

Preliminary Documentation Report (Part B)

Blue Rock Quarry, Cedar Creek, Queensland, 4207
EPBC Act (2024/09844)

Prepared for Fulton Hogan Quarries Pty Ltd
11 March 2026

Ref: 11390 E

**Saunders
Havill**

PATHWAYS TO SUCCESS

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Referral lodgement report

Blue Rock Quarry Expansion Project

Application Number: **02321**

Commencement Date:
22/03/2024

Status: **Locked**

1. About the project

1.1 Project details

1.1.1 Project title *

Blue Rock Quarry Expansion Project

1.1.2 Project industry type *

Mining

1.1.3 Project industry sub-type

Other

1.1.4 Estimated start date *

01/01/2025

1.1.4 Estimated end date *

31/12/2085

1.2 Proposed Action details

1.2.1 Provide an overview of the proposed action, including all proposed activities. *

Fulton Hogan Quarries Pty Ltd ('the Proponent') is proposing an expansion of the existing Blue Rock Quarry on land located at Cedar Creek Road, Cedar Creek, Queensland described as part of Lot 89 on WD739 and Lot 1 on SP238024. The balance of the site is currently utilised for extractive industries. Blue Rock Quarry forms part of a cluster of key extractive industries in the region to cater for the increasing demands of development in South-East Queensland (SEQ). The site is located approximately 8.2km south-west of Ormeau and 14km south of Beenleigh.

Site context and the referral area are shown on *Att 1 11390 Cedar Creek Quarry MNES Report* Figure 1 and 2.

The existing quarry has been operational since the 1970s with the initial extraction approval obtained in 1972. The extent of the current extraction area was reached in approximately 2005 with vegetation within the quarry being cleared and regrowing in cycles to support the extraction activity. These areas are considered to form part of the existing quarry operations. A range of other State and Local approvals have been obtained over the years including Environmental Authorities (EAs) which outline management requirements for the extraction activities and operational works permits to allow vegetation clearing for approved extraction. The proposed action will involve vegetation clearing to the south of the current quarry footprint. This area will then be utilised for extraction purposes. For information on project related impacts see *Att 1 11390 Cedar Creek Quarry MNES Report, Section 6, pp. 57-62*.

The expansion area that is subject to this referral is a 5.9-hectare patch of vegetation immediately adjacent to the south of the operational quarry. The referral area is extremely steep with a drop of more than 100m from the northeast to the southwest corners. The following State and local Council approvals have also been obtained for the expansion/referral area including:

- Environmental Authority P-EA-100268669 which includes extraction and screening activities for up to 1,600,000t per year on Lot 89 on WD739 and Lot 1 on SP238024. This document is provided as *Att*
- Clearing of remnant vegetation within the expansion area through DNRM permits RARP 2011/006373 and DPP 2005/101762
- MCU201400231 Material Change of Use Development Approval issued by Gold Coast City Council
- 306/3/248 (1977) Rezoning Approval for Extractive Industry issued by the then Albert Shire Council

These documents are provided as *Att 2a Environmental Approvals* and *Att 2b Environmental Approvals_Part 2*

The following information has been added:

The quarrying process at Blue Rock involves the following standard stages:

1. Mine Plan – A mine plan has been developed to coordinate the activity on site. The mine plan ensures quarrying follows an orderly process which maps out the quarry faces (vertical finished surfaces), quarry benches (horizontal finished surface) and haul routes to provide access to the extractive materials and ensure the finished quarry surface is safe, stable and suitable for rehabilitation.
2. Vegetation Clearing and Remove Overburden – Vegetation is cleared under strictly controlled processes, the organic material is mulched for site stabilisation and the top layer of material (overburden) is removed to access the quarry material.
3. Drill and Controlled Blast – Holes are drilled into the rock (typically 10 – 15m deep) and explosive are placed into holes to blast the rock and other materials from the earth via electronic detonators within a strictly controlled safety exclusion zone.
4. Load and Haul – Blasted or extracted material is loaded via excavators into quarry dump trucks and hauled to the processing plant.
5. Processing – Material is processed on site in a crushing and screening plant to grade the material into different shapes, sizes and products depending upon resource type and customer requirements. The processed material is called quarry products and / or aggregates.

6. Product Stockpiling and Transport – Processed materials are stored in piles on the sales floor and loaded into road trucks for transportation to customers and projects.
7. Application – Quarry products are used in construction projects such as road base or may be used as raw materials to create other construction materials such as concrete or asphalt which are typically produced at offsite locations.
8. Closure and Rehabilitation – Blue Rock Quarry involves a long-term operation however as resources are extracted and exhausted, the quarry is progressively rehabilitated to return the quarry back to the natural state (suitable native species) and to ensure the finished quarried surface is safe, stable and non-polluting in accordance with the approvals and authorisations for the activity. At the quarry closure (estimated in 60 years' time) and subject to permits and approvals, some other secondary land uses may be investigated to repurpose the quarry for other activities

1.2.2 Is the project action part of a staged development or related to other actions or proposals in the region?

No

1.2.6 What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant? *

The proposed action is being referred under the *Environmental Protection and Biodiversity Conservation Act 1999* for potential impacts to Matters of National Environmental Significance. Refer to *Att 1 11390 Cedar Creek Quarry MNES Report pp. 57 – 99*.

Att 1 11390 Cedar Creek Quarry MNES Report pp. 57 – 90 pp. 11-12 provides the details of the relevant legislation that applies to the referral area which at the State level includes the *Queensland Planning Regulation 2017* and *Vegetation Management Act 1999*. At the Local level, the referral area is located within the City of Gold Coast Local Government Area (LGA) and is subject to the provisions of the *Gold Coast City Council Planning Scheme 2016* ('planning scheme'). Under the planning scheme, the referral area is zoned as 'Extractive' recognising the intended land use to support resource extraction.

Under *Queensland Planning Regulation 2017* legislation, the referral area contains some Koala Habitat Area (KHA) in a Koala Priority Area (KPA). All relevant approvals were obtained prior to the commencing on 7 February 2020 therefore works are exempt from assessment under this framework.

Under the *Vegetation Management Act 1999* (VMA), the referral area is mapped as a combination of Category B (remnant) and Category X (non-remnant). The Category X mapping is maintained by an approved Property Map of Assessable Vegetation (ref: 2008/008614). Vegetation mapping shows the Category B (remnant) vegetation is mapped as Least Concern RE12.11.3. Pre-clear mapping shows the Category X (non-remnant) vegetation is mapped as both Least Concern RE12.11.3 and Least Concern RE12.11.10. Category X (non-remnant) vegetation is exempt to clear.

The Proponent is advised to ensure that any development obligations pursuant to the provisions of the *Aboriginal Cultural Heritage Act 2003* and the *Planning Act 2016* are complied with in respect to the proposed development. Applicants, developers and landowners have a duty of care under the legislation where items of cultural heritage significance are located, even if those items have not been previously recorded in a database.

1.2.7 Describe any public consultation that has been, is being or will be undertaken regarding the project area, including with Indigenous stakeholders. Attach any completed consultation documentations, if relevant. *

Fulton Hogan engaged external consultants regarding aboriginal cultural heritage on the site. The aboriginal cultural heritage consultation correspondence has been provided, refer Attachment 6 *Aboriginal Cultural Heritage Consultation*. Attachment 6 will not be made publicly available due to cultural sensitivity reasons.

The Development Application lodged in 2014 which included vegetation clearing for the project area involved a Public Notification process. This involved public notices on all of the site road frontages, letter drops to all the neighbours and an advertisement in the local newspaper which described the project and invited submissions. The public notice period for submissions was 15 business days and a total of four (4) submissions were received.

1.3.1 Identity: Referring party

Privacy Notice:

Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

By completing and submitting this form, you consent to the collection of all personal information contained in this form. If you are providing the personal information of other individuals in this form, please ensure you have their consent before doing so.

The Department of Climate Change, Energy, the Environment and Water (the department) collects your personal information (as defined by the Privacy Act 1988) through this platform for the purposes of enabling the department to consider your submission and contact you in relation to your submission. If you fail to provide some or all of the personal information requested on this platform (name and email address), the department will be unable to contact you to seek further information (if required) and subsequently may impact the consideration given to your submission.

Personal information may be disclosed to other Australian government agencies, persons or organisations where necessary for the above purposes, provided the disclosure is consistent with relevant laws, in particular the Privacy Act 1988 (Privacy Act). Your personal information will be used and stored in accordance with the Australian Privacy Principles.

See our Privacy Policy to learn more about accessing or correcting personal information or making a complaint. Alternatively, email us at privacy@awe.gov.au.

Confirm that you have read and understand this Privacy Notice *

1.3.1.1 Is Referring party an organisation or business? *

Yes

Referring party organisation details	
ABN/ACN	24144972949
Organisation name	Saunders Havill Group Pty Ltd
Organisation address	4006 QLD
Referring party details	
Name	Liam Brzezinski
Job title	Senior Ecologist
Phone	0431173273
Email	liambrzezinski@saundershavill.com
Address	9 Thompson Street, Bowen Hills, 4006 QLD

1.3.2 Identity: Person proposing to take the action

1.3.2.1 Are the Person proposing to take the action details the same as the Referring party details? *

No

1.3.2.2 Is Person proposing to take the action an organisation or business? *

Yes

Person proposing to take the action organisation details	
ABN/ACN	16004475076

Organisation name FULTON HOGAN QUARRIES PTY LTD

Organisation address 3121 VIC

Person proposing to take the action details

Name Andrew Lyndon

Job title National Planning and Approvals Manager

Phone +61 499 400 642

Email andrew.lyndon@fultonhogan.com.au

Address Garden City Office Park, Building 8, 2404 Logan Road, Eight Mile Plains, QLD, 4113

1.3.2.14 Are you proposing the action as part of a Joint Venture? *

No

1.3.2.15 Are you proposing the action as part of a Trust? *

No

1.3.2.17 Describe the Person proposing the action's history of responsible environmental management including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person proposing to take the action. *

Fulton Hogan Quarries Pty Ltd has a satisfactory record of responsible environmental management for their quarry operations. Fulton Hogan employs internal and external resources specifically trained in environmental management to assist with managing environmental impacts at the quarry sites. Fulton Hogan does not have any present proceedings under Commonwealth, State or territory law for the protection of the environment or the conservation and sustainable use of natural resources. There have been no legal proceedings brought under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person Proposing to take the Action since at least 2005 (being the date to which the Fulton Hogan current record system extend).

1.3.2.18 If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

The person proposing to take the action's corporate environmental policy is provided as *Att 3 Environmental Policy*.

1.3.3 Identity: Proposed designated proponent

1.3.3.1 Are the Proposed designated proponent details the same as the Person proposing to take the action? *

Yes

Proposed designated proponent organisation details

ABN/ACN	16004475076
Organisation name	FULTON HOGAN QUARRIES PTY LTD
Organisation address	3121 VIC

Proposed designated proponent details

Name	Andrew Lyndon
Job title	National Planning and Approvals Manager
Phone	+61 499 400 642
Email	andrew.lyndon@fultonhogan.com.au

AddressGarden City Office Park, Building 8, 2404 Logan Road, Eight Mile Plains,
QLD, 4113

1.3.4 Identity: Summary of allocation

✔ Confirmed Referring party's identity

The Referring party is the person preparing the information in this referral.

ABN/ACN	24144972949
Organisation name	Saunders Havill Group Pty Ltd
Organisation address	4006 QLD
Representative's name	Liam Brzezinski
Representative's job title	Senior Ecologist
Phone	0431173273
Email	liambrzezinski@saundershavill.com
Address	9 Thompson Street, Bowen Hills, 4006 QLD

✔ Confirmed Person proposing to take the action's identity

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	16004475076
Organisation name	FULTON HOGAN QUARRIES PTY LTD
Organisation address	3121 VIC
Representative's name	Andrew Lyndon
Representative's job title	National Planning and Approvals Manager
Phone	+61 499 400 642
Email	andrew.lyndon@fultonhogan.com.au

Address

Garden City Office Park, Building 8, 2404 Logan Road, Eight Mile Plains, QLD, 4113

✔ Confirmed Proposed designated proponent's identity

The Person proposing to take the action is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

1.4 Payment details: Payment exemption and fee waiver

1.4.1 Do you qualify for an exemption from fees under EPBC Regulation 5.23 (1) (a)? *

No

1.4.3 Have you applied for or been granted a waiver for full or partial fees under Regulation 5.21A? *

No

1.4.5 Are you going to apply for a waiver of full or partial fees under EPBC Regulation 5.21A?

No

1.4.7 Has the department issued you with a credit note? *

No

1.4.9 Would you like to add a purchase order number to your invoice? *

Yes

1.4.10 Enter purchase order number *

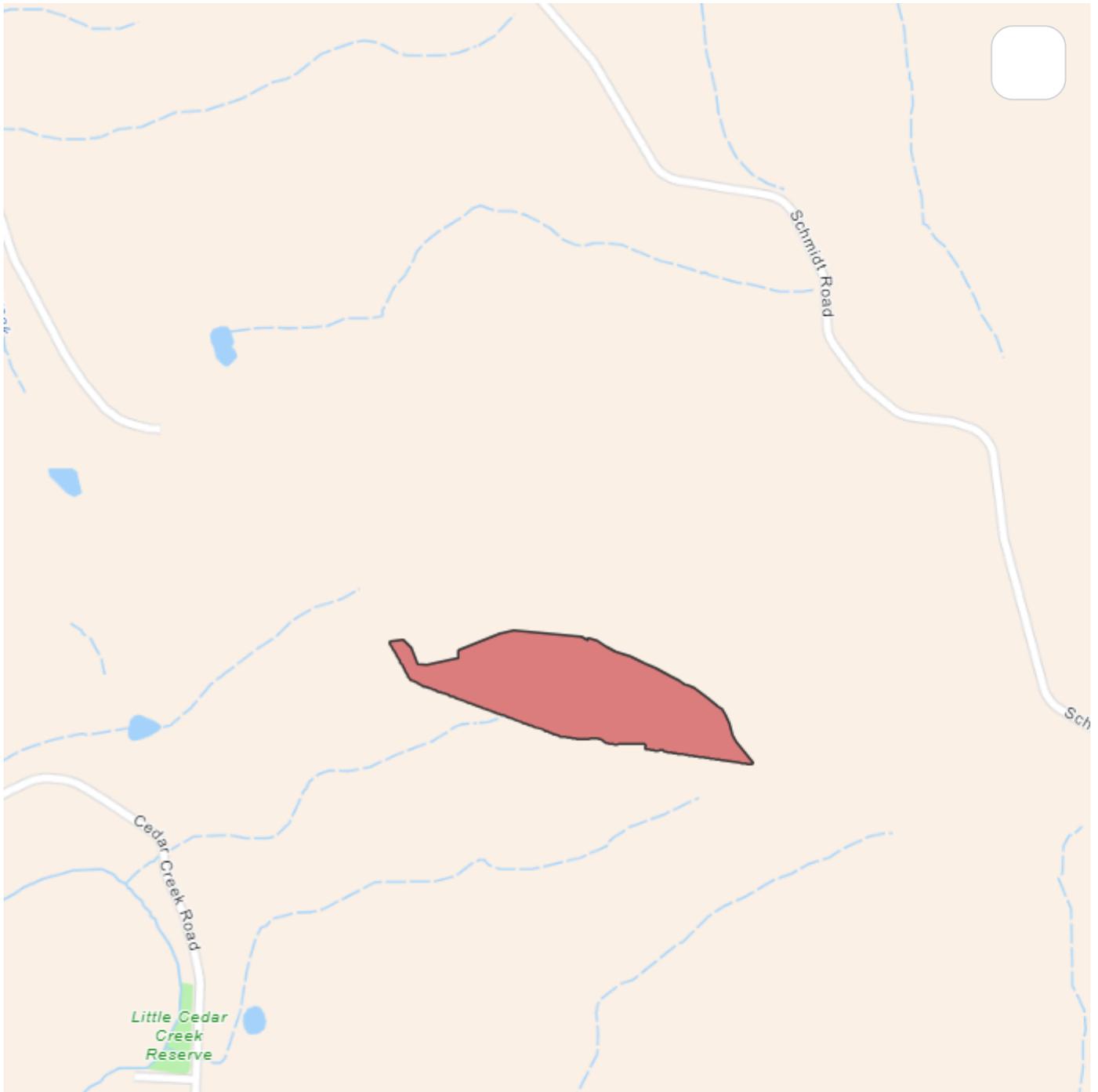
1.4 Payment details: Payment allocation

1.4.11 Who would you like to allocate as the entity responsible for payment? *

Person proposing to take the action

2. Location

2.1 Project footprint





Project Area: 5.95 Ha Disturbance Footprint: 5.95 Ha

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Powered By Esri - Sources: Esri, TomTom, Garmin, F...

2.2 Footprint details

2.2.1 What is the address of the proposed action? *

Blue Rock Quarry, Tamaree Road, Cedar Creek, Queensland 4207

2.2.2 Where is the primary jurisdiction of the proposed action? *

Queensland

2.2.3 Is there a secondary jurisdiction for this proposed action? *

No

2.2.5 What is the tenure of the action area relevant to the project area? *

The property is freehold.

3. Existing environment

3.1 Physical description

3.1.1 Describe the current condition of the project area's environment.

The referral area is mapped as a combination of Category B (remnant) and Category X (non-remnant) vegetation, with a Property Map of Assessable Vegetation (PMAV) confirming most of the Category X (non-remnant) mapping across both Lot 89 on WD739 and Lot 1 on SP238024 (refer to *Att 1 11390 Cedar Creek Quarry MNES Report, Figure 3*). The referral area is zoned as Extractive Industry, which includes land to the north, west and south. To the east and the broader locality, the land is zoned as Rural and is utilised for a mixture of rural land-uses. It is located within the suburb of Cedar Creek, approximately 12 kilometres (km) south of Beenleigh. Cedar Creek Road is present further south, the current quarry footprint to the north and a mixture of remnant and regrowth vegetation and rural residential properties in the broader landscape. The area will be predominantly accessed via Tamarae Road, which connects to the existing quarry site in the north, and Cedar Creek Road to the south.

The referral area is located in a landscape that has been partially subject to modification for past and on-going land-uses resulting in a mixture of undisturbed and highly disturbed environments (refer to *Att 1 11390 Cedar Creek Quarry MNES Report, Plan 2 and Section 4.1*). Even prior to the commencement of the quarry operation, the majority of the site showed signs of historical clearing (1965) likely for rural uses. Vegetation clearing then aligned with the continued expansion of the quarry footprint through the 1970s, 1980s and 1990s. The extent of vegetation clearing has remained largely unchanged since 2010 where patches of regrowth vegetation has formed and been cleared to facilitate current quarry operations.

The referral area is a steep south facing slope at 320m AHD in the north and 200m AHD in the south with an average of 25° (47%) and as steep as 35° (70%) in parts, adjacent to cleared tracks and the existing extractive zone of the operating quarry. The gradient continues at this level to Cedar Creek Road further south. The referral area itself is mapped as land zone 11 which includes hills and lowlands on metamorphic rocks. Soils are mainly shallow, gravelly Rudosols and Tenosols, with Sodosols and Chromosols on lower slopes and gently undulating areas. Soils are typically of low fertility on steeper slopes (refer to *Att 1 11390 Cedar Creek Quarry MNES Report, Section 4.2, pg. 19*).

The connectivity value of the referral area in the broader landscape is limited primarily by the current quarry footprint to the north, while vegetation to the south is relatively intact (refer to *Att 1 11390 Cedar Creek Quarry MNES Report, Plan 3*). Further south and west, rural residential properties and roads are present including Beaudesert Beenleigh Road and Cedar Creek Road. Within the broader landscape exists large areas of connected vegetation and several active quarry footprints.

Vegetation through the central portion of the referral area contains areas of retained canopy associated with Category B (remnant) vegetation. However, an on-ground assessment identified much of this area to be heavily weed infested as a result of historical modification and steep eroded channels leading to high levels of disturbance. Category X (non-remnant) areas include a patch of notophyll vine forest regrowth in the east

of the referral area. This polygon was identified on-ground as containing native species indicative of a notophyll vine forest community although heavily weed infested and lacking the maturity and species richness of true notophyll vine forest. Where additional areas of Category X (non-remnant) vegetation are mapped, these areas are dominated by weeds with few native species present. Refer to *Att 1 11390 Cedar Creek Quarry MNES Report, Section 5, pp. 39 - 56* and *Plan 4* for field survey descriptions.

Remnant vegetation across the referral area is generally consistent with the RE mapping of 12.11.3. The shrub and ground layer contains moderate to high disturbance with *Lantana camara* (Lantana) dominant. The entirety of the referral area contains a steep south sloping gradient averaging 25o (47%) and as steep as 35o (70%) in parts.

Vegetation in the eastern extent of the referral area was identified on-ground as containing species indicative of pre-clear RE12.11.10 - notophyll vine forest. This area contained moderate-high weed infestation in parts dominated by *Lantana camara* (Lantana) and *Rivina humilis* (Coral Berry). Given the steep gradient across the referral area, this area showed signs of erosion.

The balance of the referral area displayed significant disturbance as a result of historical land clearing and on-going erosion. A drainage line is present in the centre of the referral area which includes only weeds and acacia regrowth. The remaining areas of this polygon contained dense weeds including *Lantana camara* (Lantana), *Megathyrsus maximus* (Guinea Grass), *Melinis repens* (Red Natal Grass), *Solanum chrysotrichum* (Giant Devil's Fig), *Solanum mauritianum* (Wild Tobacco Tree), *Solanum seaforthianum* (Brazilian Nightshade), and acacia regrowth.

3.1.2 Describe any existing or proposed uses for the project area.

The action will impact on 5.94 ha of weed-infested vegetation along a steep slope directly adjoining the existing quarry area. The proposed land has historically been used for rural residential purposes, and currently exists as vacant bushland zoned for 'extractive industry'.

The proposed use of the referral area is for resource extraction, as an extension of the existing extractive industry to the north. Current Environmental Authority P-EA-100268669 (refer to *Att 2a Environmental Approvals*) includes proposed expansion area.

3.1.3 Describe any outstanding natural features and/or any other important or unique values that applies to the project area.

The site does not contain any outstanding natural features or unique values. Refer to *Att 1 11390 Cedar Creek Quarry MNES Report, Section 5, pp. 39 - 56* and *Plan 4* for field survey descriptions. *Att 1 11390 Cedar Creek Quarry MNES Report, Plan 5* shows the MNES Impact Assessment.

The entire referral area contains moderate to high disturbance and weed infestation, with very steep slope that has led to significant erosion in parts. The existing quarry is situated in the west of a large area of bushland mapped predominantly as remnant and regrowth vegetation. Given the referral area's proximity to the quarry, it likely experiences comparatively higher levels of disturbance as a result of edge effects than the large area of connected remnant vegetation further from the quarry (refer to *Att 1 11390 Cedar Creek Quarry MNES Report, Plan 3*). This suggests the referral area would not contain any unique values and was confirmed by the on-ground surveys conducted.

Ecological values within the project area are highest associated with Category B (remnant) vegetation, which is indicative of koala habitat though these areas are equally dominated by exotic weed species.

The only important values observed within the referral area were the field records of *Macadamia integrifolia* within, which is listed as Vulnerable under the EPBC Act. This species is considered important, and it is expected that the removal of *M. integrifolia* will be offset at a 4:1 ratio within a suitable vegetation community. However, while it is acknowledged that the observation of these species is important, their occurrence is not unique or outstanding within the larger area of bushland that surrounds the existing quarry and referral area which contains multiple records of the species.

It is noted that Vulnerable listed *Macadamia tetraphylla* were also observed, but since the specimens are located outside of the referral area they will not be impacted and do not need to be considered further.

3.1.4 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The referral area is a steep south facing slope at 320 m Australian Height Datum (AHD) in the north and 200 m AHD in the south with an average of 25 degrees (47%) and as steep as 35 degrees (70%) in parts, adjacent to cleared tracks and the existing extractive zone of the operating quarry. The gradient continues at this level to Cedar Creek Road further south.

3.2 Flora and fauna

3.2.1 Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.

Flora

A total of ninety-eight (98) flora species were recorded within the vegetation communities within the referral area during field surveys, as listed in *Att 1 11390 Cedar Creek Quarry MNES Report, Appendix E*. Of those, sixty-five (65) are native and thirty-three (33) species are considered to be non-native / introduced species.

One flora species listed under the EPBC Act and NCA was recorded in the referral area, *Macadamia integrifolia*. A total of 15 specimens of *Macadamia integrifolia* (2 mature, 11 semi-mature and 1 juvenile) were recorded within the referral area, as shown in *Att 1 11390 Cedar Creek Quarry MNES Report, Plan 5 MNES Impact Assessment*. This plan also shows the Vulnerable listed *Macadamia tetraphylla* specimen observed outside of the referral area, which will not be impacted by the proposed action.

Full descriptions of the field survey results are included in *Att 1 11390 Cedar Creek Quarry MNES Report, Section 5, pp. 39-56*. Remnant vegetation across the referral area is generally consistent with the RE mapping of 12.11.3 consisting of *Eucalypt* and *Corymbia* species including *Corymbia citriodora* (Spotted Gum), *Eucalyptus siderophloia* (Grey Ironbark), *Eucalyptus acmenoides* (White Mahogany), *Eucalyptus microcorys* (Tallowwood), *Eucalyptus tereticornis* (Forest Red Gum), and *Eucalyptus propinqua* (Small-fruited Grey Gum). The shrub and ground layer contains moderate to high disturbance with *Lantana camara* (Lantana) dominant. The entirety of the referral area contains a steep south sloping gradient averaging 25 degrees (47%) and as steep as 35 degrees (70%) in parts.

Vegetation in the eastern extent of the referral area was identified on-ground as containing species indicative of pre-clear RE12.11.10 - notophyll vine forest. Species included *Aphananthe philippensis* (Rough-leaved Elm), *Cordyline rubra* (Red-fruited Palm Lily), *Alphitonia excelsa* (Soap tree), *Flindersia australis* (Crows Ash), *Jagera pseudorhus* (Foambark) and *Maclura cochinchinensis* (Cockspur Thorn). This area contained moderate-high weed infestation in parts dominated by *Lantana camara* (Lantana) and *Rivina humilis* (Coral Berry). Given the steep gradient across the referral area, this area showed signs of erosion.

The balance of the referral area displayed significant disturbance as a result of historical land clearing and on-going erosion. A drainage line is present in the centre of the referral area which includes only weeds and acacia regrowth. The remaining areas of this polygon contained dense weeds including *Lantana camara* (Lantana), *Megathyrus maximus* (Guinea Grass), *Melinis repens* (Red Natal Grass), *Solanum chrysotrichum* (Giant Devil's Fig), *Solanum mauritianum* (Wild Tobacco Tree), *Solanum seaforthianum* (Brazilian Nightshade), and acacia regrowth.

RE12.11.10 is an indicator RE for the Lowland Rainforest Threatened Ecological Community. As such, an assessment of the key diagnostic requirements was carried out. The full investigation is described in *Att 1 11390 Cedar Creek Quarry MNES Report, Section 5.3.1 pp. 48 – 50*. In summary, the vegetation generally meets the context characteristics under the first five KDCs including presence of basalt or alluvium soils, position relative to the coast and within the Threatened Ecological Community's distribution. However, most of this vegetation was densely weed infested with *Lantana camara* (Lantana) and *Ardisia crenata* (Coral Berry) and detailed field surveys did not identify a tall, closed forest with multiple canopy layers. This vegetation was indicative of regrowth and lacked tall trees (20-30m). Therefore, vegetation within the referral area does not meet the Key Diagnostic Characteristics for the Lowland Rainforest Threatened Ecological Community.

Fauna

A total of twenty (20) fauna species were recorded during field surveys, inclusive of motion sensor camera traps, including thirteen (13) birds, four (4) marsupials, two (2) reptile and one (1) invasive mammal. One conservation significant fauna species, the Koala, and evidence of their activity in the form of scats was recorded during the field survey. Motion sensor camera traps also detected the presence of at least one wild dog, which are known to pose a significant threat to native fauna, including the Koala. A complete fauna species list is provided in *Att 1 11390 Cedar Creek Quarry MNES Report, Appendix E*.

Multiple targeted fauna survey methods completed in accordance with relevant Commonwealth and State survey methodologies were implemented during the field survey period to target presence of potential MNES. This included spotlighting, motion-triggered camera detection, song meter recordings, crepuscular and diurnal bird surveys, active searches for signs of fauna usage (*i.e.*, Koala SAT surveys), and searches and assessment of foraging values and habitat suitability. Details of the methodology and survey dates are provided in *Att 1 11390 Cedar Creek Quarry MNES Report, Section 3. 2 pp. 13 - 18*. Full descriptions of the field survey results are included in *Att 1 11390 Cedar Creek Quarry MNES Report, Section 5, pp. 39-56*.

Targeted surveys were conducted for Koala (*Phascolarctos cinereus*), Grey-headed Flying-fox (*Pteropus poliocephalus*), Greater Glider (*Petauroides volans*), South-eastern Black-cockatoo (*Calyptorhynchus lathami lathami*) and White-Throated Needletail (*Hirundapus caudacutus*).

3.2.2 Describe the vegetation (including the status of native vegetation and soil) within the project area.

Dominant vegetation communities have been ground-truthed through multiple site walkovers using a GPS and aerial imagery to define boundaries. All communities present within and adjacent to the referral area are described below and displayed on *Att 1 11390 Cedar Creek Quarry MNES Report, Plan 4, p. 43*. Terrestrial habitat assessment data sheets have been included as *Att 1 11390 Cedar Creek Quarry MNES Report, Appendix D*.

The referral area is mapped as comprising of a mixture of Category B (remnant) vegetation with Category X (non-remnant) vegetation as a result of an approved PMAV (ref: 2008/008614), on-ground vegetation characteristics were utilised to delineate vegetation communities. Field surveys identified three (3) distinct vegetation communities within the referral area:

1. AU1 - Indicative of remnant RE12.11.3 (3.5ha)

Remnant vegetation across the referral area is generally consistent with the RE mapping of 12.11.3 consisting of *Eucalypt* and *Corymbia* species including *Corymbia citriodora* (Spotted Gum), *Eucalyptus siderophloia* (Grey Ironbark), *Eucalyptus acmenoides* (White Mahogany), *Eucalyptus microcorys* (Tallowwood), *Eucalyptus tereticornis* (Forest Red Gum), and *Eucalyptus propinqua* (Small-fruited Grey Gum). The shrub and ground layer contains moderate to high disturbance with *Lantana camara* (Lantana) dominant. The entirety of the referral area contains a steep south sloping gradient averaging 25 degrees (47%) and as steep as 35 degrees (70%) in parts.

1. AU2 - Regrowth RE12.11.10 (1.1ha)

Vegetation in the eastern extent of the referral area was identified on-ground as containing species indicative of pre-clear RE12.11.10 - notophyll vine forest. Species included *Aphananthe philippensis* (Rough-leaved Elm), *Cordyline rubra* (Red-fruited Palm Lily), *Alphitonia excelsa* (Soap tree), *Flindersia australis* (Crows Ash), *Jagera pseudorhus* (Foambark) and *Maclura cochinchinensis* (Cockspur Thorn). This

area contained moderate-high weed infestation in parts dominated by *Lantana camara* (Lantana) and *Rivina humilis* (Coral Berry). Given the steep gradient across the referral area, this area showed signs of erosion.

1. AU3 - Highly disturbed, dominated by weeds and acacia regrowth (1.3ha)

The balance of the referral area displayed significant disturbance as a result of historical land clearing and on-going erosion. A drainage line is present in the centre of the referral area which includes only weeds and acacia regrowth. The remaining areas of this polygon contained dense weeds including *Lantana camara* (Lantana), *Megathyrsus maximus* (Guinea Grass), *Melinis repens* (Red Natal Grass), *Solanum chrysotrichum* (Giant Devil's Fig), *Solanum mauritianum* (Wild Tobacco Tree), *Solanum seaforthianum* (Brazilian Nightshade), and acacia regrowth.

The referral area is a steep south facing slope at 320m AHD in the north and 200m AHD in the south with an average of 25 degrees (47%) and as steep as 35 degrees (70%) in parts. The gradient continues at this level to Cedar Creek Road further south. The referral area itself is mapped as land zone 11 which includes hills and lowlands on metamorphic rocks. Soils are mainly shallow, gravelly Rudosols and Tenosols, with Sodosols and Chromosols on lower slopes and gently undulating areas. Soils are typically of low fertility on steeper slopes.

3.3 Heritage

3.3.1 Describe any Commonwealth heritage places overseas or other places recognised as having heritage values that apply to the project area.

No Commonwealth Heritage Places are known to be located within or adjacent to the referral area.

3.3.2 Describe any Indigenous heritage values that apply to the project area.

No Indigenous heritage values are known to occur within the referral area. A duty of care site assessment has been completed to identify any Aboriginal objects or natural features. The proponent is aware of their duty of care obligations and will engage with the traditional owners prior to the commencement of work.

3.4 Hydrology

3.4.1 Describe the hydrology characteristics that apply to the project area and attach any hydrological investigations or surveys if applicable. *

Two drainage lines are mapped under the Vegetation Management Act 1999 (VMA) as beginning in the referral area. Both drainage lines exist as steep, eroded, ephemeral gullies with heavy weed infestations. The western drainage line is present in the centre of the referral area and includes only weeds and acacia regrowth. The eastern drainage line flow path was not evident during field surveys.

The Moreton Bay RAMSAR Site (MBRS) is located approximately 20 km northeast of the referral area. The drainage lines in the referral area connect with Cedar Creek after approximately 700 m – 1km. To reach Moreton Bay, these waters must then travel over 17km north, and then at least another 15km east through a series of waterways. Water that originates on-site travels through highly disturbed land-uses including industrial and residential developments, major roads (Pacific Motorway), modified flow-paths, and rural land uses refer *Att 5 Ramsar Context Plan*. As such, the referral area is considered substantially separate from MBRS and is therefore not considered to impact it.

Stormwater within the referral area will be managed in accordance with the Stormwater Management Plan in effect for existing operations, provided as *Att 4 Stormwater Management Plan*. This management plan outlines principal objectives and how they are to be achieved including adequate control measures to manage runoff from site, preservation of water quality downstream and to provide a framework for surveillance, response and reporting. Proposed stormwater runoff management controls will be designed in accordance with the Queensland Urban Drainage Manual (QUDM), as per industry standards.

4. Impacts and mitigation

4.1 Impact details

Potential Matters of National Environmental Significance (MNES) relevant to your proposed action area.

EPBC Act section	Controlling provision	Impacted	Reviewed
S12	World Heritage	No	Yes
S15B	National Heritage	No	Yes
S16	Ramsar Wetland	No	Yes
S18	Threatened Species and Ecological Communities	Yes	Yes
S20	Migratory Species	No	Yes
S21	Nuclear	No	Yes
S23	Commonwealth Marine Area	No	Yes
S24B	Great Barrier Reef	No	Yes
S24D	Water resource in relation to large coal mining development or coal seam gas	No	Yes
S26	Commonwealth Land	No	Yes
S27B	Commonwealth Heritage Places Overseas	No	Yes
S28	Commonwealth or Commonwealth Agency	No	Yes

4.1.1 World Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.1.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.1.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

No World Heritage Sites exist within or near to the referral area. There is no potential for impact on a World Heritage Property from the proposed action. The site is located approximately 35 km north of the closest World Heritage area, Gondwanan Rainforests of Australia (Main Range National Park), and therefore no impact is anticipated to occur.

4.1.2 National Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.2.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.2.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

No National Heritage places exist within or near to the referral area. No potential for impact on a National Heritage Place from the proposed action. The closest National Heritage Place is Gondwanan Rainforests of Australia (Main Range National Park) which is approximately 35 km to the north-west of the referral area. Due to the distance of the project site away from this area, it is unlikely that it will have an impact on any National Heritage places.

4.1.3 Ramsar Wetland

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Ramsar wetland
No	No	Moreton Bay

4.1.3.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.3.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

The referral area contains two mapped drainage features. However, the stormwater originating from the referral area will have no impact on Moreton Bay Ramsar Site (MBRS) given the overall separating distance of at least 40 km (refer *Att 5 Ramsar Context Plan*). Water that originates on-site travels through highly disturbed land-uses including industrial and residential developments, major roads, modified flow-paths, and rural land uses. Furthermore, the application of a Stormwater Management Plan (refer *Att 4 Stormwater Management Plan*) ensures that stormwater will be treated in accordance with best practice guidelines including Queensland Urban Drainage Manual (QUDM) prior to leaving the site. Therefore, there is not considered to be any direct or indirect impacts on the MBRS.

No other wetlands of international importance occur within close proximity of the project extent. No direct impacts on the wetland are anticipated to occur as a result of the project construction and operation.

4.1.4 Threatened Species and Ecological Communities

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Threatened species

Direct impact	Indirect impact	Species	Common name
No	No	Anthochaera phrygia	Regent Honeyeater
No	No	Argynnis hyperbius inconstans	Australian Fritillary
No	No	Arthraxon hispidus	Hairy-joint Grass

Direct impact	Indirect impact	Species	Common name
No	No	Baloghia marmorata	Marbled Balogia, Jointed Baloghia
No	No	Bosistoa transversa	Three-leaved Bosistoa, Yellow Satinheart
No	No	Botaurus poiciloptilus	Australasian Bittern
No	No	Calidris acuminata	Sharp-tailed Sandpiper
No	No	Calidris ferruginea	Curlew Sandpiper
No	No	Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo
No	No	Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat
No	No	Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover
No	No	Climacteris picumnus victoriae	Brown Treecreeper (south-eastern)
No	No	Coeranoscincus reticulatus	Three-toed Snake-tooth Skink
No	No	Coleus habrophyllus	
No	No	Coleus nitidus	Nightcap Plectranthus, Silver Plectranthus
No	No	Corchorus cunninghamii	Native Jute
No	No	Croton mamillatus	Bahrs Scrub Croton
No	No	Cryptocarya foetida	Stinking Cryptocarya, Stinking Laurel
No	No	Cryptostylis hunteriana	Leafless Tongue-orchid
No	No	Cupaniopsis shirleyana	Wedge-leaf Tuckeroo
No	No	Cyclopsitta diophthalma coxeni	Coxen's Fig-Parrot
No	No	Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)
No	No	Delma torquata	Adorned Delma, Collared Delma
No	No	Diploglottis campbellii	Small-leaved Tamarind
No	No	Endiandra floydii	Floyd's Walnut, Crystal Creek Walnut
No	No	Endiandra hayesii	Rusty Rose Walnut, Velvet Laurel
No	No	Erythroriorchis radiatus	Red Goshawk
No	No	Falco hypoleucos	Grey Falcon
No	No	Fontainea venosa	

Direct impact	Indirect impact	Species	Common name
No	No	<i>Furina dunmalli</i>	Dunmall's Snake
No	No	<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe
No	No	<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern)
No	No	<i>Gossia gonoclada</i>	Angle-stemmed Myrtle
No	No	<i>Grantiella picta</i>	Painted Honeyeater
No	No	<i>Hemiaspis damelii</i>	Grey Snake
No	No	<i>Hirundapus caudacutus</i>	White-throated Needletail
No	No	<i>Lathamus discolor</i>	Swift Parrot
No	No	<i>Leichhardtia longiloba</i>	Clear Milkvine
No	No	<i>Lepidium peregrinum</i>	Wandering Pepper-cress
Yes	No	<i>Macadamia integrifolia</i>	Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak
No	No	<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut
No	No	<i>Maccullochella mariensis</i>	Mary River Cod
No	No	<i>Macroderma gigas</i>	Ghost Bat
No	No	<i>Mixophyes fleayi</i>	Fleay's Frog
No	No	<i>Notelaea lloydii</i>	Lloyd's Olive
No	No	<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew
No	No	<i>Owenia cepiodora</i>	Onionwood, Bog Onion, Onion Cedar
No	No	<i>Persicaria elatior</i>	Knotweed, Tall Knotweed
Yes	No	<i>Petauroides volans</i>	Greater Glider (southern and central)
No	No	<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)
No	No	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby
No	No	<i>Phaius australis</i>	Lesser Swamp-orchid
Yes	No	<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the	Koala (combined populations of Queensland, New South Wales and the

Direct impact	Indirect impact	Species	Common name
		ACT)	Australian Capital Territory)
No	No	Planchonella eerwah	Shiny-leaved Condoe, Black Plum, Wild Apple
No	No	Potorous tridactylus tridactylus	Long-nosed Potoroo (northern)
Yes	No	Pteropus poliocephalus	Grey-headed Flying-fox
No	No	Randia moorei	Spiny Gardenia
No	No	Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood
No	No	Rhodomyrtus psidioides	Native Guava
No	No	Rostratula australis	Australian Painted Snipe
No	No	Samadera bidwillii	Quassia
No	No	Sophora fraseri	
No	No	Stagonopleura guttata	Diamond Firetail
No	No	Syzygium hodgkinsoniae	Smooth-bark Rose Apple, Red Lilly Pilly
No	No	Thesium australe	Austral Toadflax, Toadflax
No	No	Tringa nebularia	Common Greenshank, Greenshank
No	No	Turnix melanogaster	Black-breasted Button-quail
No	No	Vincetoxicum woollsii	
No	No	Zieria collina	

Ecological communities

Direct impact	Indirect impact	Ecological community
No	No	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community
No	No	Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland
No	No	Lowland Rainforest of Subtropical Australia
No	No	Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Direct impact	Indirect impact	Ecological community
No	No	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

4.1.4.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.4.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Yes.

Greater Glider (*Petauroides volans*)

The Greater Glider is largely restricted to eucalypt forest and woodlands. It is primarily folivorous with a diet mostly comprising of eucalypt leaves and occasionally flowers. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The species favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. During the day it shelters in tree hollows, with a particular preference for large hollows in large, old growth trees. As such, the presence of live, hollow-bearing trees is thought to be a limiting factor within otherwise suitable habitat.

Suitable potentially foraging habitat exists on site in the form of Eucalypt woodland however the effects of historical land clearing as well as steep rocky terrain of poor-quality soil has resulted in very few mature trees or hollow bearing trees. This habitat would be removed under the proposed action.

Koala (*Phascolarctos cinereus*)

Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland and emergent food trees. Preferred food and shelter trees are naturally abundant on fertile clay soils. Along the Great Dividing Range and the coastal belt throughout the species' range, Koalas inhabit moist forests and woodlands mostly dominated by *Eucalyptus* sp.

Under the Queensland Vegetation Management Act 1999, the referral area is mapped as containing Category X (non-remnant) vegetation, locked in under an approved PMAV (ref: 2008/008614), and Category B (remnant) vegetation, containing RE 12.11.3, known to provide suitable Koala Habitat. Non-juvenile Koala Habitat Trees (NJKHTs) are present across the referral area including *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus siderophloia* (Grey Ironbark), *Corymbia intermedia* (Pink Bloodwood), *Corymbia citriodora* (Spotted Gum), *Eucalyptus propinqua* (Grey Gum), *Eucalyptus acmenoides* (White Mahogany), *Eucalyptus grandis* (Flooded Gum) and *Eucalyptus microcorys* (Tallowwood). This potential habitat would be removed from the referral area under the proposed action.

Grey-headed flying-fox (*Pteropus poliocephalus*)

The GHFF is heavily dependent on the availability of foraging resources and roost sites. As canopy feeding frugivores and nectarivores, GHFFs frequent fruiting and flowering trees in rainforests, open eucalypt forests, woodlands, *Melaleuca* sp. swamps and *Banksia* woodlands.

Suitable foraging habitat is present within the referral area in the form of Eucalypt and *Corymbia* dominated vegetation consisting of *Eucalyptus tereticornis* (Forest Red Gum), *E. crebra* (Narrow-leaved Ironbark), *E. siderophloia* (Grey Ironbark), *Corymbia citriodora* (Spotted Gum) and *Grevillea robusta* (Silky Oak). This potential habitat would be removed from the referral area under the proposed action.

Macadamia Nut (*Macadamia integrifolia*)

M. integrifolia are found along foothills and coastal ranges from northern New South Wales to south-east Queensland. Populations of the species tend to be small or consist of scattered individuals. *M.*

integrifolia are known to occur in remnant rainforest, including complex mixed notophyll forest, and prefer partially open areas such as rainforest edges. The species occur on basic and intermediate volcanics and alluvia in higher rainfall areas and occupy all topographic positions including ridges, scree slopes, foot slopes, gullies, benches and riverine terraces.

Under the DCCEEW species profile for this *Macadamia* species, habitat is largely associated with remnant vegetation containing subtropical rainforest and complex notophyll vine-forest. Within the referral area there is 1.1 ha of non-remnant vegetation which contains regrowth characteristics reflective of RE 12.11.10. This area was observed to contain vegetation characteristic of notophyll vine forest and therefore reflects potential habitat for *Macadamia integrifolia*. Field assessments throughout and adjacent to the referral area identified specimens of *Macadamia integrifolia*. Specimens observed included several juvenile and mature *M. integrifolia* located within and adjacent to the referral area.

This area of potential habitat, as well as the *M. integrifolia* specimens identified within the referral area, will be removed under the proposed action.

4.1.4.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact?

*

No

4.1.4.6 Describe why you do not consider this to be a Significant Impact. *

No.

Greater Glider (*Petauroides volans*)

A full assessment against the Significant Impact Guidelines 1.1 is provided in *Att 1 11390 Cedar Creek Quarry MNES Report, Section 8, pp. 83-89*. This assessment determined the proposed action is unlikely to result in a Significant Impact to Greater Glider.

The removal of the vegetation within the referral area under the proposed action will not have a Significant Impact on Greater Glider, since the potential habitat on site is limited, poor quality, and not considered critical to the survival of the species. The referral area is adjacent to an active quarry and has undergone historical land clearing resulting in a high prevalence of invasive weed species and Category X (non-remnant) vegetation, and in combination with the steep rocky terrain and poor-quality soil means there are

very few large, mature trees that could provide hollows for denning. Field surveys corroborated this, finding only 22% of the canopy trees within two 100 m habitat quality transects met the large tree benchmark for RE 12.11.3, and observing no hollow-bearing trees. Hollow-bearing trees are often a limiting factor to the usefulness of potential habitat to Greater Glider.

Dispersal opportunities are only present to the south-west as the current quarry footprint borders the north and unsuitable vine forest vegetation is present to the east. The nearest record of the species is approximately 5km south from 2022 with additional records further south. The majority of these sightings have been recorded within Mount Tamborine National Park which provides a significant amount of intact, high-value remnant vegetation. Vegetation within the referral area retains limited connectivity to Mount Tamborine National Park as a result of cleared rural residential land and thin linear strips of retained vegetation. Targeted surveys did not detect any evidence of Greater Glider within the referral area, suggesting the vegetation is not utilised by Greater Glider.

Therefore, the removal of potential Greater Glider habitat on site (3.5 ha) will not have a Significant Impact on the species since the habitat is highly disturbed and low quality, with limited potential for denning, and alternative suitable habitat is present in the immediate surrounds, and further in Mount Tamborine National Park.

Koala (*Phascolarctos cinereus*)

A full assessment against the Significant Impact Guidelines 1.1 is provided in *Att 1 11390 Cedar Creek Quarry MNES Report, Section 8, pp. 66-74*. This assessment determined the proposed action is unlikely to result in a Significant Impact to Koala.

The habitat that will be removed under the proposed action is considered to be low quality and not critical to the survival of Koala, especially compared to the available habitat in the surrounding area. The referral area itself has undergone historical land clearing, with portions having only scattered trees remaining and dominated by weeds at the ground level. Areas of the central and eastern extents of the referral area are vegetated with a treed canopy and varying levels of understory disturbance. The steep and highly disturbed nature of vegetation within the referral area is also unlikely to provide optimal dispersal opportunity for the species, particularly as there is no connection to the north-east/north-west.

Major arterial roads to the west, cleared residential properties to the south and the associated operational quarry directly north of the referral area are several major inhibitors to safe Koala movement within the local area. However surrounding bushland vegetation and vegetation associated with Mount Tamborine National Park and Cedar Creek area provide a large of foraging and dispersal habitat. Although the proposed vegetation clearing within the referral area adjoins these bushland areas, the referral area itself was observed to contain significant weed incursion and very steep gradient. Therefore, the habitat is considered lower value than the bushland within the wider region.

Consideration to the overall size of the referral area has also been given, where it is 5.94 ha in total, 1.25 ha of which was dominated by acacia regrowth and weeds, and 1.14 ha is reflective of regrowth vine thicket vegetation. Therefore, within the referral area, 3.55 ha can be considered “tangible” habitat for Koala, albeit low value. The referral area does not contribute significantly to critical habitat given the relatively small size in comparison to surrounding protected bushland and high levels of disturbance.

Although a Koala was observed during survey, targeted Koala context surveys assessing the area for overall occupancy suggested a low usage of the referral area by the species.

Overall, the removal of the small expansion area adjoining the existing quarry is unlikely to have a Significant Impact on Koala due to its size, quality, and the availability of a large quantity of habitat directly surrounding the referral area that is likely higher quality. The removal of vegetation within the referral area will not further existing fragmentation of habitat, nor remove any habitat that is unique or critical in the surrounding area.

Grey-headed flying-fox (*Pteropus poliocephalus*)

A full assessment against the Significant Impact Guidelines 1.1 is provided in *Att 1 11390 Cedar Creek Quarry MNES Report, Section 8, pp. 75 - 82*. This assessment determined the proposed action is unlikely to result in a Significant Impact to Macadamia Nut and Rough-shelled Bush Nut.

The removal of potential Grey-headed Flying-fox habitat within the referral area under the proposed action is unlikely to significantly impact the species, since the habitat itself is relatively small and low-quality, and the species is highly adaptive and can easily utilise the alternate habitat accessible within the surrounding area. Grey-headed Flying-fox is known to forage within a variety of habitat areas as each resource does not produce food throughout the entire year. Suitable foraging habitat is present within the referral area in the form of Eucalypt and Corymbia dominated vegetation consisting of *Eucalyptus tereticornis* (Forest Red Gum), *E. crebra* (Narrow-leaved Ironbark), *E. siderophloia* (Grey Ironbark), *Corymbia citriodora* (Spotted Gum) and *Grevillea robusta* (Silky Oak). However, given the availability of suitable foraging habitat within the broader area, associated with Wickham and Tamborine National Park in the local area and the Green Mountains further south, it is considered unlikely that the species would utilise the relatively small area of 5.94 ha associated with the expansion area.

Surveys did not record GHFF foraging within or adjacent the referral area nor as a fly-over species. Additionally, no roosts are present within the referral area or directly adjacent with a review of the National Flying-fox monitoring viewer identified a GHFF roost approximately 8.7km north-east of the referral area (Pimapama, Mirambeena Drive (851)). The proposed action not considered to reduce the area of occupancy of an important population of GHFF as there is no evidence the species utilise vegetation within the referral area. Furthermore, potential foraging habitat is limited to 3.55 ha of eucalypt vegetation, which is a fraction of the available habitat within the broader locality.

Ultimately, compared to the high mobility of the species and large availability of high-quality habitat, the removal of the small amount of low-quality potential habitat within the referral area which does not contain a roost is unlikely to constitute a Significant Impact.

Macadamia Nut (*Macadamia intergrifolia*)

A full assessment against the Significant Impact Guidelines 1.1 is provided in *Att 1 11390 Cedar Creek Quarry MNES Report, Section 8, pp. 90 - 99*. This assessment determined the proposed action is unlikely to result in a Significant Impact to Macadamia Nut.

The referral area contains 1.1 ha of potential habitat for these two species. This habitat, which will be removed under the proposed action, is considered to be low quality and not critical to the survival of either species, especially compared to the available habitat in the surrounding area. The habitat is considered low quality since the referral area has undergone historical land clearing and so is highly disturbed with high levels of invasive weed species present that compete with native flora species such as Macadamia Nut for space and nutrients. The habitat, being adjacent to the active existing quarry, is also affected by higher

levels of edge effects from the noise, light, and dust generated during extraction activities compared to habitat present further from the quarry within the large, surrounding area of bushland where records of both species occur.

The Macadamia Nut specimens that have been located within the referral area are not considered to constitute an important or key population, given only a small cluster of both mature and juvenile specimens were identified within regrowth vegetation. Other key populations are not located within or near to the referral area. The removal of the Macadamia specimens within the referral area will occur under an Impact Management Plan with compensatory plantings for each specimen removed, resulting in no net loss.

Therefore, the removal of the small number of specimens and 1.1 ha of potential habitat within the referral area is unlikely to constitute a Significant Impact to the species.

4.1.4.7 Do you think your proposed action is a controlled action? *

No

4.1.4.9 Please elaborate why you do not think your proposed action is a controlled action.

*

No.

The proposed action is not considered to be a controlled action because it is unlikely to cause Significant Impact to any MNES. The referral area is proposed for use that aligns with its current zoning ('extractive industry'), does not fragment any regulated vegetation or potential habitat for listed species, is a natural extension of a pre-existing quarry, and is highly disturbed, containing no critical or unique values. The referral area is a small section of a much larger area of largely remnant bushland and therefore the relatively small impact area of 5.9ha is not considered a significant impact.

4.1.4.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Vegetation clearing management plan

A Vegetation Clearing and Management Plan (VCMP) will form part of the broader management document submitted as part of the operational works application for the proposed action. The VCMP will cover clearing of all vegetation within the referral area and include details on:

- Vegetation communities to be removed.
- All civil works likely to impact on existing vegetation.
- Temporary and permanent exclusion and protection fencing.
- Roles and responsibilities for site contractors, the developer and the consultant group.
- Stockpiling and site access locations.

- A clearing sequence plan showing the commencement of clearing and direction of removal (this will be in conjunction with the Fauna Management Plan to allow for the appropriate flushing of fauna towards safe havens and/or the application of an appropriate relocation program).
- Links to weed management and revegetation proposals.
- The stock piling and reuse of cleared vegetation.

Fauna Management Plan

A Fauna Management Plan (FMP) will be prepared for potential impacts of the construction phase covering the loss of vegetated areas, isolated trees and likely barriers and impediments to local dispersal.

The FMP will link closely with the VCMP and include details on:

- Species surveyed as using the site with a focus on those most likely impacted by development works.
- A list of relevant State and Commonwealth legislation constraints and controls for the above listed fauna.
- A plan showing existing habitat opportunities and locations.
- Details of the threats to existing fauna species.
- Clearing sequence plan from the VCMP.
- Management and mitigation measures.
- Fauna spotter role, contacts and certification.
- Specific fauna management procedures for potential or known habitat trees.

Fauna Spotter Catcher

A registered and suitability qualified fauna spotter catcher/ecologist will need to be employed for clearing works to implement a protocol of best management practises. Significant habitat features, should any be identified on site, will be flagged prior to clearing events and these areas supervised by an appropriately experienced Ecologist. Identified within the clearing supervision protocol should be flagging of hollow bearing trees, if present, followed by the removal of vegetation surrounding them. After 24 to 72 hours, these trees should then be removed.

The objective of this is to enable hollow dependant fauna an opportunity to move on their own accord as many species utilise multiple den/roost sites within a given home range should they occur. Where required, native fauna situated within areas to be cleared will be relocated to a secure area of similar habitat prior to the commencement of vegetation clearance works by a registered fauna spotter/catcher. Should any removal and relocation of nests be required, it is to be undertaken by a suitably qualified and experienced person and advice sought where necessary.

Impact Management Plan – Macadamia sp.

Given the majority of the referral area falls within Protected plants trigger mapping under Queensland State legislation, *Nature Conservation Act 1992*. An impact management plan will be required prior to clearing for NCA/EPBC listed species *Macadamia integrifolia* which were recorded within the impact area.

An Impact Management Plan will include the following details

- attempts to avoid and minimise impact
- nature of impact
- management of impact
- justification of impact management
- survival of plant in the wild
- offsetting assessment

As part of the impact management plan a significant residual impact (justification of impact) will be provided as well as details of rehabilitation efforts (i.e extent, success, timeframe). It is expected that individual *Macadamia integrifolia* recorded within the referral area would be offset at a ratio of 4:1 within a suitable vegetation community. Surveys identified 15 individual specimens of *Macadamia integrifolia* (at varying levels of maturity) indicating planting of 60 individuals.

Operational Phase Environmental Management

he extraction activities will be carried out in accordance with the relevant permits and approvals from State and Local government. In particular, extraction activities require an Environmental Authority (EA) from DES prior to any works commencing. An EA imposes conditions to reduce or avoid potential environmental impacts. The current EA is included as *Att 2a Environmental Approvals*.

Furthermore, impacts of extraction industry during the operational phase is temporary as once the quarry benches are extracted to terminal status they are then rehabilitated with native vegetation as per the requirements of the Environmental Authority. Once rehabilitation has occurred, impacts are limited to infrequent light vehicle movements to monitor and maintain vegetation and safety fencing.

4.1.4.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

Following assessment of the significant impact guidelines, the project is not considered to have a significant impact on any MNES. An offset for the removal of the *Macadamia integrifolia* specimens located within the referral area will be provided through compensatory planting at a ratio of 4:1 as per state requirements.

4.1.5 Migratory Species

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Species	Common name
No	No	<i>Actitis hypoleucos</i>	Common Sandpiper
No	No	<i>Apus pacificus</i>	Fork-tailed Swift
No	No	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper
No	No	<i>Calidris ferruginea</i>	Curlew Sandpiper
No	No	<i>Calidris melanotos</i>	Pectoral Sandpiper
No	No	<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover
No	No	<i>Cuculus optatus</i>	Oriental Cuckoo, Horsfield's Cuckoo
No	No	<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe
No	No	<i>Hirundapus caudacutus</i>	White-throated Needletail
No	No	<i>Monarcha melanopsis</i>	Black-faced Monarch
No	No	<i>Myiagra cyanoleuca</i>	Satin Flycatcher
No	No	<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew
No	No	<i>Rhipidura rufifrons</i>	Rufous Fantail
No	No	<i>Symposiachrus trivirgatus</i>	Spectacled Monarch
No	No	<i>Tringa nebularia</i>	Common Greenshank, Greenshank

4.1.5.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.5.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

A likelihood of occurrence assessment has been carried out by SHG using information from previous and contemporary ecological field surveys to assess the potential for listed threatened species and communities to utilise and / or occur on site. The likelihood assessment has been included at *Att 1 11390 Cedar Creek Quarry MNES Report, Appendix C*. No migratory species have been identified within the referral area, and the three species that were identified as having a 'moderate' or greater likelihood of occurring on-site during the Likelihood of Occurrence table are not considered to likely be impacted by the removal the referral area vegetation.

Habitat for the Black-faced Monarch (*Monarcha melanopsis*) includes rainforest, eucalypt woodlands, coastal scrub and damp gullies. The referral area contains limited available habitat in the form of eucalypt woodland (3.55 ha). However true rainforest vegetation and damp vegetated gullies are not present. Similarly, the Satin Flycatcher (*Monarcha melanopsis*) and Rufous Fantail (*Rhipidura rufifrons*) prefer heavily vegetated gullies dominated by eucalypts. An eroded drainage line was observed within the referral area however this was heavily weed infested and did not contain eucalypt species. Therefore, the referral area is not considered to provide the preferred habitat for these species. It is considered unlikely that these species would utilise the vegetation within the referral area given the relatively small area and lack of preferred habitat. These species are also considered common throughout the SEQ region. The proposed action is not considered likely to impact the availability of habitat for the species.

4.1.6 Nuclear

4.1.6.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.6.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

The proposed action does not comprise a nuclear action, and therefore a direct and / or indirect impact is not predicted.

4.1.7 Commonwealth Marine Area

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.7.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.7.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

The proposed action is not being taken in or proximal to a Commonwealth Marine Area. Commonwealth marine areas exist approximately 18 km east of the project site, therefore the proposed action is not likely to impact on this Commonwealth marine area.

4.1.8 Great Barrier Reef

4.1.8.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.8.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

The proposed action is more than 350km south of the Great Barrier Reef Marine Park, and is not considered to directly and / or indirectly impact upon it.

4.1.9 Water resource in relation to large coal mining development or coal seam gas

4.1.9.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.9.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

The proposed action does not comprise a CSG development or large coal mine.

4.1.10 Commonwealth Land

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.10.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.10.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

The proposed action is not to occur on or adjacent to Commonwealth Land.

4.1.11 Commonwealth Heritage Places Overseas

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.11.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.11.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact.

*

No.

The proposed action is not to occur on or adjacent to Commonwealth heritage places overseas.

4.1.12 Commonwealth or Commonwealth Agency

4.1.12.1 Is the proposed action to be taken by the Commonwealth or a Commonwealth Agency? *

No

4.2 Impact summary

Conclusion on the likelihood of significant impacts

You have indicated that the proposed action will likely have a significant impact on the following Matters of National Environmental Significance:

None

Conclusion on the likelihood of unlikely significant impacts

You have indicated that the proposed action will unlikely have a significant impact on the following Matters of National Environmental Significance:

- World Heritage (S12)
- National Heritage (S15B)
- Ramsar Wetland (S16)
- Threatened Species and Ecological Communities (S18)
- Migratory Species (S20)
- Nuclear (S21)
- Commonwealth Marine Area (S23)
- Great Barrier Reef (S24B)
- Water resource in relation to large coal mining development or coal seam gas (S24D)
- Commonwealth Land (S26)
- Commonwealth Heritage Places Overseas (S27B)
- Commonwealth or Commonwealth Agency (S28)

4.3 Alternatives

4.3.1 Do you have any possible alternatives for your proposed action to be considered as part of your referral? *

No

4.3.8 Describe why alternatives for your proposed action were not possible. *

The resource within the quarry extension area adjoins an existing extractive industry to the north. This site has been used for extraction since the 1970s. The proposed extraction area covers land to the southeast of the existing operation and is a logical extension of the existing activities.

Due to the location of the valuable resource and convenient location adjacent to the existing operational site, alternatives have not been considered for the resource. The location of the proven resource adjacent to the existing infrastructure and within the 'extractive industry' zoning has affirmed the viability of the proposed extension area. The materials sourced from the proponent's operation are considered of particular importance for their unique properties and specialty applications.

The proposed expansion is for the extraction areas only and will result in a significantly reduced development footprint and amenity impacts compared to the establishment of a new quarry where new supporting screening, stockpiling and processing facilities would be developed as well as new transport operations.

5. Lodgement

5.1 Attachments

1.2.1 Overview of the proposed action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att 1 11390 Cedar Creek Quarry MNES Report.pdf Technical MNES Report	15/02/2024	No	High
#2.	Document	Att 2a Environmental Approvals.pdf Cedar Creek Environmental authority P-EA-100268669	03/10/2024	No	High
#3.	Document	Att 2b Environmental Approvals_Part 2.pdf RARP 2011-006373 (MCU201100490)	14/11/2024	No	High

1.2.7 Public consultation regarding the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att 6 Aboriginal cultural heritage consultation.pdf Cultural heritage assessment	05/06/2024	Yes	High

1.3.2.18 (Person proposing to take the action) If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att 3 Environmental Policy.pdf Fulton Hogan Group Environmental Policy	31/12/2024	No	High

3.4.1 Hydrology characteristics that apply to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att 4 Stormwater Management Plan.pdf Blue Rock Quarry Cedar Creek Stormwater Management Plan	05/11/2012	Low	High
#2.	Document	Att 5 Ramsar Context Plan.pdf Flow path of water from site to Moreton Bay Ramsar site	29/05/2024	Low	High

5.2 Declarations

Completed Referring party's declaration

The Referring party is the person preparing the information in this referral.

