NSW GOVERNMENT | Office of Environment & Heritage

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Your reference: SSD 6634
Our reference: DOC18/427484
Contact: Calvin Houlison 4224 4179

May Patterson
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Dear Ms Patterson

RE: SSD 6634 Sutton Forest Quarry Project – Comments on EIS

Thank you for consulting us regarding the abovementioned major project. Following on from our interim response, please find attached comprehensive comments. We acknowledge that the project is subject to a complex and challenging policy framework, given changes to biodiversity legislation and assessment tools since the Director-General's Requirements were issued in 2014.

The project site is recognised as being of High Environmental Value in the South East and Tablelands Regional Plan (2017); it is known to be utilised by multiple threatened species including koalas, and there are sections of multi-aged forest with hollowing-bearing trees that may support hollow dependent threatened species such as Powerful Owl, Glossy Black-cockatoo and Gang-gang Cockatoo. It exists at a pinch point in the regional biodiversity corridor and maintaining connectivity is important particularly for maintaining the regional viability of koalas.

In summary the EIS: Gives insufficient attention to avoiding impact as per the "avoid, minimise, offset" hierarchy for assessing biodiversity impacts, or avoiding harm to significant nearby objects of Aboriginal cultural heritage; does not adequately address all threatened species known or likely to occur on site; and is inconclusive on the extent of impacts to the adjacent Long Swamp Endangered Ecological Community. .

Detailed comments are provided at Attachment A, and our key recommendations are summarised below:

1) The proponent should thoroughly demonstrate how the 'avoid' principle of biodiversity assessment policy, guidelines and the DGRs has been met. Consideration needs to be given to reducing the amount of clearing particularly in the higher quality habitat.
2) The Assessment of Significance is incomplete. It should be revised to include the Koala, Powerful Owl, Glossy Black-cockatoo and Gang-gang Cockatoo. Targeted surveys for nests of the afore-mentioned bird species need to be completed to ensure that the Assessment of Significance is comprehensive and identifies all biodiversity constraints.
3) Further detailed justification for significant impacts upon the viability of the biodiversity corridor should be provided in accordance with DGRs. This is particularly the case for those listed threatened species known to occur at the site such as the Koala.
4) The proponent should prepare an updated Biodiversity Assessment Report (BAR) in accordance with the requirements of the Biobanking Assessment Methodology (BBAM). The BAR needs to include the species credit species which were omitted from the submitted report, to demonstrate how proposed offsets would "maintain or improve" biodiversity values in accordance with the DGRs.

5) The assessment of *Environment Protection and Biodiversity Conservation Act* (EPBC) 1999 matters should be updated to reflect all species listed under that Act which have been recorded on site including the Koala and the Large-eared Pied Bat. Given the quantum of clearing proposed and impacts upon EPBC Act-listed threatened species, the project should be referred to the Commonwealth.

6) Advice from our Science Branch is that the risks to Long Swamp could be much greater than that predicted in the EIS. The confidence and exact impacts remain uncertain on the basis of the information submitted. A precautionary approach to groundwater drawdown on Long Swamp Endangered Ecological Community (EEC) is therefore highly recommended.

7) Uncertainty analysis should be undertaken and improved monitoring undertaken, including direct measurements of flow in Long Swamp Creek to better understand variability, as suggested in the peer review. It should be demonstrated that a "negligible" impact upon groundwater can be achieved for Long Swamp EEC.

8) Further justification of the proposed vibration limits and dust levels to protect the rock-shelter (site 52-4-0323). The rock-shelter appears susceptible to vibration impacts and although the buffer is supported in principle, insufficient detail has been provided in support of the predicted vibration levels.

9) A program of archaeological test excavation should be conducted prior to project approval. Test excavation should be conducted in accordance with the Code of Practice for Investigation of Aboriginal Objects in NSW (DECCW 2010).

10) The following matters should be addressed in an updated Aboriginal heritage assessment:

- The relationship of the rock art site to other recorded sites and Long Swamp.
- Considering the Aboriginal cultural landscape of the proposed development area.
- Further evidence of the Aboriginal community consultation process.
- Developing the Aboriginal Cultural Heritage Management Plan prior to approval.
- Providing a methodology for the proposed salvage of Aboriginal objects.
- Deciding on the long-term management of any recovered Aboriginal objects.
- Including an updated literature review.
- Providing a map of archaeological survey transects.

Further detailed comments and analysis supporting our advice can be provided upon request. Please contact Calvin Houlison, Senior Conservation Planning Officer on 4224 4179 or via e-mail calvin.houlison@environment.nsw.gov.au should you have any further queries.

Yours sincerely

2/7/2018

MICHAEL SAXON
Director, South East Branch
Regional Operations Division

Enclosure: Attachment A OEH Detailed Comments, Sutton Forest Quarry Project
Attachment B List of Figures
Attachment C List of Tables

ATTACHMENT A – OEH DETAILED COMMENTS
SUTTON FOREST QUARRY PROJECT EIS – SSD 6634

1. Biodiversity & Offsetting

1.1 Legislative Context

1.1.1 DGRs, NSW BioBanking Methodology & NSW Biodiversity Conservation Act 2016

The proposal is subject to complex legislative and policy settings given the time elapsed since Director-General's Requirements (DGRs) were issued in February 2014 and EIS lodgement in May 2018. This has resulted in the preliminary biodiversity offsets assessments being prepared in accordance with the BioBanking Assessment Methodology (BBAM), which pre-dated the NSW Framework for Biodiversity Assessment for major projects

The *Biodiversity Conservation (Savings & Transitional) Regulation 2017* identifies projects with assessment requirements issued before August 2017 as "transitional", meaning the "former planning provisions" in place before the *Biodiversity Conservation Act 2016* (BC Act) commenced can be used.

The proponent has however acknowledged that any offset site would need to be established as a Biodiversity Stewardship Agreement (BSA) site under the BC Act and supporting Biodiversity Assessment Method (BAM). The applicant has proposed to do an assessment of impacts requiring offsets under the previous BBAM methodology, noting that credit equivalency will still need to be sought prior to lodging a BSA application.

South East and Tablelands Regional Plan (2017)

The South East and Tablelands Regional Plan (2017) maps the vegetation on site as High Environmental Value (HEV) and part of a Regional Corridor. This mapping supersedes that of the Illawarra Regional Environmental Plan No.1 biodiversity corridor, which was required to be considered by the 2014 DGRs.

Goal 2 of the Regional Plan is for "A diverse environment interconnected by biodiversity corridors", with Direction 14: "Protect important environmental assets". Direction 14 also refers to the *"significant koala population in the Wingecarribee local government area"*. Action 14.1 under this direction is to *"minimise potential impacts arising from development on areas of high environmental value…. and implement the 'avoid, minimise and offset' hierarchy".*

1.2 Impact assessment

1.2.1 Avoidance of impacts

The site's biodiversity values are well documented and considered to be high. Vegetation is generally intact and in good condition, and contains habitat features such as a large number of hollow-bearing trees suitable for use by a wide variety of flora and fauna. Two threatened flora species and ten threatened fauna species were recorded during surveys, including definitive evidence of koalas on site (scats, scratches on trees) during a recent site visit carried out by OEH staff. A number of additional threatened species, including species which have not been located by surveys, are expected to use the site at various times.

