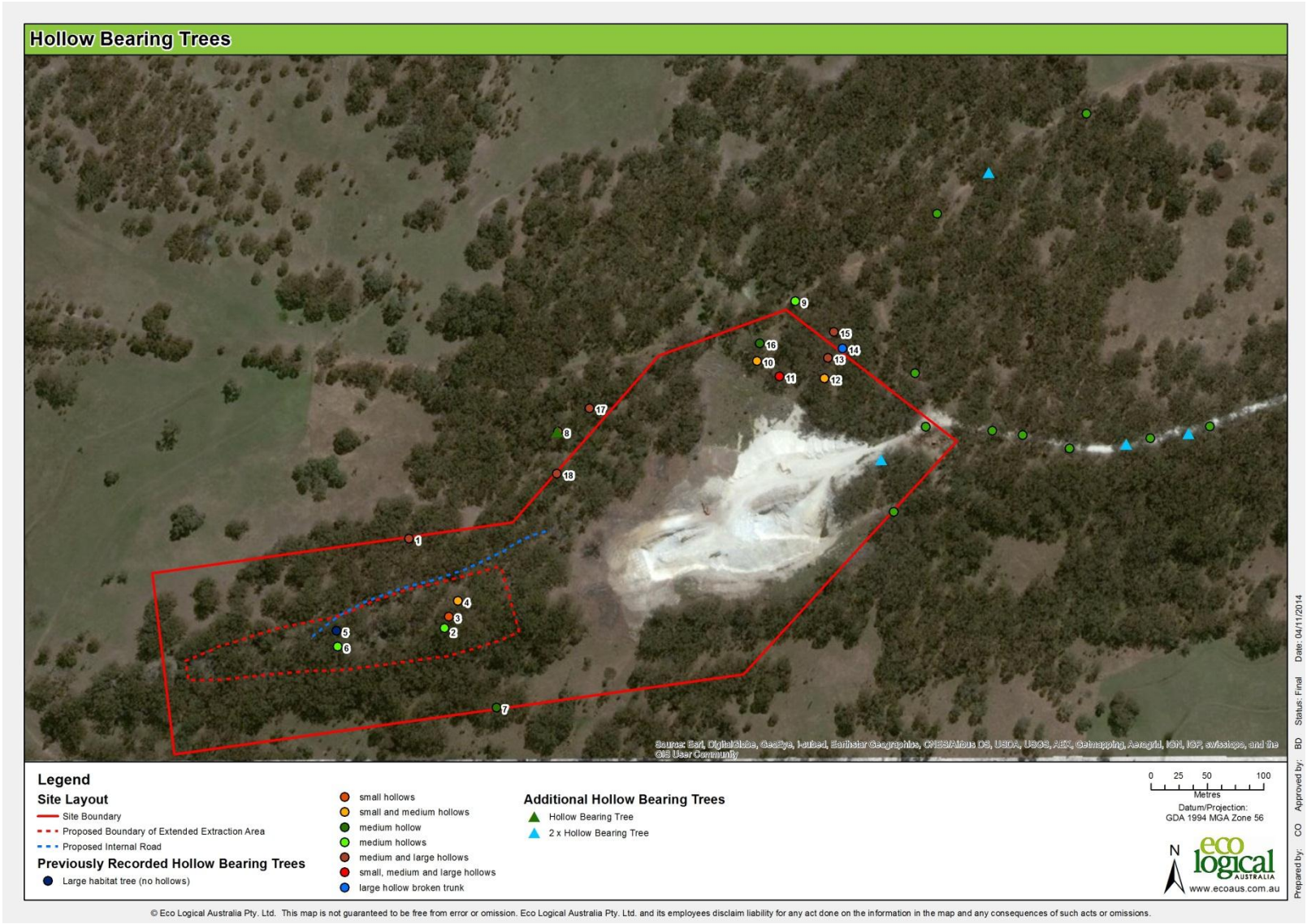


**Figure 2 Hollow bearing trees**


**Figure 3 Additional habitat features**

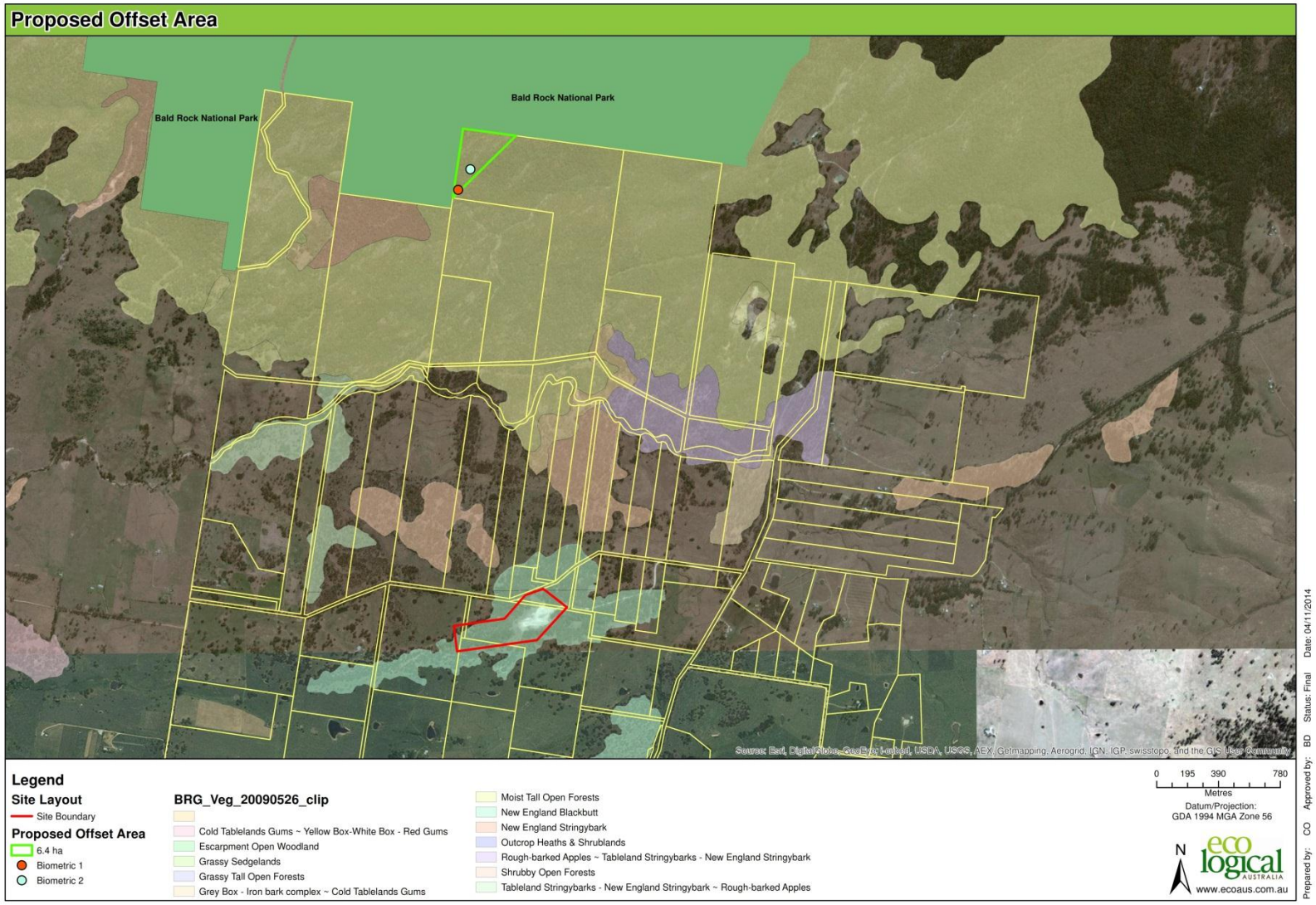




**Figure 4 Proposed offset area**

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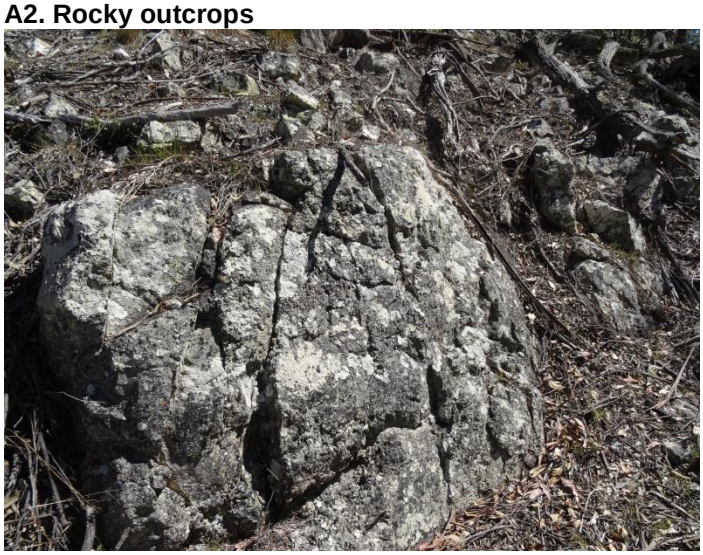
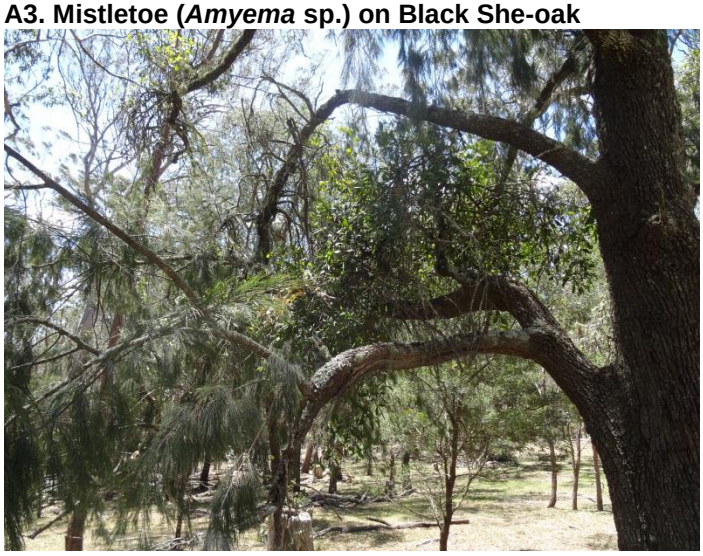
## Appendix A. Photos

### A1. Musk Lorikeet in habitat tree 14

### A2. Rocky outcrops



### A3. Mistletoe (*Amyema* sp.) on Black She-oak



## Appendix B. Statutory Assessments

### B1. Assessments of significance for *Neophema pulchella* (Turquoise Parrot)

*Neophema pulchella* (Turquoise Parrot) is a highly distinctive bird listed as a vulnerable species under the TSC Act. The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range (NPWS 2002b).

This species inhabits the margins of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. This species nests in tree hollows, logs or posts, from August to December. It forages on the ground for seeds and herbaceous plants and may be quite tolerable of disturbance (DECC 2005).