ABN/ACN	24144972949
Organisation name	Saunders Havill Group Pty Ltd
Organisation address	4006 QLD
Representative's name	Liam Brzezinski
Representative's job title	Senior Ecologist
Phone	0431173273
Email	liambrzezinski@saundershavill.com
Address	9 Thompson Street, Bowen Hills, 4006 QLD

- Check this box to indicate you have read the referral form. *
- I would like to receive notifications and track the referral progress through the EPBC portal. *
- By checking this box, I, **Liam Brzezinski of Saunders Havill Group Pty Ltd**, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. *
- I would like to receive notifications and track the referral progress through the EPBC portal. *

✔ Completed Person proposing to take the action's declaration

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	16004475076
Organisation name	FULTON HOGAN QUARRIES PTY LTD
Organisation address	3121 VIC
Representative's name	Andrew Lyndon
Representative's job title	National Planning and Approvals Manager
Phone	+61 499 400 642
Email	andrew.lyndon@fultonhogan.com.au
Address	Garden City Office Park, Building 8, 2404 Logan Road, Eight Mile Plains, QLD, 4113

Check this box to indicate you have read the referral form. *

I would like to receive notifications and track the referral progress through the EPBC portal. *

I, **Andrew Lyndon of FULTON HOGAN QUARRIES PTY LTD**, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity. *

I would like to receive notifications and track the referral progress through the EPBC portal. *

✔ Completed Proposed designated proponent's declaration

The Proposed designated proponent is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

Check this box to indicate you have read the referral form. *

- I would like to receive notifications and track the referral progress through the EPBC portal. *
- I, **Andrew Lyndon of FULTON HOGAN QUARRIES PTY LTD**, the Proposed designated proponent, consent to the designation of myself as the Proposed designated proponent for the purposes of the action described in this EPBC Act Referral. *
- I would like to receive notifications and track the referral progress through the EPBC portal. *

Attachment 1 – 11390_MNES Report_Blue Rock Quarry



Ecological Assessment – Matters of National Environmental Significance

EPBC Act Referral – MNES Assessment

Blue Rock Quarry, Cedar Creek, Queensland 4207

Prepared for Fulton Hogan Quarries Pty Ltd
16 February 2024

Job 11390

Document Control

Document: 11390 Blue Rock Quarry, Cedar Creek, Ecological Assessment – Matters of National Environmental Significance, prepared by Saunders Havill Group for Platform Residential Ltd, dated 16 February 2024

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Prepared by

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1. Introduction

Saunders Havill Group (SHG) was engaged by Fulton Hogan Quarries Pty Ltd to carry out an ecological assessment of Matters of National Environmental Significance (MNES) to support a referral under the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The purpose of this report is to identify potential MNES, specifically listed threatened species and communities that may be impacted by the proposed quarry expansion ('the action') of land located at Cedar Creek Road, Cedar Creek, Queensland ('the site').

1.1. Description of the Action

Fulton Hogan Quarries Pty Ltd ('the Proponent') is proposing an expansion of the existing Blue Rock Quarry on land located at Cedar Creek Road, Cedar Creek, Queensland described as part of Lot 89 on WD739 and Lot 1 on SP238024. The balance of the site is currently utilised for extractive industries. Blue Rock Quarry forms part of a cluster of key extractive industries in the region to cater for the increasing demands of development in South-East Queensland (SEQ).

The existing quarry has been operational since the 1970s with the initial extraction approval obtained in 1972. A range of other State and Local approvals have been obtained over the years including Environmental Authorities (EAs) which outline management requirements for the extraction activities and operational works permits to allow vegetation clearing for approved extraction. The extent of the current extraction area was reached in approximately 2005 with vegetation within the quarry being cleared and regrowing in cycles to support the extraction activity. These areas are considered to form part of the existing quarry operations.

The expansion area that is subject to this referral is a 5.9 hectare patch of vegetation immediately adjacent to the south of the operational quarry. The referral area is extremely steep with a drop of more than 100m from the northeast to the southwest corners. The following State and local Council approvals have also been obtained for the expansion/referral area including (refer **Attachment 2** accompanying this report):

- Environmental Authority P-EA-100268669 which includes extraction and screening activities for up to 1,600,000t per year on Lot 89 on WD739 and Lot 1 on SP238024.
- Clearing of remnant vegetation within the expansion area through DNRM permits RARP 2011/006373 and DPP 2005/101762
- MCU201400231 Material Change of Use Development Approval issued by Gold Coast City Council
- 306/3/248 (1977) Rezoning Approval for Extractive Industry issued by the then Albert Shire Council

Refer to **Figure 1** and **Figure 2** for site context and referral area respectively.

1.2. Purpose

This ecological assessment has been prepared to support a referral to the Australian Government's Department of Climate Change, Energy, the Environment and Water ('the Department') for assessment against the EPBC Act. The purpose is to:

- Identify biodiversity values within or near the project area including MNES
- Identify potential impacts of the proposed action on MNES
- Present a list of measures to avoid, minimise and / or mitigate the identified impacts; and
- Provide an assessment against the *Significant Impact Guideline 1.1* for MNES identified as having the potential to be impacted by the action, at its broadest scope.

The findings of this assessment will identify if the action is likely to have a significant residual impact on MNES and determine if it should be made a controlled action.

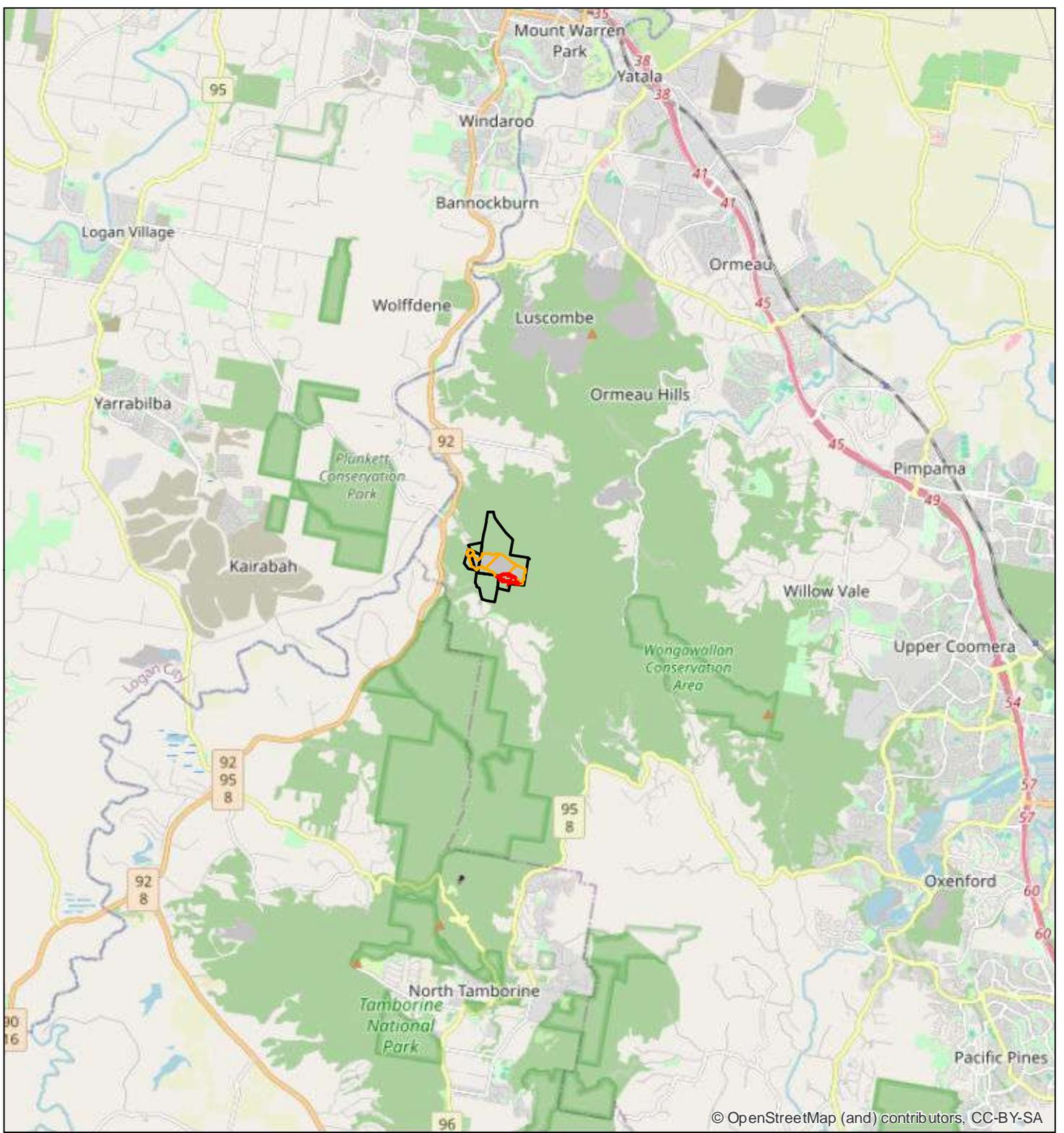
1.3. Areas of Investigation

The areas of investigation for this ecological assessment include:

- Referral area – part of Lot 89 on WD739 and Lot 1 on SP238024 totalling approximately 5.94 ha (the expansion area).
- Locality – the extent of the 5 km radius database searches of the referral area.

1.4. Site Context

The referral area is located on a steep vegetated slope, adjacent to cleared tracks and the existing extractive zones of the operating Blue Rock Quarry. It is located within the suburb of Cedar Creek, approximately 12 kilometres (km) south of Beenleigh, Cedar Creek Road is present further south, the current quarry footprint to the north and a mixture of remnant and regrowth vegetation with rural residential properties in the broader landscape.



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Legend

-  Site DCDB
-  Referral Area
-  Existing Quarry

Figure 1
Site Context



File ref. 11390 E Figure 1 Site Context A
Date 5/02/2024
Project Blue Rock Quarry, Cedar Creek



Scale (A4): 1:125,000 [GDA 2020 MGA Z56]

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2. Commonwealth Legislation and Policy

2.1. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a requirement for Commonwealth environmental assessment and approval for actions that are likely to have a significant impact on any MNES protected under the EPBC Act, including:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (listed under the Ramsar Convention);
- Listed threatened species and ecological communities;
- Migratory species protected under international agreements;
- Commonwealth marine areas;
- The Great Barrier Reef;
- Nuclear actions (including uranium mines); and
- A water resource, in relation to coal seam gas development and large coal mining development.

Other matters protected under the EPBC Act, include:

- The environment, where actions proposed are on, or will affect Commonwealth land and the environment; and
- The environment, where Commonwealth agencies are proposing to take an action.

When a proponent proposes to take an action that they believe may need approval under the EPBC Act, they must refer the proposed action to the Australian Government Minister for the Environment (the Minister). The purpose of the referral is to determine whether or not a proposed action is a 'controlled action' and thereby requires approval under the EPBC Act. If the Minister determines that a proposed action is a 'controlled action', it would then proceed through the Commonwealth assessment and approval process.

2.2. Significant Impact Guidelines 1.1.

The *Significant Impact Guidelines 1.1* (DoE 2013) (SIG 1.1) define a 'significant impact' as an impact which is important, notable, or of consequence, having regard to its context or intensity, with whether or not an action is likely to have a significant impact depending upon the sensitivity, value, and quality of the environment to be impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

The purpose of these guidelines is to assist any person who proposes to take an action to decide whether or not they should submit a referral to the Department for a decision by the Australian Government Environment Minister (the Minister) on whether assessment and approval is required under the EPBC Act. In doing so the Significant Impact Guidelines provide a set of criteria to assist in determining whether the impacts of a proposed action are likely to result in a significant residual impact on a MNES. When considering whether or not an action is likely to have a significant impact

on a MNES it is relevant to consider all adverse impacts which result from the action, including indirect and offsite impacts.

2.3. Conservation Advices

When a native species or ecological community is listed as threatened under the Commonwealth EPBC Act, a conservation advice is developed to assist its recovery. Conservation advices guide recovery planning and identify actions required for conservation and recovery of the threatened species or ecological community. They inform the Australian Government in regulatory decision-making and investment for threatened species and ecological communities. For some species and ecological communities with more complex planning needs, recovery plans may also be developed to guide recovery.

Conservation advices and recovery plans list key habitat requirements, characteristics and life histories of threatened species and ecological communities. They can be used to assess whether habitat critical to threatened species or communities may be present on a site and, therefore, are a useful tool for assessing the potential for an action to impact on MNES.

2.4. EPBC Act Environmental Offsets Policy

Environmental offsets are measures that compensate for the residual adverse impacts of an action on the environment. At the national level, environmental offsets are governed by the EPBC Act and EPBC Act Environmental Offsets Policy (2012). Environmental offsets will be required for any significant residual impact on MNES resulting from the Project.

Offsets can comprise a combination of direct offsets (*i.e.*, on ground creation or rehabilitation of habitat) and indirect compensatory measures (*i.e.*, research or educational programs) that aligns with published conservation priorities and provides a conservation gain for the MNES being impacted.

Conservation gain is the benefit that a direct offset delivers to the MNES, which maintains or increases its viability or reduces any threats of damage, destruction or extinction. A conservation gain may be achieved by:

- improving existing habitat for the protected matter;
- creating new habitat for the protected matter;
- reducing threats to the protected matter;
- increasing the values of a heritage place; and/or
- averting the loss of a protected matter or its habitat that is under threat.

An environmental offset may be required if the action is considered to have a significant impact on a MNES.

3. Assessment Methodology and Process

3.1. Desktop analysis

Prior to the commencement of field surveys, a desktop analysis was conducted of Commonwealth, State and Local environmental databases and overlay mapping to identify potential MNES and included the following:

- Commonwealth MNES protected under the EPBC Act on and around the site using the protected matters search tool with a 5 km radius (**Appendix A**);
- *Nature Conservation Act 1992* (NCA) listed threatened species on and around the site using the wildlife online database search tool with a 5 km radius (**Appendix B**);
- Public environmental databases including Atlas of Living Australia and BioMaps;
- State regulated vegetation management and vegetation supporting maps under the *Vegetation Management Act 1999* (VMA) including essential habitat mapping; and
- Local government records where MNES threatened species and communities are known to occur in the area.

Additionally, a review of aerial photography history was undertaken via QImagery to assist with the broad delineation of vegetation communities and to determine historical patterns to local vegetation communities.

Initial desktop assessment identified six (6) threatened ecological communities (TECs), thirty-seven (37) threatened flora species, forty (40) threatened fauna species and seventeen (17) migratory species as having the potential to occur within 5 km of the referral area (refer **Appendix A**). An initial assessment for the likelihood of occurrence was undertaken based on desktop survey to inform field survey methodology for target flora and fauna species and communities.

3.2. Field survey methodology

Field surveys were conducted to describe the ecological value of the referral area and surrounds. Field surveys were undertaken during seasonal conditions generally favourable to the detection and identification of flora and fauna species. Field survey methods were determined based on target species and communities and EPBC Act listed species guidelines. Fauna surveys were conducted under the following permits held by Saunders Havill Group:

- Scientific Purposes Permit WA0022007 granted under Section 12(f) of Nature Conservation (Administration) Regulation 2017
- Department of Agriculture and Fisheries (DAF) Ethics clearance CA 2020/02/1355
- Scientific User Registration SUR000451

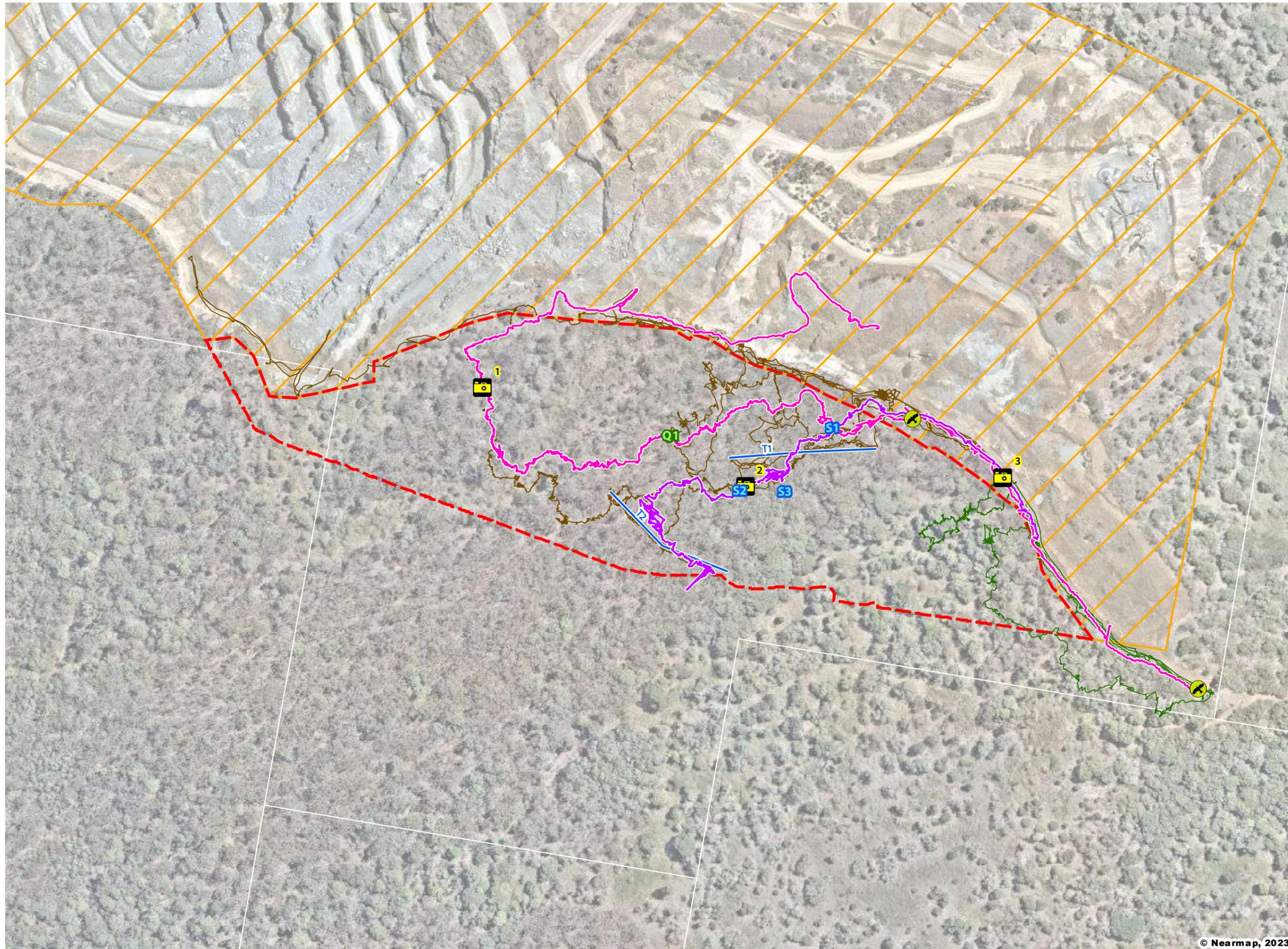
Specific survey guidelines targeting species listed under the EPBC Act are provided on the Species Profile and Threats Database (SPRAT) profile only where a guideline has been developed. The guidelines provided in **Table 1** were reviewed and incorporated into field survey methodology where required and appropriate in order to adequately identify the presence of targeted threatened species. The table also provides survey guidelines referenced for general flora and fauna surveys.

Table 1: Species-specific survey guidelines

Targeted species / ecological community	Guideline / method
<i>Phascolarctos cinereus</i> (Koala)	Spot Assessment technique (Phillips and Callaghan 2011)
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)	<i>Survey guidelines for Australia's threatened bats</i>
General terrestrial surveys	<i>Terrestrial Vertebrate Fauna Survey Guidelines</i> <i>Modified Habitat Quality Assessment methodology utilising the Guide to determining terrestrial habitat quality v 1.2 April 2017.</i>
General for threatened mammals	<i>Survey guidelines for Australia's threatened mammals</i>
General for threatened birds	<i>Survey guidelines for Australia's threatened birds</i>
Lowland Rainforest of Subtropical Australia	Methods and species lists within the <i>Conservation Advice for Lowland Rainforest of Subtropical Australia</i> (referred to herein as LRSA TEC conservation advice).

Field surveys were performed in December 2022 with additional targeted MNES surveys undertaken in June, October and November 2023 (refer **Table 2**). Field surveys utilising the methods outlined in the following subsections were conducted to describe ecological value of the subject site. Field survey effort is shown on **Plan 1**.

01. Field Survey Effort



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- Legend**
- Qld DCDB
 - Referral Area
 - Existing Quarry
- Field Survey Effort**
- Habitat Quality Transects
 - Spotlighting - 31/10/2023
 - Spotlighting - 1/11/2023
 - Observational Surveys
 - TEC Surveys
 - SAT Survey Locations
 - Quaternary Survey Location
 - Bird Survey Locations
 - Camera Trap Locations

Issue	Date	Description	Drawn	Checked
A	20/12/2023	Preliminary	TF	LB



Table 2: Field Survey Methods Summary

Date	Weather Conditions	Methods
5 December 2022	15.9°C min – 28.5°C max, 0 mm rainfall	Initial site visit, observational surveys, context analysis and SAT surveys.
5 June 2023	15.5°C min – 22.0°C max, 5.7 mm rainfall	Ground-truth vegetation communities, observational surveys, context analysis, and SAT survey.
10 October 2023	11.5 C min – 27.0°C max, 0 mm rainfall	Camera set up, Ground-truth vegetation communities, and observational surveys
31 October 2023	14.0 C min – 35.9°C max, 0 mm rainfall	Dusk surveys and nocturnal active searches.
1 November 2023	14.7 C min – 24.8°C max , 0 mm rainfall	Camera collection, dusk surveys, and nocturnal active searches.

Source: Combination of Logan City Water Treatment Plant (040854) and Canungra (Defence) QLD (140008), BOM 2023

3.2.1 Observational Survey for Significant Flora and Fauna, Habitat Trees and Biodiversity Values

The referral area was walked several times where possible to ensure all species (flora and fauna) were recorded and identified. Sections of the ‘expansion area’, particularly in the west and south, were completely inaccessible due to steep terrain and safety concerns. These areas were assessed visually where possible. Particular attention was paid to any threatened species that were listed as possibly occurring on or within the vicinity of the referral area and specific micro-assemblages which may support these threatened species. This included observations for vertebrate fauna present on or that may utilise the referral area, including faunal lists and significance status of species under the Commonwealth’s EPBC Act including the JAMBA, CAMBA, ROKAMBA and the Bonn Convention, and Queensland’s NCA.

The observational survey included identification of ecological features and values such as broad vegetation communities, fauna habitats, and ecological corridors. Identification and description of the fauna habitats present within the area included any habitat trees. Specific attention was paid to threatened flora and fauna species. Over 32 ‘man hours’ were spent within the referral area over several days performing ‘Observation Surveys’ (refer **Plan 1**).

For the purposes of this report, a significant flora and fauna species has been defined as a species that is scheduled as ‘critically endangered’, ‘endangered’, ‘vulnerable’ or conservation dependent under the Commonwealth EPBC Act.

3.2.2 Ground-truthing of Vegetation Communities

A comprehensive flora survey was undertaken using a methodology consistent with the established formats used by the Queensland Herbarium (Nelder et al. 2020¹ and Hnatiuk et al. 2009²). Survey methodology comprised an initial visual audit, followed by quantitative assessment of vegetation associations and communities. Distinct vegetation community boundaries were delineated during field survey assessment.

Vegetation was ground-truthed and assessed against current VMA Regional Ecosystem (RE) mapping and pre-clear mapping. This included reviewing the accuracy and extent of mapped RE types in addition to broad condition. Habitat quality/condition was assessed and completed in accordance with the BioCondition: A Condition Assessment Framework

¹ Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Addicott, E.P. and Appelman, C.N. (2020) *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.1*. Updated March 2020. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

² Hnatiuk, R.J., Thackway, R. and Walker, J. 2009, ‘Vegetation’, in National Committee on Soil and Terrain, Australian Soil and Land Survey Field Handbook, 3rd edition, CSIRO publishing, Melbourne, pp. 73–127.

for Terrestrial Biodiversity in Queensland Assessment Manual (version 2.2). The BioCondition assessment is a condition assessment framework for Queensland that provides a measure of how well a terrestrial ecosystem is functioning for biodiversity values. The BioCondition assessment is site-based and quantitative, and therefore a procedure that can be replicated and used across any vegetative state. The assessment provides a numerical score that can be summarised as a condition rating when compared to a BioCondition benchmark.

3.2.3 *Spot Assessment Technique (SAT) and Koala habitat surveys*

Spot Assessment Technique (SAT) surveys were conducted in areas with potential Koala food trees across the site. The aim was to assess Koala usage of the site. Spot Assessment Technique surveys follow the methodology designed by Phillips and Callaghan (2011). It involves a single ecologist combing the ground under Koala food plant trees (or non-food plant trees if necessary) for a 1-metre radius around the trunk searching for scats. Each tree searched must be greater or equal to 100 mm diameter at breast height (DBH) and search of each tree continues for up to 2 minutes. The search can cease prior to the 2-minute limit if scats are detected. Thirty trees meeting the specifications are analysed during each SAT survey.

3.2.4 *Scats, tracks and other traces search*

Surveys for scats, tracks and other fauna traces were conducted throughout field surveys in 2022 and 2023 as part of the observational surveys. Both predator and non-predator scats were sought during all searches. Specific search efforts were made to locate the presence of Koalas or evidence of their occurrence on the subject lands and the local area. In addition, particular attention was paid to the identification of potential dens, scats and tracks for invasive species, such as European Red Fox and domestic cats, to identify predator-prey interactions and understand existing impacts within the referral area.

3.2.5 *Nocturnal active searches, dusk bird surveys and spotlighting*

This non-intrusive survey technique is the most effective method to obtain estimates of nocturnal arboreal mammal incidence and abundance in wooded habitats. Spotlighting also targets medium to large terrestrial nocturnal mammals, and can detect other nocturnal taxon groups (e.g., frogs, geckoes, nocturnal snakes, nocturnal birds, spiders).

A combination of high-powered spotlights and head torches were used to sample for nocturnal mammals, birds, reptiles and frogs across the proposed action area. This technique involved detecting eye shine, and a record of vegetation density was taken. Additional information recorded included the prevailing conditions and search effort. This method was completed on 31 October and 1 November 2023.

Additionally, a series of 'point surveys' were conducted before dusk on both the 31 October and 1 November 2023, as per *Survey Guidelines for Australia's threatened birds*, where bird activity is typically high. These surveys involved listening for bird calls and observing movement at a stationary point for 20 mins. These surveys were preferred given the difficult terrain of the referral area.

3.2.6 *Motion sensor camera trap*

Camera trapping involves setting up a fixed digital camera to capture images or video of animals that pass in front of a camera with an infrared trigger. It is a non-invasive technique designed to detect medium to large sized animals as they pass, although it is possible to detect smaller animals depending on the set-up. This method identifies fauna activity beyond the scope of direct observational studies and with the absence of potential observer impacts. Three (3) camera traps were set up across the referral area and remained active for 21 days. Cameras were attached 30-100 cm from the ground on a tree trunk and directed towards landscape features. Traps were baited using a general fauna mammal bait consisting of a mixture of peanut butter and oats.

3.2.7 Fauna movement barrier assessment

A combination of contemporary aerial imagery, locality knowledge and field inspection can assist in understanding if there are barriers to fauna movement in the landscape. Once the aerial imagery is interrogated, location(s) for inspection are selected (typically roads) and barriers identified.

3.3. Likelihood of Occurrence Assessment

The likelihood of occurrence assessment was based upon publicly available species records and/or other information sources, such as field guides and web-based species profiles, including but not limited to:

- Australian Government's *Species Profile and Threats Database* (SPRAT) for the threatened species and ecological communities listed under the EPBC Act; and
- Queensland Government's *Department of Environment and Science* (DES) threatened species website.

The likelihood of occurrence assessment was informed by desktop assessment and field survey results, including an appreciation and understanding of the species habitats within the referral area. The assessment adopts a two-tiered approach; the first based on desktop analysis and the potential of occurrence and the second based on a combination of desktop and field survey to determine the likelihood of occurrence.

The likelihood of threatened species and ecological communities occurring in the referral area has been assessed against the criteria outlined in **Table 3**.

Table 3: Likelihood of occurrence assessment criteria

Likelihood of occurrence	Assessment criteria
Unlikely	No previous records of the species within the locality and one or more of the following criteria is met: <ul style="list-style-type: none"> • Not previously recorded on the referral area and surrounds and the referral area is beyond the current known geographic range; or • Dependent on specific habitat types or resources that are not present on the referral area; or • Considered extinct in the wild.
Low	No previous records of the species within the locality and one or more of the following criteria is met: <ul style="list-style-type: none"> • Site and local connectivity contains marginal habitat excluding suitable/critical habitat attributes; • Lack of recent records exist in a regional context (use 1980 as a delineation); or • Potential for vagrant or individual of the species to survive short-term;
Moderate	Species previously recorded within the locality and one or more of the following criteria is met: <ul style="list-style-type: none"> • Previously recorded in proximity to the referral area (<i>i.e.</i>, vagrant individuals); or • Potential habitat typologies or resources are present on the referral area.
High	Species previously recorded within the locality and one or more of the following criteria is met: <ul style="list-style-type: none"> • Previously recorded on the referral area; • Dependent on habitats or habitat resources that are available on the referral area; or • Suitable habitats are available on the referral area that are capable of supporting a resident population or individuals of the species.
Known	Flora species or ecological community positively identified during field surveys within the referral area. Fauna species positively recorded during field surveys within the referral area or adjacent habitats.

4. Desktop Assessment Results

4.1. Landscape Context and Historical Aerial Imagery Analysis

The referral area is located in a landscape that has been partially subject to modification for past and on-going land-uses resulting in a mixture of undisturbed and highly disturbed environments (refer to **Plan 2** for historical aerial imagery analysis). Even prior to the commencement of the quarry operation, the majority of the site showed signs of historical clearing (1965) likely for rural uses. Vegetation clearing then aligned with the continued expansion of the quarry footprint through the 1970s, 1980s and 1990s. The extent of vegetation clearing has remained largely unchanged since 2010 where patches of regrowth vegetation has formed and been cleared to facilitate current quarry operations.

The referral area itself is located on a steep south facing slope, adjacent to cleared tracks and the existing extractive zone of the operating quarry.

The connectivity value of the referral area in the broader landscape is limited primarily by the current quarry footprint to the north while vegetation to the south is relatively intact. Further south and west, rural residential properties and roads are present including Beaudesert Beenleigh Road and Cedar Creek Road. Within the broader landscape exists large areas of connected vegetation and several active quarry footprints.

Vegetation through the central portion of the referral area contains areas of retained canopy associated with Category B (remnant) vegetation. However, an on-ground assessment identified much of this area to be heavily weed infested as a result of historical modification and steep eroded channels leading to high levels of disturbance. Category X (non-remnant) areas include a patch of notophyll vine forest regrowth in the east of the referral area. This polygon was identified on-ground as containing native species indicative of a notophyll vine forest community although heavily weed infested and lacking the maturity and species richness of true notophyll vine forest. Where additional areas of Category X (non-remnant) vegetation are mapped, these areas are dominated by weeds with few native species present.

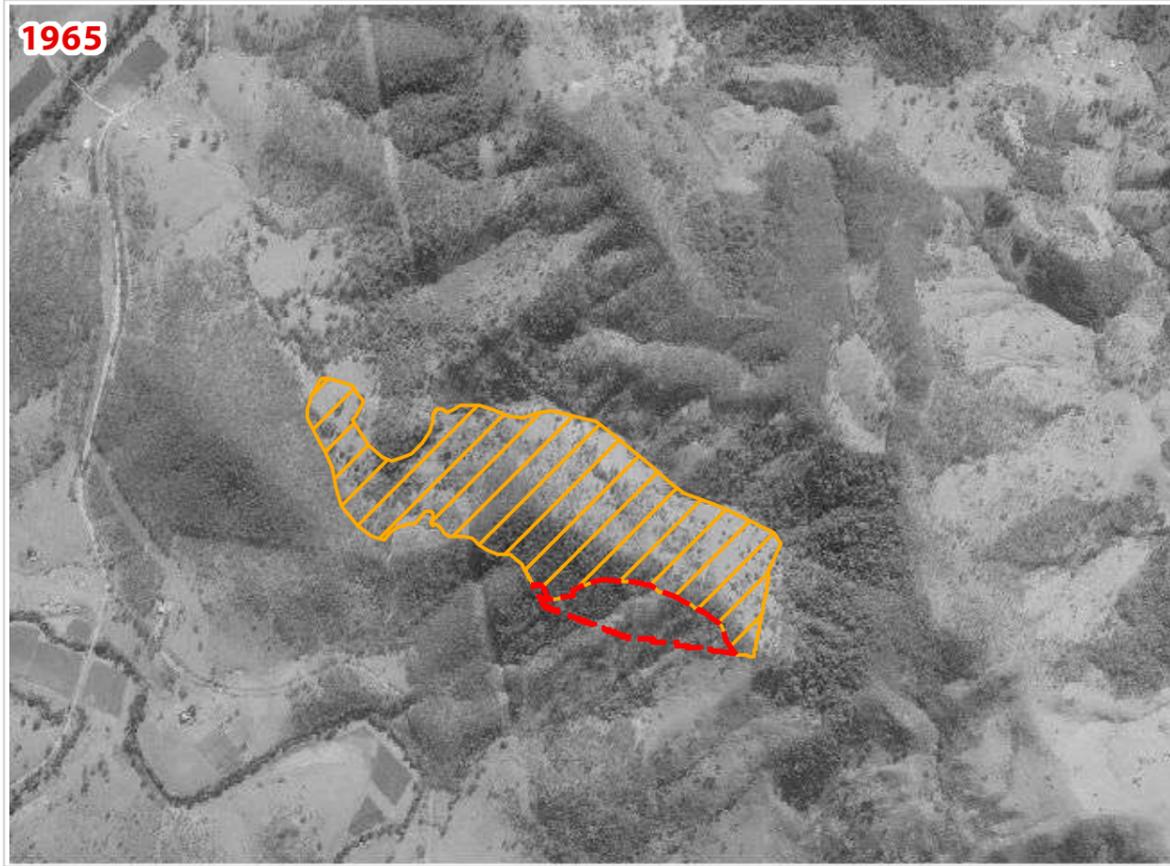
The referral area retains no connectivity value to the north of the site where the current quarry footprint is present. This also limits connectivity in a north-east and north-west direction. However, the referral area does retain connectivity value further south where remnant vegetation is present.

Refer to **Plan 3** for the fragmentation analysis.

4.2. Referral Area Topography and Soils

The referral area is a steep south facing slope at 320m AHD in the north and 200m AHD in the south with an average of 25° (47%) and as steep as 35° (70%) in parts. The gradient continues at this level to Cedar Creek Road further south. The referral area itself is mapped as land zone 11 as defined by the *Land zones of Queensland* (Wilson and Taylor, 2012). Land Zone 11 includes hills and lowlands on metamorphic rocks. Soils are mainly shallow, gravelly Rudosols and Tenosols, with Sodosols and Chromosols on lower slopes and gently undulating areas. Soils are typically of low fertility on steeper slopes.

02. Historical Aerial Imagery



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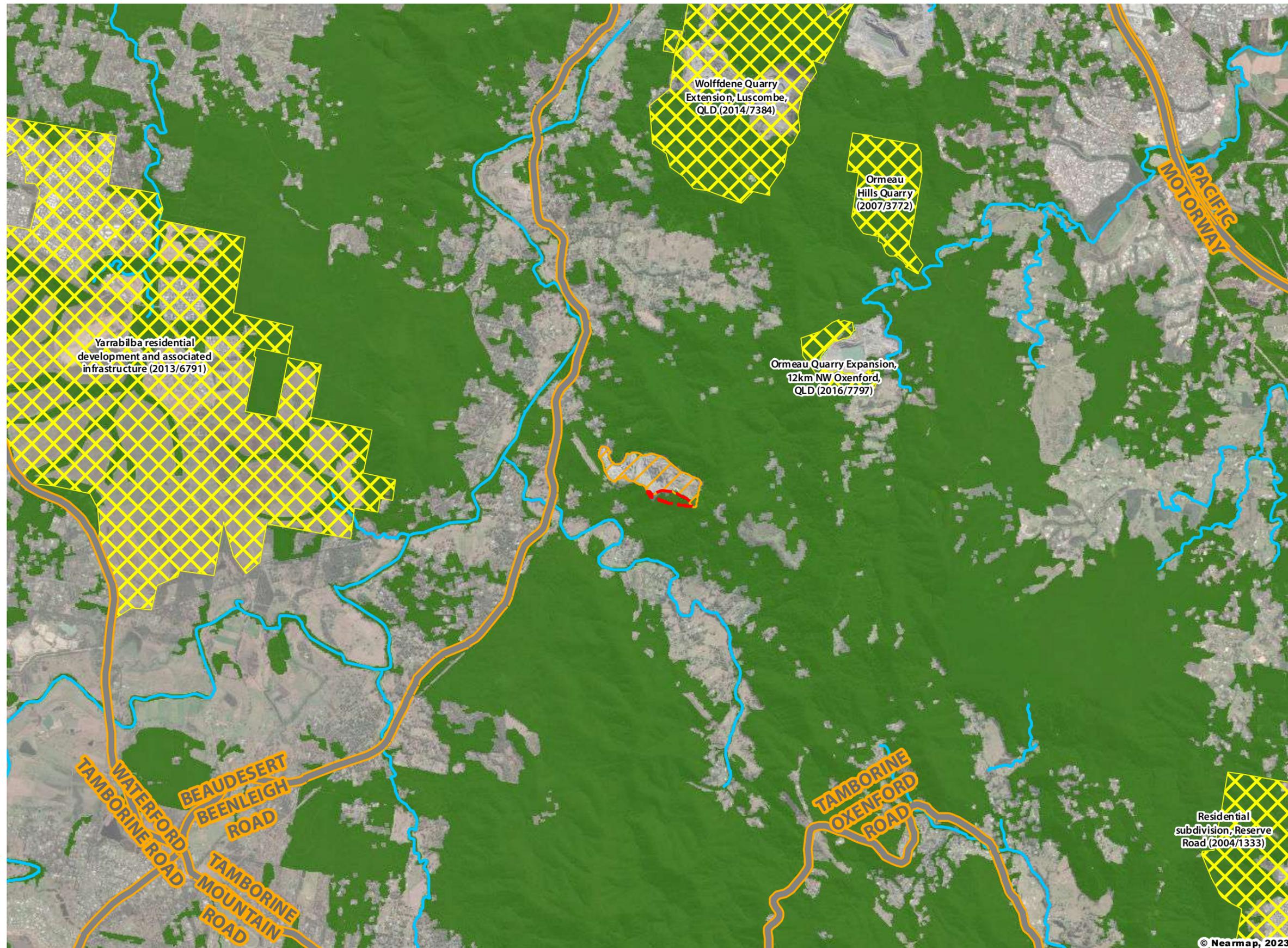
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- Legend**
-  Referral Area
 -  Existing Quarry (2023)

Issue	Date	Description	Drawn	Checked
A	20/12/2023	Preliminary	TF	LB



03. Fragmentation Analysis



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- Legend**
- Referral Area (Quarry Extension, 6 ha)
 - Existing Quarry (45.3 ha)
- Connectivity**
- Vegetation Cover
 - Watercourses
- Impediments**
- Major & Arterial Roads
 - Adjoining EPBC Referrals

Issue	Date	Description	Drawn	Checked
A	20/12/2023	Preliminary	TF	LB



4.3. Commonwealth and State Databases and Mapping

4.3.1 Protected Matters Search Tool – EPBC Act (Cth)

When a proponent proposes to take an action that they believe may need approval under the EPBC Act, they must refer the proposed action to the Australian Government Minister for the Environment (the Minister). The purpose of a referral is to determine whether or not a proposed action is a ‘controlled action’ and thereby requires approval under the EPBC Act. If the Minister determines that a proposed action is a ‘controlled action’, it would then proceed through the Commonwealth assessment and approval process.

A search using the Commonwealth’s PMST was obtained to initially determine if any MNES have potential to be temporarily or permanently located within a 5 km radius of the site. **Table 4** lists a summary of these results relevant to the site. For the purposes of this assessment, marine animals including tuna, turtles, sharks and whales have been excluded as the site is outside of a marine environment. The complete results of this search are included in **Appendix A**.

Table 4: PMST summary search results

Wetlands of International Importance		
Moreton Bay – within 10km of Ramsar Site		
Threatened Ecological Communities		
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community (Endangered) – Community may occur within area.		
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (Endangered) – Community may occur within area		
Grey box-grey gum wet forest of subtropical eastern Australia – community likely to occur within area		
Lowland Rainforest of Subtropical Australia (Critically Endangered) – Community likely to occur within area.		
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (Endangered) – Community likely to occur within area.		
White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland ecological community (Critically Endangered) – Community may occur within area.		
Threatened Species		
Scientific Name	Common Name	Status
Birds		
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered
<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-Cockatoo	Vulnerable
<i>Charadrius leschenaultii</i>	Greater Sand Plover	Vulnerable
<i>Climacteris picumnus victoriae</i>	Brown treecreeper	Vulnerable
<i>Cyclopsitta diophthalma coxeni</i>	Coxen’s Fig-Parrot	Endangered
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	Endangered

<i>Erythroriorchis radiatus</i>	Red Goshawk	Vulnerable
<i>Falco hypoleucos</i>	Grey Falcon	Vulnerable
<i>Geophaps scripta scripta</i>	Squatter Pigeon	Vulnerable
<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable
<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable
<i>Lathamus discolor</i>	Swift Parrot	Critically Endangered
<i>Numenius madagascariensis</i>	Eastern Curlew	Critically Endangered
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered
<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable
<i>Turnix melanogaster</i>	Black-breasted Button-quail	Vulnerable
Fish		
<i>Maccullochella mariensis</i>	Mary River Cod	Endangered
Frogs		
<i>Litoria olongburensis</i>	Wallum Sedgefrog	Vulnerable
<i>Mixophyes fleayi</i>	Fleay's Frog	Endangered
<i>Mixophyes iteratus</i>	Giant Barred Frog	Vulnerable
Insects		
<i>Argynnis hyperbius inconstans</i>	Australian Fritillary	Critically Endangered
<i>Phyllodes imperialis smithersi</i>	Pink Underwing Moth	Endangered
Mammals		
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable
<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spot-tailed Quoll	Endangered
<i>Macroderma gigas</i>	Ghost Bat	Vulnerable
<i>Notamacropus parma</i>	Parma Wallaby	Vulnerable
<i>Petauroides volans</i>	Greater Glider	Endangered
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	Vulnerable
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	Vulnerable
<i>Phascolarctos cinereus</i>	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Endangered
<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo (SE mainland)	Vulnerable
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	Vulnerable
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable
Plants		

<i>Arthraxon hispidus</i>	Hairy-joint Grass	Vulnerable
<i>Baloghia marmorata</i>	Marbled Balogia	Vulnerable
<i>Bosistoa transversa</i>	Three-leaved Bosistoa	Vulnerable
<i>Brachychiton</i> sp. Ormeau (L.H.Bird AQ435851)	Ormeau Bottle Tree	Critically Endangered
<i>Bulbophyllum globuliforme</i>	Miniature Moss-orchid	Vulnerable
<i>Clematis fawcettii</i>	Stream Clematis	Vulnerable
<i>Coleus habrophyllus</i> listed as <i>Plectranthus habrophyllus</i>	-	Endangered
<i>Coleus nitidus</i> listed as <i>Plectranthus nitidus</i>	-	Endangered
<i>Corchorus cunninghamii</i>	Native Jute	Endangered
<i>Croton mamillatus</i>	Bahrs Scrub Croton	Critically Endangered
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	Vulnerable
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	Vulnerable
<i>Cupaniopsis shirleyana</i>	Wedge-leaf Tuckeroo	Vulnerable
<i>Dichanthium setosum</i>	Bluegrass	Vulnerable
<i>Diploglottis campbellii</i>	Small-leaved Tamarind	Endangered
<i>Endiandra floydii</i>	Floyd's Walnut	Endangered
<i>Endiandra hayesii</i>	Rusty Rose Wallnut	Vulnerable
<i>Fontainea venosa</i>	-	Vulnerable
<i>Gossia gonoclada</i>	Angle-stemmed Myrtle	Endangered
<i>Leichhardtia longiloba</i> listed as <i>Marsdenia longiloba</i>	Clear Milkvine	Vulnerable
<i>Lepidium peregrinum</i>	Wandering Pepper-cress	Endangered
<i>Macadamia integrifolia</i>	Macadamia Nut	Vulnerable
<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut	Vulnerable
<i>Notelaea lloydii</i>	Lloyd's Olive	Vulnerable
<i>Notelaea x ipsviciensis</i> listed as <i>Notelaea ipsviciensis</i>	Cooneana Olive	Critically Endangered
<i>Owenia cepiodora</i>	Onionwood	Vulnerable
<i>Persicaria elatior</i>	Knotweed	Vulnerable
<i>Phaius australis</i>	Lesser Swamp-orchid	Endangered
<i>Planchonella eerwah</i>	Shiny-leaved Condoos	Endangered
<i>Randia moorei</i>	Spiny Gardenia	Endangered
<i>Rhodamnia rubescens</i>	Scrub Turpentine	Critically Endangered

<i>Rhodomyrtus psidioides</i>	Native Guava	Critically Endangered
<i>Samadera bidwillii</i>	Quassia	Vulnerable
<i>Sophora fraseri</i>	-	Vulnerable
<i>Syzygium hodgkinsoniae</i>	Smooth-bark Rose Apple	Vulnerable
<i>Thesium australe</i>	Austral Toadflax	Vulnerable
<i>Vincetoxicum woollsii</i>	-	Endangered (listed as <i>Tylophora woollsii</i>)
<i>Zieria collina</i>	-	Vulnerable
Reptiles		
<i>Coeranoscincus reticulatus</i>	Three-toed Snake-tooth Skink	Vulnerable
<i>Delma torquata</i>	Collared Delma	Vulnerable
<i>Furina dunmalli</i>	Dunmall's Snake	Vulnerable
<i>Hemiaspis damelii</i>	Grey Snake	Endangered

4.3.2 Wildlife Online – Nature Conservation Act 1992 (Qld)

The Queensland *Nature Conservation Act 1992* classifies and protects significant areas (Protected Areas) and protects threatened plant and animal species. The *Nature Conservation (Animals) Regulation 2020* and *Nature Conservation (Plants) Regulation 2020* lists plant and animal species presumed extinct, critically endangered, endangered, vulnerable, near threatened, special least concern, least concern, international or prohibited. The schedules of these regulations were considered in this report using a Wildlife Online Database Search with a 5 km radius of the referral area. Threatened species under the EPBC act with the potential to occur within the referral area are listed in **Table 5**. Refer to **Appendix B** for full search results.

Table 5: NCA Wildlife Online Database Search Results

Scientific Name	Common Name	Status
Mammals		
<i>Phascolarctos cinereus</i>	Koala	Endangered
Birds		
<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable
<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)	Vulnerable
Plants		
<i>Baloghia marmorata</i>	Jointed Baloghia	Vulnerable
<i>Fontainea venosa</i>	-	Vulnerable
<i>Coleus habrophyllus</i>	-	Endangered
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	Vulnerable
<i>Sophora fraseri</i>	Brush Sophora	Vulnerable

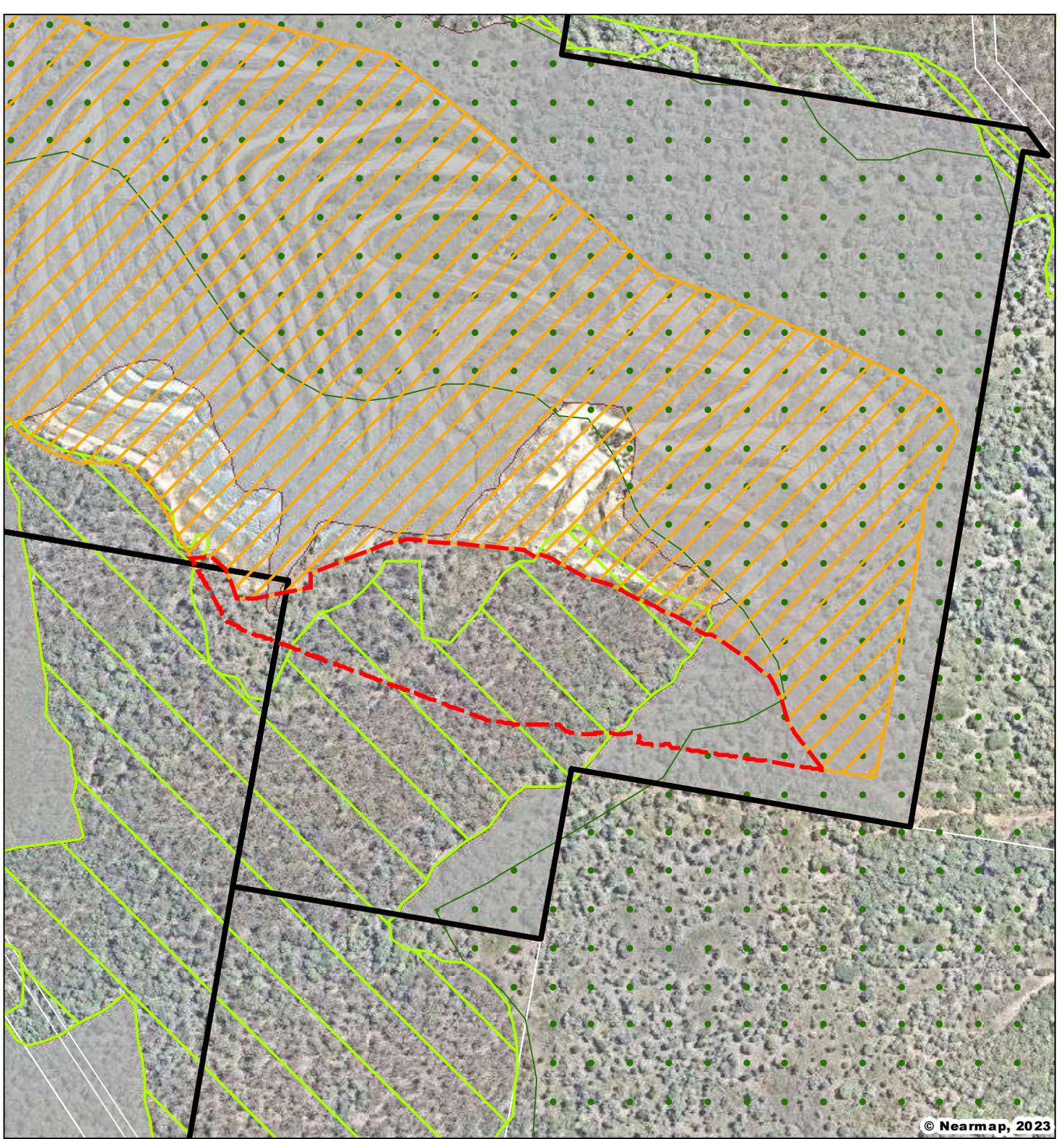
Scientific Name	Common Name	Status
<i>Macadamia integrifolia</i>	Macadamia Nut	Vulnerable
<i>Randia moorei</i>	Spiny Gardenia	Endangered
<i>Planchonella eerwah</i>	-	Endangered
<i>Corchorus cunninghamii</i>	-	Endangered
<i>Brachychiton</i> sp. (Ormeau L.H.Bird AQ435851)	Ormeau Bottle Tree	Critically Endangered

4.3.3 State Regional Ecosystems – Vegetation Management Act 1999 (Qld)

A desktop review of the Queensland ‘Regulated Vegetation Management Mapping’ under the *Vegetation Management Act 1999* (VMA) was conducted, focusing on the referral area. The referral area is mapped as a combination of Category B (remnant) and Category X (non-remnant). Vegetation mapping shows the Category B (remnant) vegetation is mapped as Least Concern RE12.11.3. Pre-clear mapping shows the Category X (non-remnant) vegetation is mapped as both Least Concern RE12.11.3 and Least Concern RE12.11.10 (refer **Table 6**).

Table 6: Regional Ecosystem Descriptions

Regional ecosystem	VMA Status	Description
RE12.11.3	Least Concern	<i>Eucalyptus siderophloia</i> and <i>E. propinqua</i> open forest +/- <i>E. microcorys</i> , <i>Lophostemon confertus</i> , <i>Corymbia intermedia</i> , <i>E. biturbinata</i> , <i>E. acmenoides</i> , <i>E. tereticornis</i> , <i>E. moluccana</i> , <i>Angophora leiocarpa</i> , <i>Syncarpia verecunda</i> with vine forest species and <i>E. grandis</i> or <i>E. saligna</i> in gullies. <i>Eucalyptus pilularis</i> and <i>E. tindaliae</i> 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. (BVG1M: 9a).
RE12.11.10	Least Concern	Notophyll and notophyll/microphyll vine forest +/- <i>Araucaria cunninghamii</i> . Characteristic species include <i>Argyrodendron trifoliolatum</i> , <i>Argyrodendron</i> sp., <i>Backhousia subargentea</i> , <i>Dissiliaria baloghioides</i> , <i>Brachychiton discolor</i> , <i>Beilschmiedia obtusifolia</i> , <i>Diospyros pentamera</i> , <i>Grevillea robusta</i> , <i>Gmelina leichhardtii</i> and <i>Ficus macrophylla</i> forma <i>macrophylla</i> . Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Not a Wetland. (BVG1M: 2a).



Legend

- | | |
|--|--|
|  Qld DCDB | PMAV Category |
|  Site DCDB |  Category A |
|  Referral Area |  Category B |
|  Existing Quarry |  Category C |
|  Remnant RE 12.11.3 |  Category R |
|  Pre-clear RE 12.11.10 |  Water |
| |  Category X |

Figure 3

Property Maps
Assessable Vegetation
and Mapped Vegetation

File ref. 11390 E Figure 3 PMAVVegetation A
Date 5/02/2024
Project Blue Rock Quarry, Cedar Creek

0 50 100 150 200 m
Scale (A4): 1:5,000 [GDA 2020 MGA Z56]



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4.3.4 State Koala Habitat Areas – Planning Regulation 2017 (Qld)

South East Queensland koala habitat protection mechanisms are incorporated into the *Planning Regulation 2017* (PR) and State Development Assessment Provisions (SDAP). The SDAP details specific assessment benchmarks where development is proposed within mapped Koala Habitat Area (KHA) and/or Koala Priority Areas (KPAs). It regulates the clearing of mapped Koala habitat through stipulating how it must be cleared (e.g. staging, presence of a Koala spotter, etc.) when a development approval is sought for a material change of use, operational work, or reconfiguring a lot to create an additional lot. The PR outlines prohibited and assessable development in a Koala priority area and Koala habitat area.

The site is mapped within a KPA and contains KHA in association with Category B (remnant) RE12.11.3. All relevant approvals were obtained prior to the commencing on 7 February 2020 therefore works are exempt from assessment under this framework.

4.4. Threatened Species and Communities Desktop Likelihood of Occurrence

4.4.1 Threatened Ecological Communities

The Protected Matters Search Tool (PMST) (refer **Appendix A**) returned the following six (6) threatened ecological communities (TEC), listed under the EPBC Act as having potential to occur within 5 km of the referral area:

- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community
- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland
- Grey box-grey gum wet forest of subtropical eastern Australia
- Lowland Rainforest of Subtropical Australia
- Subtropical eucalypt floodplain forest and woodland of the New South Wales and North Coast and South East Queensland bioregions
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

The likelihood of occurrence for each TEC within the referral area, as presented in **Table 7**, referred to State Government Regional Ecosystem mapping within the locality and known distributions of the TECs, to identify those TECs with potential to occur in the referral area or recorded during field surveys.

Table 7: Likelihood of occurrence of TECs within referral area

TEC	EPBC Act status	Desktop Potential of Occurrence
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	Endangered	Low The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Low The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.
Grey box-grey gum wet forest of subtropical eastern Australia	Endangered	Low The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.
Lowland Rainforest of Subtropical Australia	Critically Endangered	Moderate The site is mapped as containing a pre-clear regional ecosystem (RE12.11.10) associated with this threatened ecological community in the east of the referral area. Further assessment is required, refer Section 5.3.1 .
Subtropical eucalypt floodplain forest and woodland of the New South Wales and North Coast and South East Queensland bioregions	Endangered	Low The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Low The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.

4.4.2 Threatened Flora Species

Database searches returned forty-eight (48) flora species, listed as threatened under the EPBC Act and/or NCA, as being previously recorded or predicted to occur within 5 km of the referral area, as presented in **Appendix A** and **Appendix B**.

Based on the presence of species records within the locality and the habitats within the referral area, an assessment was conducted to determine those threatened flora species with potential to occur within the referral area. The desktop assessment identified that ten (10) threatened flora species under the EPBC Act had a 'moderate' or higher potential to occur on the referral area (refer **Table 8**). All other threatened flora species were assessed as having a low potential to occur.

Table 8: Likelihood of occurrence of flora species within referral area

Scientific Name	EPBC Act	NC Act	Desktop Potential of Occurrence
<i>Baloghia marmorata</i> (Marbled Baloghia)	Vulnerable	Vulnerable	<u>Moderate</u> Pre-clear RE mapping indicates the potential for notophyll vine forest within the referral area. There are multiple records within 5km of the referral area and a high density of sightings in association with Tamborine National Park. Given the potential suitable habitat and records within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.
<i>Corchorus cunninghamii</i> (Native Jute)	Endangered	Endangered	<u>Moderate</u> RE mapping indicates the potential sclerophyll forest within the referral area. There are several confirmed records within 5km of the site. Given the potential suitable habitat and records within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.
<i>Corynocarpus rupestris subsp. Arborescens</i> (Southern Corynocarpus)	Vulnerable	Vulnerable	<u>Moderate</u> Pre-clear RE mapping indicates the potential for dry rainforest/ notophyll vine forest vegetation to be present. Furthermore, there is a cluster of records 4.5km east of the referral area. Given the potential suitable habitat and records within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.
<i>Fontainea venosa</i>	Vulnerable	Vulnerable	<u>Moderate</u> Pre-clear RE mapping indicates potential for notophyll vine forest vegetation. Furthermore, the steep terrain may include rocky outcrops. There is a cluster of records of the species 2km north of the referral area. Given the potential suitable habitat and records within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.
<i>Leichhardtia coronata</i> (Slender Milkvine)	Vulnerable	Vulnerable	<u>Moderate</u> Potential suitable habitat for this species occurs within the referral area, particularly within the remnant vegetation. Associated eucalypt species are likely to occur on site and according to Queensland WildNet, there are multiple records within 5km of site. Given the potential suitable habitat and record within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.
<i>Macadamia integrifolia</i> (Macadamia Nut)	Vulnerable	Vulnerable	<u>Moderate</u> The majority of the referral area likely does not provide habitat known to support this species however, potential suitable habitat occurs within the mapped pre-clear notophyll vine forest. According to Queensland WildNet, there are multiple records of the species within 5km of the referral area. Given the potential suitable habitat and records within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.
<i>Macadamia tetraphylla</i> (Rough-shelled Bush Nut)	Vulnerable	Vulnerable	<u>Moderate</u> The majority of the referral area likely does not provide habitat known to support this species however, potential suitable habitat occurs within the mapped pre-clear notophyll vine forest. According to Queensland WildNet, there are multiple records of the species within 5km of the referral area. Given the potential suitable habitat and records within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.

Scientific Name	EPBC Act	NC Act	Desktop Potential of Occurrence
<i>Planchonella eerwah</i> (Shiny-leaved Condo)	Endangered	Endangered	Moderate Pre-clear RE mapping indicates potential for notophyll vine forest vegetation. There are multiple records within 5km of the referral area. Given the potential suitable habitat and records within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.
<i>Randia moorei</i> (Spiny Gardenia)	Endangered	Endangered	Moderate Pre-clear RE mapping indicates potential for notophyll vine forest vegetation. There are multiple records within 5km of the referral area. Given the potential suitable habitat and records within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.
<i>Sophora fraseri</i>	Vulnerable	Vulnerable	Moderate Potential suitable habitat for this species occurs within the referral area, particularly within the remnant vegetation. Associated eucalypt species are likely to occur on site and according to Queensland WildNet, there is one record within 5km of site. Given the potential suitable habitat and record within the locality, the likelihood of occurrence for this species has been assigned 'moderate'.

The detailed likelihood of occurrence assessment is presented in **Appendix C**.

4.4.3 Threatened Fauna Species

Database searches returned forty-three (43) fauna species listed as threatened under the EPBC Act and NCA as having been previously recorded or predicted to occur within 5 km of the referral area.

Based on the presence of species records within the locality and mapped habitats identified within the referral area, a likelihood of occurrence assessment was conducted to determine those threatened species with potential to occur within the assessment area. This assessment determined five (5) threatened fauna species listed under the EPBC Act as having 'moderate' or higher potential to occur on or near the referral area. These species are outlined in **Table 9**. All other threatened and/or migratory fauna species were assessed as having a 'low' potential to occur.

Refer to **Figure 4 - 8** for habitat distribution within the landscape and records of species discussed.

Table 9: Likelihood of occurrence of fauna species within referral area

Scientific Name	EPBC Act	NC Act	Desktop Potential of Occurrence
<i>Calyptorhynchus lathami lathami</i> (Southern-eastern Black-cockatoo)	Vulnerable	Vulnerable	Moderate The referral area contains wooded areas likely containing eucalypt woodland and <i>Allocasuarina</i> sub-canopy. According to Queensland WildNet and ALA, there are records of this species within 5km radius of the site. A review of these records indicate that a higher number of sightings have been recorded further south towards Cedar Creek/Mount Tamborine National Park, and north-west towards Wickham National Park, areas which provides suitable roosting and/or foraging habitat due to containing mature intact bushland. As potentially suitable habitat for the species may exist on-site the likelihood of the species to utilise the site or as fly-over has been assigned 'moderate.'

Scientific Name	EPBC Act	NC Act	Desktop Potential of Occurrence
<i>Hirundapus caudacutus</i> (White-throated Needletail)	Vulnerable	Vulnerable	Moderate The referral area contains wooded areas including open forests. A review of Queensland WildNet and ALA identified several records of the species within 5km of the site however the majority of these are 10+ years old. As the species has been recorded over a variety of habitat types the likelihood of the species to utilise the site or as fly-over has been assigned 'moderate.'
<i>Petauroides volans</i> (Greater Glider)	Endangered	Endangered	Moderate The referral area is mapped as containing Category X (non-remnant), as a result of an approved PMAV (ref: 2008/008614) and Category B (remnant) vegetation under the Queensland <i>Vegetation Management Act 1999</i> . The areas of the referral area dominated by eucalypt species, may provide potentially suitable habitat for the Greater Glider. There are recorded sightings 5-10km south of the site associated with Mount Tamborine National Park.
<i>Phascolarctos cinereus</i> (Koala)	Endangered	Endangered	Moderate-High The referral area is mapped as containing Category X (non-remnant), as a result of an approved PMAV (ref: 2008/008614) and Category B (remnant) vegetation under the Queensland <i>Vegetation Management Act 1999</i> . The area of Category B (remnant) vegetation is mapped as RE12.11.3 which is a Eucalypt dominated vegetation community containing known Koala habitat trees. According to Queensland WildNet Data, which dates back to the 1980s, 167 Koalas have been known to occur within a 5 km radius of the site. The nearest contemporary record was from 2014 approximately 500m south-west of the referral area. Based on preliminary desktop searches, there are no records of the species within the referral area. As the species is known to occur within the broader landscape as well as the presence of potential habitat within the referral area, the likelihood of occurrence has been assigned 'moderate-high.'
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)	Vulnerable	-	Moderate The referral area is mapped as containing Category X (non-remnant), as a result of an approved PMAV (ref: 2008/008614) and Category B (remnant) vegetation under the Queensland <i>Vegetation Management Act 1999</i> . The area of Category B (remnant) vegetation is mapped as RE12.11.3 which is a Eucalypt dominated vegetation community indicating potential foraging habitat may be present within the referral area. A review of the National Flying-fox monitoring viewer identified a GHFF roost approximately 8.7km north-east of the site (Pimapama, Mirambeena Drive (851)). As the species is known to forage in a variety of habitats, including open woodland areas present on-site, a desktop assessment of the likelihood of occurrence has been assigned 'moderate.'

The detailed likelihood of occurrence assessment is presented in **Appendix C**.

4.4.4 Migratory Species

Database searches returned thirteen (17) migratory fauna species listed as threatened under the EPBC Act and/or NCA as having been previously recorded or predicted to occur within 5 km of the Referral area.

Based on the presence of species records within the locality and the habitats identified within the referral area, an assessment was conducted to determine those threatened species with potential to occur within the referral area. The assessment determined that three (3) migratory terrestrial fauna species listed under the EPBC Act and/or NCA were identified as having moderate or greater potential to occur in the referral area. All other migratory fauna species were assessed as having a low potential to occur.

The detailed likelihood of occurrence assessment is presented in **Appendix C**.