The DGRs required that the proposal address *"measures taken to avoid, reduce or mitigate impacts on biodiversity"*, as well as an offset strategy to ensure that *"the development maintains or improves biodiversity values in the medium to long term"*. The DGRs also require that the development be fully detailed including *"alternatives considered"*. Avoidance is also a requirement of the NSW Biodiversity Offsets Policy for Major Projects, the BBAM and the BAM.

We acknowledge that the EIS addresses alternatives to the project and efforts to avoid impacts as required by the DGRs. However, the biodiversity and threatened species values of the site were not fully or adequately described in the EIS and the significance of the impact is under-represented in the assessment.

For example, the assessment of significance was not completed for koalas, a species that is known to be present on the site, and one for which the site is an important link in the landscape connectivity for the Southern Highlands population.

As a result, there has been insufficient consideration of biodiversity constraints and not enough focus on the need for avoidance of impact as opposed to offsetting, particularly as the assessment of significance has concluded that a significant impact from the proposal is likely. There is also limited discussion about alternate properties/sand resources that were investigated, and no discussion on whether cleared areas of the property were investigated as suitable locations for the quarry. We consider that the issue of impact avoidance requires further consideration for this project.

1.2.2 Threatened species and impact assessment under BBAM

We accept "in-principle" that use of the BBAM rather than the current methodology (BAM) is appropriate in this instance given the timing of this project and associated DGRs. However, in order to provide a robust assessment which meets the 'maintain or improve' (MoI) standard required by the DGRs, consistent application of the BBAM is required to determine impacts. This is further complicated as the Quarry Access Road refers to the FBA as the relevant assessment methodology.

The Flora and Fauna Report states that the surveys were consistent with the Biobanking Assessment Method (BBAM), however the report states that as *"the BBAM is not being utilised for a formal Biobanking Assessment... the threatened species requiring survey output is not relevant"* (pp 11-14). We consider the biodiversity assessment for the development should be done in accordance with the full BBAM, including threatened species assessment in accordance with the methodology for all relevant threatened species.

To meet the MoI standard, impacts to Species Credit Species must be assessed and offset. Section 6.5 of the BBAM identifies the process to identify and calculate the offset required for impacts to Species Credit Species. Twenty six (26) species credit species are predicted or known to occur on the site or in the Hawkesbury Nepean CMA (Table 1, Attachment B).

This process needs to be undertaken for all Species Credit Species and incorporated into a revised assessment in accordance with the BBAM, which includes either:

- Assuming the species is present;
- Undertaking a threatened species survey; or
- Obtaining an expert report.

Other issues with the report as submitted include the following:

- The report submitted does meet the full requirements for a Biodiversity Assessment Report (BAR) as described in the minimum requirements at Table 34 of the BBAM. We recommend that all components listed in Table 34 be addressed and a BAR submitted (and prepared by an accredited assessor).
- In accordance with the BBAM, all vegetation types should be expressed as Biometric Vegetation Types (BVTs) and Plant Community Types (PCTs) throughout the Report as this is what is used in the Credit Calculator to determine offset requirements. It is confusing to have numerous vegetation classifications used throughout the reports.
- The Biodiversity Assessment of the Quarry Access Road Report does not include vegetation plot data. This should be included in an updated BAR for review by OEH.

1.2.3 Hollow-bearing trees

Based on the surveys of hollow-bearing trees (HBTs) undertaken (Figure 1), we question whether the locations surveyed accurately reflect the full extent of HBTs on-site. We also question whether areas in the western and northern parts of the site were surveyed as this area shows a distinct lack of records in comparison to the cluster of HBTs indicated.

Hollow-bearing trees are a key habitat feature for a variety of threatened and non-threatened species and removal of these trees is difficult to mitigate or offset given the time it takes for hollows to form. Given the large number of hollow-dependent threatened fauna species recorded in the impact area, within a 10km radius of the site, or with habitat in the impact area, we consider that a comprehensive assessment of hollow-bearing trees in all areas proposed to be impacted is required.

1.2.4 Impacts upon biodiversity corridor

The DGRs require the proponent carry out a detailed assessment of potential impacts of the development on regionally significant remnant vegetation, or vegetation corridors with particular consideration to the Illawarra Regional Environmental Plan No 1, now superseded by the HEV mapping in the South East and Tablelands Regional Plan (2017).

The Flora and Fauna Report (Section 7.4) concludes that while the site contains land mapped as a corridor in the Regional Plan, the proposed development is unlikely to significantly interrupt this corridor considering the proposed mitigation measures and offsets proposed. We note that the assessment calculates the loss of 13% of the current corridor's width, however we question whether this is an accurate representation of the loss. The corridor width in this location is approximately 1800m and the average width of the extraction footprint appears closer to 500m (28% of total width), suggesting a greater impact (Figure 2). Given the significance of this link regionally, and the surrounding levels of vegetation fragmentation, we consider the proposed impacts on this corridor's size and integrity to be substantial. Impacts on threatened species of particular concern are discussed in further detail below.

1.2.5 Impacts upon threatened owls and cockatoos

Three of the species recorded on site (Gang-gang Cockatoo, Glossy Black-cockatoo and Powerful Owl) require large hollows in trees for nesting. Given that the site contains a large number of hollows, including many trees with large hollows, the assessment need to be supplemented with a targeted survey to determine whether the site is used by any or all of these species for nesting. This information is critical in understanding the importance of the site for threatened species. In the absence of a targeted nest survey for these species, the site must be assumed to contain nesting habitat.

The clearance of those parts of the site containing large hollows, and large numbers of hollows, is a significant impact that needs to be recognised and included in the Assessment of Significance in the EIS. These important habitat features for these species should also be avoided by the proposal as they cannot be adequately offset. The current 5-part test already concludes a significant impact on connectivity values and that the loss of 63.2 hectares of forest is significant to the local population of all five bird species known to be present. The assessment is an important tool in understanding the biodiversity constraints that should be avoided by the proposal.

Timing for targeted nest surveys are:

- Powerful Owl – May to August
- Glossy Black-cockatoo – March to August
- Gang-gang Cockatoo – October to January

In addition, the loss of hollow-bearing trees is likely to have a significant impact on the local population of the Greater Glider, Greater Broad-nosed Bat and Eastern False Pipistrelle, all of which have been recorded on the site. The Assessment of Significance is deficient in dealing with the impact on these species.

1.2.6 Koala habitat & movement corridor

The Sutton Forest Quarry proposal exists at a pinch point in the north-south koala corridor that connects the Blue Mountains to Morton National Park. The area around Penrose is the most narrow and fragmented part of what is otherwise contiguous bushland. Koalas move through the corridor at this point. Loss of native vegetation at this critical part of the corridor jeopardises not only the koalas that live in that location, but the regional viability of the species. Connectivity is critical for the long-term survival of the Southern Highlands koala population. There are very limited options for koalas to move through the Penrose area to disperse, find mates or repopulate after a catastrophic event such as fire or a disease outbreak.