This species is threatened by a number of processes including clearing of grassy-woodland and open forest habitat, loss of hollow-bearing trees, and degradation of habitat through grazing and establishment of exotic pastures, predation and illegal trapping.

Turquoise Parrot's were not recorded during the field survey but have been recorded within 10 km of the Project Site. The presence of hollow-bearing Eucalypts in the Project Site provides potential habitat.

**a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

Impacts likely to have an adverse effect on the lifecycle of the Turquoise Parrot would include impacts which resulted in the removal or degradation of significant areas of habitat including removal of hollow bearing trees. The proposal would involve the clearing of Woodland vegetation including four hollow-bearing trees.

Only a small area of woodland would be removed by the proposal, with larger areas of woodland vegetation present adjacent to the north-eastern perimeter of the Project Site. This clearance represents 16.3% of the native vegetation on the Project Site (8.6 ha) and four hollow-bearing trees with small-medium sized hollows.

Given the high mobility of the Turquoise Parrot, it is unlikely that it has a high dependence on the resources within the Project Site. Therefore, the Proposal is unlikely to place a viable local population of this species at risk of extinction.

**b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

Not applicable. The Turquoise Parrot is not an endangered population.

**c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

Not applicable. The Turquoise Parrot is not an endangered ecological community.

**d) in relation to the habitat of a threatened species, population or ecological community:**

**(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

The Proposal will remove 1.7 ha of potential habitat within 8.6 ha of potential habitat on the Project Site. The amount of potential foraging and breeding habitat disturbed due to the proposal is not likely to represent a significant loss to the species.