Table 10: Likelihood of occurrence of migratory fauna species within referral area

Scientific Name	Desktop Potential of Occurrence
<i>Migratory terrestrial species</i>	
<i>Monarcha melanopsis</i> (Black-faced Monarch)	<u>Moderate</u> Pre-clear RE mapping indicates the potential for suitable habitat associated with notophyll vine forest over part of the referral area. Furthermore, a sighting of the species was recorded in close proximity to the referral area. Due to the potential for suitable habitat and recorded sighting, a desktop assessment of the likelihood of occurrence has been assigned 'moderate.'
<i>Myiagra cyanoleuca</i> (Satin Flycatcher)	<u>Moderate</u> RE mapping indicates the potential for suitable habitat associated with eucalypt dominated woodland over part of the referral area. Furthermore, a sighting of the species was recorded in close proximity to the referral area. Due to the potential for suitable habitat and recorded sighting, a desktop assessment of the likelihood of occurrence has been assigned 'moderate.'
<i>Rhipidura rufifrons</i> (Rufous Fantail)	<u>Moderate</u> RE mapping indicates the potential for suitable habitat associated with eucalypt dominated woodland over part of the referral area. Furthermore, a sighting of the species was recorded in close proximity to the referral area. Due to the potential for suitable habitat and recorded sighting, a desktop assessment of the likelihood of occurrence has been assigned 'moderate.'

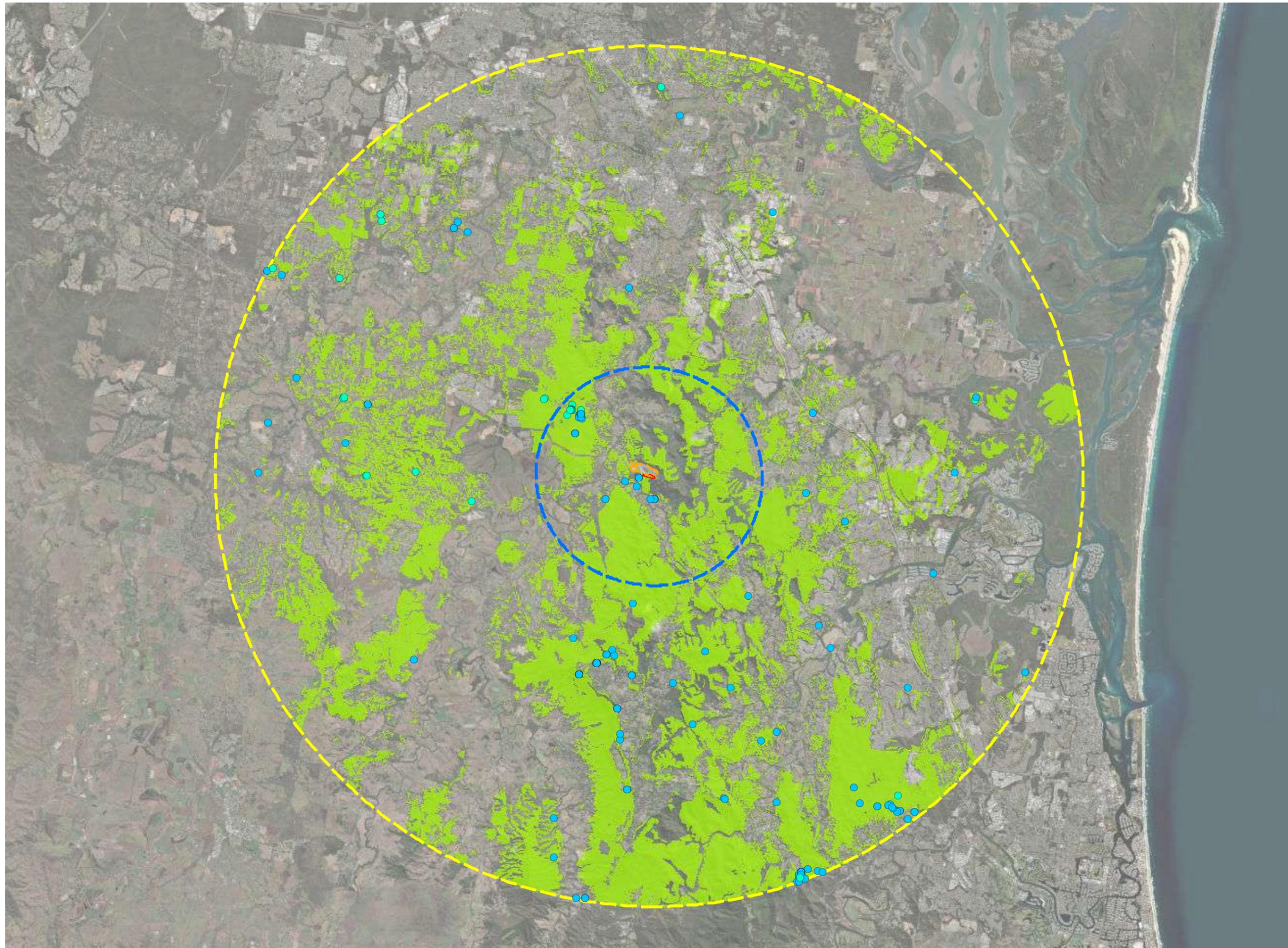
4.5. Other MNES

Of the remaining seven MNES none were determined to have no potential to be impacted by the proposed development. These are:

- World Heritage Properties - The closest World Heritage Site is the Gondwanan Rainforests of Australia (Main Range National Park) of which is approximately 35 km south of the proposed action.
- National Heritage Places - The closest National Heritage Place is the Gondwanan Rainforests of Australia which is approximately 35 km south of the referral area.
- Wetlands of International Importance (Ramsar) – The Moreton Bay Ramsar Site is approximately 15 km east of the development area.
- Commonwealth marine areas - The action is not being undertaken in or adjacent to a Commonwealth marine area. The proposed action is located 18 km west of a Commonwealth marine area.
- The Great Barrier Reef Marine Park - The GBRMP is more than 350 km north of the proposed action.
- Nuclear actions - The proposed action is not a nuclear action.
- A water resource, in relation to coal seam gas development and large coal mining development - The proposed action is not a CSG development or large coal mine.

Further assessment against the Significant Impact Guidelines is not deemed necessary for these MNES.

Figure 4. Glossy Black-cockatoo Records and Habitat Distribution



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

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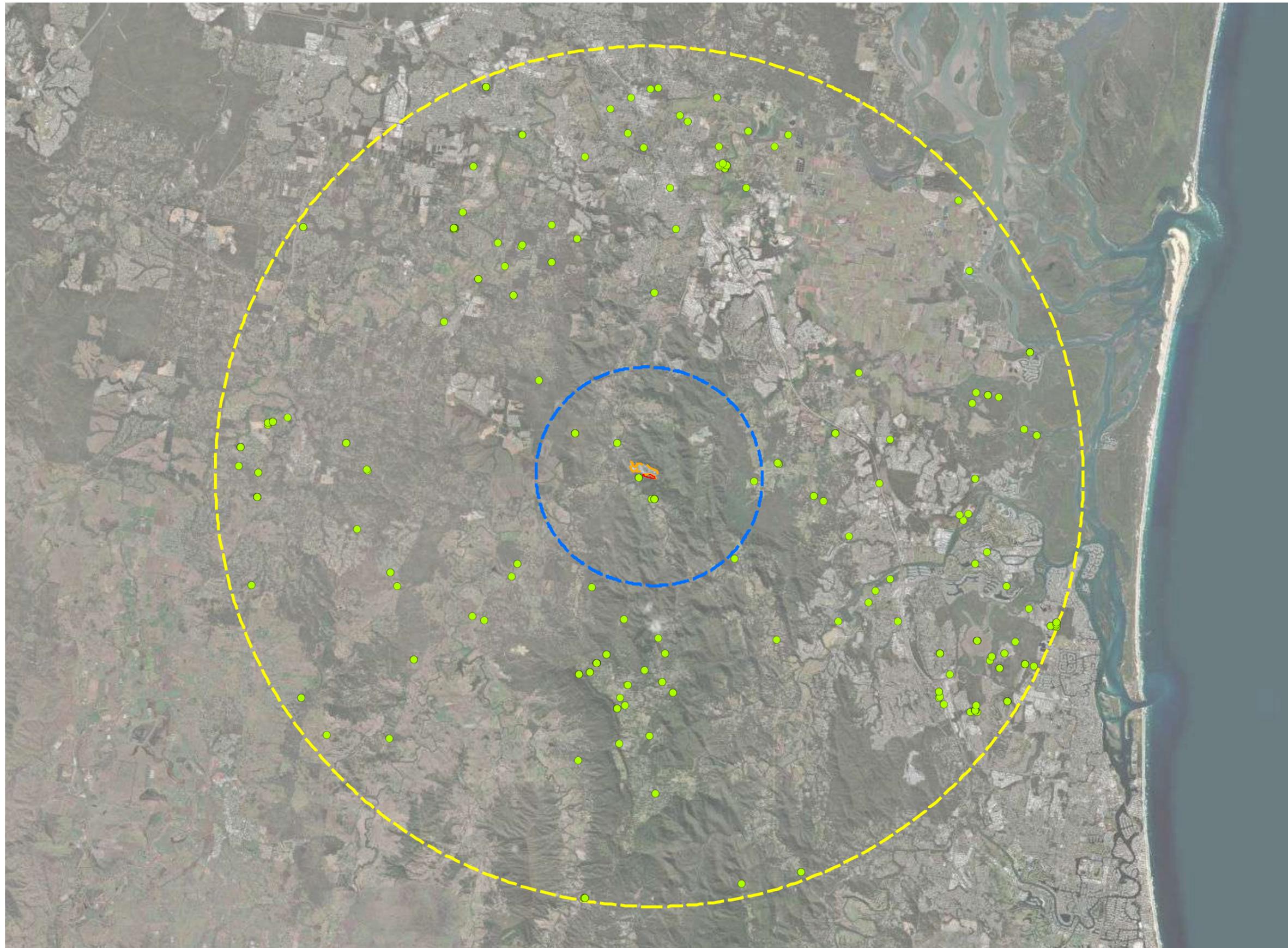
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- Legend**
- Existing Quarry (45.3 ha)
 - Referral Area (Quarry Extension, 6 ha)
 - 5KM Referral Area Buffer
 - 20KM Referral Area Buffer
- Glossy Black-cockatoo Records and Habitat**
- Glossy Black-cockatoo records within 20km of referral area recorded within past 20 years [273]
 - Glossy Black-cockatoo (South-eastern) records within 20km of referral area recorded within past 20 years [37]
 - Potential and known Glossy Black-cockatoo foraging habitat [28% within 20km of site]

Issue	Date	Description	Drawn	Checked
A	16/02/2024	Preliminary	TF	LB



Figure 5. White-throated Needle-tail Records



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- Legend**
-  Existing Quarry (45.3 ha)
 -  Referral Area (Quarry Extension, 6 ha)
 -  5KM Referral Area Buffer
 -  20KM Referral Area Buffer
 -  White-throated Needle-tail records within 20km of referral area recorded within past 20 years [481]

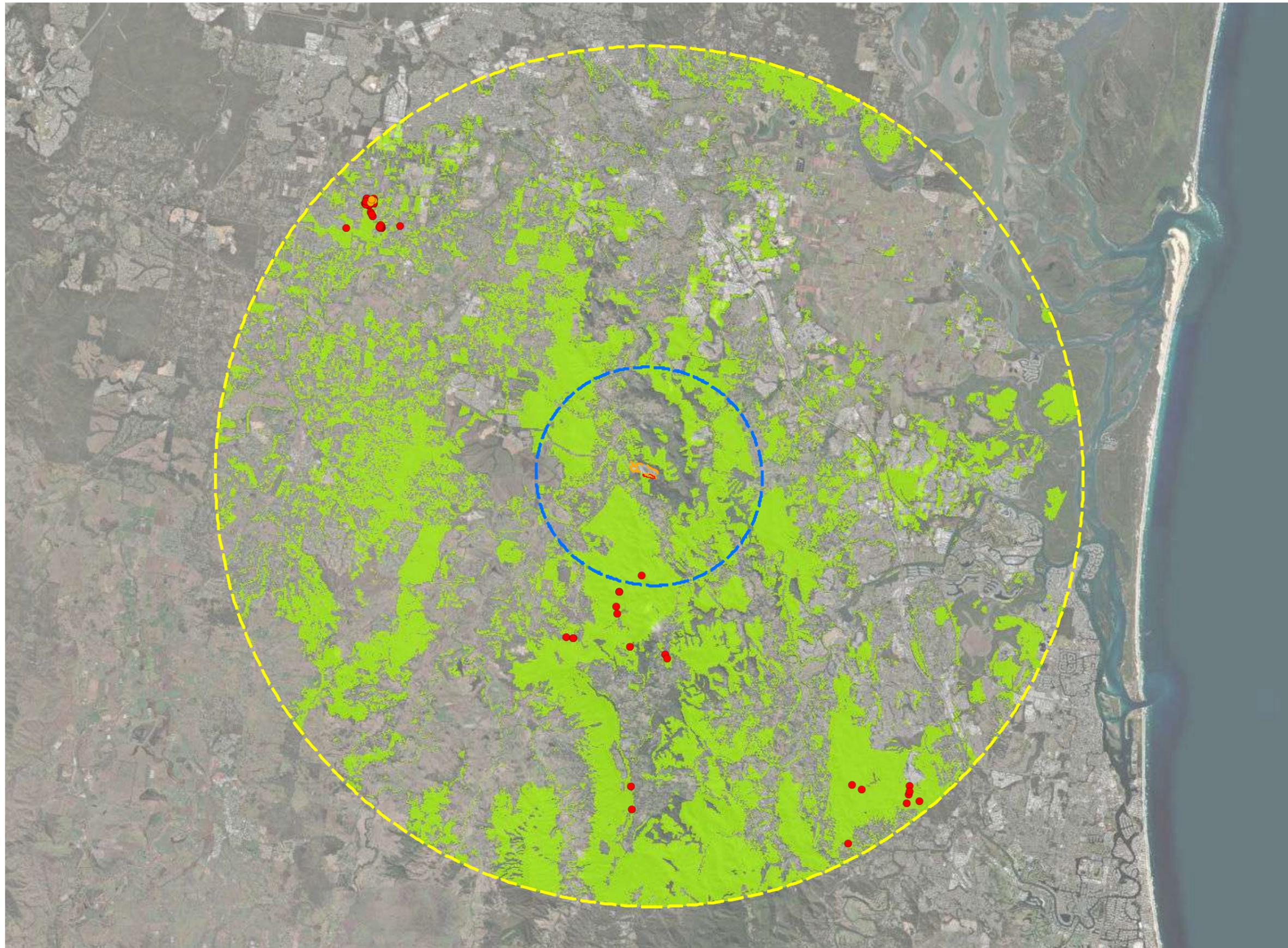
Issue	Date	Description	Drawn	Checked
A	16/02/2024	Preliminary	TF	LB

0 1 2 3 4 5 km

Transverse Mercator | GDA 2020 | Zone 56 | 1:80,000 @ A3



Figure 6. Greater Glider Records and Habitat Distribution



Notes:
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- Legend**
- Existing Quarry (45.3 ha)
 - Referral Area (Quarry Extension, 6 ha)
 - 5KM Referral Area Buffer
 - 20KM Referral Area Buffer
- Greater Glider Records and Habitat**
- Greater Glider records within 20km of referral area recorded within past 20 years [66]
 - Greater Glider (Central) records within 20km of referral area recorded within past 20 years [3]
 - Potential and known Greater Glider foraging habitat [32% within 20km of site]

Issue	Date	Description	Drawn	Checked
A	16/02/2024	Preliminary	TF	LB



Figure 7. Koala Records and Habitat Distribution



Notes:
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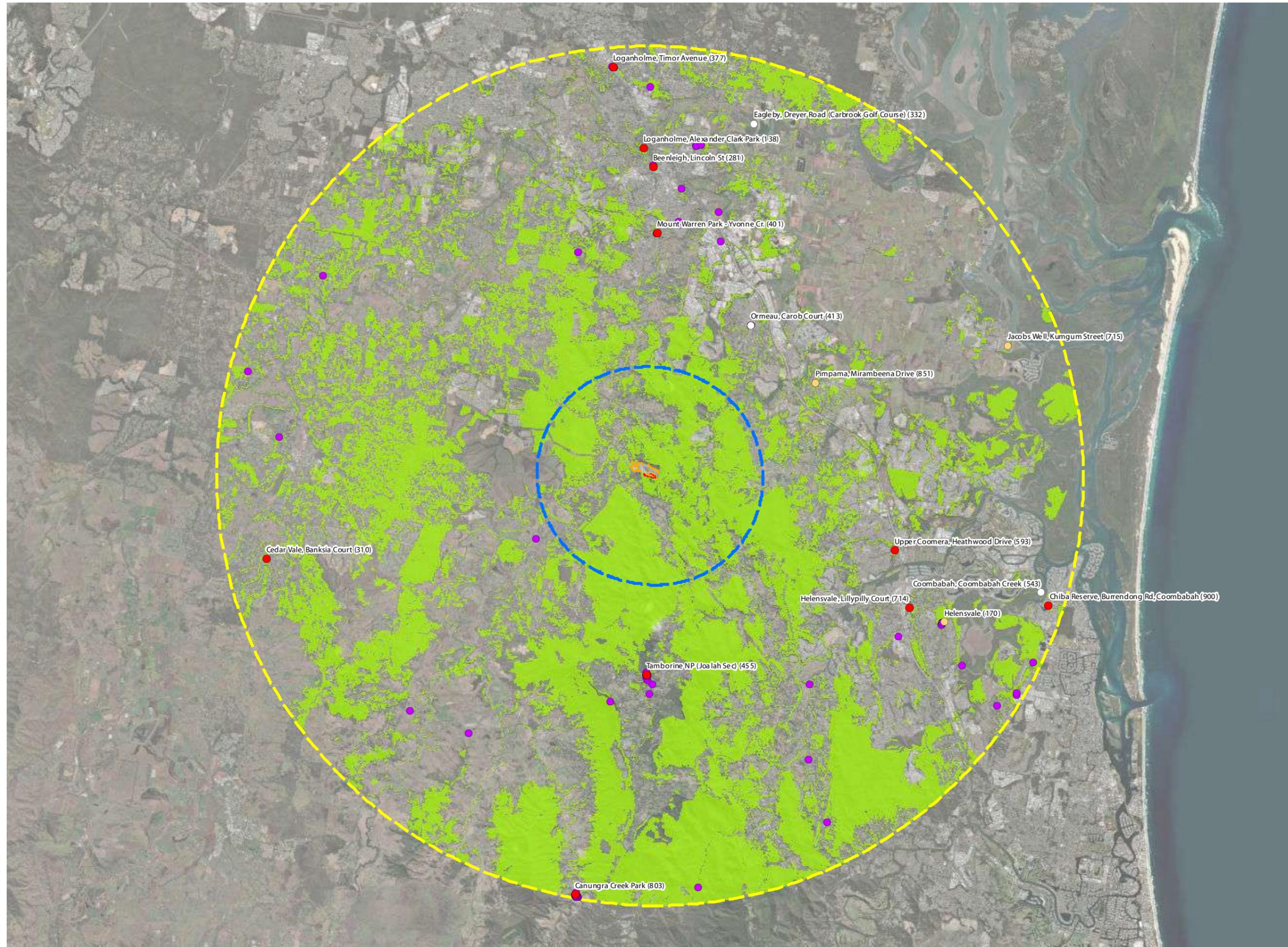
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- Legend**
- Existing Quarry (45.3 ha)
 - Referral Area (Quarry Extension, 6 ha)
 - 5KM Referral Area Buffer
 - 20KM Referral Area Buffer
- Koala Records and Habitat**
- Koala observational records within 20km of referral area recorded within past 20 years [1,160]
 - Koala incidental records within 20km of referral area recorded within past 20 years [860]
 - Potential and known Koala foraging habitat [34% within 20km of site]

Issue	Date	Description	Drawn	Checked
A	16/02/2024	Preliminary	TF	LB



Figure 8. Grey-headed Flying Fox Records, Roosts and Habitat Distribution



Notes:
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- Legend**
- Existing Quarry (45.3 ha)
 - Referral Area (Quarry Extension, 6 ha)
 - 5KM Referral Area Buffer
 - 20KM Referral Area Buffer

- Grey-headed Flying Fox Records and Habitat**
- Grey-headed Flying Fox records within 20km of referral area recorded within past 20 years [157]
 - Potential and known Grey-headed Flying Fox foraging habitat [34% within 20km of site]

- Grey-headed Flying Fox Roosts (Fed. Data, 2024)**
- Grey-headed Flying Fox roost inactive within recent surveys [3]
 - Grey-headed Flying Fox roost active within recent surveys [3]
 - Grey-headed Flying Fox roost active within recent surveys with a population level of 3 or above [10]
 - Nationally significant Grey-headed Flying Fox roost active within recent surveys [0]
 - Nationally significant Grey-headed Flying Fox roost active within recent surveys with a population level of 3 or above [0]

Issue	Date	Description	Drawn	Checked
A	16/02/2024	Preliminary	TF	LB



5. Field Survey Results

The results of the flora and fauna surveys, and the potential of occurrence, enables an understanding of the ecological constraints and potential impacts to MNES associated with the Project.

The results of the targeted vegetation, flora and fauna surveys is presented within the following sections. Refer to **Plan 4** for the field survey results across the referral area and surrounding locality.

5.1. Flora Assessment Results

5.1.1 *Habitat Assessment and Vegetation Communities*

Dominant vegetation communities have been ground-truthed through multiple site walkovers using a GPS and aerial imagery to define boundaries. All communities present within and adjacent to the referral area are described below and displayed on **Plan 4**. Terrestrial habitat assessment data sheets have been included as **Appendix D**

The referral area is mapped as comprising of a mixture of Category B (remnant) vegetation with Category X (non-remnant) vegetation as a result of an approved PMAV (ref: 2008/008614), on-ground vegetation characteristics were utilised to delineate vegetation communities. Field surveys identified three (3) distinct vegetation communities within the referral area (refer **Plan 4**).

1. AU1 - Indicative of remnant RE12.11.3 (3.5ha)
2. AU2 - Regrowth RE12.11.10 (1.1ha)
3. AU3 - Highly disturbed, dominated by weeds and acacia regrowth (1.3ha)

AU1 – Indicative of remnant RE12.11.3

Remnant vegetation across the referral area is generally consistent with the RE mapping of 12.11.3 consisting of *Eucalypt* and *Corymbia* species including *Corymbia citriodora* (Spotted Gum), *Eucalyptus siderophloia* (Grey Ironbark), *Eucalyptus acmenoides* (White Mahogany), *Eucalyptus microcorys* (Tallowwood), *Eucalyptus tereticornis* (Forest Red Gum), and *Eucalyptus propinqua* (Small-fruited Grey Gum). The shrub and ground layer contains moderate to high disturbance with *Lantana camara* (Lantana) dominant. The entirety of the referral area contains a steep south sloping gradient averaging 25° (47%) and as steep as 35° (70%) in parts (refer **Photo set 1**).



Photo set 1: Eucalypt dominated (RE12.11.3) vegetation on steep slopes within the referral area

AU2 - Regrowth RE12.11.10 (1.1ha)

Vegetation in the eastern extent of the referral area was identified on-ground as containing species indicative of pre-clear RE12.11.10 - notophyll vine forest. Species included *Aphananthe philippensis* (Rough-leaved Elm), *Cordyline rubra* (Red-fruited Palm Lily), *Alphitonia excelsa* (Soap tree), *Flindersia australis* (Crows Ash), *Jagera pseudorhus* (Foambark) and *Maclura cochinchinensis* (Cockspur Thorn). This area contained moderate-high weed infestation in parts dominated by *Lantana camara* and *Rivina humilis* (Coral Berry). Given the steep gradient across the referral area, this area showed signs of erosion (refer **Photo set 2**). RE12.11.10 is an indicator RE for the Lowland Rainforest Threatened Ecological Community. As such, an assessment of the key diagnostic requirements was carried out, refer **Section 5.3.1**



Photo set 2: Highly weed infested vegetation in the eastern extent of the referral area as pre-clear mapping RE 12.11.10.

AU3 - Highly disturbed, dominated by weeds and acacia regrowth

The balance of the referral area displayed significant disturbance as a result of historical land clearing and on-going erosion. A drainage line is present in the centre of the referral area which includes only weeds and acacia regrowth. The remaining areas of this polygon contained dense weeds including *lantana camara* (Lantana), *Megathyrsus maximus* (Guinea Grass), *Melinis repens* (red Natal Grass), *Solanum chrysotrichum* (Giant Devil's Fig), *Solanum mauritianum* (Wild Tobacco Tree), *Solanum seafortianum* (Brazilian Nightshade), and acacia regrowth (refer **Photo set 3**).



Photo set 3: Highly disturbed vegetation dominated by weeds and acacia regrowth in the centre and western extents of the referral area

04. Field Survey Results



Notes:
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- Legend**
- Qld DCDB
 - Referral Area
 - Existing Quarry
- Vegetation Communities**
- Assessment Unit 2:**
Indicative of Remnant RE 12.11.3 [3.5 ha]
 - Assessment Unit 2:**
Regrowth RE 12.11.10 [1.1 ha]
 - Assessment Unit 3:**
Highly disturbed, dominated by weeds and Acacia regrowth [1.3 ha]
- Observations**
- Macadamia tetraphylla specimen located outside referral area [1]
 - Macadamia integrifolia specimen(s) located outside referral area [2]
 - Macadamia integrifolia specimen(s) located within referral area [4]
 - Koala Observed [1]
 - Koala Scats [1]

Issue	Date	Description	Drawn	Checked
A	20/12/2023	Preliminary	TF	LB



5.1.2 Flora Species

A total of ninety-eight (98) flora species were recorded within the vegetation communities within the referral area during field surveys, as listed in **Appendix E**. Of those, sixty-five (65) are native and thirty-three (33) species are considered to be non-native / introduced species.

Refer to **Appendix E** for the complete flora list and native / non-native designation.

Two flora species listed under the EPBC Act and NCA were recorded in or adjoining the referral area. These species include *Macadamia integrifolia* which was recorded in the referral area, and *M. tetraphylla* which was recorded in the adjoining vegetation.

5.2. Fauna Assessment Results

A total of twenty (20) fauna species were recorded during field surveys, inclusive of motion sensor camera traps, including thirteen (13) birds, four (4) marsupials, two (2) reptile and one (1) invasive mammal. **One conservation significant fauna species, the Koala, and evidence of their activity in the form of scats was recorded during the field survey.** Motion sensor camera traps also detected the presence of at least one wild dog (refer to **Photo set 4**), which are known to pose a significant threat to native fauna, including the Koala.

A complete fauna species list is provided in **Appendix E**.

5.2.1 Targeted Species and survey guidelines

A detailed fauna assessment has been conducted across the referral area to identify and describe on-ground habitat features (e.g. habitat trees, fallen logs, termite mounds, roosting sites etc.), signs of fauna activity (e.g. scats, tracks, scratch marks on trees, nests etc.) and observations of species present within the area. Consideration was also given to the ecological significance of the site in the context of the local area and the broader region. A summary of the methodologies employed by SHG (detailed in **Section 3.2**) and the targeted species are summarised in **Table 11**.

Table 11: Summary of fauna survey techniques and survey effort

Scientific Name	Common Name	Survey guidelines	Techniques Implemented and survey effort
<i>Phascolarctos cinereus</i>	Koala	<i>Survey guidelines for Australia's threatened mammals</i> Phillips and Callaghan, 2011	<ul style="list-style-type: none"> - 3 SAT surveys - 12 hours of spotlighting meanders - Assessment of foraging and breeding values (habitat suitability) - 3 motion triggered camera traps deployed for 21 nights in October 2023
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	<i>Survey guidelines for Australia's threatened bats</i>	<ul style="list-style-type: none"> - Daytime roost/camp searches - 12 hours of spotlighting meanders - Assessment of foraging values and habitat suitability
<i>Petauroides volans</i>	Greater Glider	<i>Survey guidelines for Australia's threatened mammals</i> <i>Reporting detections of Southern Greater Gliders</i> (Conservation Regulator Victoria)	<ul style="list-style-type: none"> - 12 hours of spotlighting meanders - Assessment of breeding habitat (hollows) and foraging values
<i>Calyptorhynchus lathami lathami</i>	Southern-eastern Black-cockatoo	<i>Survey guidelines for Australia's threatened birds</i>	<ul style="list-style-type: none"> - Over 32 hours of meander surveys (observation searches) - Dusk 'point surveys' - Assessment of foraging values (<i>Allocasuarina</i> sp.)
<i>Hirundapus caudacutus</i>	White-throated Needletail	Nil. Species Profile and Threats Database (DCCEEW).	It is difficult to conduct systematic surveys of the white-throated needletail due to its mobility and ability to cover huge distances in a day.

5.2.2 Koala survey results

Three (3) SAT surveys to assess Koala activity within the referral area were completed in accordance with Philips and Callaghan (2011) (Refer to **Plan 1** for locations). SAT survey 1 and 2 both scored 0/30 while SAT survey 3 scored a 2/30 (refer to **Appendix F** for full SAT results). Evidence of Koala in the form of a direct sighting and scats were detected within the referral area during these targeted surveys.

5.2.3 Spotlight and nocturnal search results

A total of two (2) 3-hour spotlighting surveys were completed by SHG on the 31 October and 1 November 2023. Only common fauna species were observed during nocturnal searches.

5.2.4 Camera monitoring results

A total of three (3) baited camera traps were installed on-site for a period of 21 nights each. Three cameras were deployed on 10 October 2023 and removed 1 November 2023. Eight species were recorded by the cameras. Refer to **Tables 12 and 13** for fauna detected at each camera site.

Table 12: Camera Trap Results October 2023

Scientific Name	Common Name	Camera Site		
		Camera 1 (frog)	Camera 2 (fly)	Camera 3 (tulip)
<i>Canis familiaris</i>	Wild Dog (Invasive)			✓
<i>Macropus giganteus</i>	Eastern Grey Kangaroo			✓
<i>Gymnorhina tibicen</i>	Australian Magpie			✓
<i>Phascolarctos cinereus</i>	Koala			✓
<i>Sericornis frontalis</i>	White-throated Scrubwren	✓		
<i>Trichosurus vulpecula</i>	Brush-tail Possum	✓		
<i>Varanus varius</i>	Lace Monitor		✓	
<i>Wallabia bicolor</i>	Swamp Wallaby		✓	



Photo set 4: Wild dog detected on-site via motion sensor camera trap (left) and Koala sighting (right).

5.3. Threatened species and communities

5.3.1 Lowland Rainforest of Subtropical Australia TEC

Distribution

The LRSA TEC primarily occurs from Maryborough in Queensland to the Clarence River (near Grafton) in New South Wales (NSW). It includes isolated areas between the Clarence River and Hunter River, such as Bellinger Valley. Lowland Rainforest mostly occurs in areas < 300 m above sea level, and typically occurs in areas with high annual rainfall (> 1300 mm).

Habitat and ecology

Patches of Lowland Rainforest are generally small in size (<10 ha) and scattered / isolated. The Lowland Rainforest mostly occupies areas on highly fertile basaltic and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. These areas have been heavily cleared as they are the most suitable for agricultural use.

The ecological community is generally a moderately tall (≥ 20 m) to tall (≥ 30 m) closed forest (canopy cover ≥ 70 %). Tree species with compound leaves are common and leaves are relatively large (notophyll to mesophyll). Typically, there is a relatively low abundance of species from the genera *Eucalyptus*, *Melaleuca* and *Casuarina*. Buttresses are common as is an abundance and diversity of vines.

The identification and delineation of the LRSA TEC is principally determined by using the key diagnostic characteristics (KDCs) and the condition thresholds provided in the *Lowland Rainforest of Subtropical Australia listing advice* 2011 ('LRSA TEC Listing Advice').

The vegetation generally meets the context characteristics under the first five KDCs including presence of basalt or alluvium soils, position relative to the coast and within the TEC's distribution. Therefore, the identification and delineation of the LRSA TEC during field surveys was guided by the final two key diagnostic characteristics relating to the structure and species richness of the vegetation as well as alignment with the landform and floral characteristics of the associated regional ecosystem 12.11.10.

A total of 21 woody species that align with Appendix A of the LRSA TEC Listing Advice were recorded within the ground-truthed patches (refer **Table 13**). Notably, the majority of this vegetation patch was densely weed infested with *Lantana camara* (Lantana) and *Ardisia crenata* (Coral Berry). Additional detailed field surveys did not identify a tall, closed forest with multiple canopy layers. This vegetation was indicative of regrowth and lacked tall trees (20-30m). Therefore, vegetation within the referral area does not meet the KDC for the LRSA TEC (refer **Table 14**)

Table 13: Woody species that align with Appendix A recorded within/adjacent to the referral area

Scientific Name	Common Name
<i>Alphitonia excelsa</i>	Soap Tree
<i>Aphananthe philippensis</i>	Rough-leaved Elm
<i>Araucaria cunninghamii</i>	Hoop Pine
<i>Cordyline rubra</i>	Red-fruited Palm Lily
<i>Diploglottis australis</i>	Native Tamarind
<i>Ficus watkinsiana</i>	Strangler Fig
<i>Flindersia australis</i>	Crows Ash
<i>Grevillea robusta</i>	Silky Oak
<i>Jagera pseudorhus</i>	Foambark
<i>Lophostemon confertus</i>	Brush Box
<i>Macadamia integrifolia</i>	Macadamia
<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut
<i>Maclura cochinchinensis</i>	Cockspur Thorn
<i>Mallotus philippensis</i>	Red Kamala
<i>Melia azedarach</i>	White Cedar
<i>Pandorea pandorana</i>	Wonga-wonga Vine
<i>Pittosporum sp.</i>	-
<i>Platynerium bifurcatum</i>	Elk Horn Fern
<i>Polyscias elegans</i>	Celery Wood
<i>Smilax australis</i>	Barbed-wire Vine
<i>Stephania japonica</i>	Tape Vine

Table 14: Key diagnostic criteria for the LRSA TEC

Key Diagnostic Criteria	Referral area meets criteria
<ul style="list-style-type: none"> Distribution of the ecological community is primarily in the NSW North Coast and South Eastern Queensland bioregions, according to Interim Biogeographic Regionalisation for Australia (IBRA) version 6.1 (2004). 	✓
<ul style="list-style-type: none"> The ecological community occurs on: soils derived from basalt or alluvium; or enriched rhyolitic soils; or basaltically enriched metasediments. 	✓

<ul style="list-style-type: none"> The ecological community generally occurs at an altitude less than 300 m above sea level. 	✓
<ul style="list-style-type: none"> The ecological community typically occurs in areas with high annual rainfall (>1300mm). 	✓
<ul style="list-style-type: none"> The ecological community is typically more than 2 km inland from the coast. 	✓
<ul style="list-style-type: none"> The structure of the ecological community is typically a tall (20 m–30 m) closed forest, often with multiple canopy layers. 	✗
<ul style="list-style-type: none"> Patches of the ecological community typically have high species richness (at least 30 woody species from Appendix A). 	✗

5.3.2 Threatened Flora Species Assessment

Flora species associated with notophyll vine forest

Several flora species including *Baloghia marmorata* (Marbled Baloghia), *Corchorus cunninghamii* (Native Jute), *Corynocarpus rupestris subsp. Arborescens* (Southern Corynocarpus), *Cupaniopsis newmanii* (Long-leaf Tuckeroo), *Fontainea venosa*, *Planchonella eerwah* (Shiny-leaved Condo), *Randia moorei* (Spiny Gardenia) were identified as having a ‘moderate’ likelihood of occurring within the referral area. This assessment was based on the potential for notophyll vine forest vegetation (Pre-clear RE 12.11.10) and local records within the Mount Tamborine National Park locality.

Following field surveys, it was concluded that the majority of these species, with the exception of *Macadamia integrifolia* (Macadamia Nut) and *Macadamia tetraphylla* (Rough-shelled Bush Nut), have a ‘low’ likelihood of occurring as the vegetation associated with the notophyll vine forest RE was identified as being heavily weed infested and indicative of regrowth vegetation. This area did not contain a mature vegetation structure such as a tall, closed canopy and lacked the species richness of a notophyll vine forest community. Furthermore, these species were not recorded during detailed site surveys.

A total of 15 specimens of *Macadamia integrifolia* (2 mature, 11 semi-mature and 1 juvenile) were recorded within the referral area and are anticipated to be impacted. *Macadamia tetraphylla* was recorded outside the referral area and therefore not impacted.

Flora species associated with eucalypt woodland

Several flora species including *Leichhardtia coronata* (Slender Milkvine) and *Sophora fraseri* were identified as having a moderate likelihood of occurring within the referral area. This assessment was based on the potential for eucalypt woodland (remnant RE 12.11.3) and local records within the Mount Tamborine National Park locality.

Following field surveys, it was concluded that these species have a ‘low’ likelihood of occurring as the area of eucalypt woodland was heavily weed infested at the ground and shrub layer. Furthermore, specific habitat requirements such as creeks and rocky outcrops were absent. None of these species were recorded during detailed field surveys.

Macadamia Nut was recorded within/adjacent to the referral area. Further consideration of impacts to the species from the action, including assessment against the EPBC Act significant impact criteria, is required. Refer to Section 8.5.

5.3.3 Threatened Fauna Assessment

The following subsections present detailed findings on field results and potential habitat observed for threatened fauna listed under the EPBC Act, identified as having a 'moderate' or 'high' likelihood to occur. Where presence of a species is confirmed on-site or a likelihood of occurrence of 'moderate', 'high' or 'known' has been applied, further assessment against the Significant Impact Guidelines may be required.

Koala (*Phascolarctos cinereus*)

The Koala occurs in a range of environments containing eucalypt forest or woodland. The referral area does support habitat for the species associated with remnant RE12.11.3 albeit heavily weed infested in parts. The non-remnant portion of the site was either heavily weed infested or containing notophyll vine forest species. Spot Assessment Technique (SAT) surveys were utilised to detect evidence of Koala activity across the referral area and to determine the likelihood of occurrence on-site. Three (3) SATs were carried out across the referral area which involves searching the base of the nearest 30 trees to a central point for scats. Evidence of Koala activity in the form of scats and direct observation were recorded within the referral area.

A Koala sighting was recorded within the northern extent of the referral area during targeted site surveys. The species is known to be present within the locality and Koala habitat was confirmed within the referral area. The referral area of 5.94 ha, inclusive of 3.55 ha of suitable Koala habitat, is connected to >200ha of potentially suitable habitat in the region. The referral area is not considered to provide optimal koala habitat as the steepness and dense weeds make dispersal for the species more difficult. It is considered unlikely that the relatively small expansion area of lower value habitat (3.55 ha) would significantly reduce the area of occupancy for the species.

Koala presence was recorded through direct sighting and scat evidence was recorded within the referral area. Further consideration of impacts to the species from the action, including assessment against the EPBC Act significant impact criteria, is required. Refer to Section 8.2

Grey-headed Flying-fox (*Pteropus poliocephalus*)

Pteropus poliocephalus (Grey-headed Flying-fox) requires foraging resources and roosting sites to persist. The species is known to use a wide variety of habitats including subtropical and temperate rainforests, tall sclerophyll forest and woodlands, heaths, swamps and also urban and agricultural areas where food trees have been cultivated.

The species is highly adaptive with its diverse native diet, which it can supplement with introduced species. It is known to forage within a variety of habitat areas as each resource does not produce food throughout the entire year. No Grey-headed Flying-fox roosts were observed within the referral area. A review of the National Flying-fox monitoring viewer identified a GHFF roost approximately 8.7km north-east of the site (Pimapama, Mirambeena Drive (851)). The nearest roost of national significance (Canungra, Beechmont Road (141)) is located approximately 22 km south of the site. Given the availability of suitable foraging habitat within the broader area, it is considered unlikely that the species would utilise the relatively small area of 5.94 ha associated with the expansion area.

Notably, only 3.55ha of the referral area contains vegetation indicative of eucalypt woodland as potential foraging habitat for the species. Additionally, vibration from machinery and subterranean work can also disturb flying-foxes in a camp and likely deter the species from roosting (Ecosure 2021).

No sightings of Grey-headed Flying Fox were recorded within the referral area, and it is not expected to provide significant or high value habitat for this species. However, the presence of a small area of potential habitat within the referral area means further consideration of impacts to the species from the action, including assessment against the EPBC Act significant impact criteria, is required. Refer to Section 8.3.

Greater Glider (*Petauroides volans*)

The Greater Glider is largely restricted to eucalypt forests and woodlands of eastern Australia. It is typically found in highest abundance in taller, montane, moist eucalypt forests on fertile soils, with relatively old trees and abundant hollows associated with Category B (remnant) vegetation. While the referral area does contain mapped Category B (remnant) vegetation of eucalypt dominated communities, on-ground assessments observed high levels of disturbance across the majority of the site. The majority of the referral area consists of either retained canopy with disturbed understory or highly impacted vegetation as a result of historical and current land-uses. The referral area is situated on very steep, rocky terrain and poor-quality soils. As a result, large trees were generally limited across the area mapped as Category B (remnant) vegetation. Two 100m habitat quality transects were carried out within this vegetated polygon with results indicating an average of 10 large trees per hectare utilising 450mm DBH as the large tree threshold for RE12.11.3. This result equates to only 22% of the large tree benchmark for RE12.11.3 (45 large tree per ha). Additionally, large hollow bearing trees were significantly limited across the referral area. Nocturnal surveys (spotlighting) were conducted across the site on two separate surveys. No evidence of Greater Glider activity was recorded within the referral area. The evidence suggests that the referral area is not currently utilised by Greater Glider and is considered poor habitat for the species.

As stated in the Conservation Advice for *Petauroides volans* (Greater Glider (southern and central)) 2022, the species is particularly sensitive to disturbance associated with forest clearance and fragmentation and disperse poorly. The referral area is located in a landscape that has been partially subject to modification for past and on-going land-uses resulting in a mixture of undisturbed and highly disturbed environments. The referral area retains no connectivity value to the north of the site where the current quarry footprint is present. This also limits connectivity in a north-east and north-west direction. However, the referral area does retain connectivity value further south where remnant vegetation is present. Furthermore, there is an abundance of undisturbed remnant vegetation within environmental reserves in the surrounding locality. It is considered that if Greater Gliders were to be present within the area, they would demonstrate a preference for this higher quality habitat.

No sightings of Greater Glider were recorded within the referral area, and it is not expected to provide significant or high value habitat for this species. However, the presence of a small area of potential habitat within the referral area means further consideration of impacts to the species from the action, including assessment against the EPBC Act significant impact criteria, is required. Refer to Section 8.4.

Southern-eastern Black-cockatoo (*Calyptorhynchus lathami lathami*)

This species prefers woodland areas dominated by she-oak *Allocasuarina*, or open sclerophyll forests and woodlands with a stratum of *Allocasuarina* beneath *Eucalyptus*, *Corymbia* or *Angophora*. Southern-eastern Black-cockatoos have also been observed in mixed *Allocasuarina*, *Casuarina*, cypress *Callitris* and brigalow *Acacia harpophylla* woodland assemblages. In SEQ west of the Great Dividing Range, they have been observed feeding in remnant *Casuarina cristata* and bullock *Allocasuarina luehmannii* forests. This species is also known to utilise appropriate remnant woodlands, and individual or small pockets of *Allocasuarina* and *Casuarina* feed trees in urban areas.

The referral area contains wooded areas containing eucalypt woodland. According to Queensland WildNet and ALA, there are no records of this species within 5km radius of the site. A review of these records indicate that a higher number of sightings have been recorded further south within Cedar Creek/Mount Tamborine National Park.

The species relies on two key elements for survival being hollow bearing trees for nesting and an abundance of *Allocasuarina/ Casuarina* (She-oaks) species for foraging. Field surveys identified the vast majority of the site exhibiting some form of modification/disturbance. As such, limited hollow-bearing trees were observed across the referral area indicating that the site provides minimal roosting habitat for the species. Scattered *Allocasuarina littoralis* (Black She-oak) were observed within areas of Category B (remnant) vegetation, however the species is known to be highly selective of individual food trees requiring an abundance of individual specimens, indicating the likelihood of the species utilising the site for foraging is low.

Ultimately, the lack of hollow-bearing trees and foraging trees and availability of suitable continuous remnant habitat within the Cedar Creek/Mount Tamborine National Park area to the south, reduces the likelihood that this species would utilise the vegetation on-site.

No sightings of South-eastern Black-Cockatoo were recorded within the referral area, and it is not expected to provide habitat for this species. Further consideration of impacts to the species from the action, including assessment against the EPBC Act significant impact criteria, is not required.

White-throated Needletail (*Hirundapus caudacutus*)

The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps.

The referral area contains wooded areas including open forests. A review of Queensland WildNet and ALA identified several records of the species within 5km of the site however the majority of these are 10+ years old.

Mapped Category B (remnant) vegetation is present over the central portion of the site however field surveys identified that the majority of the vegetation on-site has evidence of disturbance from historical and on-going land-uses and thus does not resemble old growth forest. The lack of recent records (<10 years) in close proximity to the referral area indicates this species is unlikely to occur within the referral area during roosting periods due to lack of mature wooded areas. There is a low likelihood for this species to be found in airspace foraging given the small referral area and the species' high mobility and recorded presence within the area.

No sightings of White-throated Needletail were recorded within the referral area, and it is not expected to provide habitat for this species. Further consideration of impacts to the species from the action, including assessment against the EPBC Act significant impact criteria, is not required.

5.3.4 Migratory Species Assessment

Database searches returned thirteen (13) migratory fauna species listed as threatened under the EPBC Act and/or NC Act, as having been previously recorded or predicted to occur within 5 km of the referral area. Following the likelihood of occurrence assessment, three (3) species were identified as having a moderate or greater likelihood of occurring on-site. These include *Monarcha melanopsis* (Black-faced Monarch), *Myiagra cyanoleuca* (Satin Flycatcher) and *Rhipidura rufifrons* (Rufous Fantail).

Habitat for the Black-faced Moonarch includes rainforest, eucalypt woodlands, coastal scrub and damp gullies. The referral area contains limited available habitat in the form of eucalypt woodland (3.55 ha). However true rainforest vegetation and damp vegetated gullies are not present. Similarly, the Satin Flycatcher and Rufous Fantail prefer heavily vegetated gullies dominated by eucalypts. An eroded drainage line was observed within the referral area however this was heavily weed infested and did not contain eucalypt species. Therefore, the referral area is not considered to provide the preferred habitat for these species. It is considered unlikely that these species would utilise the vegetation within the referral area given the relatively small area and lack of preferred habitat. These species are considered common throughout the SEQ region. The proposed action is not considered to significantly impact the availability of habitat for the species.

No migratory fauna species of conservation significance were recorded during the field survey. The species will not be impacted by the action therefore assessment further assessment against the EPBC Act significant impact criteria is not required.

5.4. Post Field Survey MNES Assessment

A tabulated assessment of the potential for the nine MNES to occur within the referral area or be impacted by the action is provided in **Table 15**. This assessment is based on the desktop and field survey results and makes the distinction between MNES that have either nil or a very low potential to be impacted by the project and those that have some potential and were investigated further.

Table 15: Potential for the proposed action to impact MNES

MNES	Description	Relevance to Site	Assessment
World Heritage Properties	A 'declared World Heritage property' is an area that has been included in the World Heritage list or declared by the minister to be a World Heritage property. World Heritage properties are places with natural or cultural heritage values which are recognised to have outstanding universal value.	The closest World Heritage Site is the Gondwanan Rainforests of Australia of which approximately 35 km south of the proposed quarry expansion area.	There is no potential for the proposed action to impact on a World Heritage Property. Further assessment is not required.
National Heritage Places	The National Heritage List contains places or groups of places with outstanding heritage value to Australia –	The closest National Heritage Place is the Gondwanan Rainforests of	There is no potential for the proposed action to impact on a National Heritage Place. Further assessment is not required.

MNES	Description	Relevance to Site	Assessment
	whether natural, Indigenous or historic or a combination of these.	Australia of which approximately 35 km south of the proposed quarry expansion area.	
Wetlands of international importance (Ramsar)	A 'declared Ramsar wetland' is an area that has been designated under Article 2 of the Ramsar Convention or declared by the minister to be a declared Ramsar wetland under section 16 of the EPBC Act.	Moreton Bay is approximately 20 km north-east of the development area.	There is no potential for the proposed action to impact on a Wetland of International Importance (Ramsar). Further assessment is not required.
Nationally threatened species and ecological communities	An action will require approval if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories: <ul style="list-style-type: none"> ▪ extinct in the wild ▪ critically endangered ▪ endangered, or ▪ vulnerable. <p>An action will also require approval if the action has, will have, or is likely to have a significant impact on an ecological community listed in any of the following categories:</p> <ul style="list-style-type: none"> ▪ critically endangered, or ▪ endangered. 	The PMR identified 77 listed threatened species and six (6) TECs with the potential to occur in the development area or within 5 km of the proposed action.	Based on the desktop and field survey results, the following species have potential to be impacted by the action therefore require assessment against the relevant EPBC Act significant impact criteria: <ol style="list-style-type: none"> 1. <i>Petauroides volans</i> (Greater Glider) 2. <i>Phascolarctos cinereus</i> (Koala); 3. <i>Pteropus poliocephalus</i> (Grey-headed Flying-fox); 4. <i>Macadamia integrifolia</i> (Macadamia Nut) Further assessment against the significant impact criteria is required for these MNES. All other nationally threatened species and ecological communities were considered and concluded as unlikely to undergo a significant impact as a result of the proposed development.
Migratory species	An action will require approval if the action has, will have, or is likely to have a significant impact on a listed migratory species.	The PMR identified 17 listed migratory species with the potential to occur in the development area or within 5 km of the proposed action.	It is considered unlikely that the development area has habitat critical for any migratory species. Further assessment against the significant impact criteria is not required.

MNES	Description	Relevance to Site	Assessment
Commonwealth marine areas	Marine protected areas are marine areas which are recognised to have high conservation value. Actions in or near marine protected areas, or other areas with high conservation value, have a greater likelihood of significant impacts on the Commonwealth marine environment.	The action is not being undertaken in or adjacent to a Commonwealth marine area. The proposed action development area is located approximately 18km, from the nearest Commonwealth marine area.	It is considered unlikely for the proposed action to impact on Commonwealth Marine Areas. Further assessment is not required.
The Great Barrier Reef Marine Park	The Great Barrier Reef Marine Park is established under the <i>Great Barrier Reef Marine Park Act 1975</i> . The GBRMP is an area recognised to have high conservation value and an action will require approval if it is likely to impact the environment.	The GBRMP is more than 350 km north of the development area.	There is no potential for the proposed action to impact on the GBRMP. Further assessment is not required.
Nuclear actions	A nuclear action (including uranium mining) will require approval if it has, will have, or is likely to have a significant impact on the environment.	The proposed action does not comprise a nuclear action.	This MNES does not apply.
A water resource, in relation to coal seam gas development and large coal mining development	Under the EPBC Act, an action which involves a CSG development or a large coal mining development requires approval from the Australian Government if the action has, will have, or is likely to have a significant impact on a water resource.	The proposed action does not comprise a CSG development or large coal mine.	This MNES does not apply.

6. Avoidance, Mitigation and Management Measures

6.1. Potential Project related impacts

The proposed action involves the expansion of the existing Blue Rock Quarry. This will involve the clearing of vegetation which has been assessed on-ground as:

- AU1 – Indicative of Remnant RE12.11.3,
- AU2 – Regrowth RE12.11.10 , and
- AU3 – Highly disturbed, dominated by weeds and acacia regrowth.

6.1.1 Potential Direct Impacts

Vegetation Clearing

The project is predicted to directly impact all 5.94 ha of the referral area directly south of the existing Blue Rock Quarry. A breakdown of vegetation to be impacted is provided in **Plan 5**.

Habitat Loss

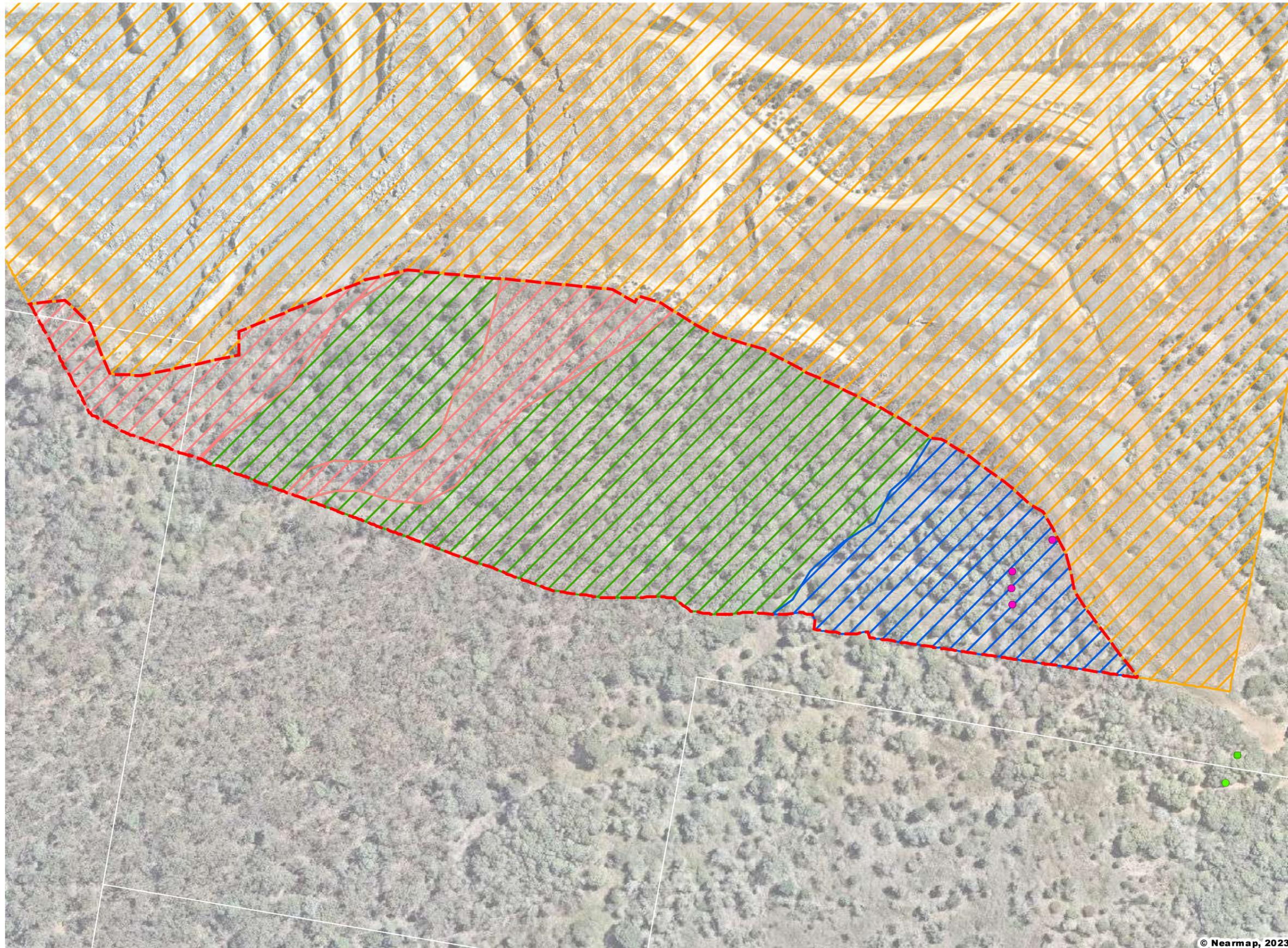
The Project is predicted to impact 5.94 ha of remnant and non-remnant habitat, which provides marginal habitat values for a range of native flora and fauna species.

The MNES identified as having a moderate and higher likelihood of occurrence based on a desktop and field assessments include Koala, Grey-headed Flying-Fox, Greater Glider and *Macadamia integrifolia*. Subsequently, these species have been further assessed in terms of the risk of potential project related impacts upon each matter, to determine the need or otherwise for EPBC Act significant impact assessments to be completed, as presented in **Table 9**

The risk of impact assessment (refer **Table 11**) is qualitative and based upon the potential extent of habitat loss resulting from the construction phase of the project and to a lesser degree the operational phase of the project. It considered, but was not limited to the following:

- The value of the impacted habitat to each respective matter;
- The amount of habitat to be directly impacted (lost) against that to be retained
- Potential indirect impacts (e.g. dust, noise and soil erosion);
- Potential fragmentation of a population into two or more populations;
- Increased fragmentation of wildlife corridors in the Referral area;
- Risk of operational impacts (e.g. noise);
- Each species ability (e.g. fauna) or inability (e.g. flora) to move away from areas of direct impact into retained habitat.

05. MNES Impact Assessment



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

Layer Sources
 © State of Queensland (Department of Resources) 2023
 Updated data available at
<http://qldspatial.information.qd.gov.au/catalogue/>

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- Legend**
- Qld DCDB
 - Referral Area
 - Existing Quarry
- Vegetation Communities Impacted**
- Assessment Unit 1:**
 Indicative of Remnant RE 12.1.1.3 [3.5 ha impacted]
 - Habitat for MNES species (Koala, GHFF, Greater Glider)
 - Assessment Unit 2:** Regrowth RE 12.1.1.10
 [1.1 ha impacted]
 - Habitat for MNES species (Macadamia)
 - Assessment Unit 3:**
 Highly disturbed, dominated by weeds and Acacia regrowth [1.3 ha impacted]
 - Not habitat for MNES species
- Observations**
- Macadamia tetraphylla specimen located outside referral area [1]
 - Macadamia integrifolia specimen(s) located outside referral area [2]
 - Macadamia integrifolia specimen(s) located within referral area [15]

Issue	Date	Description	Drawn	Checked
A	20/12/2023	Preliminary	TF	LB



6.1.2 Potential Indirect Impacts

Indirect impacts occur when project related activities affect vegetation or habitats in a manner other than a direct loss or clearing. Examples of indirect impacts include promotion of soil erosion, sedimentation of waterways, dust inhibiting plant pollination, provision of suitable seed bed for invasive plants, or increased noise activity within of directly adjacent to sensitive habitat areas.

Quarry Design and Acoustics

Quarries by nature are subterranean meaning indirect impacts on adjacent retained vegetation is expected to be negligible. The referral area slopes steeply to the south with vegetation retained beyond the southern boundary. The proposed quarry design is provided as **Figure 9**. The southern boundary of the referral areas is approximately 200-250m AHD, the quarry design demonstrates the significant drop in elevation to as low as 100m AHD in the north of the referral area. Given the referral area is only 150m wide, this demonstrates the significant benching associated with the quarry design which helps direct impacts such as noise and dust internally.

Fulton Hogan engaged MWA Environmental to carry out extensive sound modelling as part of a study to increase the Blue Rock Quarry's annual extraction limit. The MWA Environmental report addresses the potential impact of noise emissions from the proposed increase in operation limit at surrounding sensitive land uses as per condition N2 of Environmental Authority P-EA-100268669 (EA). Details of noise modelling are outlined below, refer **Appendix G** for full noise report):

The relevant EA noise limits for the anticipated operating hours are:

- Day 7am to 6pm: 45 dB(A) LAeq at a sensitive place
 - 45dB generally considered 'soft' consistent with a suburban area at night
- Early morning 6am to 7am: 35 dB(A) LAeq at a sensitive place
 - 35db considered 'soft' consistent with a natural area with no wind

Thirty-two (32) sensitive receptors surrounding the quarry were represented in the MWA Environmental model used to predict the noise of increasing the extraction limit of the quarry. Results of the noise modelling highlighted that if quarry operations are to increase the annual extraction limit, the noise levels at all receptors would comply with the above limits. Notably, the noise model was used to predict the levels at the nearest boundary of Tamborine National Park, approximately 800m (south-west). Results indicate that the quarry noise levels will be below the expected ambient background noise levels at the nearest boundary of the Tamborine National Park. On this basis, the acoustic amenity of the Tamborine National Park will be preserved in accordance with the objective of the Queensland Environmental Protection (Noise) Policy 2019 for protected areas. Furthermore, noise levels for the full operational scenarios (Short - Term and Long-Term Extraction) within retained vegetation immediately south of the referral area is predicted to be below LAeq, 45 dB(A) at the very edge of the quarry, reducing to below LAeq, 39 dB(A). For the product loading and dispatch only (early morning) scenario the predicted noise levels are below LAeq, 23 dB(A) within retained vegetation to the south. These results indicate that vegetation south of the referral area will not be significantly impacted by effects of noise associated with the quarry expansion, as such the suitability of this vegetation for flora and fauna species will not be compromised.

Noise and Vibration

Noise levels greater than existing ambient noise levels are expected during the establishment of the proposed pit extension within the project area. Sources of noise are likely to consist of short, intense pulses from mobile plant equipment, and more prolonged noise, with consistent vibration, pitch and volume from generators, excavators and pumps, in addition from noise from vehicles.

Weeds

Increased vehicle movement during the vegetation clearing phase has the potential to increase the spread of weeds in the area, however, the site is already moderately to highly disturbed by weed invasion at the ground layer, most notably *Lantana camara* (Lantana) and *Lantana montevidensis* (Creeping lantana). With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the potential introduction/spread of weeds.

Vehicle Movement

During vegetation clearing, a number of vehicles will be required to access the referral area. Direct impacts from vehicle movements on threatened species and vegetation communities include:

- damage or destruction of vegetation or fauna habitat by vehicles traversing these areas; and
- fauna strike.

Indirect impacts include:

- interference of fauna through visual and noise impacts. This in turn can affect feeding, roosting, breeding or nesting behaviour;
- damage or destruction of vegetation and fauna habitat through smothering by dust generated by vehicles traversing the project area.

With implementation of standard mitigation measures, such as exclusions fencing, the project is likely to result in a temporary and minor impact to ecological values due to vehicular movements. Further, ecological field surveys confirmed that most fauna species present on-site are common or highly mobile.

Earthworks

Dust emissions during the establishment of the proposed pit extension have the potential to generate increased dust emissions. Elevated dust emissions during these activities are likely temporary. The main sources of dust will be generated via:

- wheel-generated dust from the haul roads created for the construction phase;
- dust lift-off from exposed surfaces (e.g. construction roads and pads);
- earthworks, including construction of the embankments, and moving, dumping and shaping material; and
- vegetation and soil clearing of the land.

Excessive deposition of dust on leaves of plants can suppress their growth and photosynthesis, resulting in reduced habitat quality for fauna. High levels of airborne dust can irritate the respiratory systems of fauna and potentially result in ingestion of dust-coated seeds and other foods. Excessive deposition of dust on open water bodies may also degrade water quality and overall habitat quality for fauna. Notably the referral area exists adjacent to a highly modified environment being an operational quarry. With the implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to ecological values due to the generation of dust.

A dust assessment was also carried out by MWA which details meteorological and particulate dispersion modelling of the operation at a rate of 1.6 Mtpa has demonstrated that, with ongoing diligent implementation of the dust management measures, compliance can be maintained with the air quality limits specified in Condition A2 of Environmental Authority P-EA-100268669 and the air quality objectives specified in the Queensland Environmental Protection (Air) Policy 2019 refer **Appendix H** for full dust report).

Light Emissions During Construction

The quarry construction activities will not occur during night periods, therefore no impacts associated with artificial lighting is expected.

Waste Disposal

Inappropriate disposal of non-hazardous wastes can attract vermin and other wildlife to site. This may exacerbate potential impacts (e.g. road mortality). Litter may also enter surrounding environments. With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the generation and handling of waste. Due to the temporary nature of the construction phase, waste generation opportunities will be limited.

Hazardous and Dangerous Goods

Spills and leaks from transfers (e.g. fuel and/or chemicals) and inadequate storage of dangerous goods and hazardous wastes could result in point-source contamination of surrounding land. Direct adverse impacts could include toxic impacts on vegetation (resulting in degradation or loss of vegetation and habitats), direct toxic impacts on fauna (from contact, inhalation or ingestion) or indirect impacts on threatened and migratory species from habitat loss. Direct adverse impacts on surface and groundwater quality are also possible.

With the application of standard mitigation and management measures, impacts from liquid and solid waste disposal will be avoided or localised and small in scale. Further to this, the likelihood of significant spillages is considered extremely low. Therefore, the project is likely to result in a negligible impact to ecological values due to potential spills and leaks.