During a site visit in June 2018, OEH experts found koala scratches on two trees and koala scat at another site. Koalas are clearly present at the site and impacts need to be avoided, mitigated or offset accordingly.

OEH is developing a koala habitat and corridor map for the Wingecarribee LGA that is currently in draft (Figure 3). This shows that the Sutton Forest Quarry comprises significant areas of Class 2 habitat (1 koala per 98.9ha) and some smaller patches of Class 1 habitat (1 koala per 13.1ha). The koalas that live on site will be affected by the proposal. However, the greater risk is to the regional population of koalas due to a loss of connectivity at a critical point in a regional corridor.

The Flora and Fauna Surveys and Assessment (Kevin Mills) states that the area does not qualify as potential koala habitat due to the low proportion of koala food trees. SEPP 44 is currently under review to address existing shortcomings in how the SEPP identifying koala habitat. We have provided advice and comments to DPE on the Explanation of Intended Effect: State Environmental Planning Policy No 44 – Koala Habitat Protection (EIE), including an updated list of important koala tree species which have been incorporated in the document. This includes those tree species identified as important for koalas in the Southern Highlands based on direct observations from radio tracking undertaken by OEH in 2015-2017.

Table 9 of the Flora and Fauna Survey and Assessment identifies 12 species of eucalypt occurring in the study area. Under the Explanation of Intended Effect: State Environmental Planning Policy No 44 – Koala Habitat Protection (EIE) six of those species, *Eucalyptus radiata, E. sieberi, E. agglomerata, E. punctata, E. sclerophylla*, and *E. mannifera* should now be considered important koala trees species and added to Schedule 2 of SEPP 44.

1.2.7 Indirect impacts

Under s.8.4 of the BBAM, indirect impacts must be assessed and offset if they are unable to be avoided. Detail on assessing indirect impacts is also included in the Biobanking Assessment Methodology and Credit Calculator Operational Manual (Section 2.4 Assessing indirect impacts on biodiversity values). Impacts on Long Swamp and surrounding rock features should be addressed in accordance with these guidelines. Assessment of indirect impacts should include, but not be limited to:

- Montane Peatlands and Swamps EEC (also listed as Temperate Highland Peat Swamps on Sandstone (THPSS) threatened ecological community under the EPBC Act). There is a risk of indirect impacts to the adjacent Long Swamp EEC and associated threatened species, through changes in hydrology and sediment inflows (see Section 3 below for further detail).
- All threatened species which have potential habitat or are known to occur in this community, and
- All threatened species which are likely to utilise caves and other rocky features. This should include, but not be limited to, the Large-eared Pied Bat, which is a species known to roost and breed in sandstone caves/overhangs, and has also been recorded on site.

A full list of predicted Species Credit Species associated with the swamp are identified in Table 2.

1.2.8 Project referral to the Commonwealth

Two Commonwealth listed species, the Koala and Large-eared Pied Bat were omitted from the EPBC assessment in the Flora and Fauna Report. Both the Flora and Fauna Report and the Biodiversity Offsets Assessment Report considered that a referral to the Commonwealth under the Environment Protection and Biodiversity Act (EPBC) Act 1999 is unnecessary.

However as three individuals of the EPBC listed *Phyllota humifusa* will be destroyed, habitat for the Koala and Large-eared Pied Bat removed, as well the potential for impacts on the Temperate Highland Peat Swamps on Sandstone EEC affecting viability of this swamp, we recommend that the proponent consult with the Commonwealth regarding these matters.

Recommendations:

1) The proponent should thoroughly demonstrate how the 'avoid' principle of biodiversity assessment policy, guidelines and the DGRs has been met. Consideration needs to be given to reducing the amount of clearing particularly in the higher quality habitat.
2) The Assessment of Significance needs to be revised to include the Koala, Powerful Owl, Glossy Black-cockatoo and Gang-gang Cockatoo. Targeted surveys for nests of the bird species need to be completed to ensure that the Assessment of Significance is comprehensive and identifies all biodiversity constraints.
3) Further detailed justification for significant impacts upon the viability of the biodiversity corridor should be provided in accordance with DGRs. This is particularly the case for those listed threatened species known to occur at the site such as the Koala.
4) The proponent should engage an accredited assessor to prepare an updated Biodiversity Assessment Report (BAR) in accordance with the requirements of the Biobanking Assessment Methodology (BBAM). The BAR needs to include the species credit species which were omitted from the submitted report, to demonstrate how proposed offsets would "maintain or improve" biodiversity values in accordance with the DGRs.
5) The assessment of Environment Protection and Biodiversity Conservation Act (EPBC) Act 1999 matters should be updated to reflect all species listed under that Act which have been recorded on site including the Koala, Greater Glider and the Large-eared Pied Bat. Given the quantum of clearing proposed and impacts upon EPBC Act-listed threatened species, the project should be referred to the Commonwealth to determine whether it is a controlled action.

2. Groundwater Impacts on Long Swamp EEC

2.1 Legislative Context

Long Swamp occurs immediately adjacent to the proposed Sutton Forest Quarry. Long Swamp is identified as an EEC under both NSW BC Act (Montane Peatlands and Swamps of the New England Tableland) and Commonwealth EPBC Act (Temperate Highland Peat Swamps on Sandstone) legislation. It is noted that the Sutton Forest Quarry has not been referred to the Commonwealth, despite potential impacts to Long Swamp EEC.

2.2 Assessment of Impacts

2.2.1 Groundwater drawdown on Long Swamp

The EIS states that *"the numerical computer groundwater model predicts a maximum reduction of 0.052 ML/day in baseflow to Long Swamp Creek and Long Swamp over the 45 years of extraction".* Groundwater drawdowns are predicted to occur close to Long Swamp Creek and Long Swamp (see Figure 6).

Whilst the EIS goes on to suggest that this impact is minimal, there has been no uncertainty analysis associated with the groundwater modelling. This has been recommended in the recent IESC draft explanatory note, 'Assessing Groundwater-Dependent Ecosystems: IESC Information Guidelines Explanatory Note' (2018). The robustness of such baseflow reduction estimates is therefore uncertain.

Several springs are also stated to be located in the area, including springs which feed into Long Swamp (Larry Cook Consulting 2018). The potential effects of the quarry on spring flows to Long Swamp have not been assessed in detail. The lack of assessment of the proposal on spring flows in the area is another cause for concern. However, the Groundwater Assessment suggests that the pit could intersect the regional groundwater table leading to Long Swamp Creek and the swamp itself, which could potentially affect spring flows and groundwater recharge to Long Swamp.

The Assessment (2016) concludes that there would be a minor reduction in the baseflow to Long Swamp and other watercourses, resulting from groundwater drawdown for a small distance outside the extraction area footprint. This intercepted baseflow was predicted be in the order of 0.052ML/day in year 45 of operations, or approximately 2.6% of the modelled baseflow. The Assessment has also been undertaken, been peer reviewed, highlighting in particular that "no sensitivity or uncertainty analysis" was undertaken.