**(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

The Proposal will remove 1.7 ha of potential habitat. Given the highly mobile nature of the species and that this species will forage within open areas if necessary, it is unlikely that the Proposal would result in fragmentation of habitat for this species.

**(ii) The importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality,**

The Proposal will result in disturbance to the native vegetation which represents potential foraging and breeding habitat. The habitat to be removed cannot be considered important to the long-term survival of this species.

**e) Whether the action proposed is likely to have an adverse effect on critical habitat.**

The Turquoise Parrot is listed as vulnerable. Critical habitat cannot be declared for a vulnerable species.

**f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.**

No recovery plan or threat abatement plan of relevance has been prepared for the Turquoise Parrot.

**g) The action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

A key threatening process is defined under the TSC Act as "*a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*". Two key threatening processes listed under Schedule 3 of the TSC Act relevant to the Turquoise Parrot have potential to occur as part of the proposal:

- clearing of native vegetation; and
- removal of hollow bearing trees.

The proposal would involve clearing of native vegetation and hollow bearing trees, however these do not constitute a threatening process for the Turquoise Parrot due to the relatively small scale of these impacts as well as the abundance of suitable habitat and breeding resources within and immediately adjacent to the Project site.

**Conclusions**

The Proposal is unlikely to constitute a significant impact on Turquoise Parrot given that:

- The Proposal will remove four hollow-bearing trees but abundant breeding habitat, including large numbers of hollow-bearing trees, is still available within the Project Site and surrounding area.
- The species is wide ranging and unlikely to have a high dependence on the resources on site.
- The Proposal would not isolate or fragment any currently connecting areas of habitat in terms of use by this highly mobile species.

On the basis of the above considerations, it is unlikely that the Proposal will constitute a significant impact on the Turquoise Parrot.

**Appendix C. Proposed Offset Area**

Origin: E = exotic; N = native, NT=naturalised, non-native

| Family | Species | Common Name |
|---|---|---|
| Anthericaceae | *Laxmannia gracilis* | Slender Wire Lily |
| Asteraceae | *Vittadinia* sp. | - |
| Campanulaceae | *Wahlenbergia gracilis* | Australian Bluebell |
| Casuarinaceae | *Allocasuarina littoralis* | Black She-oak |
| Cyperaceae | *Gahnia aspera* | Rough Saw-sedge |
| Cyperaceae | *Lepidosperma laterale* | - |
| Dennstaedtiaceae | *Pteridium esculentum* | Common Bracken |
| Ericaceae | *Leucopogon lanceolatus* | - |
| Ericaceae | *Leucopogon melaleucoides* | Snowbush |
| Ericaceae | *Melichrus procumbens* | Jam Tarts |
| Ericaceae | *Melichrus urceolatus* | Urn Heath |
| Fabaceae | *Acacia floribunda* | White Sally Wattle |
| Fabaceae | *Acacia granitica* | - |
| Fabaceae | *Acacia ulicifolia* | Prickly Moses |
| Lomandraceae | *Lomandra longifolia* | Spiny-headed Mat-rush |
| Myrtaceae | *Angophora floribunda* | Rough-rough Apple |
| Myrtaceae | *Eucalyptus caliginosa* | Broad-leaved Stringybark |
| Myrtaceae | *Eucalyptus campanulata* | New England Blackbutt |
| Myrtaceae | *Eucalyptus dalrympleana* | Mountain Gum |
| Myrtaceae | *Eucalyptus deanei* | Mountain Blue Gum |
| Myrtaceae | *Eucalyptus radiata* | Narrow-leaved peppermint |
| Myrtaceae | *Leptospermum brevipes* | Slender Tea-tree |
| Myrtaceae | *Leptospermum polygalifolium* | Tantoon |
| Myrtaceae | *Lomatia silaifolia* | Crinkle Bush |
| Phormiaceae | *Dianella caerulea* | Blue Flax-lily |
| Poaceae | *Imperata cylindrica* | Blady Grass |
| Poaceae | *Poa sieberiana* | - |
| Proteaceae | *Banksia integrifolia* | Coastal Banksia |
| Proteaceae | *Persoonia cornifolia* | - |
| Proteaceae | *Petrophile canescens* | Conesticks |
| Violaceae | *Viola betonicifolia* | Native Violet |