Increased Human Presence

Increased human activity during quarry operation has the potential to disturb fauna within adjacent habitat areas. Resulting impacts to fauna include heightened vigilance and predator avoidance, which can disrupt foraging and roosting efficiency or deter wildlife from using particular areas. Impacts essentially represent a reduction in habitat availability due to edge effects. Human presence is limited to one or two people on a temporary basis until extraction reaches terminal benching. Therefore, the project is likely to result in a temporary and minor impact to ecological values due to increased human presence on site during the operational period.

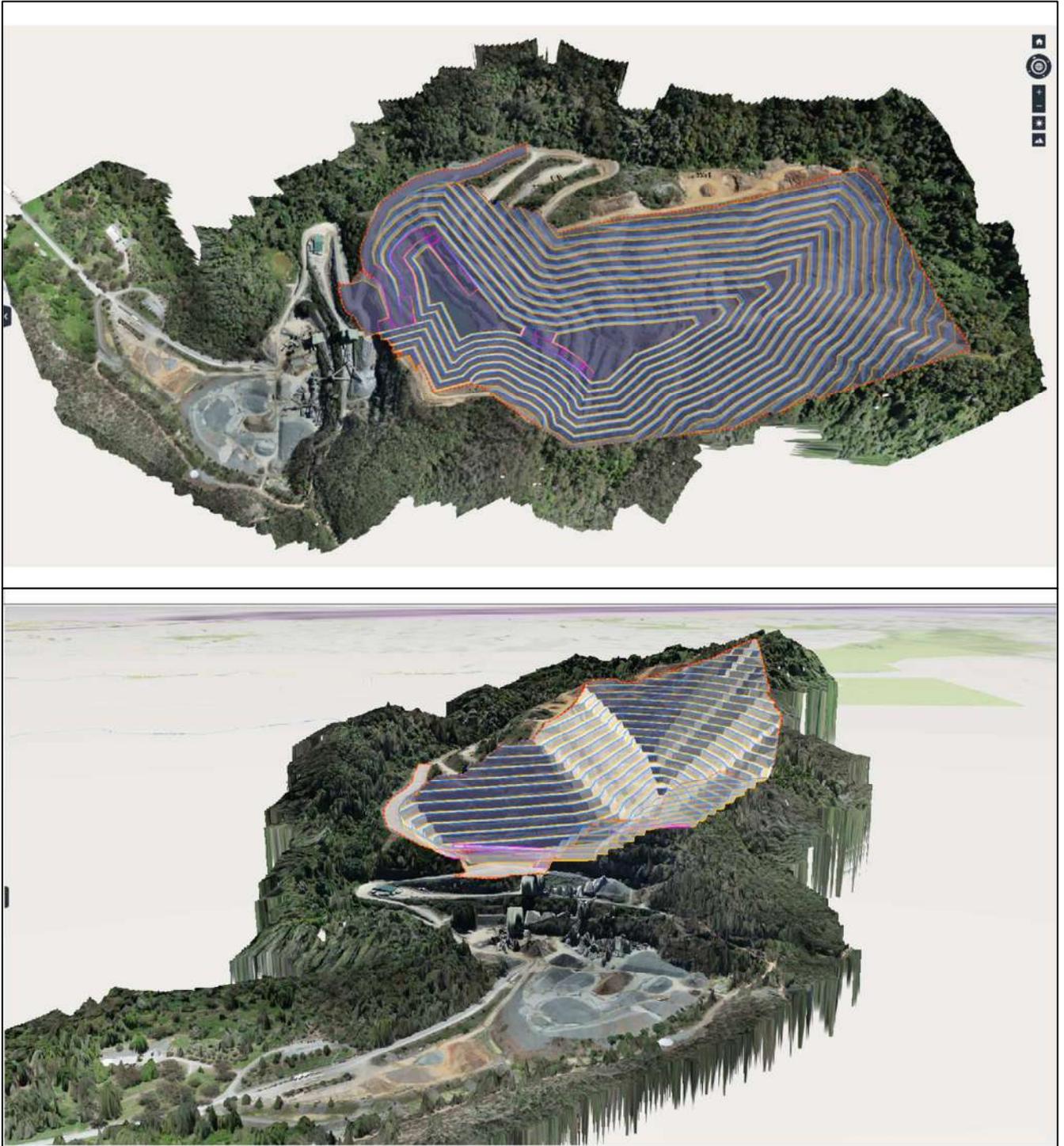


Figure 9: Proposed benching design

7. Avoidance, Mitigation and Management Measures

7.1. Clearing and Site Establishment Phase

General mitigation measures to be implemented during the construction phase of the Project are outlined below.

7.1.1 *Vegetation Clearing and Management Plan*

A Vegetation Clearing and Management Plan (VCMP) will form part of the broader management document for the proposed action. The VCMP will cover clearing of all vegetation within the referral area and include details on:

- Vegetation communities to be removed.
- All civil works likely to impact on existing vegetation.
- Temporary and permanent exclusion and protection fencing.
- Roles and responsibilities for site contractors, the developer and the consultant group.
- Stockpiling and site access locations.
- A clearing sequence plan showing the commencement of clearing and direction of removal (this will be in conjunction with the Fauna Management Plan to allow for the appropriate flushing of fauna towards safe havens and/or the application of an appropriate relocation program).
- Links to weed management and revegetation proposals.
- The stock piling and reuse of cleared vegetation.

7.1.2 *Fauna Management Plan*

A Fauna Management Plan (FMP) will be prepared for potential impacts of the construction phase covering the loss of vegetated areas, isolated trees and likely barriers and impediments to local dispersal. The FMP will link closely with the VCMP and include details on:

- Species surveyed as using the site with a focus on those most likely impacted by development works.
- A list of relevant State and Commonwealth legislation constraints and controls for the above listed fauna.
- A plan showing existing habitat opportunities and locations.
- Details of the threats to existing fauna species.
- Clearing sequence plan from the VCMP.
- Management and mitigation measures.
- Fauna spotter role, contacts and certification.
- Specific fauna management procedures for potential or known habitat trees.

7.1.3 Fauna Spotter Catcher

A registered and suitability qualified fauna spotter catcher/ecologist will need to be employed for clearing works to implement a protocol of best management practises. Significant habitat features, should any be identified on site, will be flagged prior to clearing events and these areas supervised by an appropriately experienced Ecologist. Identified within the clearing supervision protocol should be flagging of hollow bearing trees, if present, followed by the removal of vegetation surrounding them. After 24 to 72 hours, these trees should then be removed.

The objective of this is to enable hollow dependant fauna an opportunity to move on their own accord as many species utilise multiple den/roost sites within a given home range should they occur. Where required, native fauna situated within areas to be cleared will be relocated to a secure area of similar habitat prior to the commencement of vegetation clearance works by a registered fauna spotter/catcher. Should any removal and relocation of nests be required, it is to be undertaken by a suitably qualified and experienced person and advice sought where necessary.

7.1.4 Impact Management Plan – *Macadamia* sp.

Given the majority of the referral area falls within Protected plants trigger mapping under Queensland State legislation, *Nature Conservation Act 1992*. An impact management plan will be required prior to clearing for NCA/EPBC listed species *Macadamia integrifolia* which was recorded.

An Impact Management Plan will include the following details

- attempts to avoid and minimise impact
- nature of impact
- management of impact
- justification of impact management
- survival of plant in the wild
- offsetting assessment

As part of the impact management plan a significant residual impact (justification of impact) will be provided as well as details of rehabilitation efforts (i.e extent, success, timeframe). It is expected that individual *Macadamia integrifolia* recorded within the referral area would be offset at a ratio of 4:1 within a suitable vegetation community. Surveys identified 15 individual specimens of *Macadamia integrifolia* (at varying levels of maturity) indicating planting of 60 individuals.

7.2. Operational phase environmental management

The extraction activities will be carried out in accordance with the relevant permits and approvals from State and Local government. In particular, extraction activities require an Environmental Authority (EA) from DES prior to any works commencing. An EA imposes conditions to reduce or avoid potential environmental impacts. The current EA is included as an attachment to the EPBC Act referral where key management requirements are detailed.

Furthermore, impacts of extraction industry during the operational phase is temporary as once the quarry benches are extracted to terminal status they are then rehabilitated with native vegetation as per the requirements of the Environmental Authority. Once rehabilitation has occurred, impacts are limited to infrequent light vehicle movements to monitor and maintain vegetation and safety fencing.

8. Significant Impact Assessment

8.1. Significant Impact Assessment Definitions

The Significant Impact Guidelines 1.1 provides specific definitions for *'a population of a species or important population of a species'* and *'habitat critical to the survival of a species or ecological community'*. This definition is a key consideration when conducting significant impact assessments for a threatened species or ecological community listed under the EPBC Act. The definitions are presented below.

8.1.1 Population of a species

A 'population of a species' is defined by the Significant Impact Guidelines as:

"An occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- *A geographically distinct regional population, or collection of local populations*
- *A population, or collection of local populations, that occurs within a particular bioregion.*

8.1.2 Important population

An 'important population' is a population that is necessary for a species' long-term survival and recovery.

This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

8.1.3 Habitat critical to the survival of a species or ecological community

The Significant Impact Guidelines provide the following definition for *'habitat critical to the survival of a species'*

"Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- *For activities such as foraging, breeding, roosting or dispersal*
- *For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *To maintain genetic diversity and long-term evolutionary development*
- *For the reintroduction of populations or recovery of the species or ecological community.*

Such habitat may be, but is not limited to:

- *Habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community*
- *Habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.*

8.2. Phascolarctos cinereus (Koala)

8.2.1 Conservation Status

The Koala is listed as Endangered under the EPBC Act.

8.2.2 Description

Koalas (*Phascolarctos cinereus*) are native Australian tree-dwelling marsupials with predominantly grey coloured fur.

8.2.3 Distribution

The Koala is found from north-east Queensland to the south-east corner of South Australia. As a consequence of translocations, the Koala are found outside their historic range, for example, Kangaroo Island. The distribution of the Koala is influenced by altitude, temperature and leaf moisture. The density of the Koala population in coastal regions is generally greater than inland areas. Koalas are known to naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by *Eucalyptus* sp.

8.2.4 Habitat

Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland and emergent food trees. Preferred food and shelter trees are naturally abundant on fertile clay soils. Along the Great Dividing Range and the coastal belt throughout the species' range, Koalas inhabit moist forests and woodlands mostly dominated by *Eucalyptus* sp.

Koalas are highly territorial, and individuals maintain their own home range which may overlap with other individuals. Home ranges are variable depending on the location, with those in "poorer" habitats being larger than in higher quality habitats. There is little evidence for longer movements in most cases, though dispersing individuals, mostly young males, may occasionally cover distances of several kilometres over land with little vegetation. In SEQ, the average distance between natal and breeding home ranges was similar for males and females, at approximately 3.5 km. Maximum dispersal distances were up to approximately 10 km for males and females. Other studies have reported movement of up to 16 km in rural SEQ.

8.2.5 Threats

Habitat loss and fragmentation, vehicle strike and predation by domestic or feral dogs are the main threats to the Koala. Extreme environmental events, such as drought, can also cause significant mortality.

8.2.6 Significant Impact Assessment

As of 12 February 2022, the EPBC Act referral guidelines for the vulnerable Koala have been redacted following the elevation of the Koala listing status under the EPBC Act to Endangered. As such, the Federal Significant Impact Guidelines are to be utilised in the interim to determine if a significant impact on Koala may occur as a result of the proposed action. The assessment methodology included referral area surveys and consideration of Commonwealth, State and Local Government environmental database searches.

To determine whether the proposed action is likely to have a significant impact on the Koala, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 16**. The results of this assessment determined that a significant impact on the Koala may occur.

Table 16: EPBC Significant impact criteria for critically endangered and endangered species – Koala

Significant Impact Criteria	Assessment	Impact
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
<p>1. Lead to a long-term decrease in the size of a population</p>	<p>Under the <i>Queensland Vegetation Management Act 1999</i>, the referral area is mapped as containing Category X (non-remnant) vegetation, locked in under an approved PMAV (ref: 2008/008614), and Category B (remnant) vegetation, containing RE 12.11.3, known to provide suitable Koala Habitat. Non-juvenile Koala Habitat Trees (NJKHTs) are present across the referral area including <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>Eucalyptus siderophloia</i> (Grey Ironbark), <i>Corymbia intermedia</i> (Pink Bloodwood), <i>Corymbia citriodora</i> (Spotted Gum), <i>Eucalyptus propinqua</i> (Grey Gum), <i>Eucalyptus acmenoides</i> (White Mahogany), <i>Eucalyptus grandis</i> (Flooded Gum) and <i>Eucalyptus microcorys</i> (Tallowwood). The referral area itself has undergone historical land clearing, with portions having only scattered trees remaining and dominated by weeds at the ground level. Areas of the central and eastern extents of the referral area is vegetated with a treed canopy and varying levels of understory disturbance.</p> <p>A review of ALA indicates that the majority of Koala records within the local area are located west of Beaudesert Beenleigh Road or further south towards Cedar Creek and Mount Tamborine National Park. From these records it is noted that the nearest contemporary record to the referral area is from 2014, approximately 0.7km south-west of the referral area. Field assessments within the referral area detected evidence of Koala in the form of a direct observation, as well as indirectly via scats.</p> <p>Major arterial roads to the west, cleared residential properties to the south and the associated operational quarry directly north of the referral area are several major inhibitors to safe Koala movement within the local area. However surrounding bushland vegetation and vegetation associated with Mount Tamborine National Park and Cedar Creek area provide a large of foraging and dispersal habitat. Although the proposed vegetation clearing within the referral area adjoins these bushland areas, the referral area itself was observed to contain significant weed incursion and very steep gradient. Therefore, the habitat is considered lower value than the bushland within the wider region.</p> <p>Additionally, consideration to the overall size of the referral area should be given, where it is 5.94 ha in total, of which 1.25 ha was observed as dominated by acacia regrowth and weeds and 1.14 ha is reflective of regrowth vine thicket vegetation. Therefore, within the referral area, 3.55 ha can be considered “tangible” habitat for Koala, albeit low value. The referral area does not contribute significantly to critical habitat given the relatively small size in comparison to surrounding protected bushland and high levels of disturbance.</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>Considering the higher value vegetation surrounding the referral area available for Koala to utilise, it is considered highly unlikely that the removal of 5.94 ha of vegetation (3.55 ha of koala habitat) within the referral area would affect the viability or size of any Koala populations in the area.</p>	
<p>2. Reduce the area of occupancy of the species</p>	<p>Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area both as a direct observation of an individual and indirect observation of scats. Despite an individual being observed during surveys, targeted Koala context surveys assessing the area for overall occupancy, suggested a low usage of the referral area by the species. In addition, recorded sightings of the species in the local area are relatively dated (>10 years) with the majority west of Beaudesert Beenleigh Road or further south towards Cedar Creek and Mount Tamborine National Park. The nearest contemporary record was from 2014 and recorded approximately 0.7km south-west of the referral area. Several contemporary records are also present within relatively intact vegetation towards Mount Tamborine National Park to the south.</p> <p>Given the presence of intact remnant vegetation associated with Koala habitat (RE 12.11.3) surrounding the referral area, identified to contain suitable Koala habitat, it is considered a low likelihood that the relatively small 'expansion area' of 5.94 ha (of only 3.55 ha of koala habitat) will significantly affect the area of occupancy for the Koala. Furthermore, the steep and highly disturbed nature of vegetation within the referral area is unlikely to provide optimal dispersal opportunity for the species, particularly as there is no connection to the north-east/north-west.</p> <p>As mentioned, the removal of 3.55 ha of relatively low-value habitat is unlikely to have a significant impact on the area of occupancy for the species.</p>	<p>A significant impact is not likely</p>
<p>3. Fragment an existing population into two or more populations</p>	<p>Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area both as a direct observation of an individual and indirect observation of scats. Despite an individual being observed during surveys, targeted Koala context surveys assessing the area for overall occupancy suggested a low usage of the referral area by the species. A review of ALA indicates that the majority of these records are west of Beaudesert Beenleigh Road or further south towards Cedar Creek/Mount Tamborine National Park, with the nearest contemporary record from 2014, approximately 0.7km south-west of the referral area. Koalas are therefore known to occur within the area, however are more prominent within the larger more intact vegetation in the region.</p> <p>While the proposed action will remove vegetation that is potential habitat for Koala, it is considered unlikely that the relatively small 'expansion area' of 5.94ha (3.55 ha of koala habitat) will fragment any existing Koala</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>populations. This is due to its location directly abutting the current operational quarry, therefore not dividing two areas of potential habitat and instead expanding off an existing cleared area. Additionally, there is a significant availability of Koala habitat within the surrounding region, particularly within protected areas. Whilst individuals may enter the referral area due to its connectivity to the south, it is unlikely to support a population of koala given the small overall size and lack of connection to the north.</p> <p>Subsequently, the removal of vegetation within the referral area will not exacerbate existing fragmentation due to the placement of the project area directly adjoining the current quarry and expending outwards. The proposal is for a relatively small area of 5.94 ha (3.55 ha of koala habitat) and will not sever connectivity of surrounding Koala habitat areas. The referral area is steep and heavily weed infested, likely limiting dispersal opportunities.</p>	
<p>4. Adversely affect habitat critical to the survival of a species</p>	<p>The proposed action results in the removal of tree species known to be used by the Koala such as <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>E. siderophloia</i> (Grey Ironbark), <i>Corymbia intermedia</i> (Pink Bloodwood), <i>C. citriodora</i> (Spotted Gum), <i>E. propinqua</i> (Grey Gum), <i>E. acmenoides</i> (White Mahogany), <i>E. grandis</i> (Flooded Gum) and <i>E. microcorys</i> (Tallowwood). Therefore, the vegetation present has the capacity to support foraging and dispersal by the species.</p> <p>Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area both as a direct observation of an individual and indirect observation of scats. Despite an individual being observed during surveys, targeted Koala context surveys assessing the area for overall occupancy, suggested a low usage of the referral area by the species. A review of ALA indicates that the majority of these records are west of Beaudesert Beenleigh Road or further south towards Cedar Creek/Mount Tamborine National Park, with the nearest contemporary record from 2014, approximately 0.7km south-west of the referral area. Koalas are therefore known to occur within the area, however are more prominent within the larger more intact vegetation in the region.</p> <p>The habitat within the referral area does contain Koala habitat however consideration to the overall size of the referral area should be given, where it is 5.94 ha in total, of only 3.55 ha is considered koala habitat. Given that field surveys identified the area to exhibit low usage by Koala and low value habitat, it is considered highly unlikely that the proposed action will adversely affect habitat critical to the survival of the species. Whilst individuals may enter the referral area due to its connectivity to the south, the steep gradient and high density of weeds limits dispersal opportunity. Particularly, as north of the referral area is an active quarry.</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>The presence of remnant koala habitat surrounding the referral area, identified to contain suitable Koala habitat, contributes to the determination that it is a low likelihood the relatively small 'expansion area' of 5.94 ha (3.55 of koala habitat) contributes to habitat critical to the survival of Koala. Impacts are considered relatively minor due to the modified state of the impact area, proximity to current operational quarry work, and significant availability of suitable habitat within the locality including the Cedar Creek and Mount Tamborine National Park area.</p>	
<p>5. Disrupt the breeding cycle of a population</p>	<p>Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area both as a direct observation of an individual and indirect observation of scats. Despite an individual being observed during surveys, targeted Koala context surveys assessing the area for overall occupancy suggests a low usage of the referral area by the species. A review of ALA indicates that the majority of these records are west of Beaudesert Beenleigh Road or further south towards Cedar Creek/Mount Tamborine National Park, with the nearest contemporary record from 2014, approximately 0.7km south-west of the referral area. Koala are therefore known to occur within the area, however are more prominent within the larger more intact vegetation in the region.</p> <p>Consideration to the overall size of the referral area should be given, where it is 5.94 ha in total, of which only 3.55 ha is considered koala habitat. The clearing of this vegetation is not considered likely to disrupt the breeding cycle of a population. Furthermore, the steep gradient and high density of weeds results in limited dispersal opportunity for the species, particularly as the current quarry operation borders the northern boundary.</p>	<p>A significant impact is not likely</p>
<p>6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>The proposed action will impact areas containing Koala habitat trees. Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area in the form of a direct sighting and indirect evidence of scats. Despite an individual being observed within the referral area, targeted contextual and occupancy surveys indicate low Koala usage across the vegetation present.</p> <p>The referral area retains connectivity to the south and no connectivity to the north. Vast areas of connected habitat are available in the locality, portions of which are within National Parks and therefore remain protected in perpetuity.</p> <p>Although the proposed action will remove an area of vegetation containing Koala habitat, this is relatively small in comparison to the surrounding bushland areas. The referral area accounts for 5.94 ha of which only 3.55 ha can be considered "tangible" habitat for Koala. Given the overall small area of koala habitat within the referral area coupled with the availability of higher value intact habitat in the locality, it is considered</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	unlikely that the proposed action will decrease the availability of habitat to the extent that the species is likely to decline.	
<p>7. Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>The proposed action is not anticipated to significantly increase threats compared to baseline conditions as the referral area is already highly disturbed as a result of historical land practices. A number of major threats to the Koala species is present within the local region, including major and arterial roads and residential housing likely to have domestic dogs. Notable, analysis of motion camera data revealed wild dogs within the referral area.</p> <p>The proposed action is not anticipated to result in the introduction or increase of invasive species that are harmful to the Koala or Koala habitat as these species are already present within the referral area.</p>	<p>A significant impact is not likely</p>
<p>8. Introduce disease that may cause the species to decline, or</p>	<p>Diseases including chlamydial disease and Koala retrovirus (KoRV) are prevalent among Koala populations in South East Queensland. The 5.94 ha referral area, inclusive of 3.55 ha of koala habitat) will not significantly decrease the availability of habitat in the local region nor fragment a population causing stress, which is directly linked to increasing outbreak of disease. In undertaking directional clearing which allows fauna to move into surrounding areas of intact bushland under the guidance of qualified fauna spotter catcher the proposed action will take all precautions in limiting stress on individuals in the area.</p> <p>With surrounding habitat available for refuge and the area of Koala occupancy not significantly reduced, it is considered unlikely that the proposed action will introduce or increase the prevalence of disease in Koalas.</p>	<p>A significant impact is not likely</p>
<p>9. Interfere substantially with the recovery of the species.</p>	<p>The proposed action will impact areas containing Koala habitat trees. Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area in the form of a direct sighting and indirect evidence of scats. Despite an individual being observed within the referral area, targeted contextual and occupancy surveys indicate low Koala usage across the vegetation present.</p> <p>The Action is unlikely to interfere substantially with the recovery of the Koala as it is proposing the removal of relatively low-quality vegetation across the referral area, of which only 3.55 ha was observed as tangible Koala habitat (refer Plan 5). The referral area itself has undergone historical land clearing, with portions having only scattered trees remaining and dominated by weeds at the ground level. Areas of the central and eastern extents of the referral area are vegetated with a treed canopy and varying levels of understory disturbance and portions in the east contains vine-thicket regrowth lacking Koala habitat trees. It is unlikely</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>that that the proposed action will interfere substantially with the recovery of the species as habitat on-site is of a small total area, low value and offers limited dispersal opportunity</p>	
	<p>Vegetation within the surrounding locality likely contains higher-value foraging and dispersal habitat, with National Parks adjacent to the referral area providing habitat in perpetuity due to their protected status.</p>	
	<p>Impacts to Koala and their recovery are considered relatively minor due to the disturbed state of the referral area vegetation and observed low occupancy of the referral area by Koala.</p>	
	<p>Refer below for an assessment against the EPBC Act Recovery Plan for the Koala.</p>	

The EPBC Act National Recovery Plan for the Koala was published in March 2022. This recovery plan for the listed Koala replaces the National Koala Conservation and Management Strategy (2009-2014) (NRM Ministerial Council 2009). It has been developed with relevant State and Territory Governments to provide an overarching national conservation framework for the listed Koala that aligns with local, state and territory government plans, programs and strategies. However, it does not replace Local, State and Territory Government plans, programs and strategies. It is the first recovery plan for the nationally listed Koala.

The overall goal of the National Recovery Plan is ‘to stop the trend of decline in population size of the listed Koala, by having resilient, connected, and genetically healthy metapopulations across its range, and to increase the extent, quality and connectivity of habitat occupied’.

Three (3) key objectives of the Draft National Recovery Plan are provided below with responses relevant to the proposed action:

1. The area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised and then increased. The area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased.

Under the Queensland Vegetation Management Act 1999, the referral area is mapped as containing Category X (non-remnant) vegetation, locked in under an approved PMAV (ref: 2008/008614), and Category B (remnant) vegetation, containing RE 12.11.3, known to provide suitable Koala Habitat. Non-juvenile Koala Habitat Trees (NJKHTs) were observed within the referral area, however, the majority of which contains evidence of disturbance as a result of historic and on-going land uses adjacent to the area. Consideration to the overall size of the referral area should be given, where it is 5.94 ha in total, of which 1.25 ha was observed to contain acacia and weed dominated vegetation and 1.14 ha is reflective of regrowth vine thicket vegetation, not containing identified suitable Koala habitat. Therefore, within the referral area, 3.55 ha can be considered “tangible” habitat for Koala, albeit low value due to disturbance and adjacent land uses.

Subsequently, the proposed action will impact areas containing Koala habitat trees. Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area in the form of a direct sighting and indirect evidence of scats. Field surveys identified the area to exhibit low usage by Koala likely a result of the small overall area and general lack of dispersal opportunity as a result of steep gradient and highly weed infested vegetation and the current quarry footprint to the north.

As mentioned above, the referral area is a relatively small patch of low value habitat, containing 5.94 ha that includes areas of eucalypt canopy with a highly modified understory. However, regardless of its present state, the vegetation contains non-juvenile koala habitat trees (NJKHTs) available for foraging. However, given the small area of koala habitat (3.55 ha) it is not considered to significantly reduce the area of occupancy for the species, particular given the availability of suitable habitat within the locality, notably at Monut Tamborine National Park.

2. Metapopulation processes are maintained or improved.

Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area in the form of a direct sighting and indirect evidence of scats. Despite an individual being observed within the referral area, targeted contextual and occupancy surveys indicate low Koala usage across the vegetation present. While the species is known in the local area, very few contemporary sightings have been recorded close to the referral area. Therefore, it is considered that vegetation within the referral area is of relatively low value.

The referral area is located on a steep vegetated slope, adjacent to cleared tracks and the existing extractive zones of the operating quarry area. The relatively small 'expansion area' of 5.94ha, directly adjacent to the existing Quarry area and not intending to fragment areas of vegetation, is considered unlikely to impact metapopulation processes for the Koala. This is due to the relatively limited dispersal opportunities given the current quarry footprint to the north couple with the steep and weed infested vegetation.

3. Partners, communities, and individuals have a greater role and capability in listed Koala monitoring, conservation, and management.

The proposed action will impact areas containing Koala habitat trees. Detailed studies utilising both direct and indirect survey methods detected evidence of Koala within the referral area in the form of a direct sighting and indirect evidence of scats. Despite an individual being observed within the referral area, targeted contextual and occupancy surveys indicate low Koala usage across the vegetation present.

Low vehicle speeds and slow points are inherent in extraction industry operations, minimising the risk of vehicle strike. Although the proposed action will involve the removal of potential Koala habitat, the potential for a significant impact is mitigated by the small overall area of impact.

The results of this assessment determined that it is unlikely that the proposed action will have a significant impact on the Koala.

8.3. *Pteropus poliocephalus* (Grey-headed Flying-fox)

8.3.1 *Conservation Status*

The GHFF is listed as Vulnerable under the EPBC Act.

8.3.2 *Description*

The GHFF is the largest Australian bat with a wingspan of up to one metre. It has dark-grey body fur, a grey head, and a distinctive reddish-brown collar. It is also the only flying-fox with hairy legs right down to its ankles.

8.3.3 *Distribution*

The GHFF occurs along the south-east coast of Australia, from Rockhampton in central Queensland through New South Wales to western Victoria. During the last few years, the GHFF has also been recorded from Adelaide.

8.3.4 *Habitat*

The GHFF is heavily dependent on the availability of foraging resources and roost sites. As canopy feeding frugivores and nectarivores, GHFFs frequent fruiting and flowering trees in rainforests, open eucalypt forests, woodlands, *Melaleuca* sp. swamps and Banksia woodlands (Duncan *et al.* 1999). The GHFF is also known to forage in fruit crops and introduced tree species within urban environments. Roost sites for the GHFF are commonly within dense vegetation close to water, primarily rainforest patches, stands of *Melaleuca* sp., mangroves or riparian vegetation.

8.3.5 *Recovery Actions*

There is now an adopted Recovery Plan for this species at the federal level. It focuses mainly on managing adverse impacts to roosting sites, culling controls, fenced entanglement and public awareness, with reference to foraging habitat. From the recovery guidelines:

Where the existence of important winter and spring flowering vegetation communities is verified in the field, they are considered habitat critical to the survival of the Grey-headed Flying-fox. Back yard fruit trees, orchards or non-native trees that may be used for foraging are not considered to be habitat critical to the survival of the Grey-Headed Flying-Fox. Habitat critical to the survival of the Grey-headed Flying-fox may also be vegetation communities which:

- contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)
- contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or
- contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp as identified on the Department's interactive flying-fox web viewer.

Habitat critical to the survival of the Grey-headed Flying-fox should be the focus for protection and any revegetation initiatives aimed to support the species.

Notably, the recovery plan lists habitat loss as a key threat to the Grey-headed Flying-fox. It is understood that mapping of habitat critical to the survival of the grey-headed Flying-fox is an initiative of the recovery plan. The referral area is not considered to maintain important foraging habitat for the Grey-headed Flying-fox (refer below).

The Queensland Government identifies the following recovery actions:

- Identify and map important foraging and roosting habitats

- Prevent the destruction and degradation of important forested habitat, through: identifying guidelines to protect habitat; appropriate zoning; identifying development alternatives and incentives to retain habitat and educating communities.
- Encourage community partnerships and initiatives that protect important habitats, and where possible re-vegetate with foraging trees for GHFF
- Work with orchardists to improve the image of GHFF, and to identify and implement non-destructive methods to protect fruit crops, such as: appropriate netting (not monofilament netting) that is not hung loose over trees (which can entangle bats and birds)
- Reduce negative public attitudes and conflict with humans
- Develop accurate methods for monitoring population size

8.3.6 Significant Impact Assessment

EPBC Act, Grey-headed Flying-fox populations are listed as Vulnerable. The species is not specifically listed under Queensland's *Nature Conservation Act 1992* (Qld) (NCA), however, retains a Least Concern status for the purposes of the Act. The *Referral guideline for management actions in grey-headed and spectacled flying-fox camps* summarise the decision process in considering the likelihood of a significant impact on the Grey-headed Flying-fox or Spectacled Flying-fox schematically. The Guidelines are specifically for the assessment of impacts on Flying-fox camps.

GHFFs are heavily dependent on the availability of foraging resources and roost sites. As canopy feeding frugivores and nectivores, GHFFs frequent fruiting and flowering trees in rainforests, open eucalypt forests, woodlands, *Melaleuca* sp. swamps and *Banksia* woodlands (Duncan et al. 1999). The GHFF is also known to forage in fruit crops and introduced tree species within urban environments. Roost sites for the GHFF are commonly within dense vegetation close to water, primarily rainforest patches, stands of *Melaleuca* sp., mangroves or riparian vegetation. The value of vegetation to the grey-headed flying fox is difficult to assess due to the high mobility of the species in conjunction with timing of flowering of tree species within the assessment area. The maximum nightly foraging distance of GHFF is estimated at 50 kilometres, while most forage within a 15 km radius of daytime roost sites (Tidemann 1998).

Grey-headed Flying-foxes were not observed foraging or roosting within the assessment area during field survey efforts, nor were they observed as fly-over species. Suitable foraging habitat exists within the assessment area, therefore the GHFF has the potential to utilise the investigation area for foraging purposes.

The Referral guideline for management actions in grey-headed and spectacled flying-fox camps states that the guideline does not apply to the following relevant points:

- Actions in the vicinity of camps, such as development actions, firework displays or concerts, which may indirectly affect camps of EPBC Act-listed flying-fox species.
- Actions which may impact on the foraging habitat of EPBC Act-listed flying-fox species. Proponents of actions of this kind should refer to the significant impact guideline 1.1. (4.1.5).

To determine whether the proposed action is likely to have a significant impact on the Grey-headed Flying-fox, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 17**.

Table 17: GHFF Significant Impact Assessment

Significant Impact Criteria	Description	Impact
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
<p>1. Lead to a long-term decrease in the size of an important population of a species</p>	<p>Surveys did not record GHFF foraging within or adjacent to the referral area nor as a fly-over species. Additionally, no roosts are present within the referral area or directly adjacent with a review of the National Flying-fox monitoring viewer identified a GHFF roost approximately 8.7km north-east of the referral area (Pimapama, Mirambeena Drive (851)). The nearest roost of national significance (Canungra, Beechmont Road (141)) is located approximately 22 km south of the referral area.</p> <p>As the species is highly adaptive with its diverse native diet it can supplement with introduced species. It is known to forage within a variety of habitat areas as each resource does not produce food throughout the entire year. Suitable foraging habitat is present within the referral area in the form of Eucalypt and Corymbia dominated vegetation consisting of <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>E. crebra</i> (Narrow-leaved Ironbark), <i>E. siderophloia</i> (Grey Ironbark), <i>Corymbia citriodora</i> (Spotted Gum) and <i>Grevillea robusta</i> (Silky Oak). However, given the availability of suitable foraging habitat within the broader area, associated with Wickham and Tamborine National Park in the local area and the Green Mountains further south, it is considered unlikely that the species would utilise the relatively small area of 5.94 ha associated with the expansion area.</p> <p>Therefore, despite potential foraging habitat occurring within the referral area, the area is not considered to provide critical habitat supporting an important population of the species due to the small size of the referral area, significant availability of habitat in the wider region and lack of local roosts. For these reasons, the proposed action is unlikely to lead to a long-term decrease in the size of any local GHFF populations.</p>	<p>A significant impact is not likely</p>
<p>2. Reduce the area of occupancy of an important population</p>	<p>Surveys did not record GHFF foraging within or adjacent the referral area nor as a fly-over species. Additionally, no roosts are present within the referral area or directly adjacent with a review of the National Flying-fox monitoring viewer identified a GHFF roost approximately 8.7km north-east of the referral area (Pimapama, Mirambeena Drive (851)). The nearest roost of national significance (Canungra, Beechmont Road (141)) is located approximately 22 km south of the referral area.</p> <p>The proposed action not considered to reduce the area of occupancy of an important population of GHFF as there is no evidence the species utilise vegetation within the referral area. Furthermore,</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Description	Impact
	<p>potential foraging habitat is limited to 3.55 ha of eucalypt vegetation, which is a fraction of the available habitat within the broader locality.</p>	
<p>3. Fragment an existing important population into two or more</p>	<p>The SPRAT species profile outlines that while there are spatially structured colonies of GHFF, there are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout the species' geographic range.</p> <p>Regardless, the high mobility of the species and significant availability of habitat in the wider region, indicate that the small overall impact area is unlikely to fragment a population into two or more populations.</p>	<p>A significant impact is not likely</p>
<p>4. Adversely affect habitat critical to the survival of a species</p>	<p>Surveys did not record GHFF foraging within or adjacent the referral area nor as a fly-over species. Additionally, no roosts are present within the referral area or directly adjacent with a review of the National Flying-fox monitoring viewer identified a GHFF roost approximately 8.7km north-east of the referral area (Pimapama, Mirambeena Drive (851)).</p> <p>Field surveys did however identify the referral area to contain potential foraging habitat for the species. However, given the availability of suitable foraging habitat within the broader area, associated with Wickham and Tamborine National Park in the local area and the Green Mountains further south, it is considered unlikely that the species would utilise the relatively small area (3.55 ha of eucalypt woodland) associated with the expansion area.</p> <p>The habitat within the referral area is therefore not considered critical to the survival of this species due to its overall small size and low value in comparison to the surrounding region.</p>	<p>A significant impact is not likely</p>
<p>5. Disrupt the breeding cycle of an important population</p>	<p>Surveys did not record GHFF foraging within or adjacent the referral area nor as a fly-over species. Additionally, no roosts are present within the referral area or directly adjacent with a review of the National Flying-fox monitoring viewer identified a GHFF roost approximately 8.7km north-east of the referral area (Pimapama, Mirambeena Drive (851)).</p> <p>The referral area does contain potential foraging habitat for the species, albeit limited to 3.55 ha of eucalypt woodland. However, given the availability of suitable foraging habitat within the broader</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Description	Impact
	<p>area, associated with Wickham and Tamborine National Park it is considered unlikely that the species would utilise the relatively small area of vegetation associated with the expansion area. The referral area is also not considered to contain an important population of GHFF.</p> <p>The proposed action therefore will not disrupt the breeding cycle of an important population as there is no evidence an important population is utilisng vegetation on-site.</p>	
<p>6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>Although potential foraging habitat is present within the referral area, due to the presence of eucalypt vegetation, this area equates to inly 3.55 ha and is unlikely to be utliised by the species given the availability of habitat in the broader locality.</p> <p>The high mobility of the species and availability of foraging habitat in the wider region, including national park spaces, indicates that the proposed action (3.55 ha of eucalypt woodland) is unlikely to decrease the availability of habitat to the extent that the species is likely to decline.</p>	<p>A significant impact is not likely</p>
<p>7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species’ habitat</p>	<p>The referral area shows high levels of disturbance at present with a significant number of invasive species present particularly within the understory.</p> <p>It is not considered likely that the proposed action will result in invasive species that are harmful to GHFF.</p>	<p>A significant impact is not likely</p>
<p>8. Introduce disease that may cause the species to decline</p>	<p>Given the availability of suitable foraging habitat within the broader area, associated with Wickham and Tamborine National Park in the local area, it is considered unlikely that the species would utilise the relatively small area of 5.94 ha (3.55 ha of eucalypt woodland) associated with the expansion area. The referral area is not expected to impact an area of vegetation highly utilized or containing an important population of GHFF, risk of stress to a roost is highly unlikely, which can aggravate disease.</p> <p>With standard practices associated with extraction activities, the proposed action is unlikely to introduce disease into the area.</p>	<p>A significant impact is not likely</p>
<p>9. Interfere substantially with the recovery of the species</p>	<p>Recovery of the species has specifically targeted the broad scale culling of the species. In addition, conservation efforts have led to the protection of known roosting sites and important habitat. The referral area has not been identified as an important habitat nor roost site and the action is unlikely to interfere with the recovery of the species. Additionally, the high mobility of the species and availability</p>	<p>A significant impact is not likely</p>

■ Ecological Assessment – Matters of National Environmental Significance

Significant Impact Criteria	Description	Impact
	of foraging habitat in the wider region indicates that the removal of 5.94 ha (3.55 ha of eucalypt woodland) will not interfere with the recovery of the species.	

The purpose of the National Recovery Plan for the Grey-headed Flying-fox is to set out the management and research actions necessary to stop the decline of, and support the recovery of the Grey-headed Flying-fox over the next 10 years. The overall objectives of this Grey-headed Flying-fox recovery plan are:

- to improve the Grey-headed Flying-foxes national population trend by reducing the impact of the threats outlined in this plan on Grey-headed Flying-foxes through habitat identification, protection, restoration and monitoring, and
- to assist communities and Grey-headed Flying-foxes to coexist through better education, stakeholder engagement, research, policy and continued support to fruit growers.

The plan addresses the key threats facing the Grey-headed Flying-fox and recovery objectives which are provided below with responses relevant to the proposed action:

1. Identify, protect and increase native foraging habitat that is critical to the survival of the Grey-headed Flying-fox

No roosts were identified on or adjacent the referral area and the nearest known Grey-headed Flying-fox roost is located 8.7km north-east of the referral area (Pimapama, Mirambeena Drive (851)). Field surveys confirmed GHFF to be present at this roost location on 7 September 2022. The nearest roost of national significance (Canungra, Beechmont Road (141)) is located approximately 22 km south of the referral area. Habitat critical to the survival of the species is considered important winter and spring flowering vegetation communities. Important winter and spring vegetation communities are those that contain *Eucalyptus tereticornis*, *E. albens*, *E. crebra*, *E. fibrosa*, *E. melliodora*, *E. paniculata*, *E. pilularis*, *E. robusta*, *E. seeana*, *E. sideroxylon*, *E. siderophloia*, *Banksia integrifolia*, *Castanospermum australe*, *Corymbia citriodora citriodora*, *C. eximia*, *C. maculata*, *Grevillea robusta*, *Melaleuca quinquenervia* or *Syncarpia glomulifera* (Eby and Law 2008; Eby 2016; Eby et al. 2019).

Of the species listed above, *Eucalyptus tereticornis*, *E. crebra*, *E. siderophloia*, *Corymbia citriodora*, and *Grevillea robusta* were recorded within the referral area. The Grey-headed Flying-fox is a highly mobile species with the closest known active Grey-headed Flying-fox camp approximately 8.7km north-east of the referral area. Therefore, there is potential for the species to occur within the vegetation of the referral area. It is however noted that surveys did not record GHFF foraging within or adjacent the referral area nor as a fly-over species. Additionally, in general, the relatively small area of 5.94 ha associated with the proposed action (3.55 ha of eucalypt woodland) is unlikely to provide habitat critical to the survival.

Therefore, despite potential foraging habitat occurring within the referral area, the area is not considered to provide critical habitat supporting an important population of the species due to the small size of the referral area, significant availability of habitat in the wider region and lack of evidence of roost on or adjacent to the referral area.

2. Identify, protect and increase roosting habitat of Grey-headed Flying-fox camps.

No roosts were identified within the comprehensive surveys of the referral area in 2022/2023 with the nearest known active roost site located approximately, 8.7km north-east of the referral area. This species was also not observed roosting, foraging or as fly-over within the referral area.

Preferred roosting habitat for the Grey-headed Flying-fox is poorly understood, therefore it is difficult to preserve potential roosting habitat for the species. However it is considered unlikely that the 5.94 ha (3.55 ha of eucalypt woodland) expansion area provides significant potential roosting habitat for the species.

3. Determine trends in the Grey-headed Flying-fox population so as to monitor the species' national distribution, habitat use and conservation status.

Not applicable. Mitigation measures will be implemented during construction and operation of the proposed action to reduce threats.

4. Build community capacity to coexist with flying-foxes and minimise the impacts on urban settlements from new and existing camps while avoiding interventions to move on or relocate entire camps.

Not applicable. Proposed action associated with a quarry expansion not within a residential or urban area. Additionally there are no observed roosts within the referral area, with the nearest known roost site located approximately 8.7km north-east of the referral area.

5. Increase public awareness and understanding of Grey-headed Flying-foxes and the recovery program and involve the community in the recovery program where appropriate.

Not applicable due to proposed action being associated with a quarry expansion not residential development.

6. Improve the management of Grey-headed Flying-fox camps in areas where interaction with humans is likely.

Not Applicable. Proposed action associated with a quarry expansion not within a residential or urban area, therefore human interaction is not considered highly likely. Additionally, there are no observed roosts within the referral area, with the nearest known active roost site located approximately 8.7km north-east of the referral area.

7. Significantly reduce levels of licenced harm to Grey-headed Flying-foxes associated with commercial horticulture.

Not applicable – proposed action is for quarry expansion not commercial horticulture.

8. Support research activities that will improve the conservation status and management of Grey-headed Flying-foxes.

Not applicable.

9. Reduce the impact on Grey-headed Flying-foxes of electrocution on power lines, and entanglement in netting and on barbed-wire.

The proposed action is for a quarry expansion where implementation of netting and powerlines are unlikely. Fences installed in relation to quarrying activities have potential to utilising barbed wire for security purposes. However, the risk of entanglement from fencing associated with the proposed action is considered minor due to the limited potential for GHFF to enter the referral area following the removal of vegetation.

At current the potential for GHFF to enter the referral area is already considered minor due to the relatively small size of the referral area. Additionally, no roosts were identified within the referral area, and the nearest known roost site located approximately 8.7km north-east of the referral area. Although vegetation within the referral area contains five (5) of nineteen (19) important winter and spring foraging species for the Grey-headed Flying-fox, the surrounding areas of intact remnant and regrowth vegetation provides higher value potential foraging habitat for this species.

Entanglement in barbed wire is considered unlikely during construction and operation of the proposed action due to the low likelihood individuals will enter the area. Potential impacts from entanglement will be managed through the implementation of mitigation measures and procedures outlined within future management documents including the VC&MP and FMP. As such, the proposed action is considered unlikely to impact the recovery of this species.

The results of this assessment determined that it is unlikely that the proposed action will have a significant impact on the Grey-headed Flying -fox.

8.4. Petauroides Volans (Greater Glider)

8.4.1 Conservation Status

The Greater Glider is listed as Endangered under the EPBC Act and NCA as of July 2022.

8.4.2 Description

The greater glider (southern and central) is the largest gliding possum in eastern Australia. It has a head and body length of 35–46 cm, tail length of 45–60 cm, and a weight range of 900–1700 g, with females being larger than males. The greater glider (southern and central) has thick fur that increases its apparent size. Its fur colour is white or cream below and varies from dark grey, dusky brown through to light mottled grey and cream above. It has a long furry tail, large furry ears and a short snout. Its tail is not prehensile, and the gliding membrane extends from the forearm to the tibia.

8.4.3 Distribution

The Greater Glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level.

8.4.4 Habitat

The Greater Glider is largely restricted to eucalypt forest and woodlands. It is primarily folivorous with a diet mostly comprising of eucalypt leaves and occasionally flowers. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The species favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.

During the day it shelters in tree hollows, with a particular preference for large hollows in large, old growth trees (Smith et al., 2007). The presence of live, hollow-bearing trees is thought to be a limiting factor within otherwise suitable habitat. Large, continuous tracts of mature woodland and forest with a minimum of 2-4 suitable hollows per 2 ha is considered essential for sustaining a population (Eyre, 2002). The species is considered to be particularly sensitive to forest clearance and intensive logging practices (Kavanagh and Wheeler, 2004). Subsequently, Greater Gliders have relatively low persistence in small forest fragments and disperse poorly across vegetation that is not native forest. Modelling suggest that they require native forest patches of at least 160 km² to maintain viable populations (Eyre, 2002).

8.4.5 Threats

Key threats to the greater glider (southern and central) are frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting (DCCEEW, 2022). In particular is the loss of breeding habitat (hollows) and loss and fragmentation of old-growth forests.

8.4.6 Significant Impact Assessment

To determine whether the proposed action is likely to have a significant impact on the Greater Glider, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 18**. The results of this assessment determined that a significant impact on the Greater Glider is not likely.

Table 18: EPBC Significant impact criteria for critically endangered and endangered species – Greater Glider

Significant Impact Criteria	Assessment	Impact
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
<p>1. Lead to a long-term decrease in the size of a population</p>	<p>The referral area of 5.94 ha is mapped as containing 2.39ha of Category X (non-remnant) and 3.55 ha of Category B (remnant) vegetation under the Queensland Vegetation Management Act 1999 as a result of an approved PMAV (ref: 2008/008614). Native canopy species within the mapped remnant polygon include <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>Eucalyptus siderophloia</i> (Grey Ironbark), <i>Corymbia intermedia</i> (Pink Bloodwood), <i>Corymbia citriodora</i> (Spotted Gum), <i>Eucalyptus propinqua</i> (Grey Gum), <i>Eucalyptus acmenoides</i> (White Mahogany), <i>Eucalyptus grandis</i> (Flooded Gum) and <i>Eucalyptus microcorys</i> (Tallowwood). Vegetation in the eastern part of the referral area, mapped as Category X (non-remnant), contains species indicative of regrowth RE12.11.10 (i.e notophyll vine forest) this vegetation community is not considered habitat for the Greater Glider. The balance of the referral area contains highly disturbed regrowth acacia species.</p> <p>The referral area is located adjacent to an active quarry with large areas utilised for extraction activities. The referral area has undergone historical land-clearing resulting in Category X (non-remnant) vegetation and high prevalence of exotic weed species.</p> <p>The species was not observed on-site despite targeted nocturnal surveys. Suitable potentially foraging habitat exists on site in the form of Eucalypt woodland however the effects of historical land clearing as well as steep rocky terrain of poor-quality soil has resulted in very few mature trees or hollow bearing trees. The species is known to have a preference for large, mature trees for foraging and hollows for denning. As such, it is considered highly unlikely that the site supports a population of the species. Two 100m habitat quality transects were carried out within this vegetated polygon with results indicating an average of 10 large trees per hectare utilising 450mm DBH as the large tree threshold for RE12.11.3. This result equates to only 22% of the large tree benchmark for RE12.11.3 (45 large tree per ha) indicating that the vegetation on-site is not high-value to the species. Furthermore, no hollow-bearing trees were recorded within the transect areas.</p> <p>Dispersal opportunities are only present to the south-west as the current quarry footprint borders the north and unsuitable vine forest vegetation is present to the east. The nearest record of the species is approximately 5km south from 2022 with additional records further south. The majority of these sightings have been recorded within Mount Tamborine National Park which provides a significant amount of intact, high-value remnant vegetation. Vegetation within the referral area retains limited connectivity to Mount</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>Tamborine Nation Park as a result of cleared rural residential land and thin linear strips of retained vegetation.</p> <p>It is considered highly unlikely that the removal of vegetation within the referral area would affect the viability or size of any Greater Glider populations in the area given no evidence of the species on-site, relatively poor-quality habitat, and level of disturbance likely to deter the species from dispersing through the site.</p>	
<p>2. Reduce the area of occupancy of the species</p>	<p>Targeted surveys did not detect any evidence of Greater Glider within the referral area, suggesting the vegetation is not utilised by Greater Glider. Of the 5.94 ha referral area only 3.5 ha of vegetation was identified on-ground as being reflective of Category B (remnant) RE12.11.3 with the balance of the area consisting of vine forest vegetation and exotic weed dominated drainage line/historically cleared areas. The vegetation within the referral area is considered low value habitat for the species as the area lacks large trees and hollows.</p> <p>There are no recorded sightings of the species within 5km of the site according to Queensland Wildnet with a cluster of records between 5-10km to the south of the site within Mount Tamborine National Park. Connectivity to this area is limited by cleared rural residential properties retaining thin linear strips of vegetation.</p> <p>While the proposed action will remove potential Greater Glider foraging habitat, this area is limited to 3.5 ha with the balance of the referral area containing unsuitable vegetation for Greater Glider. The referral area contains relatively low value habitat as a result of steep rocky terrain and historical clearing. No Greater Glider individuals were recorded on-site, therefore it is anticipated that the removal of 3.5 ha of vegetation on-site is not considered to reduce the area of occupancy for Greater Glider.</p>	<p>A significant impact is not likely</p>
<p>3. Fragment an existing population into two or more populations</p>	<p>There is no evidence that an existing population is present on-site based on contemporary detailed field surveys and historical records.</p> <p>The vegetation small area of vegetation on-site is considered low value habitat for the species as a result of high levels of disturbance and few large, hollow bearing trees. As a result, the removal of a small area of vegetation on-site is not likely to fragment an existing population, particularly as large areas of intact vegetation is present further south at Mount Tamborine National Park where multiple records of the species exist.</p>	<p>A significant impact is not likely</p>
<p>4. Adversely affect habitat critical to the survival of a species</p>	<p>Detailed targeted surveys did not detect any evidence of Greater Glider within the referral area, suggesting the vegetation on-site is not utilised by Greater Glider. Queensland Wildnet returned no sightings of</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>Greater Glider within a 5 km radius of the referral area, however sightings have been recorded between 5-10km within Mount Tamborine National Park.</p> <p>The referral area does contain 3.5 ha of eucalypt woodland, including species <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>Eucalyptus siderophloia</i> (Grey Ironbark), <i>Corymbia intermedia</i> (Pink Bloodwood), <i>Corymbia citriodora</i> (Spotted Gum), <i>Eucalyptus propinqua</i> (Grey Gum), <i>Eucalyptus acmenoides</i> (White Mahogany), <i>Eucalyptus grandis</i> (Flooded Gum) and <i>Eucalyptus microcorys</i> (Tallowwood). This vegetation broadly meets the criteria as suitable foraging habitat for the species. However, field surveys identified that the referral area contains high levels of disturbance and generally poor-quality habitat as a result of historical land-uses and steep rocky terrain. The outcome being that the site at present retains very few large trees or large hollow bearing trees which are known to be favoured by the species. The vegetation within the referral is not considered to facilitate dispersal for the species given the shape of the referral area abutting the current quarry footprint.</p> <p>The <i>Petauroides volans</i> (greater glider (southern and central) Conservation Advice (DCCEEW, 2022) defines habitat critical to the survival of the Greater Glider as:</p> <ul style="list-style-type: none"> • <i>large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region; and</i> • <i>smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization; and</i> • <i>cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes); and</i> • <i>areas identified as refuges under future climate changes scenarios; and</i> • <i>short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonize burnt areas.</i> <p>The overall referral area does contain habitat that may be utilised by the species; however, impacts are considered relatively minor due to the area of potentially suitable habitat limited to 3.5 ha which is of relatively low value habitat. The referral area is a maximum width of 150m coupled with a small area of potentially suitable habitat indicating and low likelihood that the species would utilise vegetation within the referral area. Therefore, it is anticipated that the proposed development will not have any adverse effect on habitat critical to the survival of the species.</p>	
<p>5. Disrupt the breeding cycle of a population</p>	<p>Detailed targeted surveys did not detect any evidence of Greater Glider within the referral area, suggesting the vegetation on-site is not utilised by Greater Glider. Queensland Wildnet returned no sightings of</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>Greater Glider within a 5 km radius of the referral area, however sightings have been recorded between 5-10km within Mount Tamborine National Park.</p>	
	<p>The area of potentially suitable habitat within the referral area is limited to 3.5 ha which was identified on-ground as low-value due to high levels of disturbance and lack of large hollow-bearing trees. As a result, it is not considered that the proposed action would disrupt the breeding cycle of a population of Greater Glider as there is a lack of indication of breeding population on or near the site and the area is considered small and of low-value to be utilised by the species.</p>	
<p>6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>The proposed action will impact areas of the referral area containing eucalypt woodland, broadly considered as potential foraging habitat for the species equating to 3.5 ha. No sightings of Greater Glider were detected on-site during targeted surveys nor incidental surveys. The referral area is small and consistent of low-value habitat. As there is not evidence a local Greater Glider population utilises the referral area, it is not considered that the proposed action will impact the habitat on-site to the extent that the species is likely to decline.</p>	<p>A significant impact is not likely</p>
<p>7. Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>The project is not considered likely to introduce threats as they already occur as part of the established quarry. The proposed development will not result in the introduction or increase of invasive species that are harmful to the Greater Glider or Greater Glider habitat.</p>	<p>A significant impact is not likely</p>
<p>8. Introduce disease that may cause the species to decline, or</p>	<p>The project is unlikely to introduce disease into the area, and therefore no significant impact is considered to result from the proposed action.</p>	<p>A significant impact is not likely</p>
<p>9. Interfere substantially with the recovery of the species.</p>	<p>Detailed targeted surveys did not detect any evidence of Greater Glider within the referral area, suggesting the vegetation on-site is not utilised by Greater Glider. Queensland Wildnet returned no sightings of Greater Glider within a 5 km radius of the referral area, however sightings have been recorded between 5-10km within Mount Tamborine National Park.</p>	<p>A significant impact is not likely</p>
	<p>The recovery actions of the Greater Glider are generally around preventing impacts from fires to the species and the removal and fragmentation of habitat. The proposed action is not considered to interfere with the recovery of the species because the habitat on-site is already heavily disturbed as a result of historical clearing. In addition, the referral area contains 3.5 ha of potentially suitable habitat for the species albeit low value. This is an insignificant area impact within the region particularly as the species has been recorded multiple times within Mount Tamborine National Park 5-10km south were large contiguous areas of</p>	

Significant Impact Criteria	Assessment	Impact
	suitable vegetation area present. Hence, no significant impact is considered to result from the proposed action.	

Greater Glider Conservation Advice

The conservation advice for *Petauroides volans* (greater glider (southern and central)) came into effect on 5th July 2022. The document combines the approved conservation advice and listing assessment for the species and provides a foundation for conservation action and further planning.

Key threats to the Greater Glider are frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting. The primary conservation objective is that within the next three generations, the population size as well as the extent, quality and connectivity of habitat required to maintain the population will have increased.

Conservation and management priorities

Habitat loss, disturbance and modification (including fire)

In the wake of the recent bushfires, unburnt areas are to be protected to support population recovery. The referral area is not part of the recent bushfire impacts in question, nor was the species recorded on site. The impact area contains XX ha of potentially suitable albeit low value habitat for the species.

Climate change

The impact site is not considered to be a climate change refuge.

Invasive species (including threats from predation, grazing, trampling)

The proposed action will not introduce threats from predation that are not already present.

Ex-situ recovery actions

Translocation is not proposed in the absence of the species.

Stakeholder and Community Engagement

Not applicable to the proposed action.

Survey and Monitoring Priorities

Not applicable to the proposed action.

Information and Research Priorities

Not applicable to the proposed action.

Recovery Plan

There is not yet a recovery plan for the species.

The results of this assessment determined that it is unlikely that the proposed action will have a significant impact on Greater Glider

8.5. *Macadamia integrifolia* (Macadamia Nut)

8.5.1 *Conservation Status*

M. integrifolia is listed as Vulnerable under the EPBC Act.

8.5.2 *Description*

M. integrifolia (Macadamia Nut) are native, medium-sized trees that grow to 20m in height and crown. The species produces cream/white coloured flowers in January, March, and June to November. Fruit is produced in the form of a hard, brown, spherical nut encased in a green leathery outer shell.

8.5.3 *Distribution*

M. integrifolia are found along foothills and coastal ranges from northern New South Wales to south-east Queensland. Populations of the species tend to be small or consist of scattered individuals.

8.5.4 *Habitat*

M. integrifolia are known to occur in remnant rainforest, including complex mixed notophyll forest, and prefer partially open areas such as rainforest edges. The species occur on basic and intermediate volcanics and alluvia in higher rainfall areas and occupy all topographic positions including ridges, scree slopes, foot slopes, gullies, benches and riverine terraces. Records of the species range from 5 to 600m elevation. The species are generally sparsely distributed within suitable habitat.

8.5.5 *Threats*

Habitat loss and fragmentation, altered fire regimes, small population size and weed incursion are the main threats to the southern Macadamia species. Climate change, genetic pollution from commercial plantations, and a lack of public awareness are also considered significant threats.

8.5.6 *Significant Impact Assessment*

Under the EPBC act, *M. integrifolia* is listed as Vulnerable. The species is also listed as Vulnerable under Queensland's Nature Conservation Act 1992 (Qld) (NCA).

The Federal Significant Impact Guidelines are to be utilised to determine if a significant impact on the southern Macadamia species may occur as a result of the proposed action. The assessment methodology included referral area surveys and consideration of Commonwealth, State and Local Government environmental database searches.

To determine whether the proposed action is likely to have a significant impact on *M. integrifolia*, an assessment against the EPBC Significant Impact Guidelines 1.1 is provided in **Table 19**. The results of this assessment determined that a significant impact on this species is not likely.