The exact effects of groundwater diversion on Long Swamp therefore remain uncertain, as is the confidence in the drawdown and flow volume numbers cited. A very precautionary approach is therefore recommended. The suggestion in the peer review for better monitoring of groundwater and surface water in the area is supported. Direct measurements of flow in Long Swamp Creek should also be undertaken to understand background variability in flows and to verify any loss of flow to Long Swamp as a result of any development approved.

2.2.2 Actual and predicted impacts

The BAM which underpins the NSW BC Act 2016 contains a policy module dealing with the impact of mining beneath upland swamp EECs. For groundwater impacts defined as having greater than "nil" or "negligible environmental consequences", a maximum offset liability is required. If the predicted impacts occur then the offset is required to be provided, either in full or in part depending on the extent of the impact.

As mentioned above, a precautionary approach is highly recommended in this instance given the sensitivity of Long Swamp to groundwater loss. Should any quarrying development be approved in this area with the potential to affect swamps, we would anticipate it be demonstrated that no greater than "negligible environmental consequences" would arise.

2.2.3 Sediment overflows

Any overflows throughout the life of the mine from either sediment or water storages have the potential to transport sediment from the site into Long Swamp. A Water Management Plan has yet to be prepared for the proposal, although the EIS suggests that the sediment dam would be Type F/D (wet) basins. It is noted that in 2003, a nearby quarrying company was heavily fined after 500 tonnes of sand, silt and clay polluted Hanging Rock Swamp.

2.2.4 Eucalyptus aquatica

Eucalyptus aquatica (Broad-leaved Sally) is a small tree known only from the Penrose area in the Southern Highlands of New South Wales where it occurs sporadically in swampy ground. It is a highly restricted and threatened plant species, listed as Vulnerable under both NSW BC Act and Commonwealth EPBC Act legislation. As noted above, the swamp (fen) habitats associated with *Eucalyptus aquatica* are listed as EECs in association with Long Creek Swamp. As discussed above under Biodiversity & Offsetting, indirect impacts upon this species may result from any impacts to the swamp and should be addressed under the BBAM.

Finally, we suggest e that the views of DPI Water, Water NSW and EPA, are sought on whether the likely impacts of the quarry on surface and groundwater quality and quantity have been appropriately assessed and impacts mitigated.

Recommendations:

6) There is a concern that the risks to Long Swamp could be much greater than that predicted in the EIS. A precautionary approach to groundwater drawdown on Long Swamp Endangered Ecological Community (EEC) is highly recommended, as the confidence and exact impacts remain uncertain on the basis of the information submitted.
7) Uncertainty analysis should be undertaken and improved monitoring undertaken, including direct measurements of flow in Long Swamp Creek to better understand variability, as suggested in the peer review. It should be demonstrated that “negligible” impact upon groundwater can be achieved for Long Swamp EEC.

3. Aboriginal Cultural Heritage

3.1 Introduction

We have reviewed the Aboriginal cultural heritage assessment prepared by Landskape Natural and Cultural Heritage Management (Landskape 2018). We support developing measures to avoid harm to the art site and rock-shelter (52-4-0323) and mitigate impacts to Aboriginal heritage values. However, we are concerned that the Aboriginal heritage assessment requires additional work before the level of harm to Aboriginal heritage can be properly assessed.

3.2 Impact assessment

3.2.1 The application addresses the Director-General’s Requirements

In 2014 OEH advised the Department of our requirements in order to adequately assess the proposed harm to Aboriginal objects through this development. Following this advice, we have now reviewed the Aboriginal cultural heritage assessment prepared by Landskape Natural and Cultural Heritage Management dated 4 March 2018 (Landskape 2018).

While the broad DGRs in relation to Aboriginal heritage have been met, we remain concerned that the methodology to identify sites and the proposed mitigation measures require additional work. Further detail of our review is provided below.

3.2.2 Aboriginal cultural landscape assessment

The Landskape (2018) report should address the Aboriginal cultural landscape, in particular the relationship of the rock art site to other recorded sites and Long Swamp. This will allow more accurate assessment of the indirect impacts to the rock art site likely to result from the proposed development.

We appreciate that the proposed quarry will not directly impact the rock art site 52-4-0323, and we support measures to avoid direct impact and reduce indirect impacts. However, impacts on the Aboriginal cultural landscape, particularly in relation to site 52-4-0323 and connectivity with the other identified Aboriginal heritage sites are relevant to assessing the level of harm to Aboriginal heritage by the proposed quarry.

3.2.3 Indirect impacts to the rockshelter site

We support developing measures in the ACHMP to prevent harm to site 52-4-0323. This includes indirect impacts through vibration and dust, and the overall operation of the proposed quarry. The Landskape (2018) report does not explain how the risk of dust impact to site 52-4-0323 will be appropriately managed to prevent harm to this rock art site.

During the Aboriginal community consultation, Peter Falk Consulting recommended that no earthworks occur within 100m of site 52-4-0323 (Landskape 2018, p.12). Landskape explain that this 100m buffer has been adopted. We support this buffer in principle, however, we recommend that detailed plans are provided to demonstrate that it has been adopted.

The Noise and Vibration assessment (Spectrum Acoustics 2018) states that the vibration levels will not harm the rock-shelter. Spectrum Acoustics refer to previous assessments using similar levels (50mm/s). However, this evidence is not presented in the report and the recommended level is not appropriately justified. Given the nature of the friable sandstone, and the apparent condition of the rock-shelter, it appears that the rock-shelter will be susceptible to vibration impacts. A structural engineer may need to assess the rock-shelter site to ensure appropriate levels and buffer is used for this specific site and geology.

We recommend that the assessment is against the building damage limits in the Australian Government Department of Industry ground vibration advice, that suggests appropriate levels for structures with ‘intrinsic values’ that are much lower than the proposed 50mm/s:

https://industry.gov.au/resource/Programs/LPSD/Airborne-contaminants-noise-and-vibration/Vibration/Pages/Ground-vibration-limits.aspx.

The German Standard DIN 4150–3:1999–02 Vibration in buildings—Part 3: effects on structures may also be referred to, as this provides “safe” limits for sensitive structures.

A detailed base line recording of site 52-4-0323 must be completed if the development is approved. This should include recording any existing structural cracks and drip lines at the site and across the rock art panels. The purpose of the baseline recording is to allow any impacts from the vibration on the rock art to be monitored.

3.2.4 Archaeological survey transects should be provided

We recommend the applicant provide a map showing survey transects across the proposed development area. This should complement the information provided by Landskape (2018, pp.26-27). The survey transects should show whether the base of the sandstone cliffs was surveyed adequately to ensure the potential for other rock-shelters to be present has been adequately addressed.

We support the realignment of access roads that has occurred to avoid harm to six Aboriginal heritage sites. However, we recommend the assessment explain whether the realignments have also been archaeologically surveyed (Landskape 2018, p.xiv).