Table 19 - EPBC Significant impact criteria for critically endangered and endangered species – *Macadamia integrifolia*

Significant Impact Criteria	Assessment	Impact
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
<p>1. Lead to a long-term decrease in the size of an important population of a species</p>	<p>Under the Queensland Vegetation Management Act 1999, the referral area is mapped as containing Category X (non-remnant) vegetation, locked in under an approved PMAV (ref: 2008/008614), and Category B (remnant) vegetation, containing RE 12.11.3. The referral area itself has undergone historical land clearing, with portions having only scattered trees remaining and dominated by weeds at the ground level. Areas of the central and eastern extents of the referral area are vegetated with a treed canopy and varying levels of understory disturbance.</p> <p>A review of ALA indicates that the majority of records for these species within the local area are located to the east of the referral area within vegetation associated with Ormeau Hills. The nearest contemporary <i>M. integrifolia</i> record was from 2018 approximately 1.5km north-east of the referral area.</p> <p>Under the DCCEEW species profile for <i>Macadamia integrifolia</i>, their habitat is largely associated with remnant vegetation containing subtropical rainforest and complex notophyll vine-forest. Within the referral area there is 1.1 ha of non-remnant vegetation which contains regrowth characteristics reflective of RE 12.11.10. This area was observed to contain vegetation characteristic of notophyll vine forest and therefore reflects potential habitat for <i>Macadamia integrifolia</i>. It is however noted that on-ground the area of vine-forest was reflective of regrowth values in structure and composition, therefore lacking species diversity and densities. Areas were also observed to contain disturbance from invasive species, in particular, <i>Lantana camara</i> (Lantana) and <i>Ardisia crenata</i> (Coral Berry). Field assessments throughout the referral area identified specimens <i>Macadamia integrifolia</i>. Specimens observed included several juvenile and mature <i>M. integrifolia</i> located within and adjacent to the referral area and one <i>M. tetraphylla</i> specimen located adjacent to the referral area and therefore not proposed to be impacted.</p> <p>Important or 'key' populations of <i>M. integrifolia</i> are identified using several criteria, including population size, proximity to other populations (based on pollen transfer distance) and occurrence within remnant vegetation. The vegetation within the referral area was only identified to contain a small cluster of Macadamia specimens within regrowth vegetation and therefore likely do not meet the specified criterial to fit a key population. The referral area is not located within or adjacent the listed "populations" of <i>M. integrifolia</i> under their respective DCCEEW species profiles and will therefore not genetically reduce an area identified as contributing to these populations. The nearest populations are located north-east in Ormeau Hills and south at Tamborine, over 4 km from the referral area. The vegetation within the referral area was only identified to contain several Macadamia specimens within regrowth vegetation and therefore likely do not meet the specified criterial to fit a key population.</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>The removal of a small area of habitat (1.1 ha), which is also not remnant, nor located as apart of known populations of <i>Macadamia</i>, and contains high levels of disturbance is not considered to contribute significantly to critical habitat for this species. This conclusion is also drawn from regional ecosystem mapping revealing a high amount of remnant vine-forest (RE 12.11.10 and RE 12.11.5) within the wider area, which has the potential to support this species. Supported by records indicating a large number of specimens are found within these areas.</p>	
	<p>Although the proposed action will ultimately remove 1.1 ha of habitat (15 individual <i>M. integrifolia</i>) for these species it is not considered to lead to a long-term decrease in the size of an important <i>Macadamia</i> population within the area as only a comparatively small number of individual specimens were recorded.</p>	
	<p>The removal of the <i>Macadamia</i> specimens within the referral area will occur under an Impact Management Plan with compensatory plantings for each specimen removed, resulting in no net loss.</p>	
<p>2. Reduce the area of occupancy of an important population</p>	<p>Under the DCCEEW species profile for <i>Macadamia integrifolia</i>, their habitat is largely associated with remnant vegetation containing subtropical rainforest and complex notophyll vine-forest. Within the referral area there is 1.1 ha of non-remnant vegetation which contains regrowth characteristics reflective of RE 12.11.10. This area was observed to contain vegetation characteristic of notophyll vine forest and therefore reflects potential habitat for <i>Macadamia integrifolia</i>. It is however noted that on-ground the area of vine-forest was reflective of regrowth values in structure and composition, therefore lacking species diversity and densities. Areas were also observed to contain disturbance from invasive species, in particular, <i>Lantana camara</i> (Lantana) and <i>Ardisia crenata</i> (Coral Berry).</p> <p>Field assessments throughout and adjacent to the referral area identified specimens of both <i>Macadamia</i> species. Specimens observed included several juvenile and mature <i>M. integrifolia</i> located within and adjacent to the referral area and one <i>M. tetraphylla</i> specimen located adjacent to the referral area (therefore not impacted). Important or 'key' populations of both <i>M. integrifolia</i> are identified using several criteria, including population size, proximity to other populations (based on pollen transfer distance) and occurrence within remnant vegetation. The vegetation within the referral area contained relatively few individual specimens of <i>Macadamia</i> which are known to be common within the locality. This small cluster of specimens within regrowth vegetation is unlikely to meet the specified criteria to fit a key population.</p> <p>The referral area is identified as containing a small area of relatively low value habitat for this species, the removal of vegetation in the area will ultimately reduce the area of occupancy for the <i>Macadamia</i> species.</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>However, specimens observed are not considered an important population given the surrounding higher value remnant vine forest able to support this species where a much higher number of records have been observed. Therefore, the proposed action is not considered to have a significant impact on an important population of the species,</p>	
<p>3. Fragment an existing important population into two or more populations</p>	<p>Field assessments throughout the referral area identified specimens of <i>Macadamia integrifolia</i>.</p> <p>Specimens observed included several juvenile and mature <i>M. integrifolia</i> located within and adjacent to the referral area. The area of suitable habitat was surveyed on-ground, given the small overall area and high disturbance the field survey has a high degree of confidence that all <i>Macadamia</i> specimens were recorded.</p> <p>The vegetation within referral area where these specimens were located is mapped as non-remnant vegetation however is reflective of a modified notophyll vine forest. The referral area contains 1.1 ha reflective of this regional ecosystem, albeit in a modified state. It is noted that on-ground the area of vine-forest was reflective of regrowth values in structure and composition, therefore not reflecting the preferred remnant vegetation that supports populations of this species. Areas were also observed to contain disturbance from invasive species, in particular, <i>Lantana camara</i> (Lantana) <i>Ardisia crenata</i> (Coral Berry).</p> <p>Important or ‘key’ populations of <i>M. integrifolia</i> are identified using several criteria, including population size, proximity to other populations (based on pollen transfer distance) and occurrence within remnant vegetation. The vegetation within the referral area was only identified to contain several <i>Macadamia</i> specimens within regrowth vegetation and therefore likely do not meet the specified criteria to fit a key population.</p> <p>Additionally, listed “populations” of <i>M. integrifolia</i> within the <i>Macadamia</i> Species Recovery Plan 2019-2024 (Powell, M. and Gould, L. 2019) are not present within or adjacent the referral area. With the nearest populations located north-east in Ormeau Hills and south at Tamborine, over 4 km from the specimens within the referral area vegetation. Therefore, the number of specimens, the lack of remnant vegetation and the distance of these from areas of identified <i>Macadamia</i> populations indicates this as a low priority population.</p> <p>The removal of vegetation will occur abutting the current operational quarry and does not result in vegetation fragmentation of two potential habitat areas. Instead impacts to low value habitat to support this species is proposed, which is not identified to contain a medium to very high priority population of <i>Macadamia</i>.</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
4. Adversely affect habitat critical to the survival of a species	<p>As a result, the removal of vegetation within the referral area will not exacerbate existing fragmentation of adjoining Macadamia habitat and is not considered likely to fragment an existing population of the species.</p> <p>Field assessments throughout the referral area identified specimens of <i>Macadamia integrifolia</i>. Specimens observed included several juvenile and mature <i>M. integrifolia</i> located within and adjacent to the referral area.</p> <p>A review of ALA indicates that the majority of records within the local area are located east of the referral area within vegetation associated with Ormeau Hills. The nearest contemporary record of <i>M. integrifolia</i> was from 2018, approximately 1.5km north-east of the referral area. It is therefore not unlikely that the species has occurred within the regrowth vine thicket within the referral area, given that seed dispersal can occur over long distances by birds or small rodents that drop the nuts once unable to open the shell.</p> <p>Important or 'key' populations of <i>M. integrifolia</i> are identified using several criteria, including population size, proximity to other populations (based on pollen transfer distance) and occurrence within remnant vegetation. As mentioned previously, the presence of these species within regrowth vegetation and at a distance from other identified populations of Macadamia indicate this is a low value population, and more so reflective of a few scattered individuals.</p> <p>The proposed action will result in the removal of the Macadamia tree specimens and 1.1 ha of low value habitat for the species, which is not considered to provide critical habitat for an important population of the species.</p>	A significant impact is not likely
5. Disrupt the breeding cycle of an important population	<p>Field assessments throughout the referral area identified specimens of <i>Macadamia integrifolia</i>. Specimens observed included several juvenile and mature <i>M. integrifolia</i> located within and adjacent to the referral area.</p> <p>Under the significant impact guidelines, an 'important population' is a population that is necessary for a species' long-term survival and recovery. As discussed previously, the specimens identified within the referral area are not considered to contribute to an important population of the species due to their distance from identified key populations, limited number of species observed which are largely juvenile and presence within non-remnant vegetation reflective of regrowth notophyll vine forest.</p> <p>As a result, it is not considered that the proposed action would disrupt the breeding cycle of a population of the Macadamia species as there is an abundance of suitable Macadamia habitat in the broader area.</p>	A significant impact is not likely

Significant Impact Criteria	Assessment	Impact
<p>6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Field assessments throughout the referral area identified specimens of <i>Macadamia integrifolia</i>. Specimens observed included several juvenile and mature <i>M. integrifolia</i> located within and adjacent to the referral area.</p> <p>Within the referral area there is 1.1 ha of non-remnant vegetation mapped which contains regrowth characteristics reflective of RE 12.11.10. This area was observed to contain vegetation characteristic of notophyll vine forest and therefore reflects potential habitat for <i>Macadamia integrifolia</i>. It is however noted that on-ground the area of vine-forest was reflective of regrowth values in structure and composition, therefore lacking species diversity and densities. Areas were also observed to contain disturbance from invasive species, in particular, <i>Lantana camara</i> (Lantana) and <i>Ardisia crenata</i> (Coral Berry).</p> <p>Important or 'key' populations of <i>M. integrifolia</i> are identified using several criteria, including population size, proximity to other populations (based on pollen transfer distance) and occurrence within remnant vegetation. The vegetation within the referral area was identified to contain several Macadamia specimens within regrowth vegetation and therefore likely do not meet the specified criterion to fit a key population.</p> <p>The referral area contains a small area of regrowth characteristic vine forest which supports a low value population of Macadamia specimens and does not contribute to an important population. It is therefore considered unlikely that the relatively small 'expansion area' of 5.94ha (1.1 ha of suitable habitat) will significantly affect the availability of habitat for <i>M. integrifolia</i> to the extent it leads to the species decline.</p> <p>The removal of the Macadamia specimens within the referral area will occur under an Impact Management Plan with compensatory plantings for each specimen removed, accounting for the loss and ensuring these species continue to thrive in more suited conditions.</p>	<p>A significant impact is not likely</p>
<p>7. Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the in the vulnerable species' habitat</p>	<p>The referral area contains a significant number of invasive species at present, with the area currently containing the Macadamia species observed to contain areas dominated by <i>Lantana camara</i> (Lantana) <i>Ardisia crenata</i> (Coral Berry). Exotic vines such as Cat's claw creeper (<i>D. unguis-cati</i>) and <i>Madeira vine</i> (<i>A. cordifolia</i>) can smother and kill mature macadamia trees, neither of which were observed within the referral area and therefore are unlikely to be spread by the proposed activity.</p> <p>With the implementation of weed management protocol utilized by extraction activities the risks of increasing weed spread will be minimized. The proposed action will not result in the introduction or increase of invasive species that are harmful to <i>M. integrifolia</i> or Macadamia habitat.</p>	<p>A significant impact is not likely</p>
<p>8. Introduce disease that may cause the species to decline, or</p>	<p>Disease is not considered a significant threat to Macadamia at present however root-rot fungus (Phytophthora species) is considered to have potential impacts to the species. The extent of this is,</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
	<p>however, not known. In general, this fungus spreads naturally through the soil or via animal dispersal, however, is likely also spread via anthropogenic movement of soil. The extent of potential Phytophthora species in South-East Queensland is not known however it is yet to be listed as a key threatening process for this species and is therefore likely a minor risk.</p> <p>With general biosecurity obligations being adhered to it is unlikely that the proposed action will introduce or increase the prevalence of disease.</p>	
<p>9. Interfere substantially with the recovery of the species.</p>	<p>Under the DCCEEW species profile for these Macadamia species, their habitat is largely associated with remnant vegetation containing subtropical rainforest and complex notophyll vine-forest. Within the referral area there is 1.1 ha of non-remnant vegetation mapped which contains regrowth characteristics reflective of RE 12.11.10. This area was observed to contain vegetation characteristic of notophyll vine forest and therefore reflects potential habitat for <i>Macadamia integrifolia</i>. It is however noted that on-ground the area of vine-forest was reflective of regrowth values in structure and composition, therefore lacking species diversity and densities. Areas were also observed to contain disturbance from invasive species, in particular, <i>Lantana camara</i> (Lantana) and <i>Ardisia crenata</i> (Coral Berry). Field assessments throughout the referral area identified specimens of <i>Macadamia integrifolia</i> within the referral area. Specimens observed included several juvenile and mature <i>M. integrifolia</i> located within and adjacent to the referral area.</p> <p>Important or 'key' populations of <i>M. integrifolia</i> are identified using several criteria, including population size, proximity to other populations (based on pollen transfer distance) and occurrence within remnant vegetation. The vegetation within the referral area was identified to containing several <i>Macadamia</i> specimens within regrowth vegetation and therefore likely do not meet the specified criterial to fit a key population. The referral area is not located within or adjacent the listed "populations" of</p> <p>The nearest populations are located north-east in Ormeau Hills and south at Tamborine, over 4 km from the referral area. The vegetation within the referral area was only identified to contain several <i>Macadamia</i> specimens within regrowth vegetation and therefore likely do not meet the specified criterial to fit a key population.</p> <p>The removal of a small area of habitat (1.1 ha), which is also not remnant, nor located as apart of known populations of <i>Macadamia</i>, and contains high levels of disturbance is not considered to contribute significantly to critical habitat for this species. This conclusion is also drawn from regional ecosystem mapping revealing a high amount of remnant vine-forest (RE 12.11.10 and RE 12.11.5) within the wider area, which has the potential to support this species. Supported by records indicating a large number of specimens are found within these areas.</p>	<p>A significant impact is not likely</p>

Significant Impact Criteria	Assessment	Impact
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The Action is unlikely to interfere substantially with the recovery of *M. integrifolia*. The removal of relatively low-quality vegetation across the referral area will only marginally reduce available habitat (refer **Plan 5**).

Refer below for an assessment against the EPBC Act Recovery Plan for the southern Macadamia species.

The Southern Macadamia Species Recovery Plan was published in 2009 with a draft recovery plan published in 2019. The overall goal of the National Recovery Plan is to set out the management and research actions necessary to stop the decline of and support the recovery of the Macadamia species.

The plan addresses the key threats facing the Macadamia species and recovery objectives which are provided below with responses relevant to the proposed action:

4. Continue to identify and evaluate the extent and quality of southern Macadamia species populations and their habitat.

The referral area is mapped as containing a mixture of Category X (non-remnant) and Category B (remnant) vegetation under the Queensland Vegetation Management Act 1999 with the non-remnant vegetation locked in under an approved PMAV (ref: 2008/008614). The majority of the referral area contains evidence of disturbance as a result of adjacent land- uses. Field assessments throughout the referral area identified specimens of both Macadamia species. Specimens observed included several juvenile and mature *M. integrifolia* located within and adjacent to the referral area.

The proposed action will reduce the potential area of occupancy within this locality through the loss of approximately 1.1ha of potential habitat that includes regrowth vine thicket indicative of the pre-clear mapped RE 12.11.10.

However, it is considered unlikely that the relatively small 'expansion area' of 5.94ha (1.1 ha of suitable habitat) will significantly affect the area of occupancy for *M. integrifolia* given this area is not remnant vegetation, nor located as apart of known populations of Macadamia, and contains high levels of disturbance which is not considered to contribute significantly to critical habitat for this species. Furthermore, surrounding regional ecosystem mapping indicates that there is a high amount of remnant vegetation containing vine-forest (RE 12.11.10 and RE 12.11.5) within the wider area, which has the potential to support higher value populations of this species. This is supported by records indicating a large number of specimens are found within these areas.

5. Reduce and manage major threatening processes affecting Macadamia species habitat and their habitat.

Field assessments throughout the referral area identified specimens of *Macadamia integrifolia*. Specimens observed included several juvenile and mature *M. integrifolia* located within and adjacent to the referral area and. While the species is known in the local area, few contemporary sightings have been recorded close to the referral area and known important populations are over 4 km from the referral area. The number of specimens, the lack of remnant vegetation and the distance of these from areas of identified Macadamia populations indicates this as a low priority population.

The removal of vegetation will occur abutting the current operational quarry and does not result in vegetation fragmentation of two potential habitat areas. Instead impacts to low value habitat to support this species is proposed, which is not identified to contain a medium to very high priority population of Macadamia.

The removal of such a small area of habitat (1.11 ha), within the 5.94 ha referral area, which is also not remnant, nor located as part of known populations of *Macadamia*, and contains high levels of disturbance is not considered to contribute significantly to critical habitat for this species. This conclusion is also drawn from regional ecosystem mapping revealing a high amount of remnant vine-forest (RE 12.11.10 and RE 12.11.5) within the wider area, which has the potential to support this species. Indicative by records indicating a larger number of specimens are found within these areas.

6. Increase knowledge of *Macadamia* species and their ecology to effect their conservation and management.

Not applicable.

7. Improve awareness and understanding of *Macadamia* species, especially the management requirements of these species and major threats.

Not applicable.

8. Manage, monitor and evaluate the *Macadamia* Species Recovery Plan.

Not applicable.

The results of this assessment determined that it is unlikely that the proposed action will have a significant impact on *M. integrifolia*. No impact is proposed for *M. tetraphylla* as the species was not recorded within the impact area.

9. EPBC Act Determination Advice

9.1. EPBC Act Significant Impact Guidelines

This ecological assessment has identified Matters of National Environmental Significance (MNES) recorded or predicted to potentially occur on or near the referral area. It presents the design and mitigation measures employed to avoid and minimise project related impacts to the matters of conservation significance and quantifies the extent of potential residual impacts.

The proposed action involves the clearing area of 5.94 ha of remnant and non-remnant vegetation. Desktop assessments and field surveys indicated that, at present, Koala and *Macadamia integrifolia* are the only threatened species within the referral area.

The assessment methodology included site surveys and consideration of Commonwealth, State and Local Government environmental database searches. The assessment identified seven (7) threatened species, five (5) fauna and two (2) flora, as having potential to be present within the referral area. Field analysis found only five (5) of these species were likely to utilise habitat within the referral area.

The five (5) species were assessed against the EPBC Act significant impact guidelines and the action is not considered to have a significant impact on any of these species given the small overall impact area, lack of evidence on-site and availability of habitat in the broad locality. It is recommended that the proposed action be considered '**not a controlled action.**'

10. Appendices

Appendix A

EPBC Act Protected Matters Search Tool Results

Appendix B

NCA Wildlife Online Search Results

Appendix C

Likelihood of Occurrence Assessment

Appendix D

Habitat quality data sheets

Appendix E

Flora and Fauna Species Lists

Appendix F

SAT survey results

Appendix G

MWA Noise Assessment

Appendix H

MWA Dust Assessment

Appendix A

EPBC Act Protected Matters Search Tool
Results



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 28-Nov-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	77
Listed Migratory Species:	17

Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	9
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [\[Resource Information \]](#)

Ramsar Site Name	Proximity	Buffer Status
Moreton bay	Within 10km of Ramsar site	In feature area

Listed Threatened Ecological Communities [\[Resource Information \]](#)

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In feature area
Grey box-grey gum wet forest of subtropical eastern Australia	Endangered	Community likely to occur within area	In buffer area only
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area	In feature area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species [\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Critically Endangered	Species or species habitat may occur within area	In feature area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Roosting known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area	In feature area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
Maccullochella mariensis Mary River Cod [83806]	Endangered	Translocated population known to occur within area	In feature area
FROG			
Litoria olongburensis Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Mixophyes fleayi Fleay's Frog [25960]	Endangered	Species or species habitat likely to occur within area	In feature area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat may occur within area	In buffer area only
INSECT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area	In feature area
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Notamacropus parma Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Potorous tridactylus tridactylus Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Baloghia marmorata Marbled Baloghia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat known to occur within area	In feature area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Brachychiton sp. Ormeau (L.H.Bird AQ435851) Ormeau Bottle Tree [84105]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Clematis fawcettii Stream Clematis [4311]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Coleus habrophyllus listed as Plectranthus habrophyllus [91378]	Endangered	Species or species habitat known to occur within area	In feature area
Coleus nitidus listed as Plectranthus nitidus Nightcap Plectranthus, Silver Plectranthus [91380]	Endangered	Species or species habitat likely to occur within area	In feature area
Corchorus cunninghamii Native Jute [14659]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Croton mamillatus Bahrs Scrub Croton [84796]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat known to occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat may occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diploglottis campbellii Small-leaved Tamarind [21484]	Endangered	Species or species habitat may occur within area	In feature area
Endiandra floydii Floyd's Walnut, Crystal Creek Walnut [52955]	Endangered	Species or species habitat known to occur within area	In feature area
Endiandra hayesii Rusty Rose Walnut, Velvet Laurel [13866]	Vulnerable	Species or species habitat may occur within area	In feature area
Fontainea venosa [24040]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gossia gonoclada Angle-stemmed Myrtle [78866]	Endangered	Species or species habitat likely to occur within area	In feature area
Leichhardtia longiloba listed as Marsdenia longiloba Clear Milkvine [91911]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidium peregrinum Wandering Pepper-cress [14035]	Endangered	Species or species habitat may occur within area	In feature area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat known to occur within area	In feature area
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Species or species habitat may occur within area	In feature area
Notelaea x ipsviciensis listed as Notelaea ipsviciensis Cooneana Olive [93460]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Owenia cepiodora Onionwood, Bog Onion, Onion Cedar [11344]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In feature area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area	In feature area
Planchonella eerwah Shiny-leaved Condoo, Black Plum, Wild Apple [17340]	Endangered	Species or species habitat known to occur within area	In feature area
Randia moorei Spiny Gardenia [10577]	Endangered	Species or species habitat known to occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sophora fraseri [8836]	Vulnerable	Species or species habitat known to occur within area	In feature area
Syzygium hodgkinsoniae Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum woollsii listed as Tylophora woollsii [40080]	Endangered	Species or species habitat likely to occur within area	In feature area
Zieria collina [2178]	Vulnerable	Species or species habitat known to occur within area	In feature area
REPTILE			
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Roosting known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Roosting known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna striata White-fronted Tern [799]		Migration route may occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Protected Area Name	Reserve Type	State	Buffer Status
Edward Corbould Reserve and Retreat No.1	Nature Refuge	QLD	In buffer area only
Edward Corbould Reserve and Retreat No.5	Nature Refuge	QLD	In buffer area only
Gyetvay Park	Nature Refuge	QLD	In buffer area only
Plunkett	Conservation Park	QLD	In buffer area only
Tamborine	National Park	QLD	In buffer area only
Wickham	National Park	QLD	In buffer area only

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Harts Road Industrial Subdivision	2022/09338		Referral Decision	In buffer area only

Controlled action

Ormeau Hills Quarry	2007/3772	Controlled Action	Post-Approval	In buffer area only
Ormeau Quarry Expansion, 12km NW Oxenford, QLD	2016/7797	Controlled Action	Post-Approval	In buffer area only
Wolffdene Quarry Extension, Luscombe, QLD	2014/7384	Controlled Action	Post-Approval	In buffer area only
Yarrabilba residential development and associated infrastructure	2013/6791	Controlled Action	Post-Approval	In buffer area only

Not controlled action

GCCC Northern Wastewater Strategy and associated Reclaimed Water Scheme - Stage	2001/282	Not Controlled Action	Completed	In buffer area only
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Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Peachey Road Quarry - Vegetation Clearing - Luscombe, QLD	2021/8931	Not Controlled Action	Completed	In buffer area only
Upgraded sewerage infrastructure in the Helensvale/Coombabah catchment	2004/1427	Not Controlled Action	Completed	In buffer area only

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Clarence-Moreton	Clarence-Moreton	BA website	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

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

Please feel free to provide feedback via the [Contact us](#) page.

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Appendix B

NCA Wildlife Online Search Results



Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -27.839
Longitude: 153.195
Distance: 5
Email: keeley Madden@saundershavill.com
Date submitted: Thursday 23 Nov 2023 14:44:23
Date extracted: Thursday 23 Nov 2023 14:50:02

The number of records retrieved = 27

Disclaimer

Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the accuracy of this data, the State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.

The State of Queensland disclaims all responsibility for information contained in this product and all liability (including liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.

The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (<https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Limnodynastidae	<i>Adelotus brevis</i>	tusked frog		V		11
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	1
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami</i>	glossy black-cockatoo		V		1
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)		V	V	2
animals	birds	Menuridae	<i>Menura alberti</i>	Albert's lyrebird		NT		1
animals	birds	Strigidae	<i>Ninox strenua</i>	powerful owl		V		1
animals	insects	Papilionidae	<i>Ornithoptera richmondia</i>	Richmond birdwing		V		1
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		E	E	150
plants	land plants	Apocynaceae	<i>Leichhardtia coronata</i>			V		4/3
plants	land plants	Aristolochiaceae	<i>Pararistolochia praevenosa</i>			NT		2/2
plants	land plants	Asteraceae	<i>Picris conyzoides</i>			V		1/1
plants	land plants	Corynocarpaceae	<i>Corynocarpus rupestris subsp. arborescens</i>	southern corynocarpus		V		3/3
plants	land plants	Ericaceae	<i>Styphelia recurvisepala</i>			E		4/4
plants	land plants	Euphorbiaceae	<i>Baloghia marmorata</i>	jointed baloghia		V	V	2/2
plants	land plants	Euphorbiaceae	<i>Fontainea venosa</i>			V	V	2/2
plants	land plants	Lamiaceae	<i>Coleus habrophyllus</i>			E	E	3/3
plants	land plants	Lauraceae	<i>Cryptocarya foetida</i>	stinking cryptocarya		V	V	2/2
plants	land plants	Lauraceae	<i>Endiandra wongawallanensis</i>			E		8/6
plants	land plants	Leguminosae	<i>Sophora fraseri</i>	brush sophora		V	V	1/1
plants	land plants	Myrtaceae	<i>Rhodamnia dumicola</i>	rib-fruited malletwood		E		2/2
plants	land plants	Oleaceae	<i>Jasminum jenniae</i>			E		1/1
plants	land plants	Proteaceae	<i>Macadamia integrifolia</i>	macadamia nut		V	V	78/9
plants	land plants	Rubiaceae	<i>Randia moorei</i>	spiny gardenia		E	E	7/7
plants	land plants	Sapindaceae	<i>Cupaniopsis newmanii</i>	long-leaved tuckeroo		NT		9
plants	land plants	Sapotaceae	<i>Planchonella eerwah</i>			E	E	3/3
plants	land plants	Sparrmanniaceae	<i>Corchorus cunninghamii</i>			E	E	11/7
plants	land plants	Sterculiaceae	<i>Brachychiton sp. (Ormeau L.H.Bird AQ435851)</i>	Ormeau bottle tree		CR	CE	36/22

CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).

This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

Appendix C

Likelihood of Occurrence Assessment

Likelihood of occurrence Assessment criteria

Unlikely	<p>No previous records of the species within the locality and one or more of the following criteria is met:</p> <ul style="list-style-type: none"> • Not previously recorded on the referral area and surrounds and the referral area is beyond the current known geographic range; or • Dependent on specific habitat types or resources that are not present on the referral area; or • Considered extinct in the wild.
Low	<p>No previous records of the species within the locality and one or more of the following criteria is met:</p> <ul style="list-style-type: none"> • Site and local connectivity contains marginal habitat excluding suitable/critical habitat attributes; • Lack of recent records exist in a regional context (use 1980 as a delineation); or • Potential for vagrant or individual of the species to survive short-term;
Moderate	<p>Species previously recorded within the locality and one or more of the following criteria is met:</p> <ul style="list-style-type: none"> • Previously recorded in proximity to the referral area (<i>i.e.</i>, vagrant individuals); or • Potential habitat typologies or resources are present on the referral area.
High	<p>Species previously recorded within the locality and one or more of the following criteria is met:</p> <ul style="list-style-type: none"> • Previously recorded on the referral area; • Dependent on habitats or habitat resources that are available on the referral area; or • Suitable habitats are available on the referral area that are capable of supporting a resident population or individuals of the species.
Known	<p>Flora species or ecological community positively identified during field surveys within the referral area.</p> <p>Fauna species positively recorded during field surveys within the referral area or adjacent habitats.</p>

Matters of National Environmental Significance								
Name	Status	Type of presence	Description of the community/preferred habitat	Likelihood of Occurrence	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)		
Wetlands of International Importance (Ramsar)								
Moreton Bay			The site is located within 10 kilometres of Moreton Bay.	There will be no measurable affect to Moreton Bay.	Unlikely	Unlikely		
Threatened Ecological Communities								
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	E	Community may occur within area	In Queensland, this ecological community coincides with two regional ecosystem communities including Of Concern RE12.1.1 (<i>Casuarina glauca</i> +/- mangroves woodland) as well as areas where the canopy is dominated by <i>Casuarina glauca</i> within 12.3.20 (<i>Melaleuca quinquenervia</i> , <i>Casuarina glauca</i> +/- <i>Eucalyptus tereticornis</i> , <i>Eucalyptus siderophloia</i> open forest on low coastal alluvial plains).	Desktop analysis and field surveys confirmed that regional ecosystems 12.1.1 and 12.3.20 do not occur within the referral area	Unlikely	Unlikely		
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	E	Community may occur within area	This threatened ecological community occurs in coastal catchments, typically within 20km of the coast and below 20m above seas level, on low lying coastal alluvial areas such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces and behind fore dunes. The canopy is dominated by <i>Melaleuca sp.</i> and / or <i>Eucalyptus robusta</i> , with other <i>Eucalyptus</i> species tolerant of inundation present but not	Desktop analysis and field surveys confirmed that regional ecosystems 12.2.7, 12.3.4/12.3.4a, 12.3.5, 12.3.6, and 12.3.20 do not occur within the referral area	Unlikely	Unlikely		

dominant. In Queensland this TEC is represented by RE12.2.7, RE12.3.4/12.3.4a, RE12.3.5, RE12.3.6, and RE 12.3.20.

Grey box-grey gum wet forest of subtropical eastern Australia	E	Community likely to occur within area	Grey box-grey gum wet forest of subtropical eastern Australia is described as a forest where the canopy dominated by its characteristic Eucalyptus species (being <i>Eucalyptus moluccana</i> or <i>Eucalyptus propinqua</i> less commonly <i>Eucalyptus punctata</i>) with or without <i>Araucaria cunninghamii</i> (hoop pine) and with an understorey that typically includes significant cover of species with drier vine-forest (rainforest) affiliations. In Queensland REs likely to represent or contain the ecological community includes RE 12.9-10.3 and 12.8.14a.	Desktop analysis and field surveys confirmed that regional ecosystems 12.9-10.3 and 12.8.14a do not occur within the referral area	Unlikely	Unlikely
Lowland rainforest of subtropical Australia	CE	Community likely to occur within area	This TEC occurs mainly on basalt and alluvial soils and is characteristic of a low abundance of <i>Eucalyptus</i> , <i>Melaleuca</i> and <i>Casuarina</i> species. Specimens with buttress roots and a diversity of vines are common throughout this TEC. This community is usually associated with REs 12.3.1 (more recently mapped as 12.3.16), 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.16.	Desktop analysis and field surveys confirmed that regional ecosystems 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.12.1, and 12.12.16 do not occur on-site. Desktop analysis identified the majority of the proposed quarry expansion area as remnant RE12.11.3 with smaller areas of non-remnant vegetation. Based on desktop assessments, a polygon of re-growth vegetation to the east of the proposed quarry expansion area is mapped as pre-clear RE12.11.10 (Notophyll vine forest on metamorphic rocks). Field surveys confirmed flora species consistent with vine thicket vegetation however much	Moderate	Unlikely

				of the area was weed infested with vegetation composition not meeting the key diagnostic requirements for the <i>Lowland Rainforest of Subtropical Australia</i> TEC, specifically, a lack of both species' richness and tall closed forest structure.		
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	E	Community likely to occur within area	<p>This ecological community is found on alluvial landforms, including floodplains, the riparian zones of parent rivers and other order tributaries, alluvial flats, floodplain/alluvial terraces and periodically flooded depressions. The structure of this TEC varies from tall open forest to woodland. The canopy is dominated by eucalypts and/or other myrtaceous trees, (specifically from <i>Angophora</i>, <i>Corymbia</i>, <i>Lophostemon</i> and <i>Syncarpia</i> genera).</p> <p>A mid-layer or sub-canopy of small trees may be present – with scattered to dense shrubs. For example, <i>Melaleuca</i>, <i>Leptospermum</i> and related genera may form dense thickets beneath the main canopy, or in gaps between canopy trees.</p> <p>Typical examples of tree species include <i>Corymbia intermedia</i> (Pink Bloodwood), <i>Eucalyptus bancroftii</i> (Bancroft's Red Gum), <i>E. moluccana</i> (Grey Box), <i>E. grandis</i> (Flooded Gum), <i>E. siderophloia</i> (Grey Ironbark), and <i>E. tereticornis</i> (Forest Red Gum). In Queensland <i>Syncarpia glomulifera</i> (Turpentine) may also dominate, or co-dominate.</p> <p>Regional Ecosystems generally associated with this TEC where key diagnostic characteristics are met include RE 12.3.2, 12.3.2a, 12.3.3, 12.3.3a, 12.3.3b, 12.3.3d, 12.3.4a, 12.3.7, 12.3.7c, 12.3.7d, 12.3.10, 12.3.11, 12.3.11a, 12.3.11b, 12.3.12, 12.3.14a, 12.3.15, 12.3.19.</p>	Desktop analysis and field surveys confirmed that regional ecosystems 12.3.2, 12.3.2a, 12.3.3, 12.3.3a, 12.3.3b, 12.3.3d, 12.3.4a, 12.3.7, 12.3.7c, 12.3.7d, 12.3.10, 12.3.11, 12.3.11a, 12.3.11b, 12.3.12, 12.3.14a, 12.3.15, and 12.3.19 do not occur within the referral area	Unlikely	Unlikely

<p>White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland</p>	<p>CE</p>	<p>Community may occur within area</p>	<p>Box – Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. In Queensland the ecological community is a primary component of the following Regional Ecosystems: 11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8, 13.12.8 and 13.12.9. It can also be a smaller component of the following regional ecosystems: 11.3.23, 12.8.16 (only at the far western edge of the bioregion), 13.3.4, 13.11.3 and 13.11.4. These regional ecosystems range in conservation status from 'not of concern at present' to 'endangered'.</p>	<p>Desktop analysis and field surveys confirmed that regional ecosystems 11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8, 13.12.8 and 13.12.9, 11.3.23, 12.8.16, 13.3.4, 13.11.3, and 13.11.4 do not occur within the referral area</p>	<p>Unlikely</p>	<p>Unlikely</p>
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Listed Threatened Species

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
Birds								
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	82338	Regent Honeyeaters mostly occur in dry Box-Ironbark <i>Eucalypt</i> woodland and dry sclerophyll forest associations in areas of low to moderate relief, wherein they prefer moister, more fertile sites. These areas are generally associated with creek flats and river valleys and foothills. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. They are a generalist forager, which mainly feed on nectar from a wide range of eucalypts and mistletoes.	The referral area does contain ironbark eucalypts including <i>Eucalyptus crebra</i> (narrow-leaved Ironbark). Remnant vegetation is present which is moderately to highly disturbed with exotic weeds. Additionally, there are no local records of this species.	Low	Low
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	1001	The Australasian Bittern occurs in terrestrial wetlands and, rarely, estuarine habitats, mainly in the temperate south-east and south-west. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and / or reeds or cutting grass growing over muddy or peaty substrate. The	The referral area does not contain any terrestrial wetlands or swamps with tall dense vegetation. Additionally, there are no local records of this species.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					Australasian Bittern occurs in the far south-east of Queensland; it has been reported North to Baralaba and West to Wyandra, although in most years it is probably confined to a few coastal swamps. It is rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions.			
<i>Calidris ferruginea</i>	Curlew Sandpiper	CE	CE	856	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns.	No suitable foraging or breeding habitat occurs within the referral area. Additionally, there are no local records of this species.	Unlikely	Unlikely
<i>Calyptorhynchus lathamii lathamii</i>	Glossy Black-cockatoo	V	V	67036	This species prefers woodland areas dominated by she-oak <i>Allocasuarina</i> , or open sclerophyll forests and woodlands with a stratum of <i>Allocasuarina</i> beneath <i>Eucalyptus</i> ,	Potential suitable habitat was observed throughout the remnant vegetation however, <i>Allocasuarina</i> species were not dominant, and the	Moderate	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					<i>Corymbia</i> or <i>Angophora</i> . Glossy black-cockatoos have also been observed in mixed <i>Allocasuarina</i> , <i>Casuarina</i> , cypress <i>Callitris</i> and brigalow <i>Acacia harpophylla</i> woodland assemblages. In SEQ west of the Great Dividing Range, they have been observed feeding in remnant <i>Casuarina cristata</i> and bullock <i>Allocasuarina luehmannii</i> forests. This species is also known to utilise appropriate remnant woodlands, and individual or small pockets of <i>Allocasuarina</i> and <i>Casuarina</i> feed trees in urban areas.	understorey was moderately to highly disturbed with exotic weeds. Additionally, the vast area of potentially suitable habitat is available to the south within Tamborine National Park. There is one confirmed record within 5km of the referral area.		
<i>Charadrius leschenaultii</i>	Greater Sand Plover	V	V	877	In the non-breeding grounds in Australasia, the Greater Sand Plover is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons. They seldom occur at shallow freshwater wetlands.	No suitable foraging or breeding habitat occurs within the referral area. Additionally, there are no local records of this species.	Unlikely	Unlikely
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern)	V	V	67062	The Brown treecreeper (south-eastern) prefers dry open eucalypt forests and woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open native understorey. They also occupy mallee, forests and woodlands subject to periodic	Suitable habitat is present in the form of eucalypt forest although it is recognised that the species is absent from steep rocky terrain and within dense shrub layers, both of which are present across the referral area.	Low	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					inundation. The subspecies is not usually found in woodlands with a dense shrub layer, and it is absent from heavily degraded woodlands and steep rocky hills. Optimal habitat for the subspecies must be subject to ongoing disturbance. Essential habitat features include large trees, fallen timber, hollows, and tree stumps.	Additionally, there are no local records of this species.		
<i>Cyclopsitta diophthalma coxeni</i>	Coxen's Fig Parrot	CE	CE	59714	The Coxen's Fig Parrot occurs in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest. Food is mainly taken from figs however other species fruit have been recorded in their diet including <i>Elaeocarpus grandis</i> , <i>Syzygium corynanthum</i> , <i>Litsea reticulata</i> and <i>Grevillea robusta</i> .	The referral area does contain marginal suitable habitat in the form of regrowth vine thicket associated with pre-clear RE12.11.10. However, this vegetation was highly weed infested and did not contain the species composition of true vine thicket vegetation. Additionally, there are no local records of this species.	Low	Unlikely
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	E	E	533	The Eastern Bristlebird inhabits low dense vegetation in a broad range of habitat types including sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest. It occurs near the coast, on tablelands and in ranges. The Eastern Bristlebird is found in habitats with a variety of species compositions, but is defined by a	The referral area does not contain the understorey vegetation structure that this species favours. There is no evidence of permanent residence, and due to the scarcity of this species and lack of local records, its occurrence is highly unlikely.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					similar structure of low, dense, ground or understorey vegetation.			
<i>Erythrotriorchis radiatus</i>	Red Goshawk	E	E	942	A wide ranging and highly mobile species generally observed over eucalypt habitats. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest margins. Habitat has to be open enough for fast attack and manoeuvring in flight, but provide cover for ambushing of prey.	The referral does contain a mix of vegetation types including eucalypt woodland and regrowth vine ticket. However, the referral area is heavily vegetated and likely does not provide the open forest habitat suitable for the species to hunt. There is no evidence of permanent residence, and due to the scarcity of this species and lack of local records, its occurrence is highly unlikely.	Low	Unlikely
<i>Falco hypoleucos</i>	Grey Falcon	V	V	929	The Grey Falcon is a medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a	Preferred habitat was observed throughout the referral area. However, there are no local records of this species.	Low	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (<i>Eucalyptus camaldulensis</i>) and Coolibah (<i>E. coolabah</i>).			
<i>Geophaps scripta</i>	Squatter Pigeon (southern)	V	V	64440	This species inhabits open grasslands and woodlands typically with a native understorey although may occur in artificial pasture.	No suitable habitat was observed throughout the referral area. In addition, the species is very rarely observed in southern Queensland, and thus this species is not expected to occur.	Unlikely	Unlikely
<i>Grantiella picta</i>	Painted Honeyeater	V	V	470	The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips.	Potential suitable habitat was observed throughout the remnant vegetation within the referral area, however the understorey was moderately to highly disturbed with exotic weeds and low abundance of mistletoes. Additionally, there are no records in the local area.	Low	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
<i>Hirundapus caudacutus</i>	White-throated Needletail	V	V	682	Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps.	Potential suitable habitat was observed throughout the remnant vegetation within the referral area, however the understorey was moderately to highly disturbed with exotic weeds. This species is highly mobile and found over a range of habitat types. There are three confirmed record within 5km of the site.	Moderate	Low
<i>Lathamus discolor</i>	Swift Parrot	CE	E	744	The Swift Parrot breeds in Tasmania during spring to early summer. During autumn and winter the species migrates to the mainland where it follows a nomadic existence linked to the availability and timing of flowering of trees in various locations.	The referral area does contain a mix of flowering species however there have been no recorded sightings surrounding the referral area. The availability of potentially suitable habitat within the surrounding area indicates a low likelihood the species would utilise the small area of vegetation within the referral area. Additionally, there are no records in the local area.	Low	Low
<i>Menura alberti</i>	Albert's Lyrebird	-	NT	-	Albert's Lyrebird is mostly restricted to rainforests and wet sclerophyll forests with mesic understorey, usually at altitudes of more than 300 m above sea level. They are typically located in gullies, along	Potential suitable habitat was observed within the referral area however, the understorey was moderately to highly disturbed with exotic weeds. There is one confirmed	Moderate	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					watercourses, and on the slopes and ridges of steep mountain ranges	record within 5km of the site however most of the records within the local area occur in Tamborine National Park where more suitable habitat occurs.		
<i>Ninox strenua</i>	Powerful Owl	-	V	-	Found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys, especially along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. Needs old growth trees to nest.	Potential suitable habitat was observed throughout the remnant vegetation on site however, the understorey was moderately to highly disturbed with exotic weeds. The referral area generally lacked large hollow bearing trees and watercourses. There is one confirmed record within 5km of the site however most of the records within the local area occur in Tamborine National Park.	Moderate	Low
<i>Numenius madagascariensis</i>	Eastern Curlew	CE	E	847	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and	No suitable habitat was observed within the referral area. Additionally, there are no records in the local area.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					sometimes use the mangroves. The birds are also found in saltworks and sewage farms.			
<i>Rostratula australis</i>	Australian Painted-snipe	E	E	77037	The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. The species has a scattered distribution throughout many parts of Australia, with a single record from Tasmania.	No suitable wetlands occur within the referral area. It is unlikely that this species will occur. Additionally, there are no records in the local area.	Unlikely	Unlikely
<i>Stagonopleura guttata</i>	Diamond Firetail	V	V	59398	Diamond Firetails are usually found in eucalypt, casuarina, or acacia woodlands, open forests and other lightly timbered areas, including grassland with scattered trees. They generally prefer areas with low tree density, few large logs, low litter cover and high grass cover.	Eucalypt woodland was present within the referral area although the preference for low tree density and high grass cover was not present. Additionally, there are no records in the local area.	Low	Unlikely
<i>Turnix melanogaster</i>	Black-breasted Button Quail	V	V	923	Typical habitat occurs in dry rainforest and vegetation immediately adjacent to rainforest. However, the species has also been recorded in a variety of low coastal heathlands around Fraser Island and nearby mainland. Deep leaf litter in which the species can forage appears to be particularly favoured.	The referral area does not contain dry rainforest or vegetation immediately adjacent to rainforest, and no heathlands are present. It is unlikely that this species will occur. Additionally, there are no records in the local area.	Unlikely	Unlikely

Fish

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
<i>Maccullochella mariensis</i>	Mary River Cod	E	-	83806	The Mary River Cod prefers deep, shaded, slow-flowing freshwater pools and in streams with undercut banks, boulders, sunken logs and woody debris.	No suitable habitat was observed throughout the referral area.	Unlikely	Unlikely
Amphibian								
<i>Adelotus brevis</i>	Tusked Frog	-	V	-	Tusked frogs can be found in a range of habitats including open grasslands, large swamps, low woodlands, dry and wet sclerophyll forests and rainforests. They are not recorded to be concerned about artificial or highly disturbed sites. Tusked frogs rarely occur above 400m above sea level and are known to breed in a range of sites.	The preferred habitat for the species was not present within the referral area. However, records of the species occur within 5km of the site.	Low	Low
<i>Litoria olongburensis</i>	Wallum Sedge Frog	V	V	1821	Wallum Sedge frog is restricted to coastal lowlands and sand islands with low nutrient soils or deep sands. Vegetation types include heathland, Melaleuca swamps. Sedgeland and Banksia woodlands. Occurs in low pH water characteristics of Wallum environments, flowing creeks and in marshy or swampy habitats and connecting channels, and coastal freshwater lakes.	No suitable habitat was observed throughout the referral area. Additionally, there are no records in the local area.	Unlikely	Unlikely
<i>Mixophyes fleayi</i>	Fleay's Frog	E	E	25960	Fleay's Frog is associated with montane rainforest and open forest communities adjoining rainforest. The species occurs along	No suitable habitat was observed throughout the referral area.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					stream habitats from first to third order streams (i.e. small streams close to their origin through to permanent streams with grades of 1 in 50) and is not found in ponds or ephemeral pools.	Additionally, there are no records in the local area.		
<i>Mixophyes iteratus</i>	Giant Barred Frog	V	V	1944	Inhabits slow flowing sections of streams in wet sclerophyll and rainforest. This species has been observed to prefer a closed forest canopy with a relatively light cover of vegetation at ground level and also requires permanent pondage areas for breeding.	No suitable habitat was observed throughout the referral area. Additionally, there are no records in the local area.	Unlikely	Unlikely
Insects								
<i>Argynnis hyperbius inconstans</i>	Australian Fritillary	CE	E	88056	Most specimens have been collected from river estuaries or swampy coastal areas at or near sea level. The Australian fritillary butterfly is restricted to open, swampy, coastal areas where the larval food plant, <i>Viola betonicifolia</i> , grows as a small, insignificant ground herb in association with <i>Lomandra longifolia</i> (Long Leaved Matrush) and grasses, especially the grass <i>Imperata cylindrica</i> (Blady Grass). This habitat is called <i>Melaleuca</i> wetlands, although the larval food plant does not occur in all sub-types of this plant community.	No suitable coastal habitat was observed throughout the referral area. Additionally, there are no records in the local area.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
<i>Ornithoptera richmondia</i>	Richmond Birdwing	-	V	-	The Richmond Birdwing occur in subtropical rainforest habitats in association with its larval host plants, <i>Aristolochia praevanosa</i> and <i>Pararistolochia laheyana</i> .	The referral area does not contain any subtropical rainforest habitat, or species represented in this species' lifecycle.	Unlikely	Unlikely
<i>Phyllodes imperialis smithersi</i>	Pink Underwing Moth	E	-	86084	The Pink Underwing Moth is found below the altitude of 600 m in undisturbed, subtropical rainforest. It occurs in association with the vine <i>Carronia multiseppalea</i> .	No suitable habitat was observed throughout the referral area. Additionally, there are no records in the local area.	Unlikely	Unlikely
Mammals								
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	E	183	The Large-eared Pied Bat roosts on sandstone cliffs and fertile woodland valley habitat within close proximity of each other. However, in South East Queensland habitat includes rainforest and moist eucalypt forest habitats at high elevations.	No suitable habitat was observed throughout the referral area. Additionally, there are no records in the local area.	Unlikely	Unlikely
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll	E	E	75184	The Spot-tailed Quoll has a preference for mature wet forest habitat. Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable. This predominantly nocturnal species rests during the day in dens. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves. Individuals require an abundance of food such as birds and small mammals, and large areas of	Suitable habitat in the form of rock outcrops and caves were not observed throughout the referral area. There are no records of the species within 5km of the referral area.	Low	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					relatively intact vegetation through which to forage.			
<i>Macroderma gigas</i>	Ghost Bat	V	E	174	Ghost bats are known to inhabit large complex caves and old mineshafts.	No suitable habitat was observed throughout the referral area. Additionally, there are no records in the local area.	Unlikely	Unlikely
<i>Notamacropus parma</i>	Parma Wallaby	V	-	89289	The Parma Wallaby prefers wet sclerophyll forest with a thick understorey of shrubs and nearby grass patches. They also inhabit dry sclerophyll forest with a dense understorey and occasionally, rainforest habitats. The species relies on a thick understorey for shelter.	Suitable habitat in the form of thick understorey vegetation is present within the referral area. However, the species is very rarely observed in southern Queensland, and thus this species is not expected to occur onsite.	Unlikely	Unlikely
<i>Petauroides volans</i>	Greater Glider (southern and central)	E	E	254	The Greater Glider is an arboreal nocturnal marsupial that is mostly restricted to eucalypt forests and woodlands, although it occurs in highest abundance in taller, montane, moist eucalypt forests with abundant (large) hollow-bearing trees for shelter and a variety of eucalypt species for feeding. Diet consists of eucalypt leaves, and occasionally flowers. Small home ranges and low dispersability make this species sensitive to clearing and	A variety of eucalypt species occur over the referral area, although there is a relatively low occurrence of hollow-bearing trees, so limited suitable shelter habitat exists. The nearest records are located in Tamborine National Park, approximately 5-10km south of the referral area. However, given the species is highly susceptible to disturbances and is unlikely to utilise an area in proximity to	Moderate	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					fragmentation, with low persistence in small forest fragments.	disturbance, it would be highly unlikely the species would utilise vegetation within the referral area. Given the maximum width of the referral area as 150m and relatively poor quality habitat, it is considered unlikely the species would utilise this area.		
<i>Petaurus australis australis</i>	Yellow-bellied Glider	V	V	87600	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	Potentially suitable habitat does occur in the remnant vegetation within the referral area however, there is a relatively low occurrence of hollow-bearing trees, so limited suitable shelter habitat exists. Additionally, there are no records within 5km of the referral area with the majority of records in Tamborine National Park. However, given the species is highly susceptible to disturbances and is unlikely to utilise an area in proximity to disturbance, it would be highly unlikely the species would utilise vegetation within the referral area. Given the maximum width of the	Low	Low

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						referral area as 150m and proximity to an active quarry.		
<i>Petrogale penicillata</i>	Brush-tailed Rock Wallaby	V	V	225	This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks. It also utilises tree limbs. While it appears that most Brush-tailed Rock-wallaby colonies are on north-facing slopes and cliff lines, colonies have been found on south-facing cliffs in Kangaroo Valley, in the Macleay River Gorge, in the Warrumbungles and at Mt Kaputar, although usually in lower densities.	The referral area is characterised by steep slopes however, rocky habitat is largely absent. There are no records of the species within 5km of the referral area.	Unlikely	Unlikely
<i>Phascolarctos cinereus</i>	Koala	E	E	85104	The Koala is found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland.	The referral area does contain koala habitat trees associated with remnant RE12.11.3 and the species is known to occur within the area. A koala was observed at the time of survey within the referral area, as well as the presence of scats. The vegetation present contains Koala food and habitat trees.	Moderate-High	Known
<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo	V	V	66645	The Long-nosed Potoroo inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open	Given the lack of sightings within the locality and unsuitable habitat within the referral area, it's considered	Unlikely	Unlikely

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					areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrub of tea-trees or melaleucas. A sandy loam soil is also a common feature.	unlikely that this species would occur within the referral area.		
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	V	V	96	Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The home range of the New Holland Mouse ranges from 0.44 ha to 1.4 ha. The species peaks in abundance during early to mid stages of vegetation succession typically induced by fire.	Given the lack of sightings within the locality and unsuitable habitat within the referral area, it's considered unlikely that this species would occur within the referral area.	Unlikely	Unlikely
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	-	186	Species generally roosts in camps in trees adjacent to larger permanent watercourse. The Grey-headed flying fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops. The primary food source is blossom from Eucalyptus and related genera.	Suitable vegetation occurs within the referral area, particularly within the remnant vegetation. There were no roosts observed, with the nearest known roost site located in Tamborine National Park, approximately 7km to the south. There are multiple records within 5km of the referral area however, most of the records in the broader area are in Tamborine National Park to the south.	Moderate	Low

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						Furthermore, Flying-foxes are sensitive to sounds particularly impulsive sounds such as blasting. Vibration from machinery and subterranean work can also disturb flying-foxes.		
Plants								
<i>Arthraxon hispidus</i>	Hairy-joint Grass	V	V	9338	Hairy-joint grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland.	Suitable habitat in the form of creeks and swamps are not present within the referral area. Furthermore, there are no records of the species within 5km of the referral area.	Unlikely	Unlikely
<i>Baloghia marmorata</i>	Marbled Balogia	V	V	8463	Marbled Balogia occurs in subtropical rainforest/notophyll vine forest and wet sclerophyll forest with a rainforest understorey. Associated species include <i>Eucalyptus microcorys</i> , <i>Archontopheonix cunninghamiana</i> , <i>Aphanthe philippinensis</i> , <i>Capparis arborea</i> , <i>Planchonella australis</i> , <i>Ficus spp</i> , <i>Olea paniculata</i> , <i>P. myrsinoides</i> .	Suitable habitat in the form of regrowth vine forest is present within the referral area however this area is heavily weed infested at the ground layer. There are multiple records within 5km of the referral area and a high density of sightings in association with Tamborine National Park. The species was not observed within the referral area during site surveys.	Moderate	Low
<i>Bosistoa transversa</i>	Three-leaved Bosistoa	V	-	16091	The Three-leaved Bosistoa is conserved within Mt Warning National Park, Numbinbah Nature Reserve, Limpinwood Nature Reserve and Whian Whian State Forest. While population	Rainforest/wet forest and species the Three-leaved Bosistoa is commonly associated with were not located on site. Therefore, it is considered unlikely	Unlikely	Unlikely

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					information is unavailable, it is thought to be common in its range. It generally grows in wet sclerophyll forest, dry sclerophyll forest and rainforest up to 300 metres in altitude. It is commonly associated with <i>Argyrodendron trifoliolatum</i> , <i>Syzygium hodgkinsoniae</i> , <i>Endiandra pubens</i> , <i>Dendrocnide photinophylla</i> , <i>Acmena ingens</i> , <i>Diploglottis australis</i> and <i>Diospyros mabacea</i> .	to occur on-site due to lack of suitable habitat.		
<i>Brachychiton</i> sp. (Ormeau L.H.Bird AQ435851)	Ormeau Bottle Tree	CE	CE	84105	The Ormeau bottle tree occurs in riparian forest near small streams in rocky gorges among microphyll vine forest. It prefers undisturbed rainforest with few weeds. The species only occurs in the northern Darlington Range of south-east Queensland and its distribution is associated with the Lowland Rainforest of Subtropical Australia TEC.	Suitable habitat in the form of regrowth vine thicket was present within the referral area however this area was heavily weed infested and did not contain the species richness to be considered the Lowland Rainforest of Subtropical Australia TEC. Furthermore, the species was not observed during site surveys.	Low	Low
<i>Bulbophyllum globuliforme</i>	Miniature Moss-orchid	V	NT	6649	This species is known from four locations, including Puzzle Creek near Paluma (north-east Queensland), Kroombit Tops near Calliope (Central Queensland), Cainbable Creek in Lamington National Park (south-east Queensland) and Levers Plateau (north-east New South Wales). The Miniature Moss-orchid is a host-specific species, only growing on the	No suitable rainforest habitat to support this species occurs within the referral area. Additionally, there are no records in the local area.	Unlikely	Unlikely

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					Hoop Pine, where it colonises the upper branches of mature trees. The Hoop Pine occurs in upland (usually 100-900 m above sea level) subtropical rainforest communities that have a discontinuous distribution along the Australian east coast.			
<i>Clematis fawcettii</i>	Stream Clematis	V	V	4311	Stream Clematis occurs from the Richmond River in north-east NSW to the Bunya Mountains in south-east Queensland. This species is conserved within the Richmond Range National Park (NP), Toonumbar NP, Lamington NP, Main Range NP and Mt Barney NP. Stream Clematis prefers canopy gaps on loam soils derived from basalt and mixed volcanic rocks usually near streams. Associated vegetation communities include dry rainforest, complex notophyll vineforest (warm and cool subtropical rainforest), on the margins of semi-evergreen vine thickets and, at one site, in eucalypt open forest with scattered vine forest species	No suitable habitat to support this species occurs within the referral area	Unlikely	Unlikely
<i>Coleus habrophyllus</i>	Shaggy-leaved Plectranthus	E	E	64589	Plants have been recorded growing on chert or sandstone outcrops, in open woodlands often in shaded situations near vine forest. Seven populations are known including: Oxley Creek, Greenbank; Opposum Creek,	Regrowth vine thicket vegetation is present within the referral area however this area is heavily weed infested at the ground layer. Therefore, unlikely the species would be present.	Low	Low

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					Springfield; Woogaroo Creek, Goodna; three populations within White Rock Conservation Park, incorporating Six Mile Creek and near Ormeau (south of Beenleigh).	There are records within 5km of the site, however these are associated with the known population near Ormeau.		
<i>Coleus nitidus</i> (Listed as <i>Plectranthus nitidus</i> under NC Regulation 2020)	Nightcap Plectranthus, Silver Plectranthus	E	E	55742	Nightcap Plectranthus occurs on rocky cliff faces or amongst rocky outcrops and boulders. Locations are often damp and sheltered or may be sheltered by adjacent canopy. Associated vegetation includes subtropical rainforest or ecotones between open forest and rainforest to altitudes of 180m. Microhabitat requirements are rocky rainforest and wet sclerophyll forest streams. Also may occur in associated with White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community.	No suitable habitat to support this species occurs within the referral area	Unlikely	Unlikely
<i>Corchorus cunninghamii</i>	Native Jute	E	E	14659	The Native Jute occurs in the ecotone of wet sclerophyll forest and dry-subtropical rainforest (e.g. araucarian microphyll vine forest), and in Hoop Pine (<i>Araucaria cunninghamii</i>) plantations. It often occurs on hill crests, exposed slopes, ridges or upper slopes of hilly terrain on south or south-east. It	Potential suitable habitat was observed within the referral area however the understorey was moderately to highly disturbed with exotic weeds. There are several confirmed records within 5km of the	Moderate	Low

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					also occurs on sheltered slopes, gullies and on lower slopes, depending on the topographic position of the sclerophyll-rainforest margin.	site. Field surveys failed to locate this species on-site.		
<i>Croton mamillatus</i>	Bahrs Scrub Croton	CE		84796				
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	V	V	11976	The Stinking Cryptocarya is restricted to coastal sands, or if not, then close to the coast, occurring in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt to an altitude of 150 m.	No suitable coastal habitat to support this species occurs within the referral area. However, there are a cluster of records 4.5km east of the referral area. Field surveys failed to locate this species.	Low	Unlikely
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	-	19533	Leafless tongue-orchid habitats include wet heath, sedgeland, grasstree plains and in woodland with scribbly gum, silvertop ash, red bloodwood and black she-oak.	Suitable habitat for the species is not present within the referral area	Unlikely	Unlikely
<i>Corynocarpus rupestris subsp. arborescens</i>	Southern Corynocarpus	V	V	19303	The Southern Corynocarpus occurs in dry rainforest on steep, rocky, basaltic slopes on the north-eastern face of Glenugie Peak. The subspecies persists in habitats where fire is excluded.	There are three records within 5km of the referral area however suitable dry rainforest habitat to support this species is absent from the referral area. Field surveys failed to locate this species on-site.	Moderate	Low
<i>Cupaniopsis newmanii</i>	Long-leaved Tuckeroo	-	NT	-	The Long-leaved Tuckeroo occurs in complex notophyll vine forest, simple notophyll mixed closed forest, very tall open forest and woodland, and wet sclerophyll woodland at	Potential suitable habitat occurs within the referral area, particularly in the re-growth vine thicket vegetation, however the understorey is	Moderate	Low

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					altitudes of 40 to 550m. The species is found on slopes, margins of rainforest, creek banks, and roadsides. Associated species include <i>Argyrodendron spp</i> , <i>Araucaria cunninghamii</i> , <i>Sloanea woollsii</i> , <i>Dendrocnide excelsa</i> , <i>Ficus watkinsiana</i> , <i>Eucalyptus grandis</i> , <i>E. microcorys</i> , <i>Lophostemon confertus</i> and <i>Syncarpia glomulifera</i> .	moderately to highly disturbed with exotic species. Additionally, this species was not located during field surveys. However, there are multiple records of this species within 5km of the referral area.		
<i>Cupaniopsis shirleyana</i>	Wedge-leaf Tuckeroo	V	V	3205	The Wedge-leaf Tuckeroo occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along riverbanks at altitudes up to 550 m above sea level. This species is also likely to occur on the margins of native vegetation in scrubby urbanised areas. Predominately found on dark brown sandy loams and sandy clay loams (pH 5-7.5) and rocky scree slopes. Generally, these soils have formed from volcanic parent materials (mainly granites and granodiorites, basalt and andesitic flows, and pyroclastics).	Potential suitable habitat occurs within the referral area, particularly in the regrowth vine thicket vegetation, however the understorey is moderately to highly disturbed with exotic species. There are no records of the species within 5km of the referral area and the species was not observed during site surveys.	Low	Low
<i>Dichanthium setosum</i>	Bluegrass	V	-	14159	In Queensland, bluegrass has been reported from the Leichhardt, Morton, North Kennedy and Port Curtis regions. <i>Dichanthium setosum</i> is associated with heavy basaltic black soils and stony red-brown hardsetting loam with	There are no local records of this species, with the closest sighting in the Toowoomba and surrounds.	Unlikely	Unlikely

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					clay. It can be found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown.			
<i>Diploglottis campbellii</i>	Small-leaved Tamarind	E	E	21484	<i>Diploglottis campbellii</i> occurs in forest types varying from luxuriant lowland subtropical to drier subtropical rainforest with a <i>Lophostemon confertus</i> (Brush Box) open overstorey. Their preferred habitat is well-watered and well-drained sites on basalt-derived soils or alluvium at low altitude.	The referral area contains marginally suitable habitat in the form of regrowth vine thicket vegetation. However, this area was heavily weed infested and lacked high species richness. There are no records of the species within 5km of the referral area and the species was not recorded during site surveys.	Low	Unlikely
<i>Endiandra floydii</i>	Floyd's Walnut	E	-	52955	Warm temperate, subtropical rainforest or wet sclerophyll forest with Brush Box overstorey, and in Camphor Laurel forest. The species can occur in disturbed and regrowth sites. The species generally prefers sheltered locations however it has been recorded on ridgelines, slopes, gullies and creek flats.	Subtropical rainforest is not present within the referral area however, regrowth vine thicket vegetation is present. However, this area lacks typical vegetation structure such as tall canopy and high species richness. There are no records of the species within 5 km of the referral area and the species was not observed during site surveys.	Low	Low

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<i>Endiandra hayesii</i>	Rusty Rose Walnut	V	V	13866	The Rusty Rose Walnut occurs in subtropical and warm temperate rainforests, and <i>Lophostemon confertus</i> forests on poorer soils. The species is rarely found in Queensland with the only known locations being Burleigh Heads, Tallebudgera, and Springbrook National Park.	Subtropical rainforest is not present within the referral area however, regrowth vine thicket vegetation is present. This area lacks typical vegetation structure such as tall canopy and high species richness. There are no records of the species within 5 km of the referral area and the species was not observed during site surveys.	Low	Low
<i>Endiandra wongawallanensis</i>		-	E	-	<i>Endiandra wongawallanensis</i> is found in subtropical rainforest habitat or on its ecotonal edges. The species prefers the upslope ecotonal margins of rainforest patches on the margins of dry sclerophyll forest dominated by <i>Corymbia intermedia</i> , <i>Eucalyptus acmenoides</i> , <i>E. pilularis</i> , <i>E. propinqua</i> , <i>E. siderophloia</i> , <i>Lophostemon confertus</i> , and <i>Syncarpia glomulifera</i> .	Potential suitable habitat for this species occurs within the referral area, particularly within the remnant vegetation and where ecotonal areas area present, however rainforest margins are not present. Furthermore, the understorey is moderately to highly disturbed with exotic weeds. Associated eucalypt species occur on site and there are multiple records within 5km of the site. Field surveys did not observe the species.	Moderate	Low
<i>Fontainea venosa</i>		V	V	24040	Occurs in notophyll vine forest and vine thicket with a mean annual rainfall of 1000-	Regrowth vine thicket vegetation was present within the referral area,	Moderate	Low

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					1100 mm on soils derived from and containing abundant andesitic rocks, often on rocky outcrops or along creeks.	however, rocky outcrops and creeks were not present. There is a cluster of records of the species 2km north of the referral area however the species was not recorded during site surveys.		
<i>Gossia gonoclada</i>	Angle-stemmed Myrtle	E	CE	78866	<i>Gossia gonoclada</i> is recorded growing along watercourses. The species prefers to grow in lowland remnant riparian rainforest and notophyll vine forest in subtropical South-east Queensland. Some have been recorded in the ecotone areas between vine forest and rainforest vegetation and that of Eucalypts.	Potential suitable habitat in the form of regrowth vine thicket is present within the referral area however watercourses are not present. There is one record of the species within 5km of the referral area. The species was not observed during site surveys.	Low	Low
<i>Jasminum jenniae</i>	Shrubby Jasmine	-	E	-	Found in subtropical and dry rainforest regions of south-east Queensland.	No suitable rainforest habitat to support this species occurs within the referral area. However, there is one record within 5km of the referral area. The species was not observed during site surveys.	Low	Low
<i>Leichhardtia coronata</i>	Slender Milkvine	-	V	-	Most commonly found in open eucalypt forest and woodland communities on hillslopes and ridge tops at altitudes of 40–780m above sea level. It has been found on rocky outcrops along cliff lines. Most commonly recorded with <i>Eucalyptus fibrosa</i> , <i>E.</i>	Potential suitable habitat for this species occurs within the referral area, particularly within the remnant vegetation. However, the understorey is moderately to highly disturbed with exotic weeds. Associated eucalypt	Moderate	Low

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					<i>carnea</i> , <i>Corymbia citriodora</i> , <i>C. henryi</i> , <i>E. acmenoides</i> , and <i>E. propinqua</i> .	species occur and there are a few records within 5km of the referral area. Notably, the species was not observed during site surveys.		
<i>Leichhardtia longiloba</i>	Clear Milkvine	V	V	91911	Clear Milkvine grows in open eucalypt forest, or margins of subtropical and warm temperate rainforest, and in areas of rocky outcrops. Associated species include <i>Eucalyptus crebra</i> , <i>E. microcorys</i> , <i>E. acmenoides</i> , <i>E. saligna</i> , <i>E. propinqua</i> , <i>Corymbia intermedia</i> and <i>Lophostemon confertus</i> .	Potential suitable habitat for this species occurs within the referral area, particularly within the remnant vegetation. However, the understorey is moderately to highly disturbed with exotic weeds. Associated eucalypt species occur but there are no records within local area and the species was not observed during site surveys.	Low	Low
<i>Lepidium peregrinum</i>	Wandering Pepper-cress	E	-	14035	This species occurs from the Bunya Mountains, south-east Queensland, to near Tenterfield, in northern New South Wales. At Clifton, this species grows in riparian open forest dominated by <i>Eucalyptus camaldulensis</i> and <i>Casuarina cunninghamiana</i> with a variably dense shrubby understorey of <i>Hymenanthera dentata</i> , <i>Bursaria spinosa</i> , <i>Acacia fimbriata</i> , <i>A. floribunda</i> , <i>Callistemon viminalis</i> and <i>Leptospermum brachyandrum</i> . This species was most abundant in the tussock grassland fringe of the riparian open forest.	No suitable habitat to support this species occurs within the referral area.	Unlikely	Unlikely

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<i>Macadamia integrifolia</i>	Macadamia Nut	V	V	7326	The Macadamia Nut grows in remnant rainforest. It prefers to grow in mild frost-free areas with reasonably high rainfall. Vegetation communities range from notophyll mixed forest, extremely tall closed forest, simple notophyll mixed very tall closed forest to simple microphyll-notophyll mixed mid-high closed forest with Araucaria and Argrodendron emergents.	Multiple juvenile, semi-mature, and mature <i>Macadamia integrifolia</i> were observed at the time of survey within and adjacent to the referral area. There are multiple records of the species within 5km of the referral area.	Moderate	Known
<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut	V	V	6581	This species generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of the forests and mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well drained sites.	One <i>Macadamia tetraphylla</i> was observed in the area adjoining the referral area. There are multiple records of the species within 5km of the referral area.	Moderate	Known (outside referral area)
<i>Notelaea ipsviciensis</i>	Cooneana Olive	CE	CE	81858	The Cooneana Olive survives as an understorey plant in degraded, eucalypt dominated dry sclerophyll vegetation communities. Soils in the area are of low fertility, depauperate and sandstone-based. This species prefers open woodland communities with open canopies. The known population is adjacent to subdivided, modified and developed land.	Potential suitable habitat in the form of eucalypt dominated vegetation is present within the referral area. However, there are no records of the species within 5km of the referral area with all records within the Ipswich region.	Low	Unlikely

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<i>Notelaea lloydii</i>	Lloyd's Olive	V	V	15002	The species occurs on undulating to hilly terrain either in moist gullies or on gentle to steep dry slopes, but is rarely found on rocky outcrops. Soil types are mostly shallow, well drained and stony to very rocky in texture. Found in the ecotone between eucalypt open forests and vine thickets at 80-480 m above sea level (asl).	Regrowth vine thicket and eucalypt woodland is present within the referral area and a marginal ecotonal area. However, the referral area is heavily weed infested at the ground layer and there are no records of the species within 5km. Furthermore, the species was not recorded during site surveys.	Low	Low
<i>Owenia cepiodora</i>	Onionwood	V	V	11344	<i>N. suberosa</i> grows at 180 to 500 m altitude on a variety of soils. It mainly occurs in complex notophyll vine forest and wet sclerophyll forest. Also recorded from dry sclerophyll forest. Associated rainforest species include <i>Dissiliaria baloghioides</i> (lancewood), <i>Podocarpus elatus</i> (she pine), <i>Argyrodendron</i> spp. and <i>Hedraianthera porphyropetala</i> . Associated species in wet sclerophyll include <i>E. saligna</i> (Sydney blue gum) and <i>Lophostemon confertus</i> (brush box). Associated dry sclerophyll species include <i>Corymbia citriodora</i> (spotted gum), <i>E. acmenoides</i> (white mahogany) and <i>E. punctata</i> (grey gum).	Potential suitable habitat for this species occurs within the referral area, where regrowth vine thicket is present, however the referral area is moderately to highly disturbed with exotic weeds. Associated dry sclerophyll species occur but there are no records within local area and the species was not observed during site surveys	Low	Low
<i>Pararistolochia praevenosa</i>		-	NT	-	<i>Pararistolochia praevenosa</i> occurs in subtropical rainforests on the eastern coast	Suitable habitat for the species is not present within the referral area	Unlikely	Unlikely

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					and lower ranges (<600m) on nutrient rich soils.			
<i>Persicaria elatior</i>	Knotweed, Tall Knotweed	V	V	5831	Knotweed commonly grows in damp places including coastal areas with swampy areas, along watercourses, streams and lakes, swamp forests as well as disturbed areas. Associated species include <i>Melaleuca linearifolia</i> , <i>M. quinquenervia</i> , <i>Lophostemon suaveolens</i> , <i>Casuarina glauca</i> , <i>Corymbia maculate</i> , <i>Pseudognaphalium luteoalbum</i> and <i>Polygonum hydropiper</i> .	No suitable habitat to support this species occurs within the referral area	Unlikely	Unlikely
<i>Phaius australis</i>	Lesser Swamp-orchid	E	E	5872	The Lesser Swamp-orchid is commonly associated with coastal wet heath/sedge land wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark or Swamp Mahogany are found. Typically, the Lesser Swamp-orchid is restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest (Broad-leaved Paperbark/Swamp Mahogany/Swamp Box (<i>Lophostemon suaveolens</i>), swampy rainforest (often with sclerophyll emergent), or fringing open forest. It is often associated with rainforest elements such as Bangalow Palm (<i>Archontophoenix cunninghamiana</i>) or Cabbage Tree Palm (<i>Livistona australis</i>).	No suitable habitat to support this species occurs within the referral area	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
<i>Picris conyzoides</i>		-	V	-	<i>Picris conyzoides</i> occurs in open eucalypt forest and cultivated paddock between the Gold Coast to Gympie and Crow's Nest.	Open eucalypt forest and cultivated paddocks are not present within the referral area. There is one record within 5km of the referral area however the species was not observed during site surveys.	Low	Low
<i>Planchonella eerwah</i>	Shiny-leaved Condoos, Black Plum, Wild Apple	E	E	17340	The species prefers subtropical rainforest, dry rainforest and <i>Araucaria cunninghamii</i> vine scrub.	Marginal suitable habitat in the form of regrowth vine thicket was observed within the referral area, however this area lacked species richness and tall canopy trees. There are multiple records within 5km of the referral area however the species was not observed during detailed field surveys.	Moderate	Low
<i>Randia moorei</i>	Spiny Gardenia	E	E	10577	Shrub or small bushy tree to about 8m in dry rainforest north of the Beenleigh area; endemic to Qld.	Suitable habitat in the form of dry rainforest is generally not present within the referral area. However, there are multiple records within 5km of site. The species was not recorded during site surveys and is unlikely to occur given high disturbance levels.	Moderate	Low
<i>Rhodamnia dumiicola</i>	Rib-filled Malletwood	-	E	-	Shrub or small bushy tree to about 8m in dry rainforest north of the Beenleigh area; endemic to Qld.	Suitable habitat in the form of dry rainforest is generally not present within the referral area. The closest records are located approximately 6km	Low	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
						north-east of the referral area and the species was not observed on-site during field surveys.		
<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE	CE	15763	Known to occur from coastal districts of NSW north from Batemans Bay to Bundaberg in Queensland. The distribution occasionally extends inland onto the escarpment up to 600 m ASL in areas with rainfall of 1000-1600 mm. Commonly occurs in all rain forest subforms except cool temperate rainforest. Species occupies a range of volcanically derived and sedimentary soils and is a common pioneer species in Eucalypt forests. Often found in wet sclerophyll associations in rainforest transition zones and Creekside riparian associations. Flowers from late winter through spring, with a peak in October and fruits appear in December in the Sydney region. Habitat is likely to include subtropical rainforests, northern warm temperate rainforests, littoral rainforest, for example.	Suitable habitat in the form of temperate rainforest is not present within the referral area although Eucalypt forests are present. There are three records of the species east of the referral area however the species was not observed on-site during site surveys.	Low	Low
<i>Rhodomyrtus psidioides</i>	Native Guava	CE	CE	19162	Known to occur from coastal districts of NSW north from Gosford to Maryborough in Queensland. Occurrence records are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur	Suitable habitat in the form of subtropical rainforests, warm temperate rainforests, littoral rainforest, and wet sclerophyll forests are not present on-site. Where vine	Low	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges. The species flowers in late spring to early summer, producing fruits in summer. Habitat is likely to include subtropical rainforests, warm temperate rainforests, littoral rainforest, and wet sclerophyll forests.	thicket vegetation is present, this area is regrowth and highly weed infested. There is one record of the species within 5km of the referral area however the species was not observed on-site during site surveys.		
<i>Samadera bidwillii</i>	Quassia	V	V	29708	Quassia commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude. The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils.	This species favours lowland rainforest or rainforest margins which are absent from the referral area, and no local records exist, and thus Quassia is unlikely to be present on site.	Low	Low
<i>Sophora fraseri</i>		V	V	8836	This species normally grows in wet sclerophyll forest and a range of rainforest types. Associated species include: <i>Corymbia citriodora</i> , <i>Eucalyptus carnea</i> , <i>E. microcorys</i> , <i>E. acmenoides</i> , <i>E. propinqua</i> and <i>Lophostemon confertus</i> . The shrub appears to prefer growing along rainforest margins, in eucalypt forests in the vicinity of rainforests or in large canopy gaps in closed forest communities	Potential suitable habitat for this species occurs within the referral area, particularly within the remnant vegetation. However, the understorey is moderately to highly disturbed with exotic weeds. Associated eucalypt species occur within the referral area and there is one record of the species	Moderate	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
						within 5km. Field surveys failed to locate this species on-site.		
<i>Styphelia recurvisepala</i>		-	E	-	<i>Styphelia recurvisepala</i> occurs in coastal districts on sandstone ridges up to 235m above sea level. Associated species in low, open heathland include <i>Eucalyptus trachyphloia</i> , <i>Leptospermum microcarpum</i> , <i>L. luehmannii</i> . Associated species in open forest or woodland include <i>E. dura</i> , <i>E. planchoniana</i> , <i>Angophora woodsiana</i> , and <i>E. curtisii</i> .	The preferred habitat and associated species are generally absent from the referral area. Local records are present and confined to an area approximately 4.5km west. The species was not observed during site surveys,	Low	Low
<i>Syzygium hodgkinsoniae</i>	Smooth-bark Rose Apple	V	V	3539	Smooth-bark Rose Apple occurs in riverine rainforest on rich alluvial or basaltic soils. The species mainly occurs as scattered individuals along degraded watercourses.	Riverine rainforests are not present within the referral area. There are no records within 5km of the referral area with all records south towards the NSW border.	Unlikely	Unlikely
<i>Thesium australe</i>	Austral Toadflax	V	V	15202	Austral Toadflax is semi-parasitic on the roots of a range of grass species, notably <i>Themeda triandra</i> (Kangaroo Grass). It occurs in shrubland, grassland or woodland, often on damp sites.	The referral area contains eucalypt woodland and regrowth vine thicket. <i>Themeda triandra</i> (Kangaroo Grass) is present although the majority of the referral area is dominated by weeds at the ground layer. There are no records of the species within 5km of the referral area.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
<i>Vincetoxicum woollsi</i> listed as <i>Tylophora woollsi</i>	-	E	E	40080	<i>Vincetoxicum woollsi</i> has been recorded from wet sclerophyll and rainforest margins. SPRAT details that the only known Queensland population was recorded from Girraween NP in 1995. Atlas of Living Australia (ALA) demonstrates one (1) record within Springbrook National Park on the New South Wales border.	No suitable habitat to support this species occurs within the referral area and no records are present within 5km.	Unlikely	Unlikely
<i>Zieria collina</i>	-	V	V	2178	<i>Zieria collina</i> occurs on steep slopes and narrow gullies in the transition zone between wet open forest and rainforest. The species is restricted to Mount Tamborine and the surrounding area.	This species favours rainforest margins which are absent from the site, all records are >5km south associated with Tamborine National Park.	Unlikely	Unlikely
Reptiles								
<i>Coeranoscincus reticulatus</i>	Three-toed Snake-tooth Skink	V	-	59628	Three-toed Snake-tooth Skins have been found in loose, well mulched, friable soils, in and under rotting logs, in forest litter, under fallen hoop pine bark and under decomposing cane mulch. Projected foliage cover was estimated at 70-80% at two research sites. In Queensland, the species has been recorded in rainforest, closed forest, wet sclerophyll forest, tall open <i>Eucalyptus pilularis</i> forest, tally	Suitable habitat in the form of layered open eucalypt forest is present within the referral area associated with remnant vegetation. However, the site is heavily weed infested and disturbed as result of edge effects associated with current quarry operations. There are no records of the species within 5km of the referral area.	Low	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					layered open eucalypt forest and closed <i>Lophostemon confertus</i> forests. It has also been recorded in areas of extensive regrowth in heavily logged areas.			
<i>Delma torquata</i>	Collared Delma	V	V	1656	In general, the species occurs on rocky hillsides on basalt and lateritic soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket.	Potential suitable habitat for this species occurs on site, particularly within the remnant vegetation. However, the understorey is moderately to highly disturbed with exotic weeds and there are no records within 5km of site.	Low	Low
<i>Furina dunmalli</i>	Dunmall's Snake	V	V	59254	Dunmall's Snake has been found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow other Wattles, native Cypress or Bull-oak, and various Blue Spotted Gum, Ironbark, White Cypress Pine and Bull oak open forest and woodland associations on sandstone derived soils. Dunmall's Snake occurs primarily in the Brigalow Belt region in the south-eastern interior of Queensland. Records indicate sites at elevations between 200–500 m above sea level. The snake is very rare or secretive with limited records existing. It has been recorded at Archokoora, Oakey, Miles, Glenmorgan,	The species is found in a broad range of habitats however is primarily associated with the Brigalow belt. There are very few records east of the Great Dividing Range.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					Wallaville, Gladstone, Lake Broadwater, Mount Archer, Exhibition Range National Park, roadside reserves between Inglewood and Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park.			
<i>Hemiaspis damelii</i>	Grey Snake	E	E	1179	The grey snake is a relatively small, venomous, front-fanged (proteroglyphous) snake. In Queensland, grey snake habitat is Brigalow <i>Acacia harpophylla</i> and Belah <i>Casuarina cristata</i> woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, areas with small gullies and ditches, and floodplain environments where the species shelters beneath logs, rocks and soil cracks.	Habitat attributes to support this species are not present on-site and there is a lack of records within the local area.	Unlikely	Unlikely

*Status abbreviations are as follows: CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near Threatened, C = Least Concern, SL = Special Least Concern, - = Not Listed.

Listed migratory species (not listed above)

Scientific name	Common name	EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
Migratory marine birds						
<i>Apus pacificus</i>	Fork-tailed Swift	678	This species is almost exclusively aerial and mostly occur over inland plains but sometimes above foothills or in coastal areas.	Preferred habitat not present within the referral area.	Unlikely	Unlikely
Migratory terrestrial species						
<i>Cuculus optatus</i>	Oriental Cuckoo	86651	Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types	Potential suitable habitat for this species occurs on site, particularly within the remnant vegetation. However, the understorey is moderately to highly disturbed with exotic weeds and there are no records within 5km of the site.	Low	Low
<i>Monarcha melanopsis</i>	Black-faced Monarch	609	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine thickets, complex notophyll vine forests, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and occasionally cool temperate rainforest.	Regrowth vine thicket is present within the referral area, although this area is heavily disturbed and weed infested. A sighting of the species was recorded in close proximity to the referral area.	Moderate	Low
<i>Motacilla flava</i>	Yellow Wagtail	644	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	612	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt dominated forests and taller woodlands, and on migration occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	Suitable habitat in the form of eucalypt dominated woodland is present within the referral area. Furthermore, the species has been sighted in close proximity to the referral area.	Moderate	Low
<i>Rhipidura rufifrons</i>	Rufous Fantail	592	The Rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by Eucalypts such as <i>Eucalyptus microcorys</i> , <i>Eucalyptus pilularis</i> , <i>Eucalyptus resinifera</i> and a number of other Eucalyptus species.	Suitable habitat in the form of eucalypt dominated woodland is present within the referral area. Furthermore, the species has been sighted in close proximity to the referral area.	Moderate	Low
<i>Symposiachrus trivirgatus as Monarcha trivirgatus</i>	Spectacled Monarch	83946	The Spectacled Monarchs natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests. Its preference is for thick understorey areas.	No suitable habitat to support this species occurs within the referral area.	Low	Low

Migratory wetland species

<i>Actitis hypoleucos</i>	Common Sandpiper	59309	The Common Sandpiper utilises a wide range of coastal wetlands and some inland wetlands, including estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and clay pans, and occasionally piers and jetties. They are mostly found in shallow water, around muddy margins or rocky shores and sometimes in muddy areas littered with rocks or snags. The species commonly utilises mangroves for foraging and roosting but is rarely seen on mudflats.	No suitable habitat to support this species occurs within the referral area.	Unlikely	Unlikely
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	874	In Australia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, and beach	No suitable habitat to support this species occurs within the referral area.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
			cast algae / seaweed or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland. They also occur in salt works and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves.			
<i>Calidris melanotos</i>	Pectoral Sandpiper	858	The Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Occasionally found further inland.	No suitable habitat to support this species occurs within the referral area.	Unlikely	Unlikely
<i>Gallinago hardwickii</i>	Latham's Snipe	863	Latham's Snipe occurs in permanent and ephemeral wetlands. They usually inhabit open, freshwater wetlands with low, dense vegetation.	No suitable habitat to support this species occurs within the referral area.	Unlikely	Unlikely
<i>Pandion haliaetus</i>	Osprey	952	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers.	No suitable habitat to support this species occurs within the referral area.	Unlikely	Unlikely
<i>Tringa nebularia</i>	Common Greenshank	832	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. The species is known to forage at the edges of wetlands in soft mud or mudflats.	No suitable habitat to support this species occurs within the referral area.	Unlikely	Unlikely

Appendix D

Habitat quality data sheets

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Transect ID	T1	Job Number / Property	11390 - Blue Rock Quarry
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Part B - Site Data

Recorders	LB and DH	Date	5/06/2023
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Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
na		12.11.3	12

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

Eucalyptus crebra dominated with Eucalyptus tereticornis, Eucalytus microcorys and Eucalyptus propinqua. Moderatly weedy shrub layer

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

Tree species richness:				
Total number of species	12			EDL / Dom / R
Scientific Name	<i>Eucalyptus crebra</i>	Common Name	Narrow-leaved Ironbark	EDL/Dom/R
Scientific Name	<i>Eucalyptus microcorys</i>	Common Name	Tallowwood	
Scientific Name	<i>Eucalyptus tereticornis</i>	Common Name	Forest Red Gum	
Scientific Name	<i>Corymbia intermedia</i>	Common Name	Pink Bloodwood	
Scientific Name	<i>Eucalyptus propinqua</i>	Common Name	Grey Gum	
Scientific Name	<i>Corymbia citriodora</i>	Common Name	Spotted Gum	
Scientific Name	<i>Acacia disparrima</i>	Common Name	Hickory Wattle	
Scientific Name	<i>Alphitonia excelsa</i>	Common Name	Soap Tree	
Scientific Name	<i>Allocasuarina littoralis</i>	Common Name	Black She-oak	
Scientific Name	<i>Glochidion ferdinandi</i>	Common Name	Cheese Tree	
Scientific Name	<i>Lophostemon confertus</i>	Common Name	Brush Box	
Scientific Name	<i>Eucalyptus acmenoides</i>	Common Name	White Mahogany	

Shrub species richness:				
Total number of species	6			
Scientific Name	<i>Erythrina vespertilio</i>	Common Name	Batwing Coral Tree	
Scientific Name	<i>Mallotus philippensis</i>	Common Name	Red Kamala	
Scientific Name	<i>Grewia latifolia</i>	Common Name	Dog's Balls	
Scientific Name	<i>Breynia oblongifolia</i>	Common Name	Coffee Bush	
Scientific Name	<i>Alphitonia excelsa</i>	Common Name	Soap Tree	
Scientific Name	<i>Hibiscus heterophyllus</i>	Common Name	Rosella	
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		

Grass species richness:				
Total number of species	3			
Scientific Name	<i>Imperata cylindrica</i>	Common Name	Blady Grass	
Scientific Name	<i>Themeda triandra</i>	Common Name	Kangaroo Grass	
Scientific Name	<i>Oplismenus aemulus</i>	Common Name	Creeping Beard Grass	
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		

Forbs and others (non grass ground) species richness:				
Total number of species	13			
Scientific Name	<i>Plectranthus sp.</i>	Common Name		
Scientific Name	<i>Pandorea pandorana</i>	Common Name	Wong Wonga Vine	
Scientific Name	<i>Smilax australis</i>	Common Name	Barbed-wire Vine	
Scientific Name	<i>Eustrephus latifolius</i>	Common Name	Wombat Berry	
Scientific Name	<i>Cayratia clematidea</i>	Common Name	Slender Grape	
Scientific Name	<i>Lobelia purpurascens</i>	Common Name	White Root	
Scientific Name	<i>Parsonsia straminea</i>	Common Name	Monkey Rope	
Scientific Name	<i>fern*</i>	Common Name		
Scientific Name	<i>Dianella caerulea</i>	Common Name	Blue Flax-lily	
Scientific Name	<i>Big leaf vine*</i>	Common Name		
Scientific Name	<i>Platynerium superbum</i>	Common Name	Staghorn	
Scientific Name	<i>Drynaria rigidula</i>	Common Name	Basket Fern	
Scientific Name	<i>Stephania japonica</i>	Common Name	Tape Vine	

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

Total percentage cover within plot	70.00%		
Scientific Name	<i>Lantana camara</i>	Common Name	Lantana
Scientific Name	<i>Chloris gayana</i>	Common Name	Rhodes Grass

Scientific Name	<i>Paspalum mandiocanum</i>	Common Name	Broad-leaved Paspalum
Scientific Name	<i>Passiflora suberosa</i>	Common Name	Corky Passion
Scientific Name	<i>Solanum seafortianum</i>	Common Name	Brazilian Nightshade
Scientific Name	<i>Asparagus aethiopicus</i>	Common Name	Ground Asparagus
Scientific Name	<i>Melinis minutiflora</i>	Common Name	Molasses Grass
Scientific Name	<i>Eragrostis curvula</i>	Common Name	African Love Grass
Scientific Name		Common Name	
Scientific Name		Common Name	

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

Total Length of Coarse Woody Debris (Meters per hectare)	11.40		
1	2.20	26	
2	1.50	27	
3	1.50	28	
4	1.40	29	
5	2.60	30	
6	2.20	31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

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

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	25%	40%	0%	0%	0%	13%
Native other grass						
Native forbs and other species	5%	2%	3%	15%	7%	6%
Native shrubs						
Non-native grass	20%	0%	0%	0%	0%	4%
Non native forbs and shrubs	0%	3%	30%	0%	1%	7%
Litter	50%	55%	67%	75%	40%	57%
Rock						
Bare Ground				10%	52%	31%
Cryptogram						
Total	100%	100%	100%	100%	100%	100%

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

Eucalypt Large tree DBH benchmark used :	450	Number of large eucalypt trees:	E.acminoides 470 E.tereticornis 450, 470, 450, 450 E.microcorys 560, 460
Non- Eucalypt Large tree DBH benchmark used:	200	Number of large non eucalypt trees:	A.littoralis 240, 220
Total Number Large Trees: per ha	14		

Median Tree Canopy Height Measurements	Canopy:	19	Sub-canopy:	8	Emergent:	NA
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Percentage of ecologically dominant layer species regenerating:	100
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Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	77.5%	Sub-canopy:	35.60%	Emergent:	NA
Shrub canopy cover %	11.60%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	0.0	8.3	8.3	T2	0.0	5.2	5.2
T1	8.3	12.9	4.6	T2	5.2	11.0	5.8
T1	16.0	21.6	5.6	T2	21.4	23.0	1.6
T1	22.3	29.5	7.2	T2	24.0	26.4	2.4
T1	32.0	39.4	7.4	T2	37.9	40.7	2.8
T1	39.8	43.3	3.5	T2	57.4	63.5	6.1
T1	43.3	47.3	4.0	T2	63.5	67.2	3.7
T1	47.3	49.0	1.7	T2	69.0	71.3	2.3
T1	49.0	54.1	5.1	T2	77.3	76.3	-1.0
T1	54.7	58.3	3.6	T2	75.5	77.0	1.5
T1	58.3	63.3	5.0	T2	80.0	81.9	1.9
T1	63.3	71.4	8.1	T2	87.5	89.0	1.5
T1	71.4	75.9	4.5	T2	92.2	94.0	1.8
T1	82.0	86.1	4.1	T2			0.0
T1	94.0	97.3	3.3	T2			
T1	98.5	100.0	1.5	T2			0.0

Layer	Start	End	Interval	Layer	Start	End	Interval
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Shrub	2.3	4.2	1.9	Shrub	71.7	72.4	0.7
Shrub	14.5	15.4	0.9	Shrub	84.5	85.4	0.9
Shrub	16.9	17.1	0.2	Shrub	91.5	92.8	1.3
Shrub	22.4	23.3	0.9	Shrub	95.2	96.7	1.5
Shrub	38.0	39.3	1.3	Shrub			0.0
Shrub	50.9	52.6	1.7	Shrub			0.0
Shrub	57.0	57.3	0.3	Shrub			0.0

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 I: GHFF Stem Count

Species Name	Stem Count
<i>Eucalyptus crebra</i>	22
<i>Corymbia intermedia</i>	4
<i>Allocasuarina littoralis</i>	4
<i>Eucalyptus tereticornis</i>	15
<i>Eucalyptus microcorys</i>	9
<i>Acacia disparrima</i>	9
<i>Eucalyptus acmenoides</i>	10
<i>Eucalyptus propinqua</i>	9
<i>Lophostemon confertus</i>	4

Attach Landscape Photos Here

North



South



East





West



Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Transect ID	T2	Job Number / Property	11390 - Blue Rock Quarry
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Part B - Site Data

Recorders	LB and DH	Date	1/11/2023
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Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
na		12.11.3	12

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

Steep south facing mid slope

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

Tree species richness:				
Total number of species	11			EDL / Dom / R
Scientific Name	<i>Eucalyptus crebra</i>	Common Name	Narrow-leaved Ironbark	Dom / R
Scientific Name	<i>Eucalyptus microcorys</i>	Common Name	Tallowwood	
Scientific Name	<i>Eucalyptus tereticornis</i>	Common Name	Forest Red Gum	R
Scientific Name	<i>Corymbia intermedia</i>	Common Name	Pink Bloodwood	
Scientific Name	<i>Eucalyptus propinqua</i>	Common Name	Grey Gum	
Scientific Name	<i>Corymbia citriodora</i>	Common Name	Spotted Gum	R
Scientific Name	<i>Acacia disparrima</i>	Common Name	Hickory Wattle	R
Scientific Name	<i>Alphitonia excelsa</i>	Common Name	Soap Tree	R
Scientific Name	<i>Allocasuarina littoralis</i>	Common Name	Black She-oak	R
Scientific Name	<i>Eucalyptus acmenoides</i>	Common Name	White Mahogany	
Scientific Name	<i>Lophostemon confertus</i>	Common Name	Brush Box	R
Scientific Name		Common Name		

Shrub species richness:				
Total number of species	4			
Scientific Name	<i>Jacksonia scoparia</i>	Common Name	Dogwood	
Scientific Name	<i>Mallotus philippensis</i>	Common Name	Red Kamala	
Scientific Name	<i>Leucopogon juniperinus</i>	Common Name	Prickly Heath	
Scientific Name	<i>Hibiscus heterophyllus</i>	Common Name	Rosella	
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		

Grass species richness:				
Total number of species	2			
Scientific Name	<i>Imperata cylindrica</i>	Common Name	Blady Grass	
Scientific Name	<i>Themeda triandra</i>	Common Name	Kangaroo Grass	
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		

Forbs and others (non grass ground) species richness:				
Total number of species	9			
Scientific Name	<i>Lomandra multiflora</i>	Common Name	Many Flowered Mat Rush	
Scientific Name	<i>Geitonoplesium cymosum</i>	Common Name	Scrambling Lily	
Scientific Name	<i>Smilax australis</i>	Common Name	Barbed-wire Vine	
Scientific Name	<i>Lomandra longifolia</i>	Common Name	Long-leaved Matrush	
Scientific Name	<i>Dianella caerulea</i>	Common Name	Blue Flax-lily	
Scientific Name	<i>Bursaria spinosa</i>	Common Name	Black Thorn	
Scientific Name	<i>Cheilanthes distans</i>	Common Name	Bristle Cloak Fern	
Scientific Name	<i>Lepidosperma laterale</i>	Common Name	Variable Saw Sedge	
Scientific Name	<i>Dendrobium speciosum</i>	Common Name	King Orchid	
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		
Scientific Name		Common Name		

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

Total percentage cover within plot	60.00%		
Scientific Name	<i>Lantana camara</i>	Common Name	Lantana
Scientific Name	<i>Chloris gayana</i>	Common Name	Rhodes Grass

Scientific Name	<i>Abrus precatorius</i>	Common Name	Gidgee Gidgee
Scientific Name	<i>Passiflora suberosa</i>	Common Name	Corky Passion
Scientific Name	<i>Lantana montevidensis</i>	Common Name	Creeping Lantana
Scientific Name	<i>Eragrostis curvula</i>	Common Name	African Love Grass
Scientific Name	Purple Pea?	Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

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

Total Length of Coarse Woody Debris (Meters per hectare)	22.40		
1	2.20	26	
2	1.50	27	
3	2.50	28	
4	2.00	29	
5	6.50	30	
6	2.50	31	
7	1.00	32	
8	3.20	33	
9	1.00	34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

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

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	40%	25%	0%		25%	23%
Native other grass						
Native forbs and other species						
Native shrubs						
Non-native grass						
Non native forbs and shrubs						
Litter	60%	75%	95%	40%	55%	65%
Rock						
Bare Ground			5%	60%	20%	28%
Cryptogram						
Total	100%	100%	100%	100%	100%	100%

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

Eucalypt Large tree DBH benchmark used :	450	Number of large eucalypt trees:	C.citriodora 470, 460 E.propinqua 460
Non- Eucalypt Large tree DBH benchmark used:		Number of large non eucalypt trees:	
Total Number Large Trees: per ha	6		

Median Tree Canopy Height Measurements	Canopy:	22	Sub-canopy:	11	Emergent:	NA
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Percentage of ecologically dominant layer species regenerating:	100
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Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	74.1%	Sub-canopy:	26.80%	Emergent:	NA
Shrub canopy cover %	4.90%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1	0.0	8.8	8.8	T2	5.2	11.7	6.5
T1	12.7	19.7	7.0	T2	22.2	23.8	1.6
T1	26.8	39.8	13.0	T2	36.8	39.8	3.0
T1	43.0	49.0	6.0	T2	52.6	59.6	7.0
T1	50.0	55.2	5.2	T2	77.7	80.0	2.3
T1	61.2	81.3	20.1	T2	81.3	82.7	1.4
T1	86.0	100.0	14.0	T2	86.0	91.0	5.0
T1			0.0	T2			0.0
T1			0.0	T2			0.0
T1			0.0	T2			0.0
T1			0.0	T2			0.0
T1			0.0	T2			0.0
T1			0.0	T2			0.0
T1			0.0	T2			0.0
T1			0.0	T2			0.0

Layer	Start	End	Interval	Layer	Start	End	Interval
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Shrub	5.1	5.3	0.2	Shrub		0.0
Shrub	17.8	18.4	0.6	Shrub		0.0
Shrub	33.7	35.6	1.9	Shrub		0.0
Shrub	42.3	43.0	0.7	Shrub		0.0
Shrub	49.0	49.6	0.6	Shrub		0.0
Shrub	55.7	56.6	0.9	Shrub		0.0
Shrub			0.0	Shrub		0.0

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

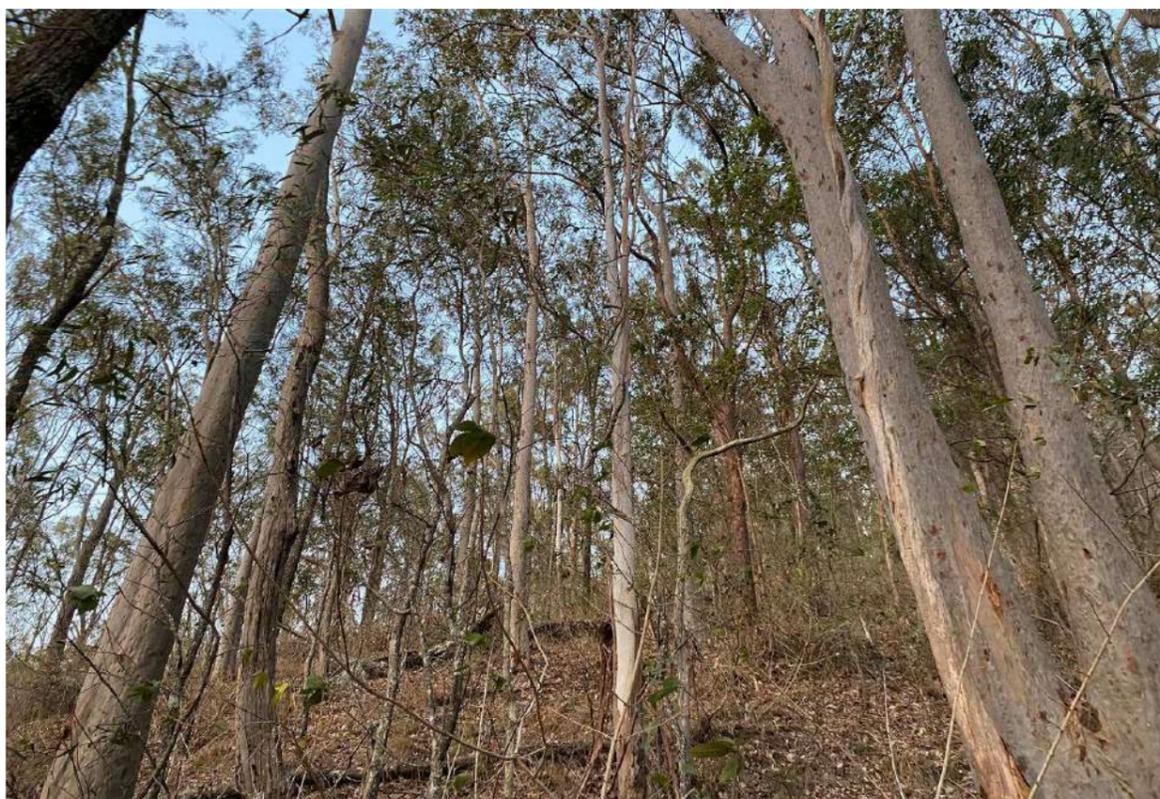
Part I: GHFF Stem Count

Species Name	Stem Count
<i>Eucalyptus crebra</i>	46
<i>Corymbia intermedia</i>	4
<i>Allocasuarina littoralis</i>	2
<i>Eucalyptus tereticornis</i>	10
<i>Eucalyptus microcorys</i>	5
<i>Corymbia citriodora</i>	15
<i>Eucalyptus acmenoides</i>	3
<i>Eucalyptus propinqua</i>	1
<i>Lophostemon confertus</i>	6
<i>Alphitonia excelsa</i>	1

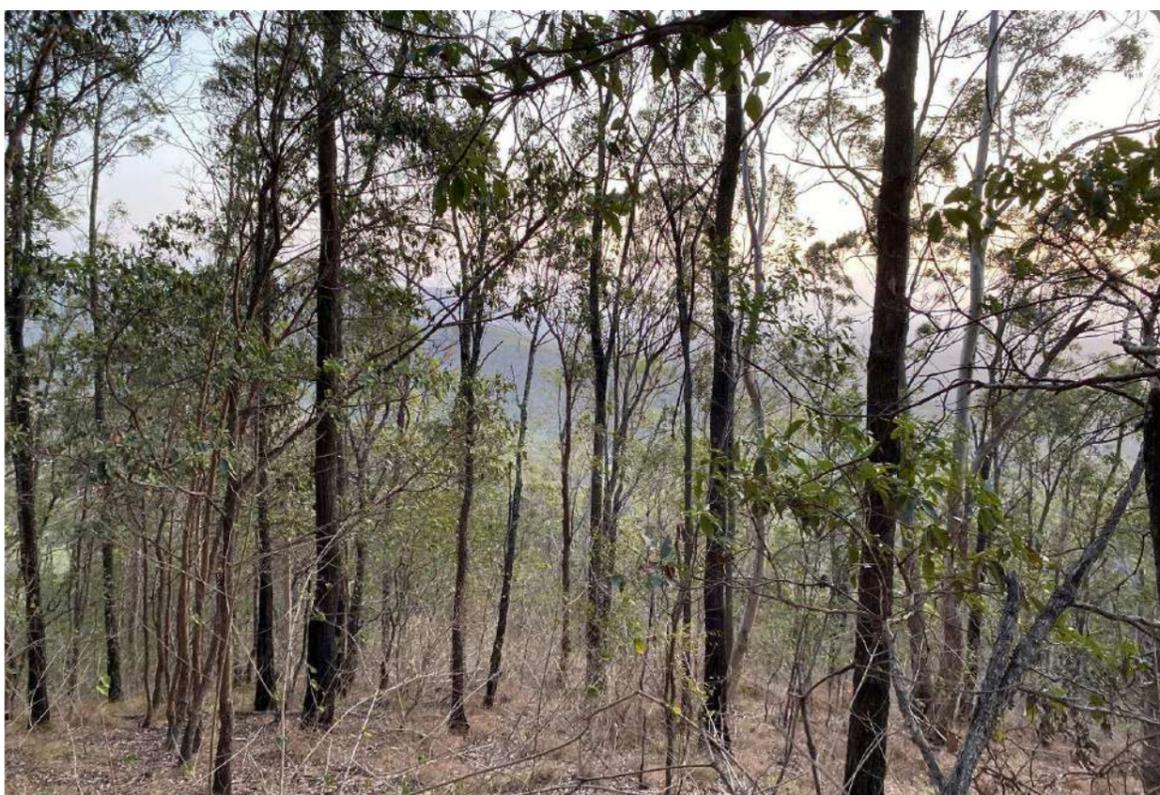
Part J: SAT Survey Results

Attach Landscape Photos Here

North



South



East



West



Appendix E

Flora and Fauna Species Lists

Flora species list

<u>Scientific Name</u>	<u>Common Name</u>	<u>Native/Introduced</u>
<i>Acacia concurrens</i>	Black Wattle	Native
<i>Acacia disparrima</i>	Hickory Wattle	Native
<i>Adiantum atroviride</i>	Maidenhair Fern	Native
<i>Alchornea ilicifolia</i>	Native Holly	Native
<i>Alchornia ilicifolia</i>	Native Holly	Native
<i>Allocasuarina littoralis</i>	Black She-Oak	Native
<i>Alphitonia excelsa</i>	Soap Tree	Native
<i>Alpnia caerulea</i>	Native Ginger	Native
<i>Aphananthe philippensis</i>	Rough-leaved Elm	Native
<i>Araucaria cunninghamii</i>	Hoop Pine	Native
<i>Aristida calycina</i>	Dark Wiregrass	Native
<i>Bursaria spinosa</i>	Black Thorn	Native
<i>Calochlaena dubia</i>	Soft Bracken	Native
<i>Carissa ovata</i>	Current Bush	Native
<i>Cordyline rubra</i>	Red-fruited Palm Lily	Native
<i>Corymbia citriodora</i>	Spotted Gum	Native
<i>Corymbia intermedia</i>	Pink Bloodwood	Native
<i>Cupaniopsis anacardoides</i>	Tuckeroo	Native
<i>Dianella cearula</i>	Blue Flax Lily	Native
<i>Dichondra repens</i>	Kidney Weed	Native
<i>Diploglottis australis</i>	Native Tamarind	Native
<i>Elaeocarpus reticulatus</i>	Blueberry Ash	Native
<i>Erythrina vespertilio</i>	Bat-wing Coral Tree	Native
<i>Eucalyptus acemenoides</i>	White Mahogany	Native
<i>Eucalyptus crebra</i>	Narrow Leaf Ironbark	Native
<i>Eucalyptus grandis</i>	Flooded Gum	Native
<i>Eucalyptus microcorys</i>	Tallowwod	Native
<i>Eucalyptus propinqua</i>	Small-fruited Grey Gum	Native
<i>Eucalyptus siderophloia</i>	Grey Ironbark	Native
<i>Eucalyptus tereticornis</i>	Forest Red Gum	Native
<i>Eustrephus latifolius</i>	Wombat Berry	Native
<i>Ficus watkinsiana</i>	Strangler Fig	Native
<i>Flindersia australis</i>	Crows Ash	Native

<u>Scientific Name</u>	<u>Common Name</u>	<u>Native/Introduced</u>
<i>Geitonoplesium cymosum</i>	Scrambling Lily	Native
<i>Goodenia rotundifolia</i>	Star Goodenia	Native
<i>Grevillea robusta</i>	Silky Oak	Native
<i>Hardenbergia violacea</i>	Native Sarsaparilla	Native
<i>Harpullia pendula</i>	Tulipwood	Native
<i>Hibiscus heterophyllus</i>	Native Rosella	Native
<i>Imperata cylindrica</i>	Blady Grass	Native
<i>Ipomoea plebeia</i>	Bell Vine	Native
<i>Jacksonia scoparia</i>	Dogwood	Native
<i>Jagera pseudorhus</i>	Foambark	Native
<i>Lobelia purpurascens</i>	White Root	Native
<i>Lomandra longifolia</i>	Long-leaved Matrush	Native
<i>Lophostemon confertus</i>	Brush Box	Native
<i>Macadamia integrifolia</i>	Macadamia	Native
<i>Macadamia tetraphylla</i>	Bauple Nut	Native
<i>Macaranga tanarius</i>	Macaranga	Native
<i>Maclura cochinchinensis</i>	Cockspur Thorn	Native
<i>Malaisia scandens</i>	Burny Vine	Native
<i>Mallotus philippensis</i>	Red Kamala	Native
<i>Melia azedarach</i>	White Cedar	Native
<i>Oplismenus aemulus</i>	Creeping Beard Grass	Native
<i>Ottochloa gracillima</i>	Graceful grass	Native
<i>Pandorea pandorana</i>	Wonga-wonga Vine	Native
<i>Passiflora aurantia</i>	Orange Passion Vine	Native
<i>Petalostigma pubescens</i>	Native Quinine	Native
<i>Pittosporum sp.</i>	-	Native
<i>Platycterium bifurcatum</i>	Elk Horn Fern	Native
<i>Plectranthus parviflorus</i>	Little Spurflower	Native
<i>Polyscias elegans</i>	Celery Wood	Native
<i>Rubus rosifolius</i>	Rose-leaved Raspberry	Native
<i>Smilax australis</i>	Barbed-wire Vine	Native
<i>Stephania japonica</i>	Tape Vine	Native
<i>Themeda triandra</i>	Kangaroo Grass	Native

<u>Scientific Name</u>	<u>Common Name</u>	<u>Native/Introduced</u>
<i>Ageratina riparia</i>	Mistflower	Introduced
<i>Ambrosia artemisiifolia</i>	Annual Ragweed	Introduced
<i>Ardisia crenata</i>	Coral Berry	Introduced
<i>Bidens pilosa</i>	Cobbler's Pegs	Introduced
<i>Chloris gayana</i>	Rhodes Grass	Introduced
<i>Cordyline fruticosa</i>	Cordyline	Introduced
<i>Erythrina crista-galli</i>	Cockspur Coral Tree	Introduced
<i>Gomphocarpus physocarpus</i>	Balloon Cotton	Introduced
<i>Hibiscus tetrafolia</i>	Hibiscus	Introduced
<i>Lantana camara</i>	Lantana	Introduced
<i>Lantana montevidensis</i>	Creeping Lanatana	Introduced
<i>Megathyrsus maximus</i>	Guinea Grass	Introduced
<i>Melinis repens</i>	Red Natal Grass	Introduced
<i>Momordica charantia</i>	Bitter Melon	Introduced
<i>Paspalum mandiocanum</i>	Broad-leaved Paspalum	Introduced
<i>Passiflora suberosa</i>	Corky Passion Vine	Introduced
<i>Passiflora subpeltata</i>	White Passionflower	Introduced
<i>Physalis angulata</i>	Wild Gooseberry	Introduced
<i>Senna septemtrionalis</i>	Smooth Cassia	Introduced
<i>Sida rhombifolia</i>	Common Sida	Introduced
<i>Solanum chrysotrichum</i>	Giant Devil's Fig	Introduced
<i>Solanum mauritianum</i>	Wild Tobacco Tree	Introduced
<i>Solanum seaforthianum</i>	Brazilian Nightshade	Introduced
<i>Solanum sp.</i>	Nightshade	Introduced
<i>Solanum torvum</i>	Devil's Fig	Introduced
<i>Sorghum halepense</i>	Johnson Grass	Introduced
<i>Tagetes minuta</i>	Stinking Roger	Introduced
<i>Tecoma stans</i>	Yellow Bells	Introduced
<i>Verbena bonariensis</i>	Purple-top Verbena	Introduced

Fauna species list

Scientific Name	Common Name	Native/Introduced
BIRDS		
<i>Alectura lathamii</i>	Brush Turkey	Native
<i>Centropus phasianinus</i>	Pheasant Cuckoo	Native
<i>Corvus orru</i>	Torresian Crow	Native
<i>Coturnix ypsilophora</i>	Brown Quail	Native
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Native
<i>Geopelia humeralis</i>	Bar shouldered dove	Native
<i>Gymnorhina tibicen</i>	Australian Magpie	Native
<i>Malurus cyaneus</i>	Superb Fairy-wren	Native
<i>Malurus melanocephalus</i>	Red-backed Fairy Wren	Native
<i>Philemon corniculatus</i>	Noisy Friarbird	Native
<i>Psophodes olivaceus</i>	Eastern Whipbird	Native
<i>Rhipidura leucophrys</i>	Willie Wagtail	Native
<i>Sericornis frontalis</i>	White-brown Scrub Wren	Native
REPTILES		
<i>Morelia spilota</i>	Carpet Python	Native
<i>Varanus varius</i>	Lace Monitor	Native
MAMMALS		
<i>Canis lupus familiaris</i>	Wild Dog	Introduced
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	Native
<i>Phascolarctos cinereus</i>	Koala	Native
<i>Trichosurus vulpecula</i>	Brushtail Possum	Native
<i>Wallabia bicolor</i>	Swamp Wallaby	Native

Appendix F

SAT survey results

Tree No.	Species	DBH	Scats (Y/N)	SAT 1
1	<i>Eucalyptus aceminoides</i>		230 N	
2	<i>Eucalyptus tereticornis</i>		350 N	
3	<i>Eucalyptus tereticornis</i>		400 N	
4	<i>Eucalyptus tereticornis</i>		220 N	
5	<i>Eucalyptus tereticornis</i>		210 N	
6	<i>Eucalyptus propinqua</i>		230 N	
7	<i>Eucalyptus microcorys</i>		360 N	
8	<i>Corymbia intermedia</i>		300 N	
9	<i>Eucalyptus tereticornis</i>		300 N	
10	<i>Eucalyptus tereticornis</i>		120 N	
11	<i>Eucalyptus microcorys</i>		130 N	
12	<i>Eucalyptus tereticornis</i>		250 N	
13	<i>Eucalyptus microcorys</i>		230 N	
14	<i>Eucalyptus microcorys</i>		250 N	
15	<i>Eucalyptus tereticornis</i>		120 N	
16	<i>Eucalyptus tereticornis</i>		250 N	
17	<i>Eucalyptus microcorys</i>		100 N	
18	<i>Eucalyptus tereticornis</i>		450 N	
19	<i>Eucalyptus microcorys</i>		210 N	
20	<i>Erythrina vespertilio</i>		280 N	
21	<i>Eucalyptus siderophloia</i>		200 N	
22	<i>Eucalyptus tereticornis</i>		320 N	
23	<i>Allocasuarina littoralis</i>		100 N	
24	<i>Eucalyptus microcorys</i>		210 N	
25	<i>Eucalyptus siderophloia</i>		100 N	
26	<i>Eucalyptus siderophloia</i>		100 N	
27	<i>Eucalyptus tereticornis</i>		300 N	
28	<i>Eucalyptus microcorys</i>		100 N	
29	<i>Eucalyptus microcorys</i>		230 N	
30	<i>Eucalyptus aceminoides</i>		150 N	

Tree No.	Species	DBH	Scats (Y/N)	SAT 2
1	<i>Eucalyptus propinqua</i>		350 N	
2	<i>Lophostemon confertus</i>		400 N	
3	<i>Eucalyptus siderophloia</i>		200 N	
4	<i>Eucalyptus acemenoides</i>		140 N	
5	<i>Eucalyptus siderophloia</i>		200 N	
6	<i>Lophostemon confertus</i>		200 N	
7	<i>Lophostemon confertus</i>		210 N	
8	<i>Lophostemon confertus</i>		210 N	
9	<i>Eucalyptus acemenoides</i>		180 N	
10	<i>Eucalyptus microcorys</i>		230 N	
11	<i>Eucalyptus tereticornis</i>		170 N	
12	<i>Eucalyptus siderophloia</i>		170 N	
13	<i>Eucalyptus acemenoides</i>		180 N	
14	<i>Eucalyptus microcorys</i>		250 N	
15	<i>Eucalyptus acemenoides</i>		180 N	
16	<i>Eucalyptus siderophloia</i>		450 N	
17	<i>Eucalyptus microcorys</i>		180 N	
18	<i>Eucalyptus acemenoides</i>		160 N	
19	<i>Eucalyptus acemenoides</i>		360 N	
20	<i>Eucalyptus acemenoides</i>		200 N	
21	<i>Eucalyptus acemenoides</i>		230 N	
22	<i>Eucalyptus siderophloia</i>		250 N	
23	<i>Eucalyptus tereticornis</i>		350 N	
24	<i>Eucalyptus microcorys</i>		120 N	
25	<i>Lophostemon confertus</i>		210 N	
26	<i>Eucalyptus propinqua</i>		310 N	
27	<i>Eucalyptus acemenoides</i>		200 N	
28	<i>Allocasuarina littoralis</i>		210 N	
29	<i>Eucalyptus siderophloia</i>		180 Y	
30	<i>Eucalyptus siderophloia</i>		190 N	

Tree No.	Species	DBH	Scats (Y/N)	SAT 3
1	<i>Eucalyptus propinqua</i>		350 Y	
2	<i>Eucalyptus crebra</i>		200 N	
3	<i>Eucalyptus crebra</i>		270 N	
4	<i>Eucalyptus microcorys</i>		380 Y	
5	<i>Eucalyptus crebra</i>		220 N	
6	<i>Eucalyptus microcorys</i>		300 N	
7	<i>Eucalyptus microcorys</i>		260 N	
8	<i>Eucalyptus microcorys</i>		320 N	
9	<i>Eucalyptus microcorys</i>		300 N	
10	<i>Eucalyptus tereticornis</i>		180 N	
11	<i>Corymbia intermedia</i>		190 N	
12	<i>Eucalyptus microcorys</i>		230 N	
13	<i>Eucalyptus crebra</i>		100 N	
14	<i>Eucalyptus propinqua</i>		330 N	
15	<i>Eucalyptus acmenoides</i>		300 N	
16	<i>Eucalyptus crebra</i>		180 N	
17	<i>Eucalyptus microcorys</i>		140 N	
18	<i>Eucalyptus crebra</i>		200 N	
19	<i>Eucalyptus tereticornis</i>		160 N	
20	<i>Lophostemon confertus</i>		330 N	
21	<i>Lophostemon confertus</i>		200 N	
22	<i>Eucalyptus crebra</i>		140 N	
23	<i>Eucalyptus crebra</i>		230 N	
24	<i>Eucalyptus tereticornis</i>		150 N	
25	<i>Eucalyptus crebra</i>		300 N	
26	<i>Eucalyptus crebra</i>		200 N	
27	<i>Lophostemon confertus</i>		190 N	
28	<i>Eucalyptus crebra</i>		300 N	
29	<i>Eucalyptus crebra</i>		220 N	
30	<i>Eucalyptus crebra</i>		260 N	

Appendix G

MWA Noise Assessment



NOISE ASSESSMENT

PROPOSED INCREASE IN ANNUAL EXTRACTION LIMIT

BLUE ROCK QUARRY

TAMAREE ROAD

CEDAR CREEK

Prepared for:

Fulton Hogan Quarries Pty Ltd

Prepared by:

MWA Environmental

23 August 2022

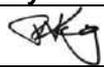
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Principal Author:	Mr Ben Hyde
Client:	Fulton Hogan Quarries Pty Ltd
Client Contact:	Mr Andrew Lyndon

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1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

MWA Environmental has been engaged to prepare a Noise Assessment for an Environmental Authority amendment application to increase the currently approved extraction limit for the Blue Rock Quarry at Tamaree Road, Cedar Creek (“**the quarry**”).

The quarry currently holds Environmental Authority P-EA-100268669 (“**the EA**”) (22 June 2022) which permits extraction and screening of more than 1 Million tonnes of material per annum for the following environmental relevant activities (“**ERAs**”):

- ERA 16 - Extraction and Screening 2(c) - Extracting, other than by dredging, in a year, the following quantity of material – more 1,000,000t; and
- ERA 16 - Extraction and Screening 3(c) - Screening, in a year, the following quantity of material - more than 1,000,000t

Condition G1 of the EA limits the amount of material that may be extracted from the site to no more than 1,400,000 tonnes per year.

Fulton Hogan Quarries Pty Ltd seeks to increase the annual extraction limit to up to 1.6 Million tonnes per annum (“**Mtpa**”), which requires an application to amend Condition G1 of the EA. No other conditions in the EA are proposed to be amended through the application.

The increase to the annual extraction limit is sought to allow flexibility to supply forecast market demand for processed (crushed and screened) and unprocessed (overburden) material as the EA Condition G1 limitation applies to the total amount of extracted material.

Aside from the increased annual extraction limit, no other changes are proposed to the currently approved quarrying activities.

This report addresses the potential impact of noise emissions from the proposed operation up to the 1.6 Mtpa limit at surrounding sensitive land uses.

The assessment has been based upon detailed computer noise modelling and provides recommendations for any measures required for the quarry to comply with the EA noise limits at the increased annual extraction limit.

The assessment methodology has been maintained as consistent with reporting¹ recently assessed by the Department of Environment and Science for the purpose of the current EA.

¹ *Noise Assessment – Proposed Increase in Annual Production Limit – Blue Rock Quarry– Tamaree Road, Cedar Creek* (MWA Environmental, 27 April 2022)

1.2 SITE DESCRIPTION

The Blue Rock Quarry is located at Tamaree Road, Cedar Creek and comprises the following properties:

- Lot 1 on SP238024
- Lot 89 on WD739
- Lot 14 on RP151378
- Lot 15 on RP151378
- Lot 16 on RP151378.

The location of the subject site and surrounding land uses is shown on **Figure 1**.

The quarry access is via Tamaree Creek Road at the western boundary, with the access road running east through the site to the main stockpile pad / sales floor. A smaller front stockpile and storage area is located to the south of the weighbridge nearer to the site entry.

The crushing and screening plant (processing plant) is located centrally on the site. Extraction operations are currently occurring concurrently at the lower, more central, extraction area and a more recent upper extraction area on the eastern part of the site.

1.3 SURROUNDING LAND USES

An aerial photograph of the subject site and surrounding land uses is included as **Figure 1**.

Surrounding land uses comprise:

- | | |
|----------------------|--|
| To the North: | Vegetated land predominantly zoned rural, rural landscape and environment precinct. Few dwellings, well separated from the quarry. Topographic ridge provides acoustic buffering. |
| To the East: | Vegetated land predominantly zoned rural, rural landscape and environment precinct. Very few dwellings, well separated from the quarry. Topographic ridge provides acoustic buffering. |
| To the South: | Vegetated land predominantly zoned rural, rural landscape and environment precinct. Scattered dwellings on rural properties along Cedar Creek Road. |
| To the West: | Land predominantly zoned rural, rural landscape and environment precinct. Dwellings on rural properties along Tamaree Road. |

Surrounding sensitive uses in the vicinity of the subject site are residential dwellings located along Tamaree Road to the west on Cedar Creek Road to the south and several dwellings well remote from the site to the north and east.

Thirty-two (32) sensitive receptors have been represented in the noise model and are identified on **Figure 2** with labels R1 to R32 for the purpose of this assessment.

The nominated receptor R32 was identified on aerial imagery as remote dwelling-like structures that appear to be within an unformed road reserve. Access arrangements are unclear, and it may be that these structures are not lawful dwellings. Conservatively, R32 been assessed as a sensitive receptor for the purposes of this report.

The property containing nominated receptor R23 is owned by Fulton Hogan but has conservatively been assessed as a sensitive receptor for the purposes of this report.

Consideration has been given to potential noise impacts at the Tamborine National Park which, at its nearest point, is setback approximately 800 metres to the southwest of the subject land.

2.0 NOISE IMPACT ASSESSMENT

2.1 RELEVANT NOISE CRITERIA

The proposed increase to the annual extraction threshold does not fundamentally change the type or sources of noise emissions from the site and thus the relevant noise limits for this assessment are those specified in Environmental Authority P-EA-100268669.

Condition N2 of the EA specifies the relevant noise limits for the quarry, as follows:

N2	<p>Noise from the activity must not exceed the levels identified in <i>Table 1 - Noise limits</i> when measured in accordance with the associated monitoring requirements.</p> <p>Table 1 - Noise limits</p> <table border="1"> <thead> <tr> <th rowspan="2">Noise level dB(A) measured as</th> <th>6am – 7am</th> <th>7am – 6pm</th> <th>6pm – 10pm</th> <th>10pm – 6am</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">Noise measured at the sensitive place*</td> </tr> <tr> <td>L_{Aeq}, adj, T</td> <td style="text-align: center;">35</td> <td style="text-align: center;">45</td> <td style="text-align: center;">35</td> <td style="text-align: center;">30</td> </tr> <tr> <td>Max L_{pA} T</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">49</td> </tr> <tr> <td colspan="5" style="text-align: center;">Noise measured at the commercial place</td> </tr> <tr> <td>L_{Aeq}, adj, T</td> <td style="text-align: center;">40</td> <td style="text-align: center;">50</td> <td style="text-align: center;">40</td> <td style="text-align: center;">40</td> </tr> </tbody> </table> <p>* A residential dwelling at the location is not considered to be a sensitive place, so long as a contractual arrangement exists between you and the owner of the dwelling</p> <p>Associated monitoring requirements</p> <ol style="list-style-type: none"> All monitoring devices must be calibrated and maintained according to the manufacturer's instruction manual. Any monitoring must be in accordance with the most recent version of the administering authority's <i>Noise Measurement Manual</i>. Any monitoring of noise emissions from the activity must be undertaken when the activity is in operation. 	Noise level dB(A) measured as	6am – 7am	7am – 6pm	6pm – 10pm	10pm – 6am	Noise measured at the sensitive place*					L _{Aeq} , adj, T	35	45	35	30	Max L _{pA} T	-	-	-	49	Noise measured at the commercial place					L _{Aeq} , adj, T	40	50	40	40
Noise level dB(A) measured as	6am – 7am		7am – 6pm	6pm – 10pm	10pm – 6am																										
	Noise measured at the sensitive place*																														
L _{Aeq} , adj, T	35	45	35	30																											
Max L _{pA} T	-	-	-	49																											
Noise measured at the commercial place																															
L _{Aeq} , adj, T	40	50	40	40																											

No commercial place receptors were identified as relevant to this assessment. The nuisance sensitive places considered are all residential dwellings, as identified on **Figure 2**.

The relevant EA noise limits for the anticipated operating hours are:

Day 7am to 6pm: 45 dB(A) L_{Aeq} at a sensitive place

Early Morning 6am to 7am: 35 dB(A) L_{Aeq} at a sensitive place

Based upon noise monitoring undertaken at the western and southern residential interfaces the quarry noise was deemed to not exhibit tonal, impulsive or low frequency noise characteristics warranting adjustments.

2.2 NOISE MODELLING

2.2.1 NOISE MODELLING METHODOLOGY

To enable assessment of noise from the proposed quarrying operations a detailed noise model has been established using the SoundPLAN 8.2 software applying the CONCAWE noise propagation algorithms. The SoundPLAN model is an accepted regulatory model that allows input of site-specific terrain data and source noise data as sound power level spectra.

MWA Environmental prepared a site-specific meteorological dataset for the purposes of the air quality assessment. The meteorological model has been applied to the assessment of significant wind conditions in accordance with the methodology outlined in the DEHP *Guideline – Noise Control - Planning for Noise Control* (2015). The site-specific meteorological data was generated using the TAPM and CALMET meteorological models with input of regional observation data. Seasonal wind roses were generated to analyse the seasonal frequency of wind speeds less than 3 metres per second for the 6am to 6pm period and are presented in **Attachment 1**. Analysis of the wind roses identified that winds at speeds of less than 3 metres per second are not anticipated from any direction sectors for more than 30 percent of hours in any season. As such, there are no significant wind conditions to be addressed in the noise modelling as per the DEHP *Guideline – Noise Control - Planning for Noise Control* (2015).

For the 6am to 6pm period temperature inversions are not expected to be a significant feature in terms of noise propagation, with Pasquill Class F stability predicted only 5 percent of hours between 6am to 6pm annually. For the 6am to 6pm period the noise modelling has assessed neutral atmospheric conditions (Pasquill Class D stability).

The noise modelling has considered the following scenarios for the proposed 1.6Mtpa extraction rate:

Full Operations 1.6Mtpa - Short-Term Extraction

- Full extraction, processing and product sales operations 7am to 6pm
- Peak hour product truck loading and dispatch rate
- Short-term (current) extraction operations concurrently at the Upper Level (eastern extraction area) and Lower Level (central extraction area) based upon recent topographical survey of the site

Full Operations 1.6Mtpa - Long-Term Extraction

- Full extraction, processing and product sales operations 7am to 6pm
- Peak hour product truck loading and dispatch rate
- Long-term (conceptual) extraction operations concurrently at the Upper Level (eastern extraction area) and Lower Level (central extraction area) based upon conceptual interim development

Product Loading and Dispatch Only 1.6Mtpa

- More typical product truck loading and dispatch rate
- No extraction or processing operations

The model layouts and the source locations for each of the above scenarios are shown on the drawings included in **Attachment 2**.

Rock drills have been represented as operating at elevated and exposed locations. Drilling at lower and less topographically exposed benches and pit locations throughout the majority of the quarry life will result in reduced noise exposure at surrounding sensitive receptors compared to the results presented in this report.

It should be noted that the proposed increase in the annual extraction limit will not change the currently approved extraction and processing operations with the exception of increasing the volume of material extracted and processed.

The model was established over an area of 4 km x 3 km centred on the subject land. The topography of the surrounding area was sourced from State of Queensland (Department of Natural Resources) 2021 QSpatial 1m LiDAR contours and elevation points². Representations of the existing site topography and conceptual long-term quarry landform were input to the model based upon CAD drawings provided by Fulton Hogan.

2.2.2 NOISE CONTROL MEASURES

The crushing and screening plant includes significant noise mitigation measures including:

- Enclosure of the primary (jaw) crushing plant in a building constructed of sheet steel with selective internal lining in acoustic curtain material
- Enclosure of the tip head structure in a building constructed of sheet steel with selective internal lining in acoustic curtain material including a three-sided and roofed bay for the dump truck to tip from
- Enclosure of the road base plant in a building constructed of sheet steel

The noise modelling has been based upon sound power levels for the crushing and screening plant determined from noise measurements at the quarry in February 2022.

MWA Environmental observed the use of Epiroc SmartROC drill rigs at the site, which are modern low noise rigs.

Beyond the current operational noise controls, no specific noise mitigation measures have been relied upon in the noise modelling for the higher 1.6Mtpa extraction rate.

Notwithstanding, it is recommended that **mobile plant** (e.g. front-end loaders, dozers, haul trucks, excavators) **be fitted with broadband reversing alarms** to mitigate potential nuisance from the tonal characteristics of traditional beeper alarms.

All fixed and mobile plant and equipment operated at the site should be selected and maintained to minimise noise emissions.

² © State of Queensland (Department of Resources) 2021

2.2.3 MODELLED NOISE SOURCES

Sound power level data for the processing plant has been based upon detailed measurements of the existing plant at the quarry in February 2022.

The sound power levels for road haulage trucks, dump trucks, front-end loaders, excavators and rock drills have been based upon detailed source characterisations from previous MWA Environmental projects for the same or comparable equipment.

Table 1 summarises the noise sources modelled to represent noise emissions from the various quarry activities for the Full Operations scenarios.

Table 2 summarises the noise sources modelled to represent noise emissions from the lower intensity Product Sales only scenario.