3.2.5 The literature review should be updated

We recommend that the literature review (Landskape 2018, pp.20 –22) is updated to include recent work in the region. Recent work by EMM and Navin Officer Heritage Consultants is likely to be especially relevant:

- EMM, 2016, Aboriginal Cultural Heritage Assessment to support an AHIP application for continued farming activities on Hume Coal and its affiliated companies and Prepared for Hume Coal Pty Ltd (AHIMS #103677).
- Navin Officer, 2012, Highlands Source Project: Subsurface Testing and Salvage at Aboriginal Sites between Goulburn and Wingecarribee Reservoir, NSW (AHIMS #102662).
- NSW Archaeology, 2005, Proposed Subdivision at Lot 1, Sackville Road Hilltop, NSW, Subsurface Test Excavation (AHIMS #99396).

The cumulative impact assessment (Landskape 2018, p.51) may need to be revised in light of the updated literature review.

3.2.6 Archaeological test excavation should be conducted

We recommend that archaeological test excavation is conducted in accordance with the Code of Practice for Investigation of Aboriginal Objects in NSW (DECCW 2010). Given that Landskape has also identified several Aboriginal artefact scatters with broad site boundaries, we recommend test excavation is conducted to clarify the nature and extent of these sites.

During Aboriginal community consultation test excavation was also recommended by Glenda Chalker of Cubbitch Barta Native Title Claimants Aboriginal Corporation (Landskape 2018, p.12). In addition, our 2014 advice to the Department noted that subsurface archaeological testing should be considered in areas that are identified to contain potential for subsurface Aboriginal objects.

In considering test excavation, Landskape (2018, p.12) argue that the soils in the impact area are eroded and do not contain depositional soils with potential to preserve archaeological evidence. However, this is an assertion that is not supported with evidence in the report. We also note that not all archaeological research questions require a preserved stratigraphic sequence; deflated archaeological sites have provided research potential across Australia. The Landskape (2018) report should address this potential.

During the OEH site visit in June 2018, additional stone artefacts were observed on access tracks. We note that the site descriptions provided by Landskape (2018, p.34-37) show that artefact scatters were identified in areas of increased surface visibility, such as along dirt tracks and the edge of a dam. This suggests that the ground surface visibility may be biasing the survey results. A test excavation program can address that bias.

Given the range of landforms that the proposed development and access road cover, it is highly unlikely that there are no depositional environments present. This is particularly true for the proposed stockpiling and processing area. Subsurface archaeological deposits have been recorded in land with similar disturbance levels in this region, including through land clearance and cultivation (e.g. EMM 2016, NOHC 2012, NSW Archaeology 2005).

The aims of the test excavation should include:

- To test whether buried archaeological deposits are present and provide evidence for the conclusions regarding archaeological site distribution provided by Landskape (2018, p.14).
- Establish the relationship between surface artefact scatters and subsurface artefact deposits.
- Clarify the archaeological significance of the identified sites so that the impact to Aboriginal heritage sites overall by this development can be more accurately quantified.

- Determine whether more detailed archaeological salvage work is required before impact to the sites by the proposed works.
- Inform our understanding of the Aboriginal cultural landscape of the development area, including the relationship between the rock shelter site and surrounding Aboriginal heritage sites.

3.2.7 Proposed salvage of Aboriginal objects

Further information is required on the proposed salvage. The salvage program is not adequately defined. It is unclear whether Landskape (2018, p.54) is proposing an archaeological salvage excavation, or collection of surface artefacts only.

The proposed salvage methodology should be prepared in consultation with OEH and the RAPs.

3.2.8 Long term management of Aboriginal objects

We recommend that any proposal to rebury artefacts is accompanied by evidence of consultation with the Aboriginal community about the reburial location, a map showing the reburial location, a methodology for reburial, a time frame for the reburial, support of the landowner for reburial to occur at that location, a commitment to register the reburial location on AHIMS. Given the proposed 30 plus years life of this project, it may be necessary for multiple reburial events to occur.

If the long-term management will be through curation by ILALC (as proposed by Landskape), a 'Transfer of Aboriginal Objects' (also known as a care agreement) should be entered into by ILALC with OEH. This is a requirement of Section 85A of the National Parks and Wildlife Act. Section 85A is not exempt under the SSD approval. Information about the transfer of Aboriginal objects is available on the OEH website at: http://www.environment.nsw.gov.au/licences/CareAgreements.htm

The long-term management of Aboriginal objects should be resolved before project approval. Evidence of consultation with the Aboriginal community about the proposed long-term management should be included in the ACHAR.

3.2.9 Evidence of consultation with the Aboriginal community should be provided

The DGRs require the applicant to 'demonstrate effective consultation with Aboriginal communities in determining and assessing impacts, and determining and selecting mitigation options and measures'. Our 2014 advice recommended the applicant comply with clause 80C of the National Parks and Wildlife Act.

An overview of the consultation process is provided (Landskape 2018, pp.10 – 12). We recommend the Department request evidence of this consultation process. We suggest that copies of written consultation and a consultation log are provided as evidence of this process. We also recommend that the applicant maintain regular and continuous consultation with the Registered Aboriginal Parties (RAPs) about this project as it moves through the EIS and application process.

We are concerned that given the length of time since the consultation process started, the consultation may not have been continuous. OEH guidelines suggest that breaks in contact of over six months may not constitute continuous consultation. RAPs should be regularly updated about the progress of a project.

3.2.10 Support the development of an Aboriginal Cultural Heritage Management Plan (ACHMP)

We support the recommendation by Landskape (2018) to develop an ACHMP. We recommend that the ACHMP includes:

- A protocol for how ongoing consultation with the Aboriginal community will occur over the life of the project.
- Protection and ongoing monitoring procedures to ensure site 52-4-0323 (the rock-shelter) is not harmed by the proposed vibration and dust impacts.

- The methodology for the proposed salvage of Aboriginal objects within the development area.
- A methodology for how the discovery of unrecorded Aboriginal objects during the development works will be managed.
- Finalised methodology for the long-term management of Aboriginal objects.

We suggest that the ACHMP is developed before project approval to ensure the Aboriginal community is consulted about the management of Aboriginal heritage and that any comments from the RAPs on the ACHMP can be considered by the decision maker.

An Aboriginal Heritage Impact Permit is not required because this development is being assessed under the SSD/SSI framework of the EP&A Act. Therefore, the ACHMP should provide a level of detail that will allow the Department to be confident that Aboriginal heritage values can be appropriately managed through the life of this development. We recommend that the ACHMP is developed before project approval to allow the decision maker to consider the management and mitigation of Aboriginal heritage when considering the development application.

Recommendations:

8) Further justification of the proposed vibration limits and dust levels to protect the rockshelter (site 52-4-0323). The rockshelter appears susceptible to vibration impacts and although the buffer is supported in principle, insufficient detail has been provided in support of the predicted vibration levels.

9) A program of archaeological test excavation should be conducted prior to project approval. Test excavation should be conducted in accordance with the Code of Practice for Investigation of Aboriginal Objects in NSW (DECCW 2010).