**Table 1: Summary of Modelled Noise Sources
Full Operations**

SOURCE GROUP	NOISE SOURCE	#	SOURCE TYPE	SOUND POWER LEVEL L _{Aeq} - dB(A)
'Front End' Processing Plant	Tip Head Building	1	Building Source	115
	Primary Crusher Building			
	Transfer Tower	1	Point Source	106
'Road Base' Plant	'Road Base' Plant Building	1	Building Source	108
'Back End' Processing Plant	Screen 2	1	Point Source	108
	Screen 3	1	Point Source	106
	Screen 4	1	Point Source	100
	Screen 5	1	Point Source	98
	Crusher 2	1	Point Source	117
	Crusher 3 & 4	1	Point Source	115
Extraction, Pit Operations and Pit to Plant Haulage	Rock Drill	2	Point Source	110
	Excavator at Pit (working cycle)	3	Point Source	109
	Internal Haulage Route 11 loads per hour from pit to plant, split between upper and lower extraction areas	1	Line Source	83/metre
Product Loading, Stockpiling and Dispatch	Loaders at Main Stockpiles	3	Point Source	107
	Loaders at Front Stockpiles	1	Point Source	107
	Access Road 66 trips (33 loads) per hour from stockpiles to site entry	1	Line Source	75/metre (two-way)

**Table 2: Summary of Modelled Noise Sources
Product Loading and Dispatch Operations Only (Early Morning)**

SOURCE GROUP	NOISE SOURCE	#	SOURCE TYPE	SOUND POWER LEVEL L_{Aeq} - dB(A)
Product Loading, Stockpiling and Dispatch	Loader at Main Stockpiles	1	Point Source	107
	Access Road 32 trips (16 loads) per hour from stockpiles to site entry	1	Line Source	72/metre (two-way)

Other more minor plant items and vehicles will be used at the quarry at times but should not materially increase overall noise emissions above the level of the above modelled noise sources.

2.2.4 NOISE MODELLING RESULTS

The results of the SoundPLAN 8.2 modelling for the various operational scenarios are provided in **Attachment 3** as contours of predicted resultant noise levels on a cadastral base showing the locations of the representative surrounding residences (refer **Figure 2**).

The predicted resultant noise levels at the representative receptor locations for the various operational scenarios are summarised in the following tables:

Other residential dwellings within the model domain, which are not summarised in tabulated results, are noted to be no more affected than the selected representative receptors.

Table 3: Full Operations 1.6Mtpa - Short-Term Extraction

Table 4: Full Operations 1.6Mtpa - Long-Term Extraction

Table 5: Product Loading and Dispatch Only 1.6Mtpa

Table 3: Summary of Model Results – dB(A)
Full Operations 1.6Mtpa - Short-Term Extraction

Nuisance Sensitive Receptor (refer Figure 2)	$L_{Aeq,1hr}$ dB(A)	Noise Limit
R1	44.1	<i>45 dB(A) L_{Aeq} 7am to 6pm</i>
R2	41.0	
R3	42.3	
R4	37.5	
R5	37.2	
R6	39.5	
R7	38.1	
R8	37.9	
R9	35.0	
R10	37.3	
R11	38.8	
R12	39.2	
R13	32.9	
R14	24.7	
R15	25.3	
R16	24.3	
R17	24.2	
R18	29.8	
R19	30.3	
R20	33.2	
R21	34.0	
R22	33.0	
R23	43.5	
R24	29.8	
R25	28.5	
R26	26.2	
R27	24.7	
R28	24.7	
R29	23.2	
R30	<20	
R31	<20	
R32	37	
Complies 7am to 6pm?		Yes

Table 4: Summary of Model Results – dB(A)
Full Operations 1.6Mtpa - Long-Term Extraction

Nuisance Sensitive Receptor (refer Figure 2)	$L_{Aeq,1hr}$ dB(A)	Noise Limit
R1	44.1	<i>45 dB(A) L_{Aeq} 7am to 6pm</i>
R2	40.8	
R3	42.2	
R4	37.1	
R5	36.9	
R6	39.5	
R7	37.9	
R8	37.7	
R9	34.7	
R10	37.3	
R11	38.8	
R12	39.0	
R13	31.6	
R14	22.3	
R15	22.6	
R16	22.5	
R17	24.7	
R18	29.6	
R19	30.2	
R20	32.9	
R21	33.5	
R22	32.6	
R23	43.5	
R24	29.8	
R25	28.7	
R26	26.2	
R27	24.8	
R28	24.8	
R29	23.0	
R30	<20	
R31	<20	
R32	25.7	
Complies 7am to 6pm?		Yes

**Table 5: Summary of Model Results – dB(A)
Product Loading and Dispatch Only 1.6Mtpa**

Nuisance Sensitive Receptor (refer Figure 2)	$L_{Aeq,1hr}$ dB(A)	Noise Limit
R1	34.8	45 dB(A) L_{Aeq} 7am to 6pm & 35 dB(A) L_{Aeq} 6am to 7am
R2	34.6	
R3	33.8	
R4	31.7	
R5	30.6	
R6	31.3	
R7	30.3	
R8	29.1	
R9	26.4	
R10	26.9	
R11	28.6	
R12	29.3	
R13	15.5	
R14	8.5	
R15	7.0	
R16	8.1	
R17	12.1	
R18	11.2	
R19	12.5	
R20	18.0	
R21	21.7	
R22	25.4	
R23	31.2	
R24	18.1	
R25	20.4	
R26	15.6	
R27	17.5	
R28	18.7	
R29	18.9	
R30	<20	
R31	<20	
R32	8.9	
Complies 6am to 6pm?		Yes

The noise modelling undertaken demonstrates that noise emissions from the quarry operation at a rate of 1.6Mtpa can comply with the noise limits specified in Condition N2 of Environmental Authority P-EA-100268669.

No additional noise mitigation measures beyond the measures currently in place at the quarry have been relied upon for this assessment.

The noise modelling has also been used to predict the resultant noise levels from the quarry operation at a rate of 1.6Mtpa at the nearest boundary of the Tamborine National Park. Predicted noise levels for the full operation scenarios are below $L_{Aeq} 30$ dB(A). For the product loading and dispatch only (early morning) scenario the predicted noise levels are below $L_{Aeq} 13$ dB(A). The quarry noise levels will thus be below the expected ambient background noise levels at the nearest boundary of the Tamborine National Park. On this basis, the acoustic amenity of the Tamborine National Park will be preserved in accordance with the objective of the Queensland *Environmental Protection (Noise) Policy 2019* for protected areas.

3.0 CONCLUSION

MWA Environmental has been engaged to prepare a Noise Assessment for an Environmental Authority amendment application to increase the currently approved extraction limit for the Blue Rock Quarry at Tamaree Road, Cedar Creek.

The quarry currently holds Environmental Authority P-EA-100268669 (22 June 2022) which permits extraction and screening of more than 1 Million tonnes of material per annum. Condition G1 of the EA limits the amount of material that may be extracted from the site to no more than 1,400,000 tonnes per year.

Fulton Hogan Quarries Pty Ltd seeks to increase the annual extraction limit to up to 1.6 Million tonnes per annum, which requires an application to amend Condition G1 of the EA. No other conditions in the EA are proposed to be amended through the application.

The increase to the annual extraction limit is sought to allow flexibility to supply forecast market demand for processed (crushed and screened) and unprocessed (overburden) material as the EA Condition G1 limitation applies to the total amount of extracted material.

Detailed computer noise modelling of the operation at a rate of 1.6 Mtpa has demonstrated that compliance can be maintained with the noise limits specified in Condition N2 of Environmental Authority P-EA-100268669.

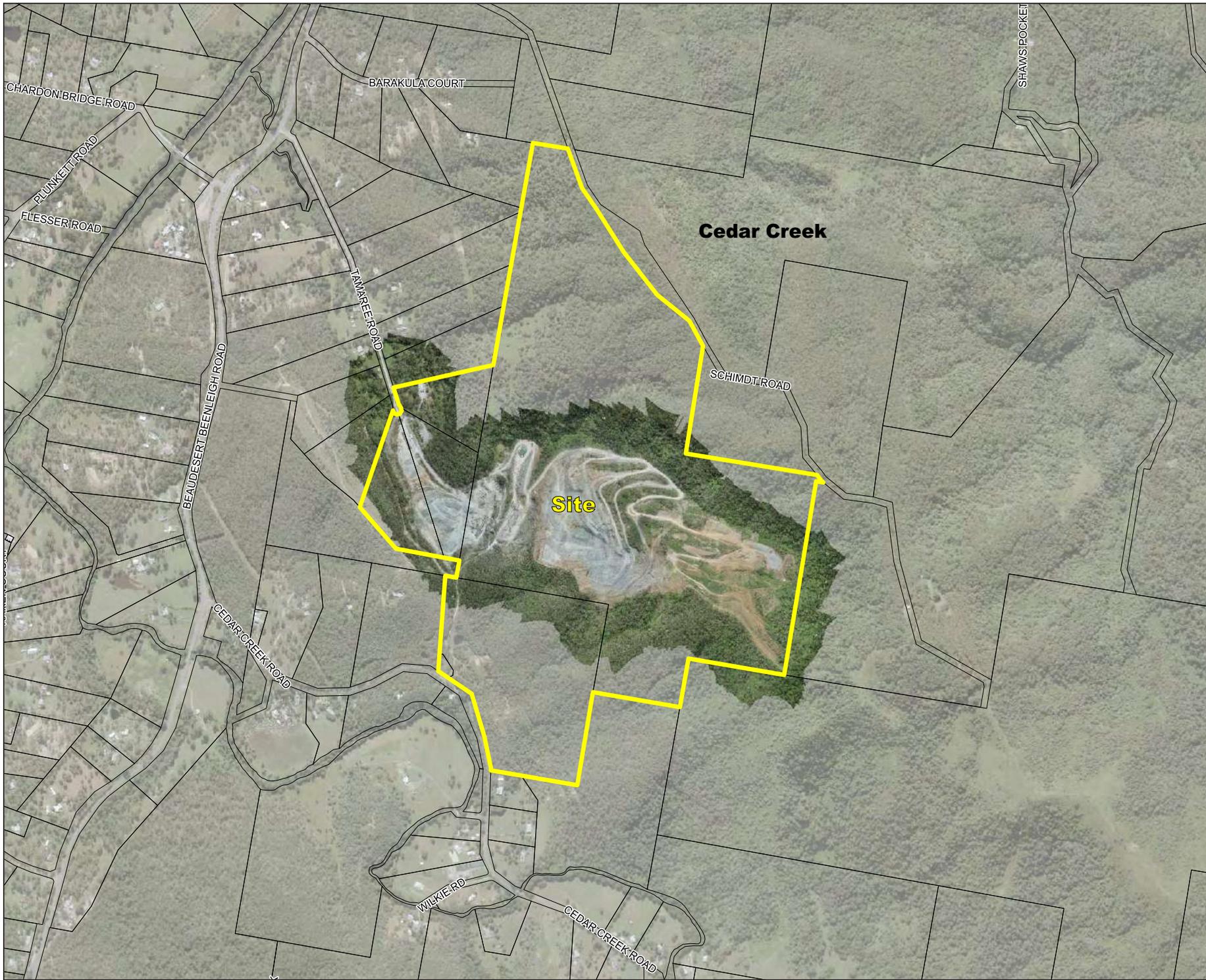
The quarry noise levels will be below the expected ambient background noise levels at the nearest boundary of the Tamborine National Park. On this basis, the acoustic amenity of the Tamborine National Park will be preserved in accordance with the objective of the *Environmental Protection (Noise) Policy 2019* for protected areas.

No additional noise mitigation measures beyond the measures currently in place at the quarry have been relied upon for this assessment.

Based upon the detailed noise assessment undertaken, the proposed amendment of Condition G1 of Environmental Authority P-EA-100268669 to allow for the extraction and screening of up to 1.6 Mtpa is supported with no required amendment to the current noise conditions in the Environmental Authority.

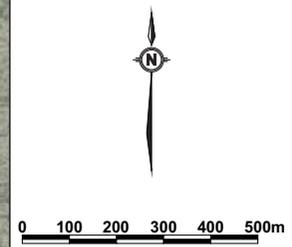
MWA Environmental
23 August 2022

FIGURES



LEGEND
 **SITE LOCATION**

DRAWING REFERENCES
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 DRONE SURVEY AERIAL,
 AER DRONE 100mm 220201.ecw,
 © THE STATE OF QUEENSLAND
 DNRME LAND AND SPATIAL INFORMATION
 IMAGERY QLDBASE ALLUSERS.



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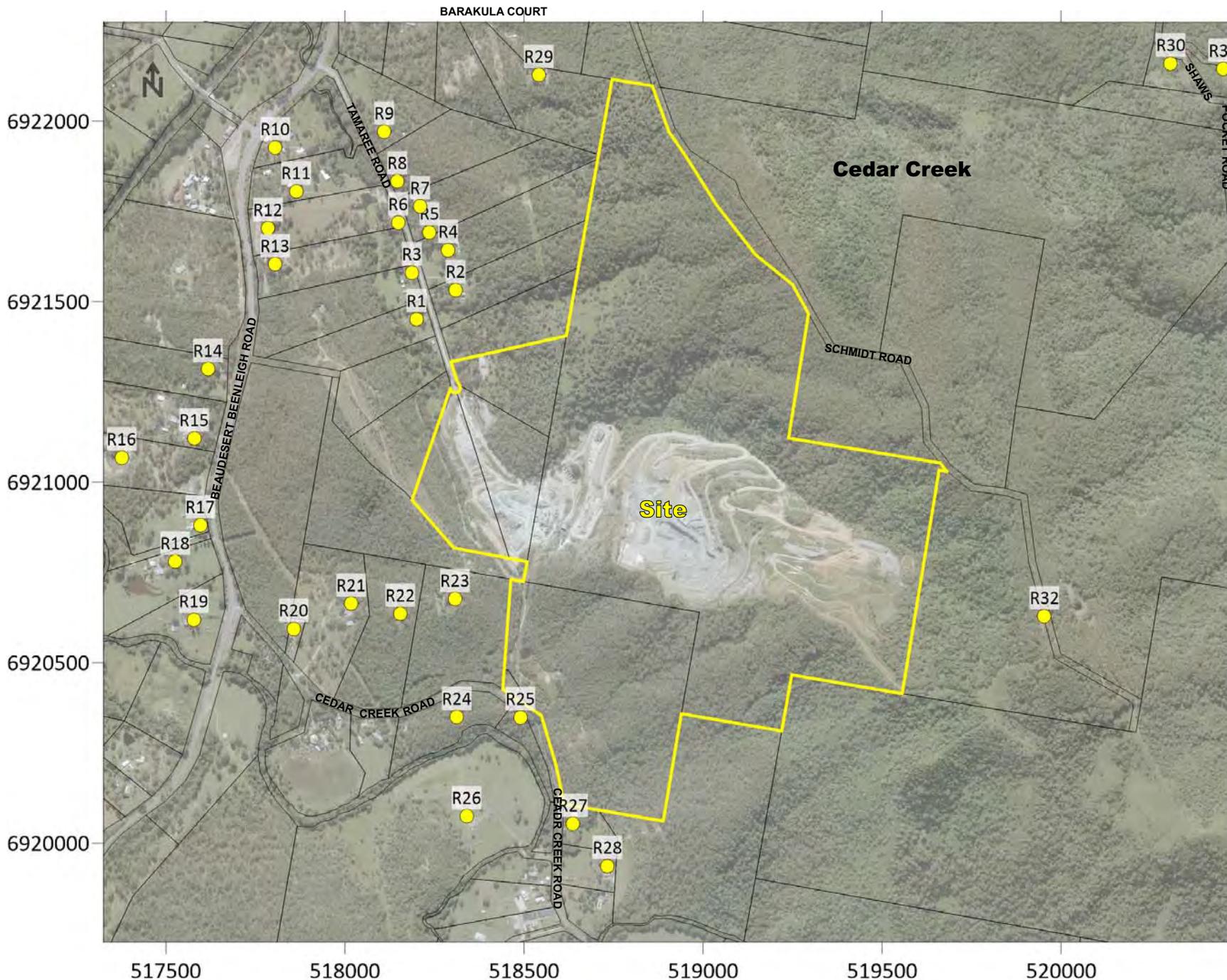
PROJECT
NOISE IMPACT ASSESSMENT
 PROPOSED INCREASE IN ANNUAL PRODUCTION LIMIT
 TAMAREE ROAD
 CEDAR CREEK QLD

TITLE
SITE LOCATION

JOB	CEDAR CREEK	FIGURE 1
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DATE	26/04/22	DWG NUMBER
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REV.		

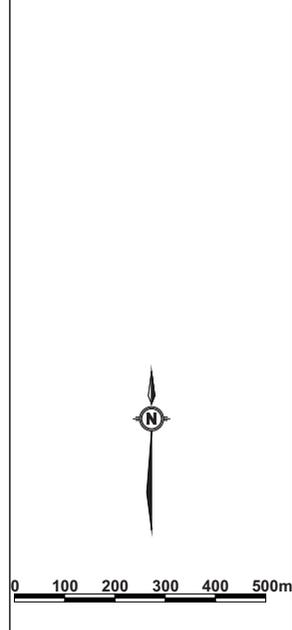


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 ABN 94 010 833 084



LEGEND
R32 NEAREST SENSITIVE RECEPTORS (R1-R32)

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 IMAGERY QLDBASE ALLUSERS.



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PROJECT
NOISE IMPACT ASSESSMENT
 PROPOSED INCREASE IN ANNUAL PRODUCTION LIMIT
 TAMAREE ROAD
 CEDAR CREEK QLD

TITLE
SENSITIVE RECEPTOR LOCATIONS

JOB	CEDAR CREEK	FIGURE 2
JOB NO.	21-081	
DATE	26/04/22	DWG NUMBER
SCALE	1:15000 (A4)	21-081-2
REV.		

ATTACHMENT 1

Assessment of Significant Meteorological Conditions

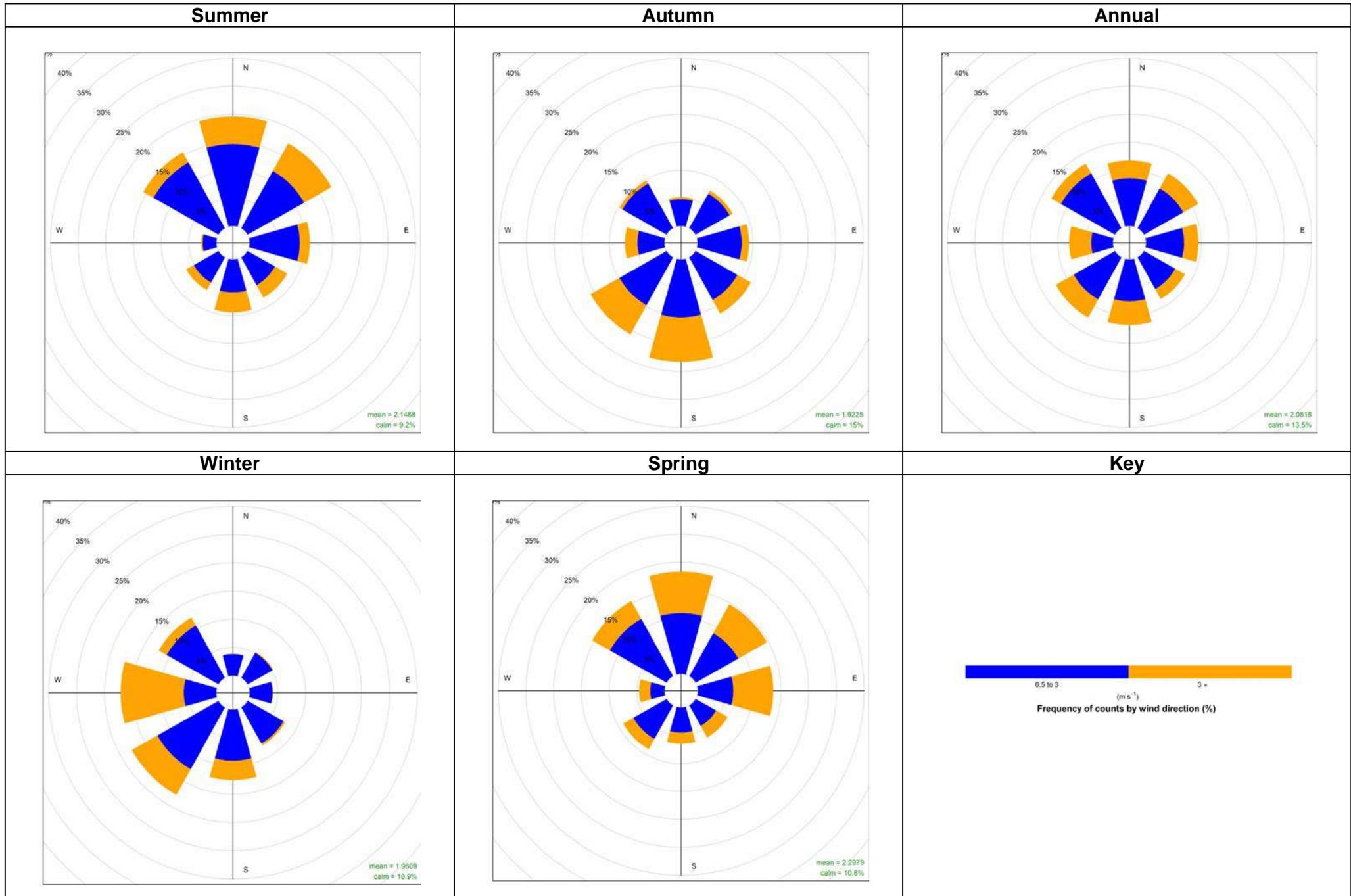
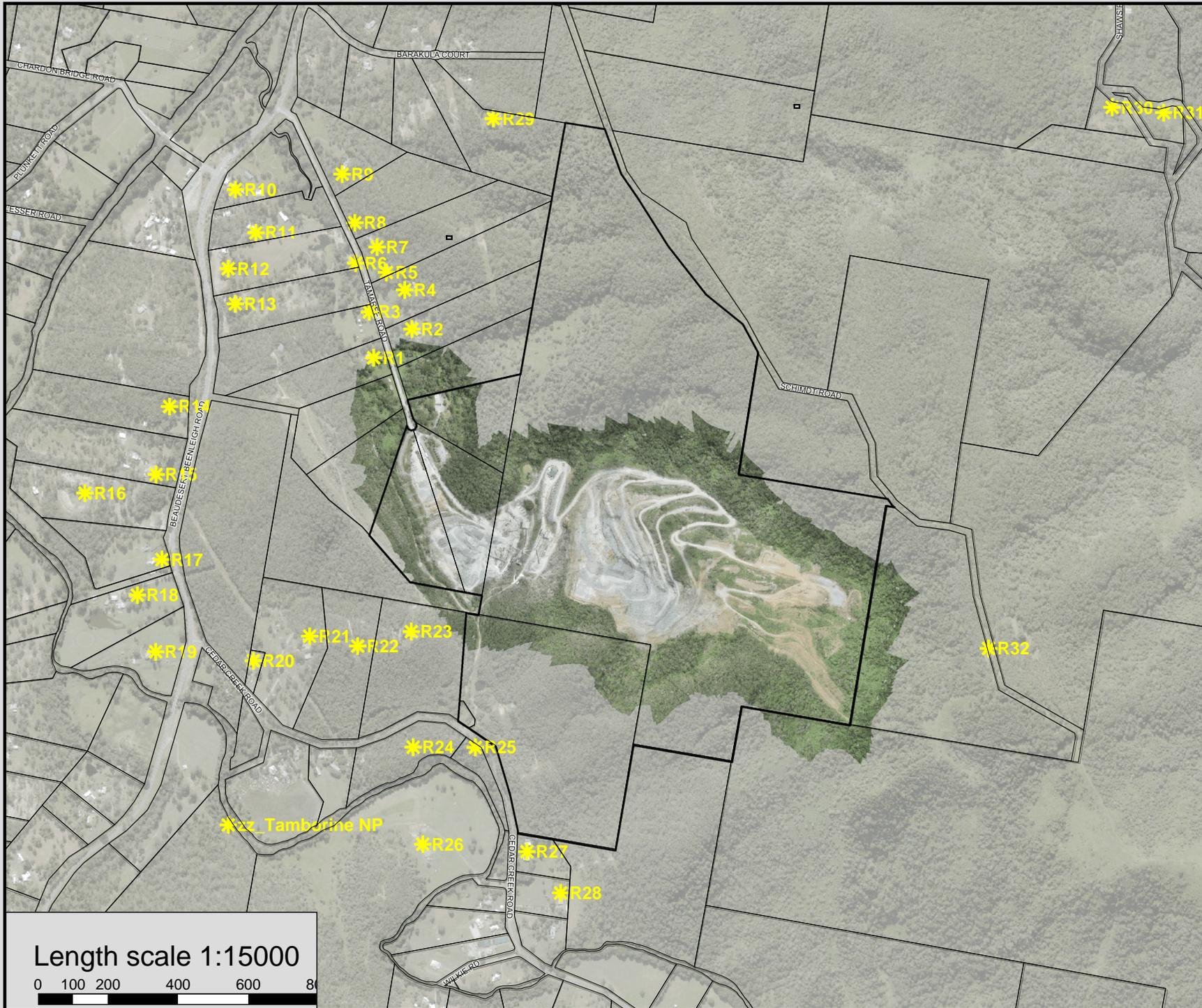


Figure A1.1 Seasonal wind frequency analysis for the period 6am to 6pm for the Site as generated by CALMET

ATTACHMENT 2

SoundPLAN 8.2

Model Layout Plans



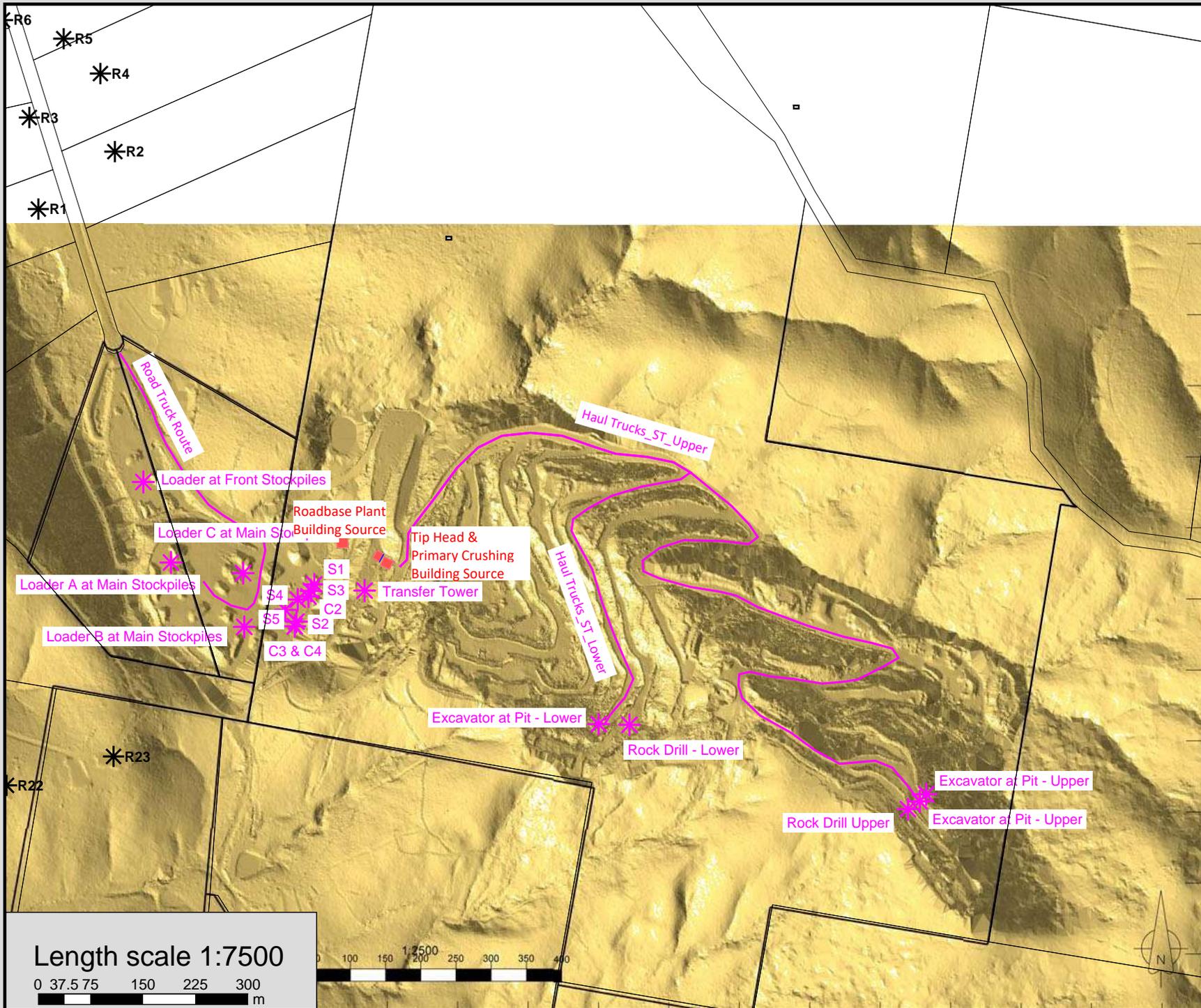
Legend

- Cadastral
- * Point receiver

**Cedar Creek 21-081
Overall Model Layout**

August 2022





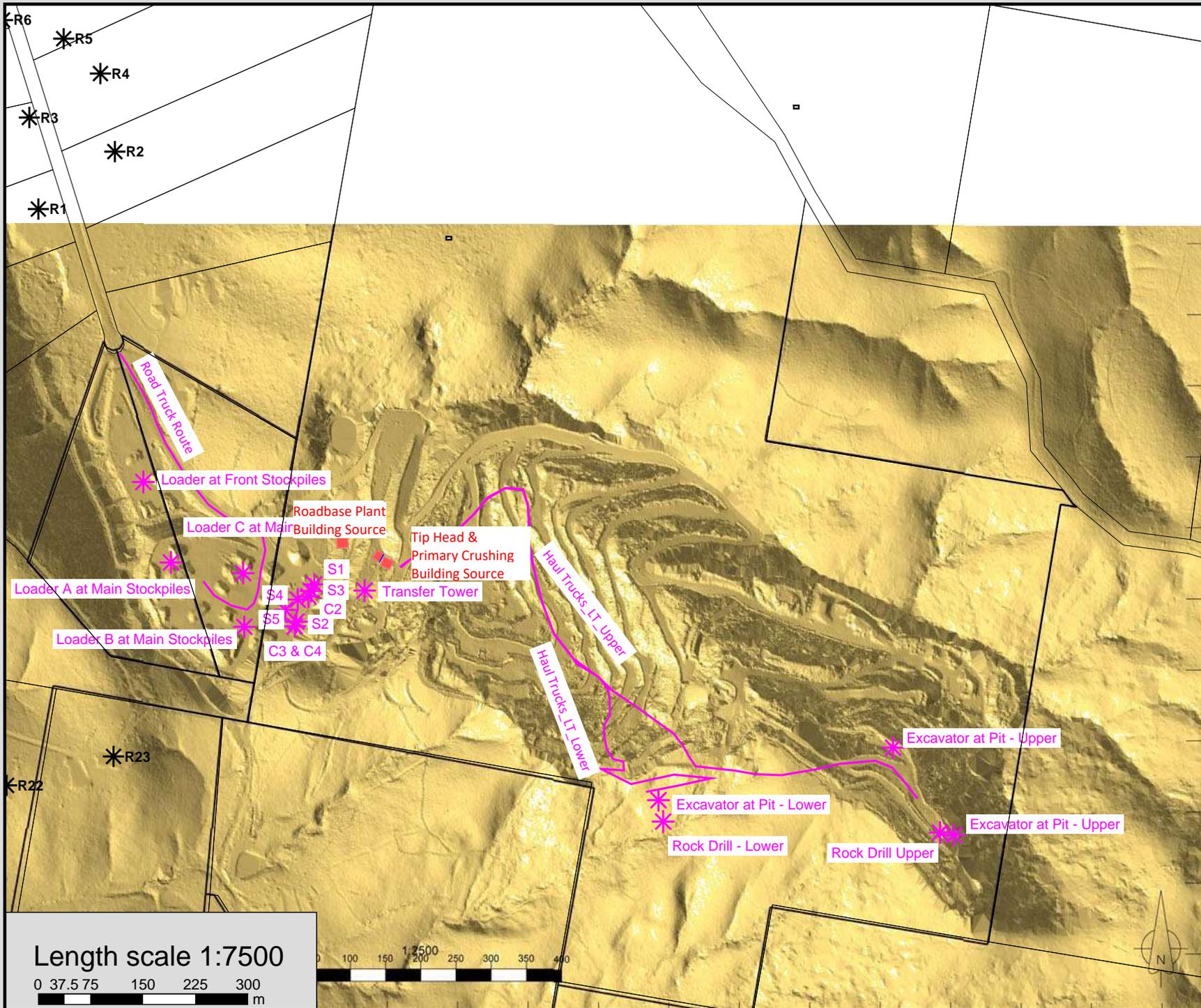
Legend

- Cadastral
- Point source
- Point receiver
- Building source
- Line source

Cedar Creek 21-081
1.6Mtpa
Short-Term Extraction
Full Operation
August 2022

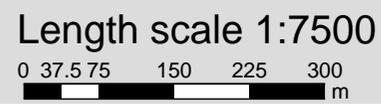
Length scale 1:7500





- Legend**
- Cadastral
 - * Point source
 - * Point receiver
 - Building source
 - Line source

Cedar Creek 21-081
1.6Mtpa
Long-Term Extraction
Full Operation
August 2022



ATTACHMENT 3

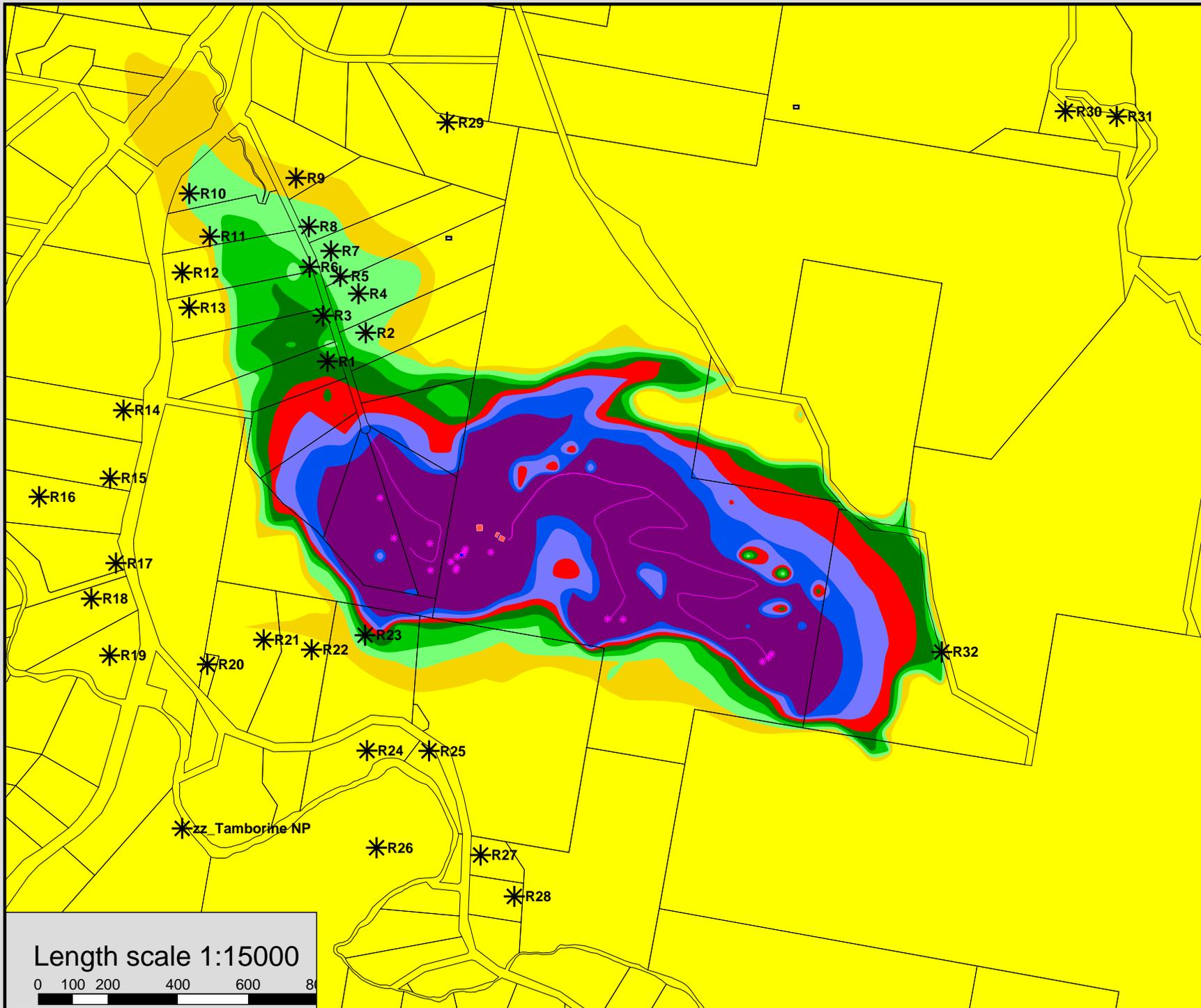
SoundPLAN 8.2

Predicted Noise Levels

Full Operations 1.6Mtpa - Short-Term Extraction

Full Operations 1.6Mtpa - Long-Term Extraction

Product Loading and Dispatch Only 1.6Mtpa



Noise level
 $L_{Aeq,T}$
 in dB(A)

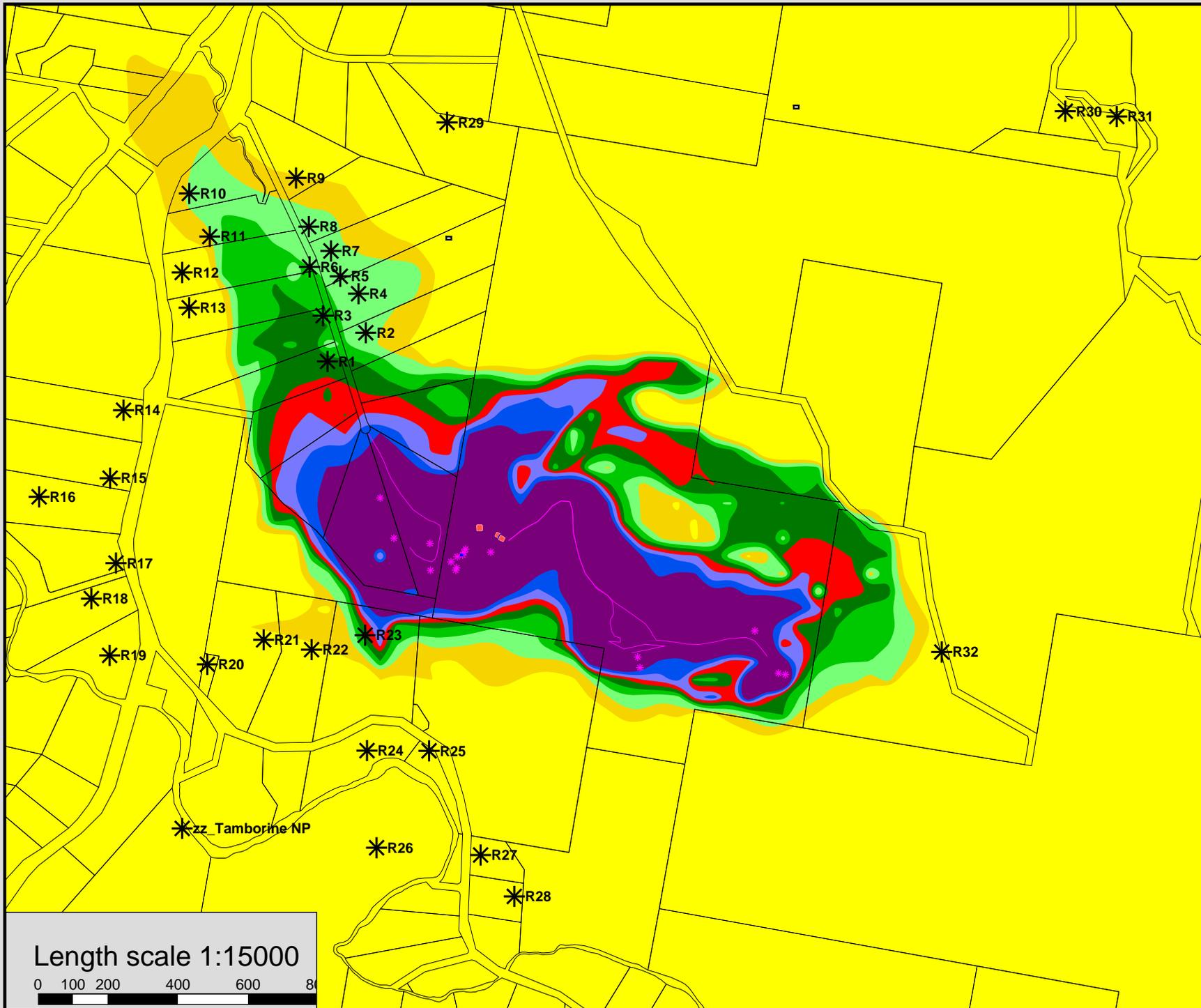
≤ 33	≤ 33
33 <	≤ 36
36 <	≤ 39
39 <	≤ 42
42 <	≤ 45
45 <	≤ 48
48 <	≤ 51
51 <	≤ 54
54 <	

Legend

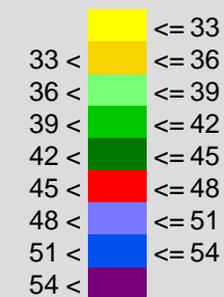
- Cadastral
- * Point source
- * Point receiver
- Building source
- Line source

Cedar Creek 21-081
1.6Mtpa
Short-Term Extraction
Full Operation
August 2022





Noise level
 $L_{Aeq,T}$
 in dB(A)



Legend

- Cadastral
- * Point source
- * Point receiver
- Building source
- Line source

Cedar Creek 21-081

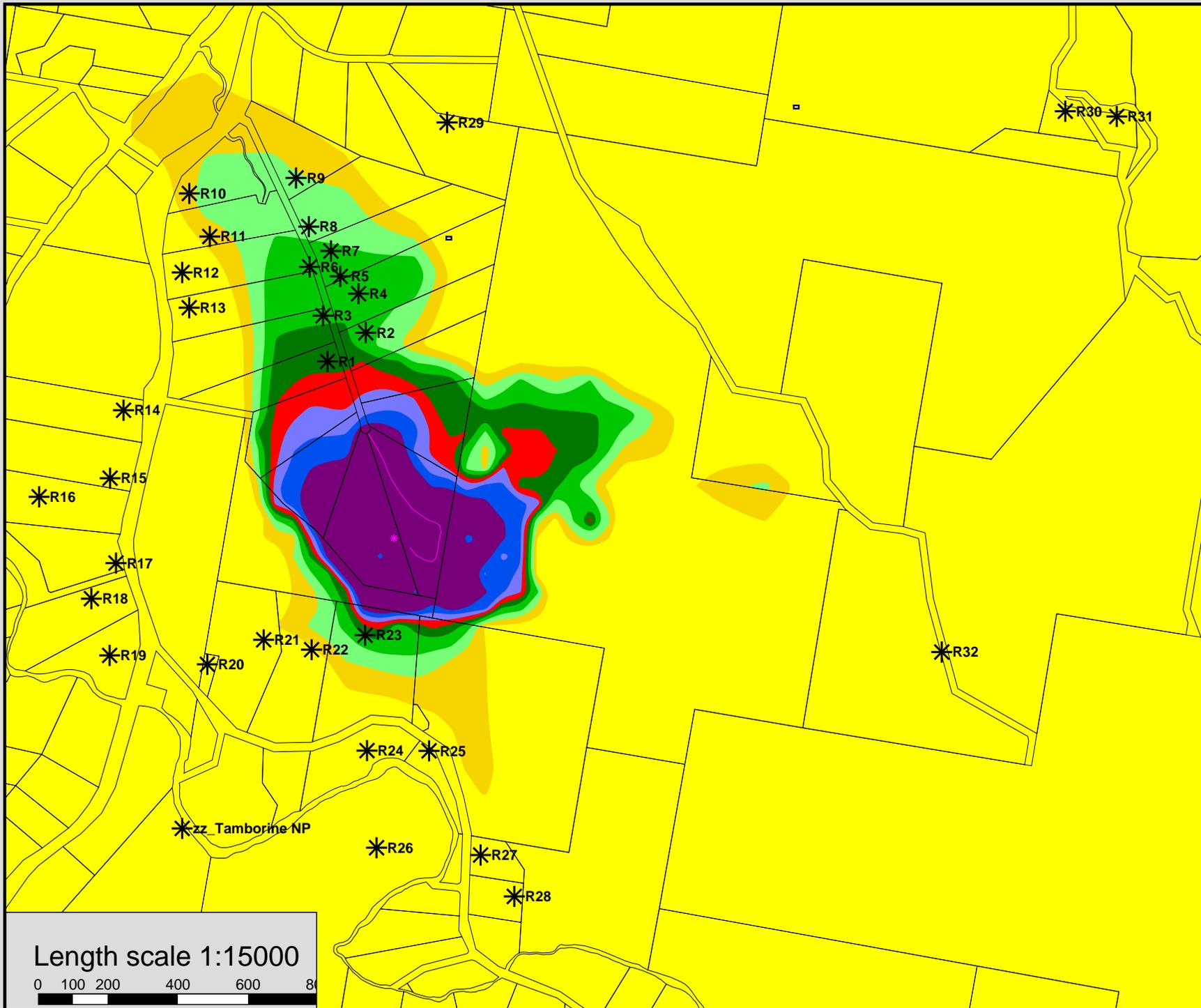
**1.6Mtpa
 Long-Term Extraction**

Full Operation

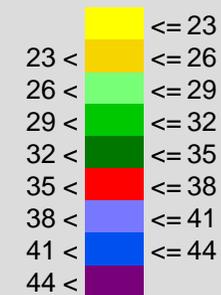
August 2022

Length scale 1:15000





Noise level
 $L_{Aeq,T}$
 in dB(A)



Legend

- Cadastral
- * Point source
- * Point receiver
- Building source
- Line source

Cedar Creek 21-081

6am to 7am

Product Sales Only

August 2022

Length scale 1:15000



Appendix H

MWA Dust Assessment



DUST ASSESSMENT

PROPOSED INCREASE IN ANNUAL EXTRACTION LIMIT

BLUE ROCK QUARRY

TAMAREE ROAD

CEDAR CREEK

Prepared for:

Fulton Hogan Quarries Pty Ltd

Prepared by:

MWA Environmental

23 August 2022

DOCUMENT CONTROL SHEET

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Level 15 241 Adelaide Street		Job No:	21-081
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Client:	Fulton Hogan Quarries Pty Ltd
Client Contact:	Mr Andrew Lyndon

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7					
8					

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FIGURES**ATTACHMENTS**

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

MWA Environmental has been engaged to prepare a Dust Assessment for an Environmental Authority amendment application to increase the currently approved extraction limit for the Blue Rock Quarry at Tamaree Road, Cedar Creek (“**the quarry**”).

The quarry currently holds Environmental Authority P-EA-100268669 (“**the EA**”) (22 June 2022) which permits extraction and screening of more than 1 Million tonnes of material per annum for the following environmental relevant activities (“**ERAs**”):

- ERA 16 - Extraction and Screening 2(c) - Extracting, other than by dredging, in a year, the following quantity of material – more 1,000,000t; and
- ERA 16 - Extraction and Screening 3(c) - Screening, in a year, the following quantity of material - more than 1,000,000t

Condition G1 of the EA limits the amount of material that may be extracted from the site to no more than 1,400,000 tonnes per year.

Fulton Hogan Quarries Pty Ltd seeks to increase the annual extraction limit to up to 1.6 Million tonnes per annum (“**Mtpa**”), which requires an application to amend Condition G1 of the EA. No other conditions in the EA are proposed to be amended through the application.

The increase to the annual extraction limit is sought to allow flexibility to supply forecast market demand for processed (crushed and screened) and unprocessed (overburden) material as the EA Condition G1 limitation applies to the total amount of extracted material.

Aside from the increased annual extraction limit, no other changes are proposed to the currently approved quarrying activities.

This report addresses the potential impact of particulate emissions from the proposed operation up to the 1.6 Mtpa limit at surrounding sensitive land uses.

The assessment has been based upon detailed dust dispersion modelling and provides recommendations for any measures required for the quarry to comply with the EA dust limits and the relevant Queensland *Environmental Protection (Air) Policy 2019* air quality objectives at the increased annual extraction limit.

The assessment methodology has been maintained as consistent with reporting¹ recently assessed by the Department of Environment and Science for the purpose of the current EA.

¹ *Dust Assessment – Proposed Increase in Annual Production Limit – Blue Rock Quarry– Tamaree Road, Cedar Creek* (MWA Environmental, 27 April 2022)

1.2 SITE DESCRIPTION

The Blue Rock Quarry is located at Tamaree Road, Cedar Creek and comprises the following properties:

- Lot 1 on SP238024
- Lot 89 on WD739
- Lot 14 on RP151378
- Lot 15 on RP151378
- Lot 16 on RP151378.

The location of the subject site and surrounding land uses is shown on **Figure 1**.

The quarry access is via Tamaree Creek Road at the western boundary, with the access road running east through the site to the main stockpile pad / sales floor. A smaller front stockpile and storage area is located to the south of the weighbridge nearer to the site entry.

The crushing and screening plant (processing plant) is located centrally on the site. Extraction operations are currently occurring concurrently at the lower, more central, extraction area and a more recent upper extraction area on the eastern part of the site.

1.3 SURROUNDING LAND USES

An aerial photograph of the subject site and surrounding land uses is included as **Figure 1**.

Surrounding land uses comprise:

- | | |
|----------------------|--|
| To the North: | Vegetated land predominantly zoned rural, rural landscape and environment precinct. Few dwellings, well separated from the quarry. Topographic ridge provides acoustic buffering. |
| To the East: | Vegetated land predominantly zoned rural, rural landscape and environment precinct. Very few dwellings, well separated from the quarry. Topographic ridge provides acoustic buffering. |
| To the South: | Vegetated land predominantly zoned rural, rural landscape and environment precinct. Scattered dwellings on rural properties along Cedar Creek Road. |
| To the West: | Land predominantly zoned rural, rural landscape and environment precinct. Dwellings on rural properties along Tamaree Road. |

Surrounding sensitive uses in the vicinity of the subject site are residential dwellings located along Tamaree Road to the west on Cedar Creek Road to the south and several dwellings well remote from the site to the north and east.

Thirty-two (32) sensitive receptors have been represented in the dust model and are identified on **Figure 2** with labels R1 to R32 for the purpose of this assessment.

The nominated receptor R32 was identified on aerial imagery as remote dwelling-like structures that appear to be within an unformed road reserve. Access arrangements are unclear, and it may be that these structures are not lawful dwellings. Conservatively, R32 been assessed as a sensitive receptor for the purposes of this report.

The property containing nominated receptor R23 is owned by Fulton Hogan but has conservatively been assessed as a sensitive receptor for the purposes of this report.

2.0 DUST IMPACT ASSESSMENT

2.1 RELEVANT AIR QUALITY CRITERIA

The proposed increase to the annual extraction limit does not fundamentally change the type or sources of particulate emissions from the site and thus the relevant dust limits for this assessment are those specified in Environmental Authority P-EA-100268669.

Condition A2 of the EA specifies the relevant air quality limits for the quarry, as follows:

A2	<p>Dust and particulate matter emissions must not exceed the following concentrations at any sensitive place or commercial place:</p> <ul style="list-style-type: none"> a) dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 (or more recent editions), or b) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM₁₀) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, when monitored in accordance with Australian Standard AS 3580.9.6 (or more recent editions) or any other method approved by the administering authority.
----	---

The EA thus limits particulate impacts at nuisance sensitive places to:

- A maximum dust deposition rate of 120 mg/m²/day when measured in accordance with AS3580.10.1; and
- A maximum PM₁₀ 24 hour average concentration of 50 $\mu\text{g}/\text{m}^3$ when measured in accordance with relevant Australian Standards or alternative methods agreed by the administering authority.

The limits in Condition A2 of the EA are consistent with contemporary criteria for the key air quality indicators for extractive industry uses (PM₁₀ and dust deposition).

This assessment has also addressed the particulate air quality objectives specified in the *Queensland Environmental Protection (Air) Policy 2019*.

The air quality assessment has also considered potential impacts from respirable crystalline silica emissions. While there is no relevant Queensland ambient air quality objective for crystalline silica, reference has been made to the Victorian EPA criterion stipulated in *Protocol for Environmental Management: Mining and Extractive Industries, Publication 1191* (EPA Victoria, 2007). The Victorian PEM objective is based upon the Californian Office of Environmental Health Assessment determination of "an airborne level that would pose no significant health risk to individuals indefinitely exposed to that level". This criterion has previously been adopted for the assessment of other hard rock quarry assessments across South East Queensland.

The adopted assessment criteria for particulate emissions associated with the quarry are summarised in **Table 1** below.

Table 1: Applicable Particulate Objectives

POLLUTANT	AVERAGING PERIOD	GUIDELINE	SOURCE
PM₁₀	24 Hour Average	50 µg/m ³	EPP(Air) 2019 & P-EA-100268669
	Annual Average	25 µg/m ³	EPP(Air) 2019
PM_{2.5}	24 Hour Average	25 µg/m ³	EPP(Air) 2019
	Annual Average	8 µg/m ³	EPP(Air) 2019
TSP	Annual Average	90 µg/m ³	EPP(Air) 2019
Dust Deposition	Monthly Average	120 mg/m ² /day	P-EA-100268669
Silica (as PM_{2.5})	Annual Average	3 µg/m ³	EPA Victoria

2.2 AMBIENT DUST CONCENTRATIONS

The Queensland Government operates a network of ambient air quality monitoring stations across the state. Air Monitoring Reports are published annually and validated hourly ambient monitoring datasets are published through the Queensland Government data portal.

Ambient air quality monitoring measured at Springwood has been adopted as background concentrations for the purpose of this assessment. The Springwood air quality monitoring station is the closest long-term air monitoring station to the subject site.

A summary of the relevant ambient air quality statistics for inclusion in the dispersion modelling assessment as ambient concentrations is presented in **Table 2**.

Table 2: Ambient Dust Data Applied to Assessment

POLLUTANT	AVERAGING TIME	AMBIENT	SOURCE
PM ₁₀	24 Hour Average	13.9 µg/m ³	24-hour average 70 th percentile over 5 years from 2016 to 2020 at Springwood
	Annual Average	13.2 µg/m ³	Average over 5 years from 2016 to 2020 at Springwood
PM _{2.5}	24 Hour Average	6.3 µg/m ³	24-hour average 70 th percentile over 5 years from 2016 to 2020 at Springwood
	Annual Average	5.7 µg/m ³	Average over 5 years from 2016 to 2020 at Springwood
TSP	Annual Average	26.4 µg/m ³	Double the PM ₁₀ average over 5 years from 2016 to 2020 at Springwood
Deposition	Monthly Average	40 mg/m ² /day	Estimate based upon historical monitoring

2.3 DUST MODELLING

2.3.1 DUST MODELLING METHODOLOGY

To enable assessment of particulate concentrations and deposition rates from the proposed 1.6Mtpa quarrying operations, detailed dispersion modelling has been conducted using the CALMET / CALPUFF modelling system.

The CALMET / CALPUFF modelling system considers 3-dimensional unsteady state meteorology and is suitable for modelling pollutant transport on a regional scale and for complex terrain and coastal zones. The CALMET / CALPUFF modelling system simulates the effects of spatially and time varying meteorology on pollutant transport within the model domain, including chemical transformation and removal. CALPUFF considers emissions as a series of puffs that, if emitted at a sufficient frequency, simulate a continuous emission. Representation of the plume as a series of puffs allows the pollutant transport to vary spatially across the model domain in accordance with the 3-dimensional meteorological field.

A site-specific 3-dimensional prognostic meteorological dataset generated using TAPM was processed using the CALMET program to provide meteorological inputs in a form suitable for the CALPUFF dispersion model. The terrain and land use resolution were refined to a 50-metre grid for the CALMET / CALPUFF modelling to ensure a reasonable representation of the terrain at the locality. CALMET prepares 3-dimensional meteorological data for each hour of the CALPUFF run based upon the 3-dimensional prognostic dataset generated using TAPM (TAPM Version: 4.0.5).

The CALMET / CALPUFF model was set up to model dispersion within a 5 km x 5 km area surrounding the subject site. The topography of the subject site and surrounding area was sourced from State of Queensland (Department of Natural Resources, Mines and Energy) 2018 QSpatial LiDAR Contours at 5 metre resolution. The CALPUFF sampling domain was represented over a 3.2 km x 2.5 km area encompassing the quarry and surrounding sensitive receptors.

In order to assess dust emissions from the proposed quarrying operations at a rate of 1.6Mtpa, CALPUFF dispersion modelling has been undertaken.

The assessment has been based upon a peak extraction and production rate of 1.6 Million tonnes per annum. Dispersion modelling has conservatively considered emissions from a larger (conceptual long-term) exposed quarry pit footprint, with extraction at the lower (central) and upper (eastern) pit areas. The assessment has dump truck haulage routes from pit to plant and product truck haulage from stockpiles to the site entry. Stockpiling and loading of material have been modelled at the main stockpile pad, with supplementary stockpiling at the smaller front (western) stockpile area. The activity rates for the purposes of the emissions inventory were developed in accordance with operational information supplied by Fulton Hogan Quarries Pty Ltd.

Particulate concentrations and deposition rates have been assessed at representative discrete receptors as shown on **Figure 2**. Gridded receptor modelling has also been undertaken to produce contours of the predicted dust concentrations and deposition rates over the model domain.

The model-predicted dust concentrations and deposition rates due to emissions from the quarrying activities were added to the ambient concentrations presented in **Table 2** above to assess the cumulative dust exposure at surrounding receptors.

In order to assess the potential dust deposition from the quarry it was necessary to model a particle size distribution. Whilst the actual particle size distribution of various sources and materials does vary, it is considered reasonable to apply a generalised particle size distribution for the purposes of this modelling. The modelled particle size distribution was derived from the following data included in the USEPA AP42 Chapter 13.2.4 *Aggregate handling and Storage Piles*².

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053 ^a

^a Multiplier for < 2.5 µm taken from Reference 14.

A detailed summary of the particle size distributions input to the TSP, PM₁₀ and PM_{2.5} models is provided as **Attachment 1**.

² USEPA (2006) Compilation of Air Pollutant Emission Factors – Volume 1: Stationary Point and Area Sources, AP-42 Chapter 13.2.4 Aggregate Handling and Storage Piles, United States Environmental Protection Agency.

2.3.1 PETROGRAPHIC ANALYSIS

Petrographic analysis of rock samples extracted at the subject land was supplied by Fulton Hogan Quarries Pty Ltd. Based upon the supplied report, the source rock at the site has an indicative free silica content of 12%.

An assessment of respirable crystalline silica (as PM_{2.5}) at 12% has been undertaken for the evaluation of potential crystalline silica impacts against the annual average exposure guideline.

2.3.2 METEOROLOGICAL DATA

No suitable site-specific meteorological data was available for this assessment. In the absence of site-specific data, following accepted methodology for assessment, the TAPM (TAPM Version: 4.0.5) software was utilised to develop a prognostic meteorological model which generated a year of representative hourly meteorological data for the locality.

TAPM has been used to predict meteorological parameters specific to the area surrounding the subject site including temperature, wind speed, wind direction and stability classification. The model accesses databases of surface characteristics (terrain height, soil and vegetation) and synoptic weather analyses provided by CSIRO to carry out these analyses. TAPM is able to process the output data to produce meteorological data files suitable for input to the CALMET / CALPUFF modelling system i.e. a 3-dimensional grid of hourly varying meteorological parameters over a full year.

Technical discussion of the model algorithms, inputs and model validation studies are provided in the Part 1: Technical Paper (Hurley, 2002) and Part 2: Summary of Verification Studies (Hurley *et al*, 2002)^{3,4}.

The centre coordinates for the model grid were Latitude -27°50' and Longitude 153°11'30". The following nested model grids were applied to the TAPM modelling:

- 50 x 30 km grid (total area 1500 km x 1500 km)
- 50 x 10 km grid (total area 500 km x 500 km)
- 50 x 3 km grid (total area 150 km x 150 km)
- 50 x 1 km grid (total area 50 km x 50 km)

Twenty-five vertical grid levels were modelled.

³ Hurley, P.J. (2002) The Air Pollution Model (TAPM) Version 2: User Manual. Aspendale: CSIRO Atmospheric Research Internal Paper.

⁴ Hurley, P.J. (2002) The Air Pollution Model (TAPM) Version 2: Part 1: Technical Description. Aspendale: CSIRO Atmospheric Research Technical Paper.

The TAPM model was set up to generate a site-specific meteorological data file for the locality, based upon synoptic analysis data for the representative Year 2020, as provided by CSIRO. An analysis of wind speeds and directions measured at the Queensland Government monitoring station at Beaudesert, approximately 25 km to the southwest of the subject site was undertaken for the most recent 10 years of complete meteorological data from 2012 to 2021. The Year 2020 was statistically the most representative of the long-term average conditions for this period of available data.

Observed wind speeds and wind directions for the Bureau of Meteorology meteorological stations at Beaudesert was incorporated into the TAPM model as assimilation data. Considering broader topographical influences and separation from the subject site, the station was given a radius of influence of 30 km over 2 vertical levels with a quality factor of 0.9.

The surface input files for CALMET were extracted for Beaudesert in addition to an upper air meteorological dataset above this monitoring station. The CALMET model further resolved the prognostic meteorology to a finer terrain, land use and soil type resolution of 250 metres over a 32.5 x 25 km area covering the subject site and surrounding region for the purpose of dispersion modelling.

To further resolve the local terrain influences on plume transport and dispersion, a nested CALMET model was configured over an area covering the subject site and surrounding local area for the purpose of capturing variations in terrain and local scale dispersion modelling. The nested CALMET model further resolved the prognostic meteorology to a finer terrain, land use and soil type resolution of 50 metres over a 5 km x 5 km area covering the subject site and surrounding sensitive uses.

Analysis of the CALMET derived meteorology for the subject land including a wind rose, wind frequency graph, monthly average temperatures graph and tabulated stability class analysis is contained in **Attachment 2**.

2.3.3 DUST EMISSION SOURCES

The following sources were represented in the CALPUFF Model:

- Haul Routes (unpaved) as a series of area sources;
- Access Roads (paved) as a series of area sources between the wheel wash and the site entry;
- Access Road (unpaved) as a series of area sources between the wheel wash and the stockpile pad;
- Wind Erosion from stockpiles and unsealed areas as area sources;
- Drilling as an area source;
- Loading Truck at Pit as an area source;
- Tip Head and Primary Crusher as a volume source;

- Processing Plant operation as an area source;
- Loading to Stockpiles as an area source;
- Loading from Stockpiles to trucks as an area source.

Dust emissions from each of these sources have been represented in the CALPUFF model as area sources with appropriate locations, sizes and initial dispersion parameters to represent the releases.

Emissions rates for each of the above sources have been calculated using published emission factors from the following references:

- NPI *Emission Estimation Technique Manual for Mining v3.1*, Environment Australia (2012);
- USEPA AP42 Chapter 13.2.1 *Paved Roads* (2011);
- USEPA AP42 Chapter 13.2.2 *Unpaved Roads* (2006);
- USEPA AP42 Chapter 11.19.2 *Crushed Stone Processing and Pulverized Mineral Processing* (2004);
- USEPA AP42 Chapter 13.2.4 *Aggregate Handling and Storage Piles* (2006).

Annual emissions from wind erosion of exposed surfaces at the site have been estimated using the method presented in the NPI *Emission Estimation Technique Manual for Mining v3.1*, wind erosion emissions have only been represented when wind speed is greater than a 5.4m/s threshold.

A summary of the emission calculations and emission rates is included as **Attachment 3**.

2.3.4 DUST CONTROL MEASURES

The Crushing and Screening Plant incorporates significant dust mitigation measures including:

- Enclosure of the primary (jaw) crushing plant in a building constructed of sheet steel
- Enclosure of the tip head structure in a building constructed of sheet steel including a three-sided and roofed bay for the dump truck to tip from
- Enclosure of the road base plant in a building constructed of sheet steel

The quarry implements a range of additional measures to minimise particulate emissions from key sources, including the following measures:

- Dust suppression (misting sprays) to the processing plant;
- Regular washing and sweeping of the sealed access road to manage silt track out;
- Water truck with full time operator operates on the access road, internal unsealed roads and the operations area;
- Wheel wash for trucks prior to the weighbridge;
- Low speed haulage of material from pit to plant (less than 30km/h); and
- Drill rigs with integrated dust collection system.