10) The following matters should be addressed in an updated Aboriginal heritage assessment:

    - The relationship of the rock art site to other recorded sites and Long Swamp.
    - Considering the Aboriginal cultural landscape of the proposed development area.
    - Further evidence of the Aboriginal community consultation process.
    - Developing the Aboriginal Cultural Heritage Management Plan prior to approval.
    - Providing a methodology for the proposed salvage of Aboriginal objects.
    - Deciding on the long term management of any recovered Aboriginal objects.
    - Including an updated literature review.
    - Providing a map of archaeological survey transects.

ATTACHMENT B – LIST OF FIGURES

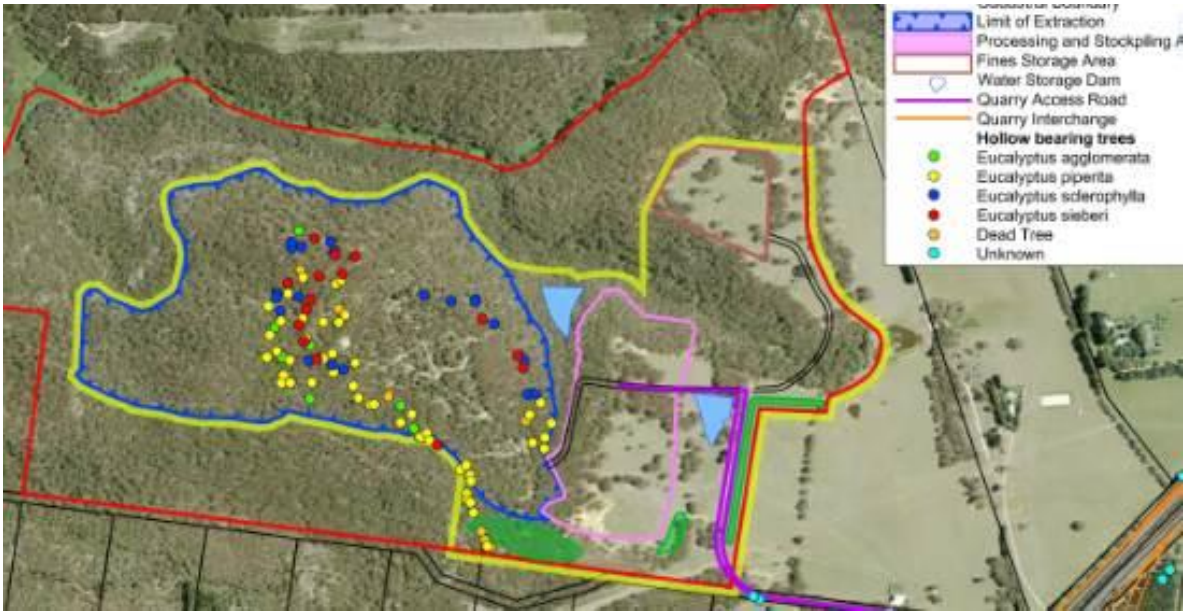

Figure 1: Hollow-bearing trees survey (Mills 2018)

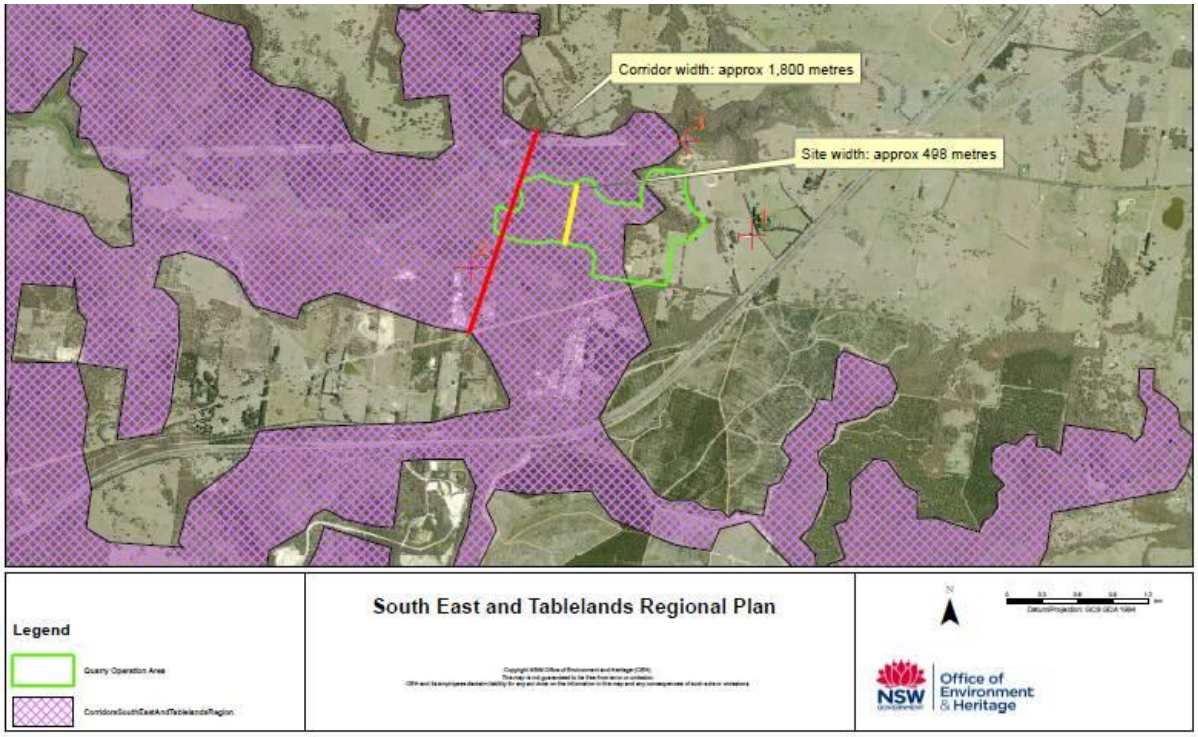

Figure 2: Quarry impacts site relative to regional biodiversity corridor (HEV)

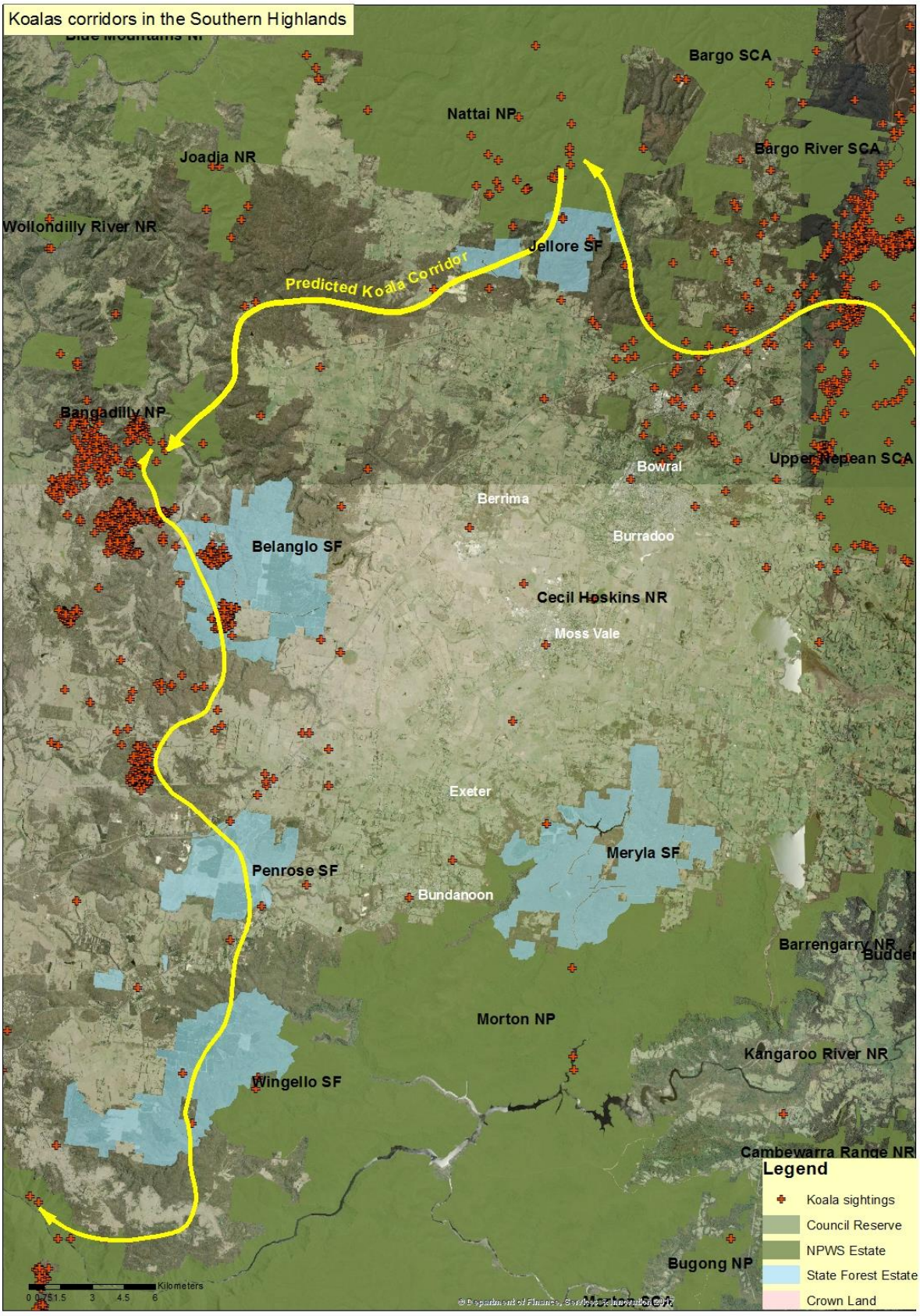

Figure 3: Regional Koala Corridors in the Southern Highlands

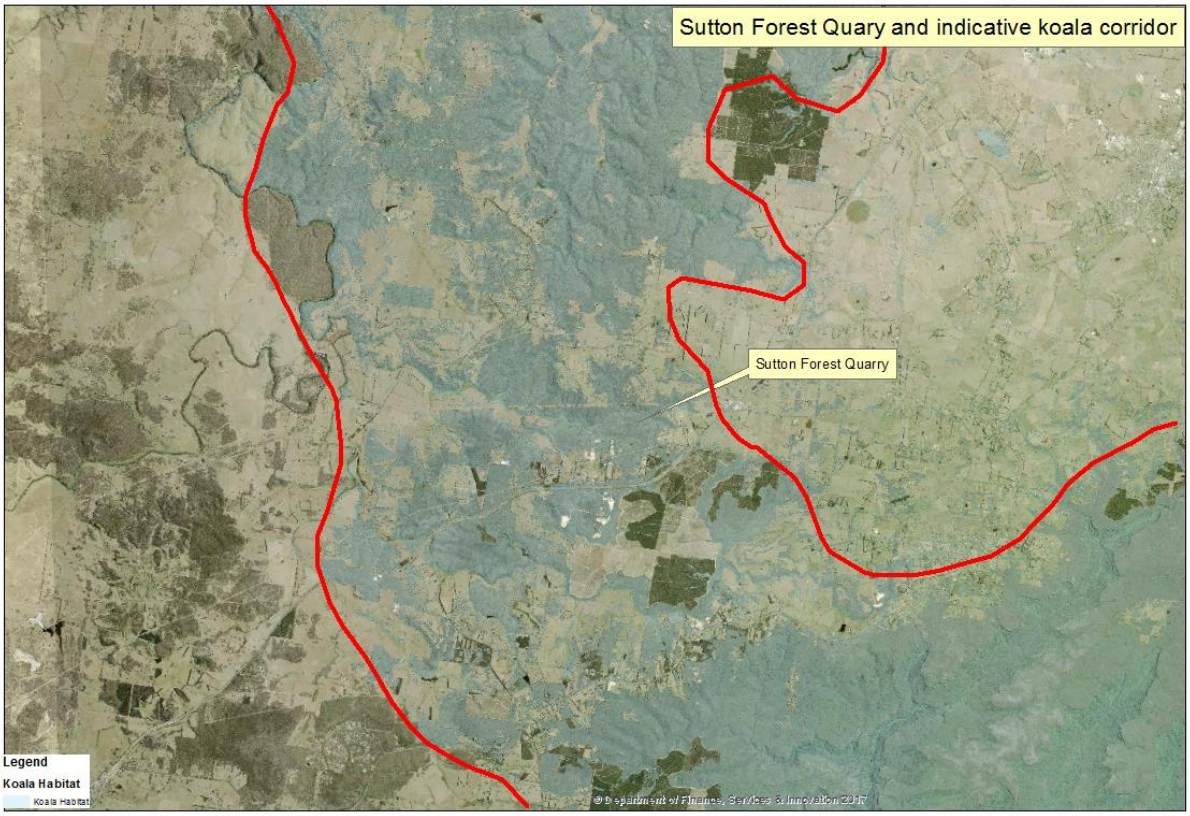

Figure 4: Koala habitat in the Penrose area

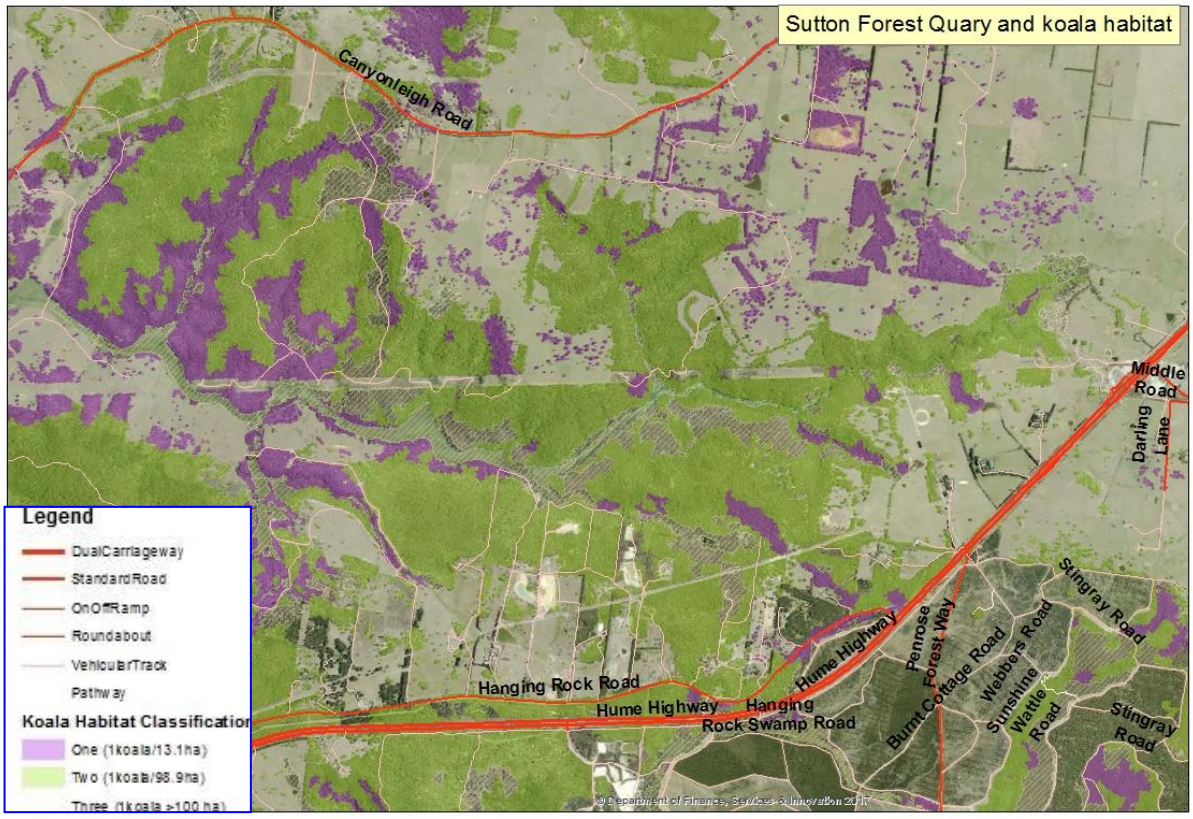

Figure 5: Koala habitat in and around Sutton Forest Quarry project

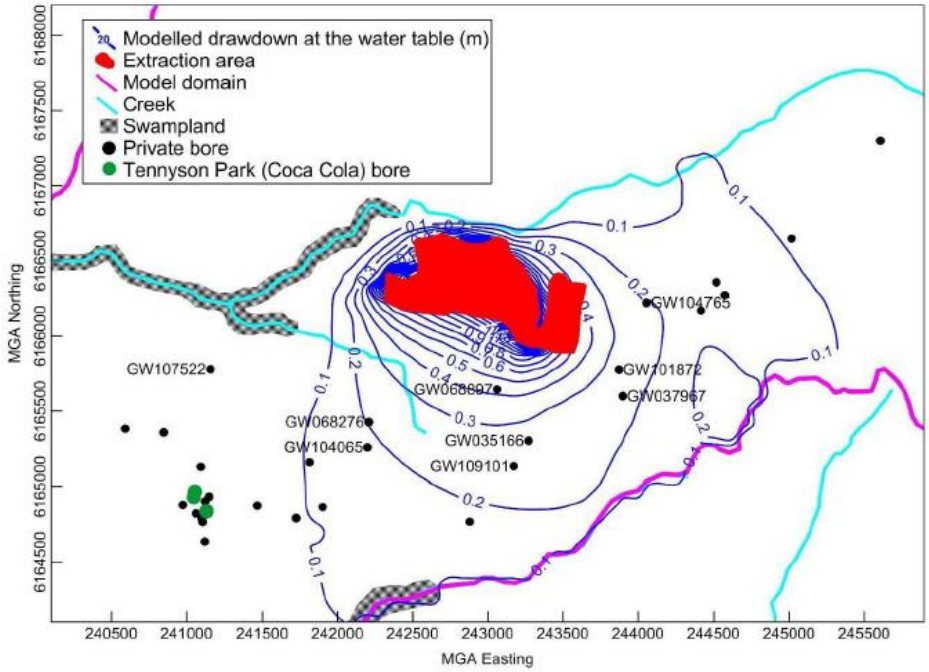

Figure 6: Modelled water table drawdown at the end of extraction operations (Coffey 2016)

ATTACHMENT C – LIST OF TABLES

Table 1: *Species credit species in Hawkesbury-Nepean CMA*

Scientific Name	Common Name	Class of Credit
Acacia bynoeana	Bynoe's Wattle	Species
Acacia flocktoniae	Flockton Wattle	Species
Acacia pubescens	Downy Wattle	Species
Anthochaera phrygia	Regent Honeyeater	Species
Boronia deanei	Deane's Boronia	Species
Cercartetus nanus	Eastern Pygmy-possum	Species
Chalinolobus dwyeri	Large-eared Pied Bat	Species
Heleioporus australiacus	Giant Burrowing Frog	Species
Hibbertia puberula	Hibbertia puberula	Species
Hoplocephalus bungaroides	Broad-headed Snake	Species
Leucopogon exolasius	Woronora Beard-heath	Species
Litoria booroolongensis	Booroolong Frog	Species
Litoria littlejohni	Littlejohn's Tree Frog	Species
Persoonia acerosa	Needle Geebung	Species
Persoonia bargoensis	Bargo Geebung	Species
Persoonia glaucescens	Mittagong Geebung	Species
Persoonia hirsuta	Hairy Geebung	Species
Petaurus norfolcensis	Squirrel Glider	Species
Petrogale penicillata	Brush-tailed Rock-wallaby	Species
Phascolarctos cinereus	Koala	Species
Phyllota humifusa	Dwarf Phyllota	Species
Pseudophryne australis	Red-crowned Toadlet	Species
Pultenaea glabra	Smooth Bush-Pea	Species
Solanum amourense	Solanum amourense	Species
Tetratheca glandulosa	Tetratheca glandulosa	Species
Varanus rosenbergi	Rosenberg's Goanna	Species

Table 2: *Predicted species credit species associated with Long Swamp (Montane Peatlands and Swamps EEC)*

Scientific Name	Common Name	Class of Credit
Baloskion longipes	Dense Cord-rush	Species
Carex klaphakei	Klaphake's Sedge	Species
Veronica blakelyi	Veronica blakelyi	Species
Eucalyptus aquatica	Broad-leaved Sally	Species
Gentiana wingecarribiensis	Wingecarribee Gentian	Species
Hakea dohertyi	Kowmung Hakea	Species
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	Species
Kunzea cambagei	Cambage Kunzea	Species
Litoria aurea	Green and Golden Bell Frog	Species
Petalura gigantea	Giant Dragonfly	Species
Pomaderris cotoneaster	Cotoneaster Pomaderris	Species
Zieria covenyi	Coveny's Zieria	Species