The mitigating effects of the dust control measures implemented at the site have been considered in dust emission estimation calculations presented in this report.

2.3.5 DUST MODELLING RESULTS

Summaries of the model-predicted particulate concentrations and deposition rates at the representative sensitive receptors (refer **Figure 2**) for the 1.6Mtpa operating scenario are provided in **Table 3**.

The predicted concentrations at the representative receptors include the ambient concentrations presented in **Table 2**.

Other residential dwellings within the model domain (refer **Figure 2**) are no more affected than the selected representative receptors.

Table 3: 1.6Mtpa Quarry Operations Model-Predicted Particulate Exposure (including ambient)

Receptor	PM ₁₀		PM _{2.5}		TSP	Dust Deposition	Silica
	Maximum 24-hour average (µg/m ³)	Annual Average (µg/m ³)	Maximum 24-hour average (µg/m ³)	Annual Average (µg/m ³)	Annual Average (µg/m ³)	Maximum Monthly Average (mg/m ² /day)	Annual Average (µg/m ³)
R1	30.5	16.6	8.6	6.15	33.5	62	0.05
R2	24.7	16.0	7.6	6.05	32.3	65	0.04
R3	27.2	15.8	8.0	6.03	31.8	58	0.04
R4	23.0	15.5	7.3	5.98	31.1	59	0.03
R5	23.2	15.3	7.4	5.96	30.7	56	0.03
R6	26.0	15.3	7.8	5.95	30.5	54	0.03
R7	23.2	15.1	7.4	5.93	30.1	54	0.03
R8	24.3	14.9	7.5	5.90	29.7	52	0.02
R9	23.5	14.6	7.4	5.86	29.0	49	0.02
R10	28.1	14.4	8.0	5.84	28.4	46	0.02
R11	27.6	14.6	8.0	5.87	28.9	47	0.02
R12	24.6	14.4	7.6	5.84	28.6	48	0.02
R13	25.2	14.5	7.7	5.86	28.8	50	0.02
R14	23.4	14.0	7.4	5.80	28.0	50	0.01
R15	25.8	13.9	7.7	5.79	27.8	50	0.01
R16	22.4	13.7	7.3	5.76	27.4	46	0.01
R17	22.6	13.9	7.3	5.79	27.9	50	0.01
R18	20.6	13.8	7.1	5.78	27.7	47	0.01
R19	19.1	13.9	6.9	5.79	27.8	47	0.01
R20	19.7	14.4	7.1	5.84	28.8	56	0.02
R21	22.3	14.9	7.4	5.92	30.1	66	0.03
R22	22.2	15.5	7.4	5.99	31.2	76	0.03
R23	37.0	17.4	9.7	6.25	35.4	107	0.07
R24	23.6	15.1	7.5	5.93	30.3	71	0.03
R25	25.1	15.4	7.9	5.97	31.0	77	0.03
R26	21.2	14.5	7.2	5.85	29.0	58	0.02
R27	21.3	14.6	7.3	5.86	29.3	61	0.02
R28	20.5	14.4	7.1	5.83	28.8	58	0.02
R29	17.5	14.1	6.7	5.80	28.1	50	0.01
R30	15.6	13.3	6.5	5.71	26.7	42	0.002
R31	15.2	13.3	6.4	5.71	26.6	41	0.001
R32	33.8	14.5	8.5	5.84	29.2	76	0.02
Air Quality Objective	50 µg/m³	25 µg/m³	25 µg/m³	8 µg/m³	90 µg/m³	120 mg/m²/day	3 µg/m³
Complies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The results of the gridded receptor modelling are presented in **Attachment 4** as contours of predicted particulate concentrations and deposition rates over an aerial photograph base. The plotted concentrations / deposition rates include the ambient concentrations specified in **Table 2** above.

The modelling conducted demonstrates that, with ongoing diligent implementation of the dust management measures, the proposed 1.6Mtpa quarrying activities can comply with the limits specified in Condition A2 of Environmental Authority P-EA-100268669 and the relevant Queensland *Environmental Protection (Air) Policy 2019* air quality objectives at surrounding sensitive receptors.

The predicted respirable crystalline silica concentrations readily comply with the adopted criterion at all surrounding sensitive receptors.

3.0 CONCLUSION

MWA Environmental has been engaged to prepare a Dust Assessment for an Environmental Authority amendment application to increase the currently approved extraction limit for the Blue Rock Quarry at Tamaree Road, Cedar Creek.

The quarry currently holds Environmental Authority P-EA-100268669 (22 June 2022) which permits extraction and screening of more than 1 Million tonnes of material per annum. Condition G1 of the EA limits the amount of material that may be extracted from the site to no more than 1,400,000 tonnes per year.

Fulton Hogan Quarries Pty Ltd seeks to increase the annual extraction limit to up to 1.6 Million tonnes per annum, which requires an application to amend Condition G1 of the EA. No other conditions in the EA are proposed to be amended through the application.

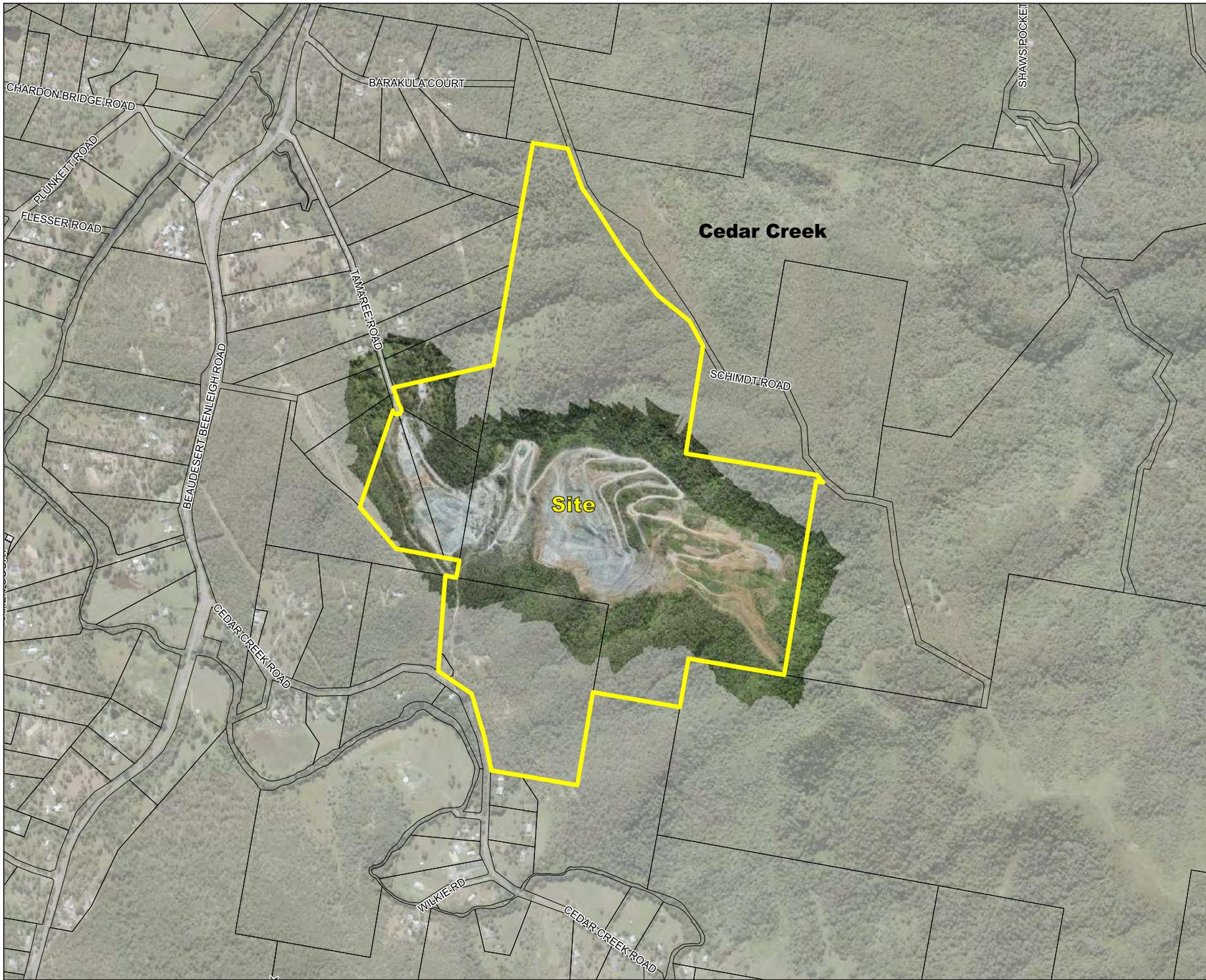
The increase to the annual extraction limit is sought to allow flexibility to supply forecast market demand for processed (crushed and screened) and unprocessed (overburden) material as the EA Condition G1 limitation applies to the total amount of extracted material.

Detailed meteorological and particulate dispersion modelling of the operation at a rate of 1.6 Mtpa has demonstrated that, with ongoing diligent implementation of the dust management measures, compliance can be maintained with the air quality limits specified in Condition A2 of Environmental Authority P-EA-100268669 and the air quality objectives specified in the Queensland *Environmental Protection (Air) Policy 2019*.

Based upon the detailed dust assessment undertaken, the proposed amendment of Condition G1 of Environmental Authority P-EA-100268669 to allow for the extraction and screening of up to 1.6 Mtpa is supported with no required amendment to the current noise conditions in the Environmental Authority.

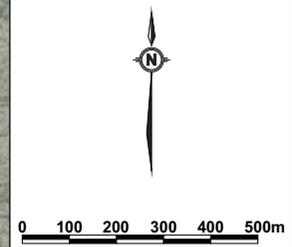
MWA Environmental
23 August 2022

FIGURES



LEGEND
 **SITE LOCATION**

DRAWING REFERENCES
 - CEMENT & AGGREGATE CONSULTING,
 DRONE SURVEY AERIAL,
 AER DRONE 100mm 220201.ecw,
 © THE STATE OF QUEENSLAND
 DNRME LAND AND SPATIAL INFORMATION
 IMAGERY QLDBASE ALLUSERS.



CLIENT
 FULTON HOGAN QUARRIES PTY LTD

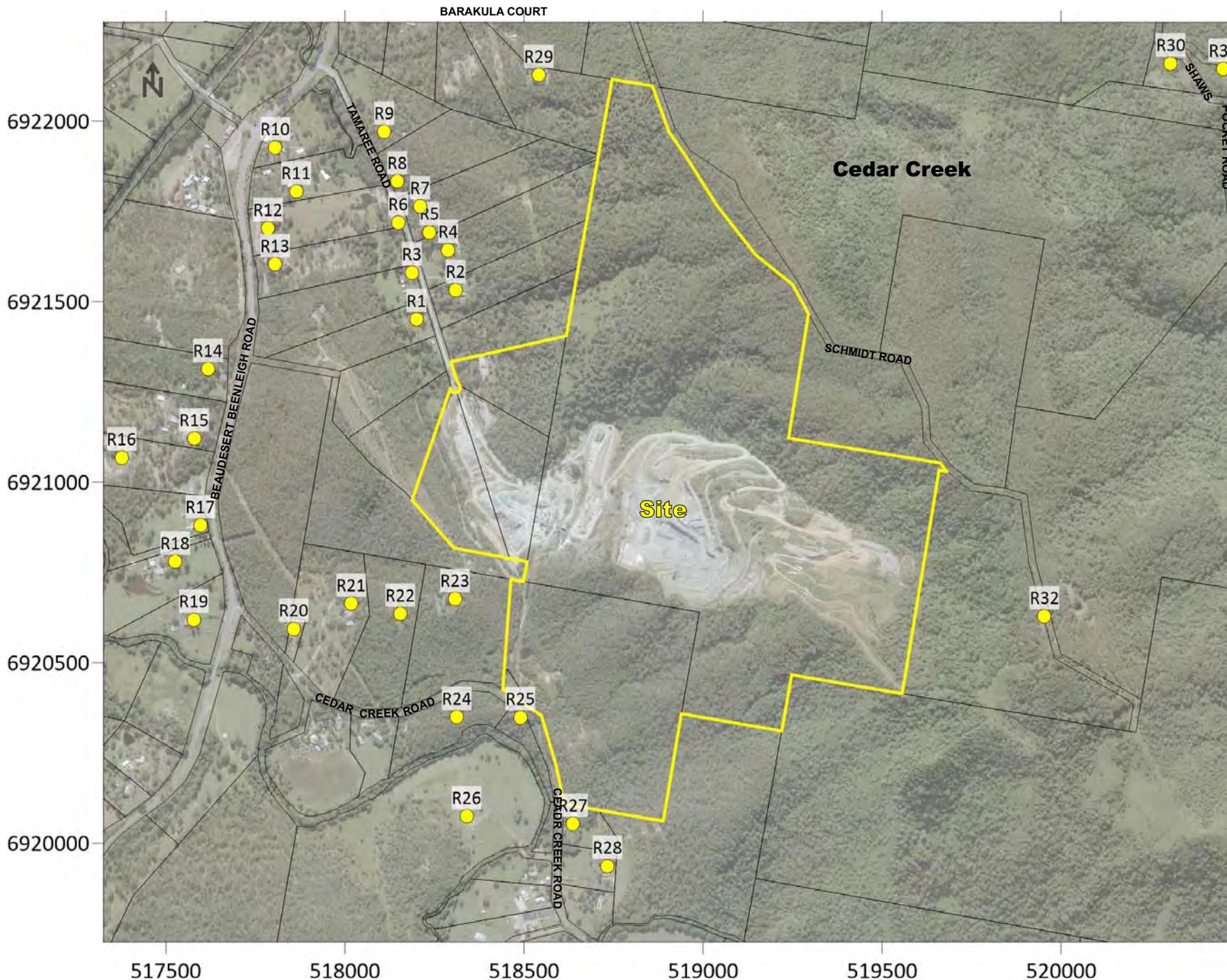
PROJECT
DUST IMPACT ASSESSMENT
 PROPOSED INCREASE IN ANNUAL PRODUCTION LIMIT
 TAMAREE ROAD
 CEDAR CREEK QLD

TITLE
SITE LOCATION

JOB	CEDAR CREEK	FIGURE 1
JOB NO.	21-081	
DATE	26/04/22	DWG NUMBER
SCALE	1:16000 (A4)	21-081-1
REV.		

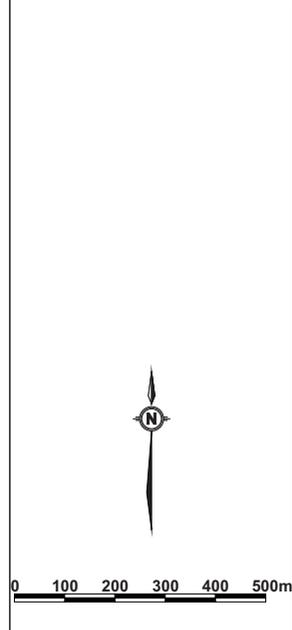


Max Winders & Associates Pty Ltd t/as MWA Environmental
 Level 15, 241 Adelaide St, Brisbane. GPO BOX 3137, Brisbane Qld 4001
 P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
 W www.mwaenviro.com.au
 ABN 94 010 833 084



LEGEND
 SITE LOCATION
 NEAREST SENSITIVE RECEPTORS (R1-R32)

DRAWING REFERENCE
 © THE STATE OF QUEENSLAND
 DNRME LAND AND SPATIAL INFORMATION
 IMAGERY QLDBASE ALLUSERS.



CLIENT
 FULTON HOGAN QUARRIES PTY LTD

PROJECT
DUST IMPACT ASSESSMENT
 PROPOSED INCREASE IN ANNUAL PRODUCTION LIMIT
 TAMAREE ROAD
 CEDAR CREEK QLD

TITLE
SENSITIVE RECEPTOR LOCATIONS

JOB	CEDAR CREEK	FIGURE 2
JOB NO.	21-081	
DATE	26/04/22	DWG NUMBER
SCALE	1:15000 (A4)	21-081-2
REV.		

ATTACHMENT 1

Modelled Particle Size Distribution

PARTICLE SIZE DISTRIBUTION

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 μm	< 15 μm	< 10 μm	< 5 μm	< 2.5 μm
0.74	0.48	0.35	0.20	0.053*

* Multiplier for < 2.5 μm taken from Reference 14.

TSP

FRACTION #	1	2	3	4	5	6
PARTICLE SIZE (MICRONS)	>30	<30	<15	<10	<5	<2.5
ASSUMED MEAN PARTICLE SIZE (MICRONS)	40	22.5	12.5	7.5	3.75	1.25
% OF TOTAL	0.26	0.26	0.13	0.15	0.147	0.053
STANDARD DEVIATION	0	0	0	0	0	0

PM10

FRACTION #	4	5	6
PARTICLE SIZE (MICRONS)	<10	<5	<2.5
ASSUMED MEAN PARTICLE SIZE (MICRONS)	7.5	3.75	1.25
% OF TOTAL	0.15	0.147	0.053
% OF <PM10	0.428571	0.42	0.151429
STANDARD DEVIATION	0	0	0

PM2.5

FRACTION #	6
PARTICLE SIZE (MICRONS)	<2.5
ASSUMED MEAN PARTICLE SIZE (MICRONS)	1.25
% OF TOTAL	0.053
% OF <PM2.5	100
STANDARD DEVIATION	0

ATTACHMENT 2

Analysis of CALMET-Generated Site Meteorological Data

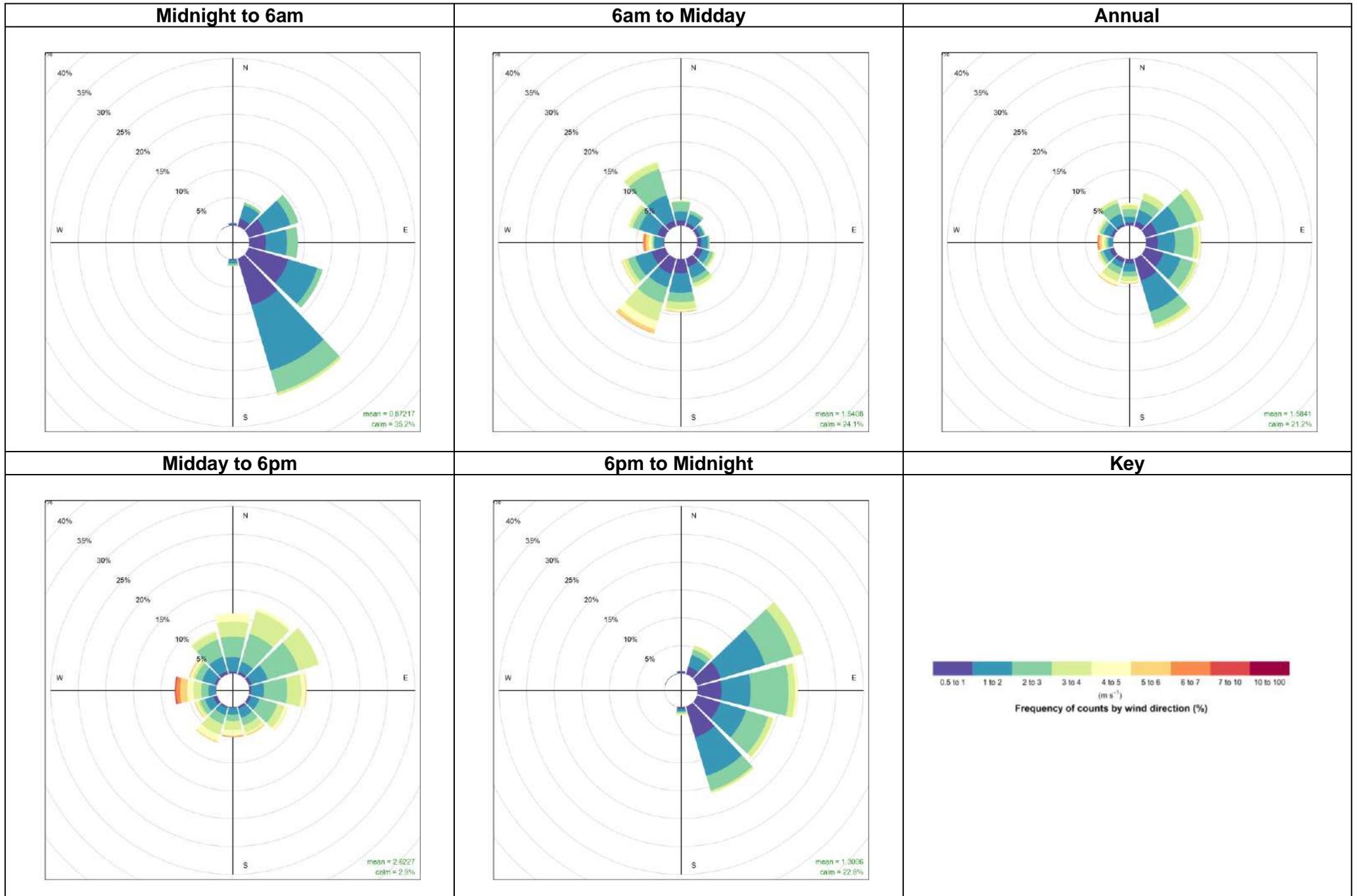


Figure A2.1 Diurnal wind roses for Site as generated by CALMET

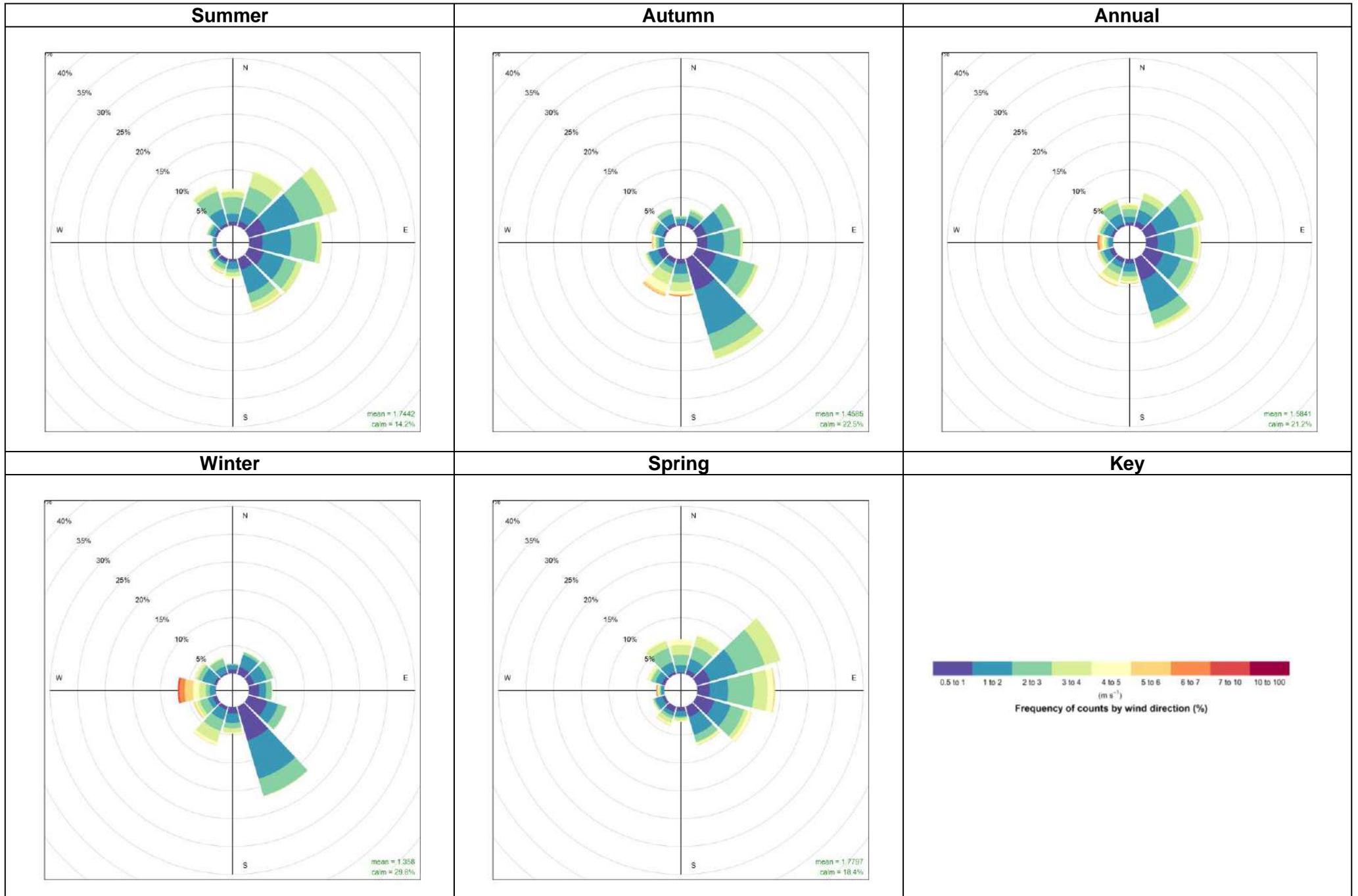


Figure A2.2 Seasonal wind roses for Site as generated by CALMET

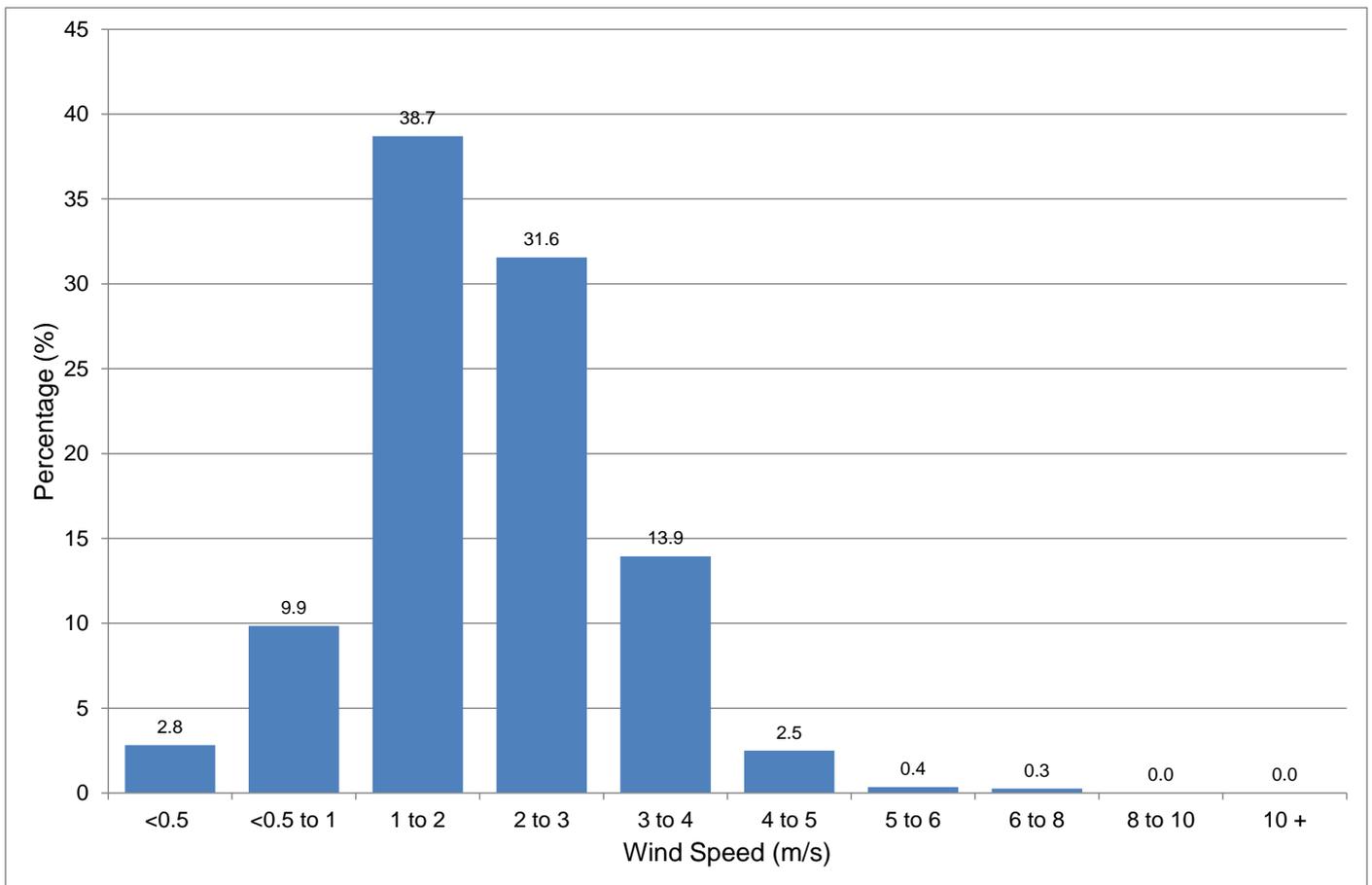


Figure A2.3 Wind frequency graph for Site as generated by CALMET

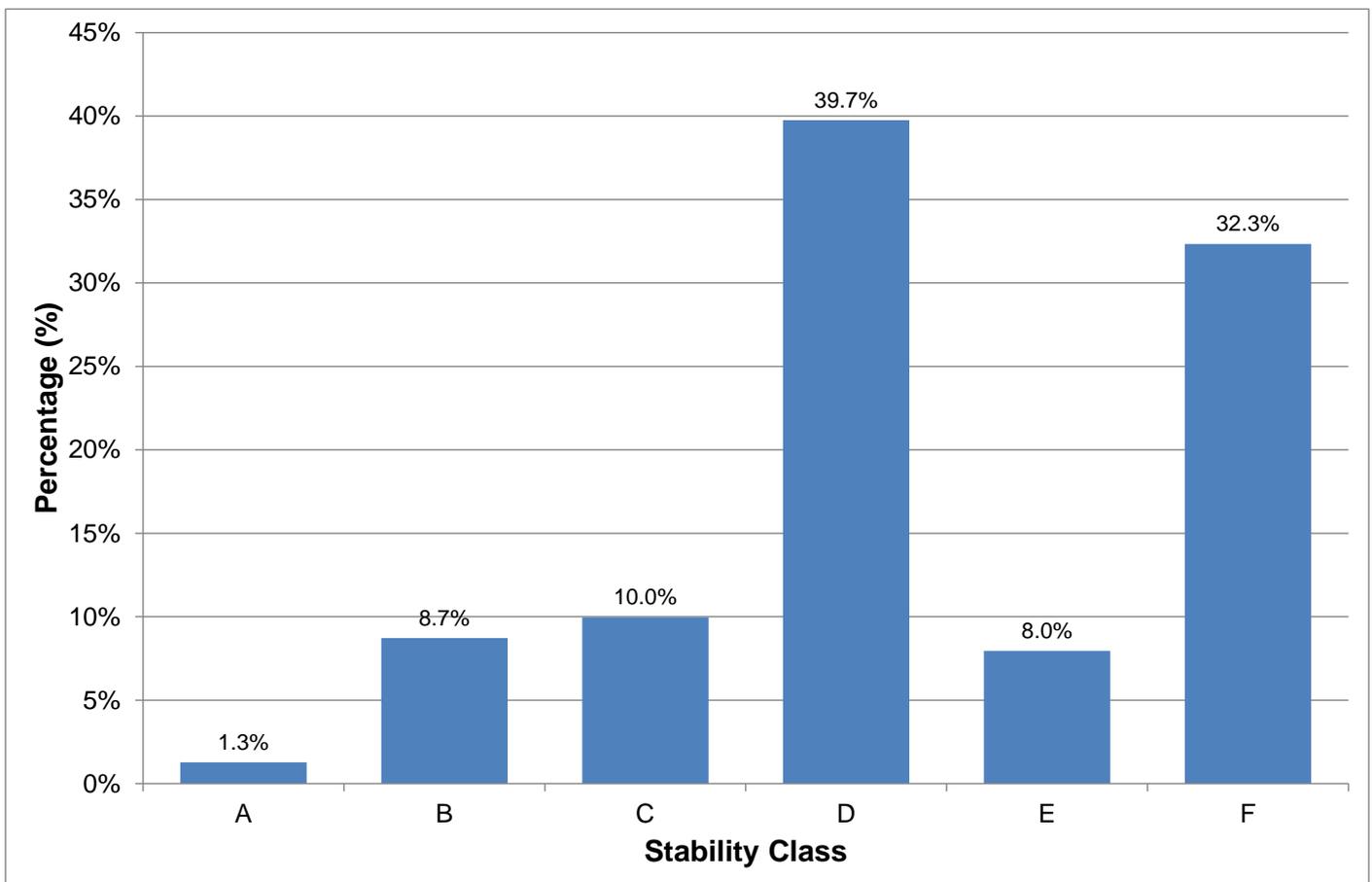


Figure A2.4 Stability Class distribution for Site as generated by CALMET

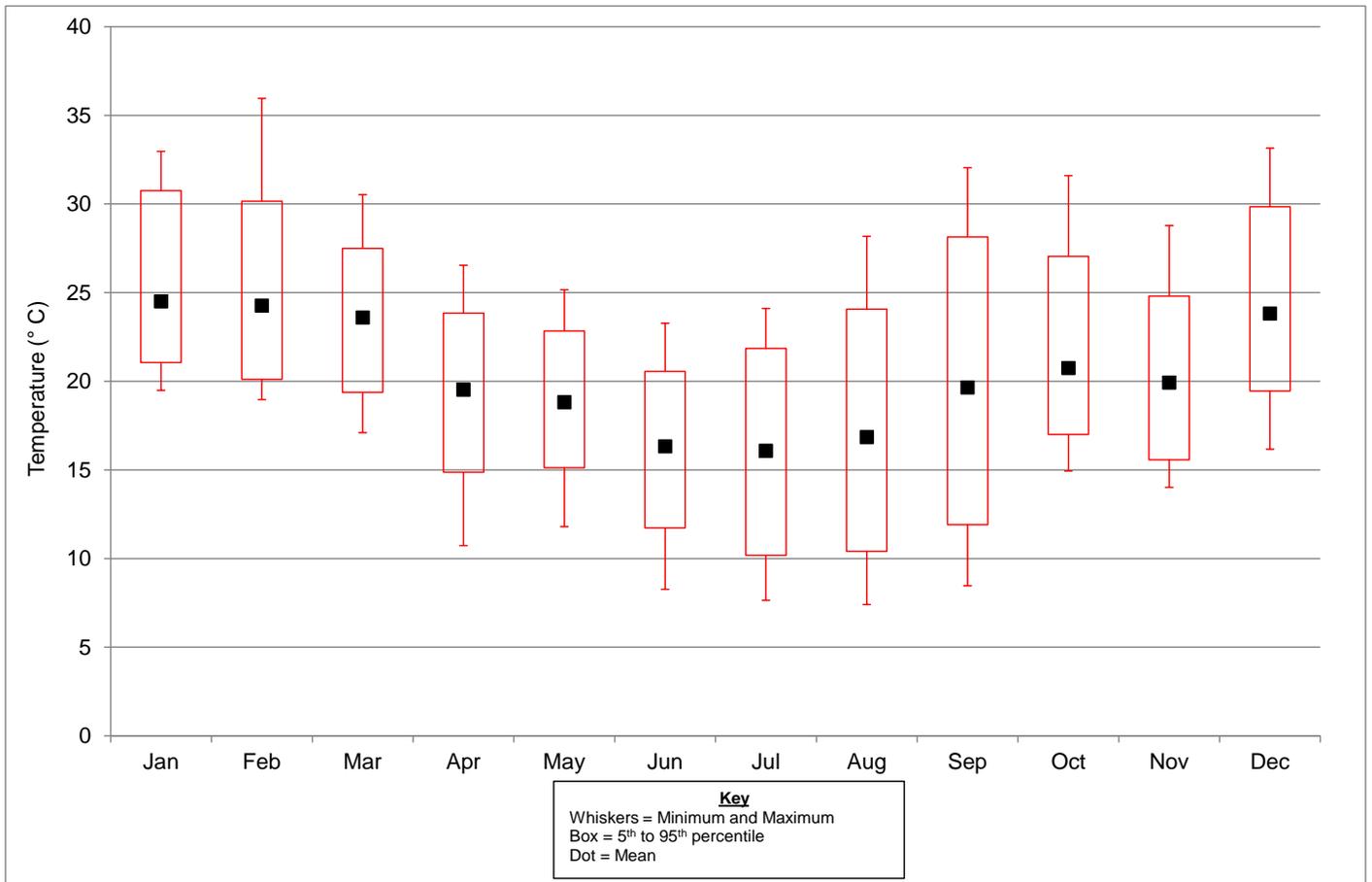


Figure A2.5 Box and Whisker plot of monthly temperature for Site as generated by CALMET

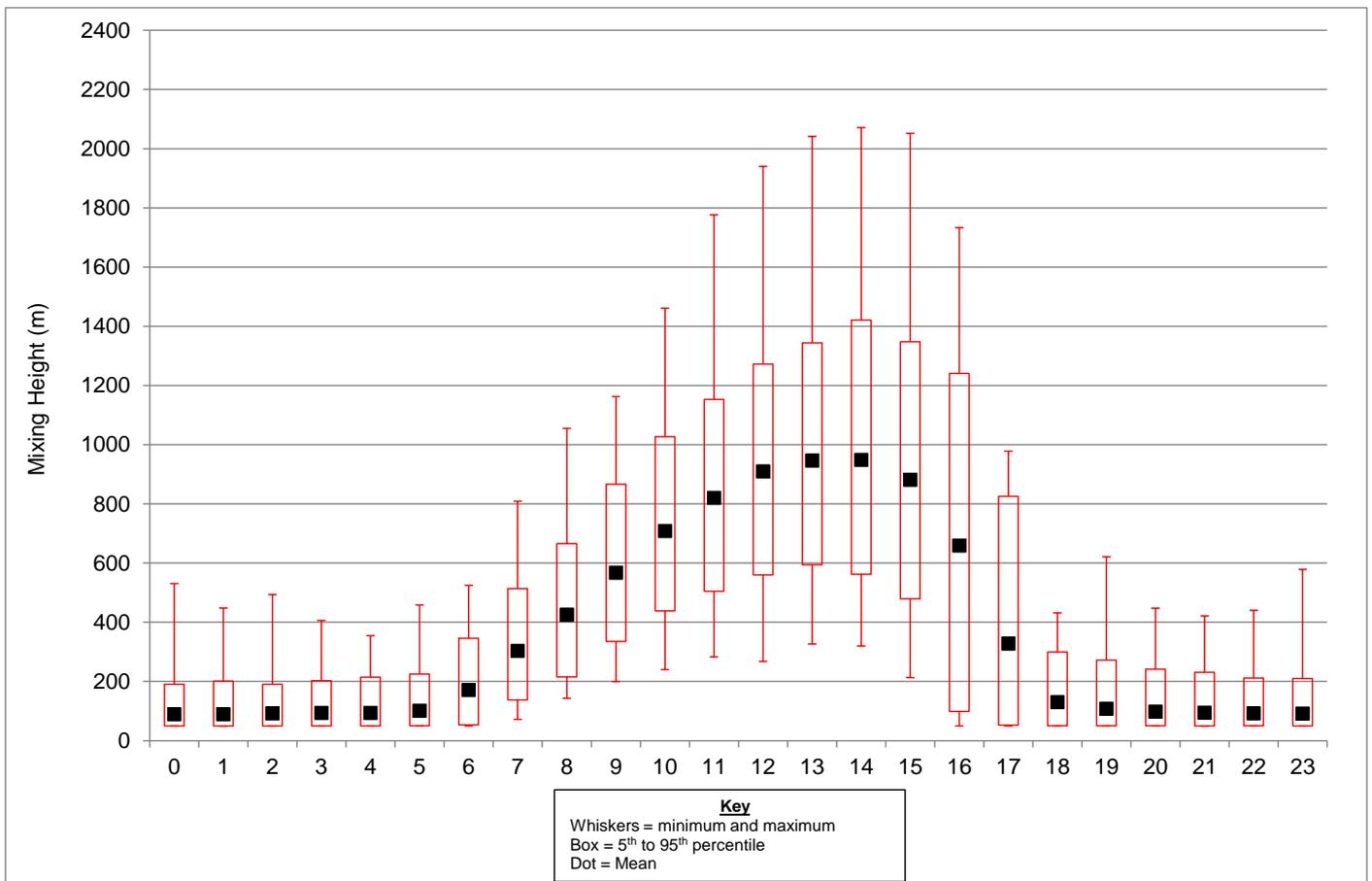


Figure A2.6 Box and Whisker plot of diurnal mixing height for Site as generated by CALMET

ATTACHMENT 3

Particulate Emission Estimation Calculations

WIND EROSION

- **Exposed Stockpile Areas, Quarry Pit and Processing Plant**

NPI Emission Estimation Technique Manual for Mining (Environment Australia, 2012)

Silt Content (s): 5 % (*USEPA AP42 Chapter 13.2.2 Table 13.2.2-1*)

Wind erosion emissions for wind speeds greater than 5.4m/s

PAVED ROADS

Paved access road for product trucks

USEPA AP42 Chapter 13.2.1 Paved Roads (2011)

Silt Loading Factor: 8.2 g/m² (*USEPA AP42 Chapter 13.2.1 Table 13.2.1-3 for quarry access road*)

Control Measures: Level 2 watering (>2 litres/m²/hour)

UNPAVED ROADS

All unpaved routes for product trucks

USEPA AP42 Chapter 13.2.2 Unpaved Roads (2006)

Haul Road Silt Content 8.3%: (*USEPA AP42 Chapter 13.2.2 Table 13.2.2-1 for quarry haul road*)

Control Measures: Level 2 watering (>2 litres/m²/hour)

All unpaved routes for dump trucks

USEPA AP42 Chapter 13.2.2 Unpaved Roads (2006)

Haul Road Silt Content 8.3%: (*USEPA AP42 Chapter 13.2.2 Table 13.2.2-1 for quarry haul road*)

Control Measures: Level 2 watering (>2 litres/m²/hour)

IN PIT ACTIVITIES

DRILLING BLAST HOLES (IN PIT)

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

LOADING TRUCKS WITH FRAGMENTED STONE (IN PIT)

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

PROCESSING PLANT

PROCESSING PLANT CONVEYOR TRANSFER POINTS

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

Control Measures: Water Sprays to Conveyor Transfer Points

LOADING TRUCKS WITH CRUSHED PRODUCT (AT STOCKPILES)

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

UNLOADING FRAGMENTED STONE FROM TRUCKS (AT TIP HEAD TO PROCESSING PLANT)

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

Control Measures: Enclosed Primary and Secondary Crusher and Tip Head

Control Efficiency: 70 % (Table 4 NPI Emission Estimation Technique Manual for Mining, Environment Australia 2011)

PROCESSING PLANT PRIMARY CRUSHING

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

Control Measures: Enclosed Primary and Secondary Crusher and Tip Head

PROCESSING PLANT SECONDARY CRUSHING

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

Control Measures: Enclosed Primary and Secondary Crusher and Tip Head

PROCESSING PLANT TERTIARY CRUSHING

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

Control Measures: Water Sprays to Processing Plant.

PROCESSING PLANT QUATERNARY CRUSHING

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

Control Measures: Water Sprays to Processing Plant.

PROCESSING PLANT SCREENING

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

Control Measures: Water Sprays to Processing Plant.

PROCESSING PLANT FINES SCREENING

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

Control Measures: Water Sprays to Processing Plant.

LOADING STOCKPILES WITH CRUSHED PRODUCT

USEPA AP42 Chapter 13.2.4 Aggregate Handling and Storage Piles (2006)

Material moisture content % (M): 0.7 (mean from Table 13.2.4-1)

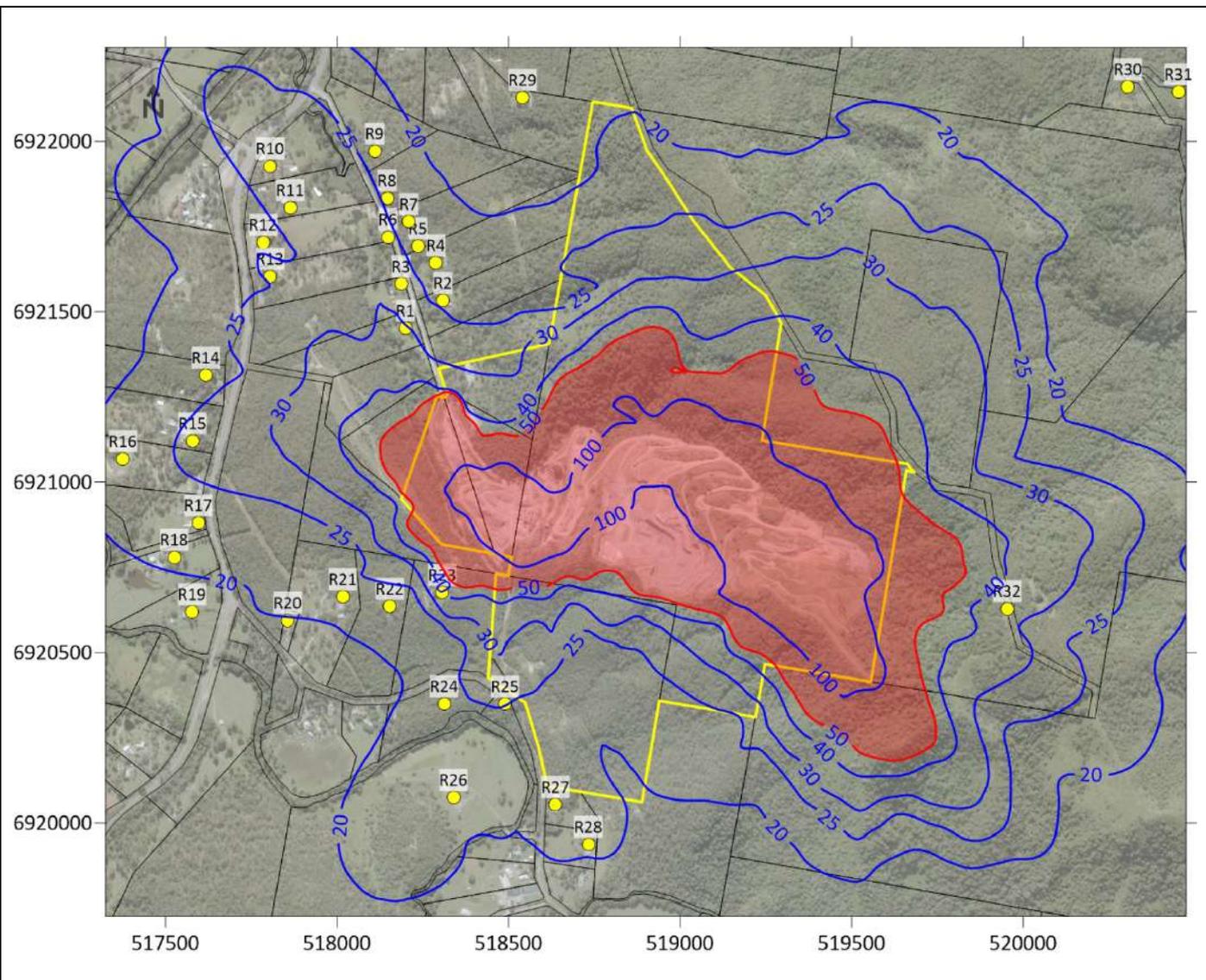
STOCKPILE AREAS

LOADING AND UNLOADING TRUCKS WITH CRUSHED PRODUCT (AT STOCKPILES)

USEPA AP42 Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing (2004)

ATTACHMENT 4

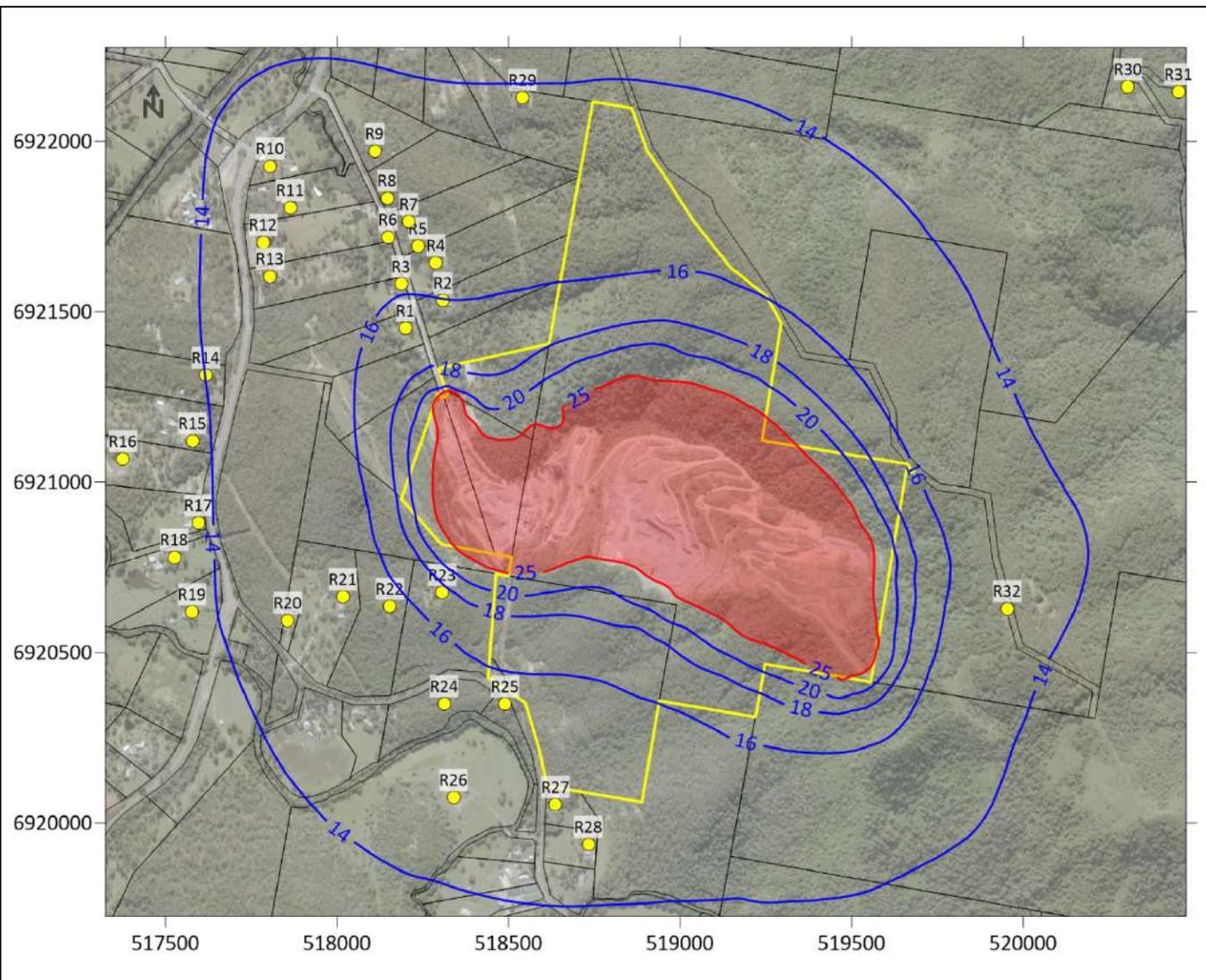
Predicted Dust Concentrations / Deposition Rates Plots



Cedar Creek - 21-081

Predicted Maximum PM₁₀ 24-hour average concentrations including ambient concentrations from the Fulton Hogan Blue Rock Quarry for a production rate of 1,600,000 tonnes per annum

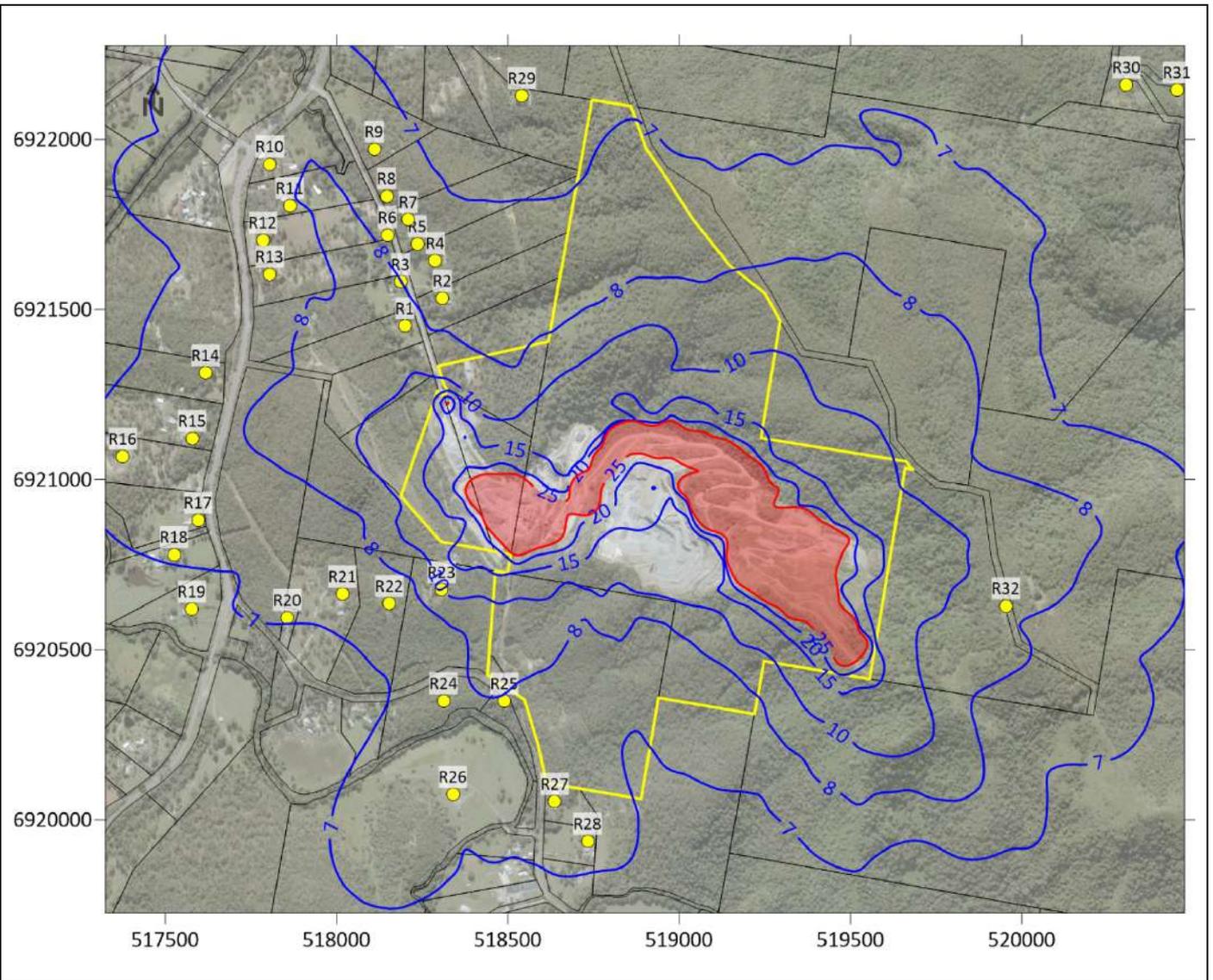
Figure A4.1	Pollutant	Averaging Period	Ambient Concentration	Air Quality Objective	Date
	PM ₁₀	Maximum 24-hour average	13.9 µg/m ³	50 µg/m ³	5-Aug-2022



Cedar Creek - 21-081

Predicted PM₁₀ annual average concentrations including ambient concentrations from the Fulton Hogan Blue Rock Quarry for a production rate of 1,600,000 tonnes per annum

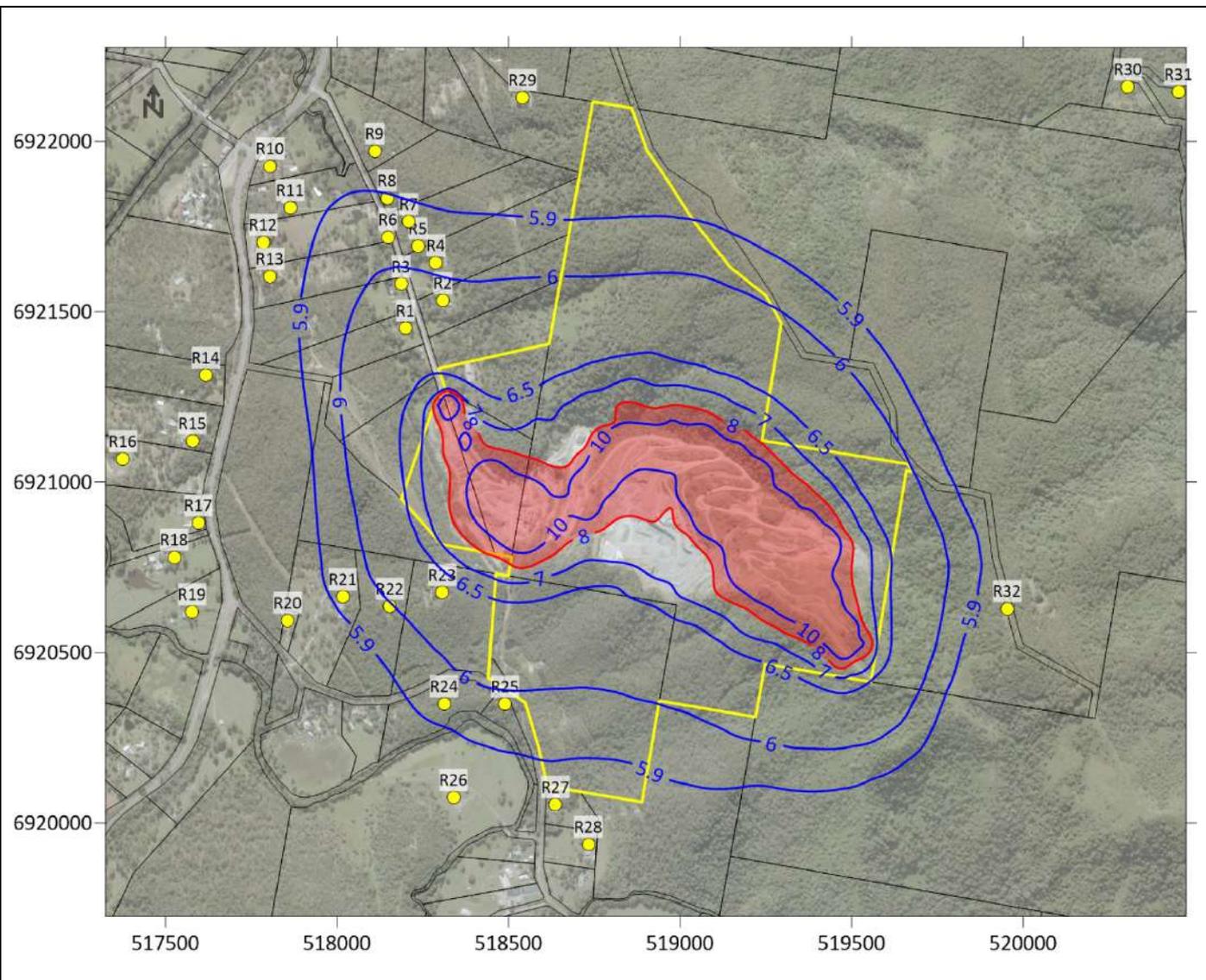
Figure A4.2	Pollutant	Averaging Period	Ambient Concentration	Air Quality Objective	Date
	PM ₁₀	Annual Average	13.2 µg/m ³	25 µg/m ³	5-Aug-2022



Cedar Creek - 21-081

Predicted Maximum PM_{2.5} 24-hour average concentrations including ambient concentrations from the Fulton Hogan Blue Rock Quarry for a production rate of 1,600,000 tonnes per annum

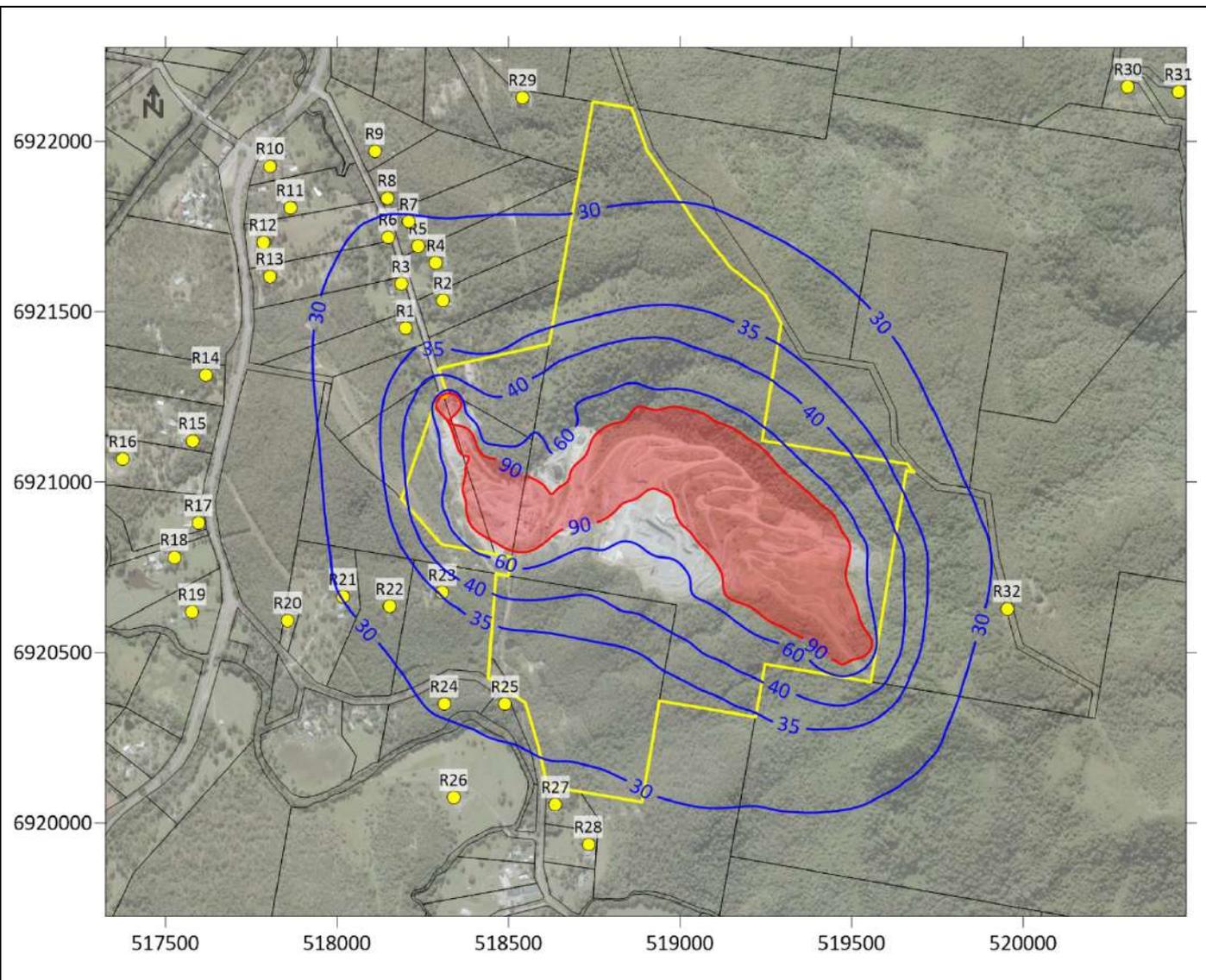
Figure A4.3	Pollutant	Averaging Period	Ambient Concentration	Air Quality Objective	Date
	PM _{2.5}	Maximum 24-hour average	6.3 µg/m ³	25 µg/m ³	5-Aug-2022



Cedar Creek - 21-081

Predicted PM_{2.5} annual average concentrations including ambient concentrations from the Fulton Hogan Blue Rock Quarry for a production rate of 1,600,000 tonnes per annum

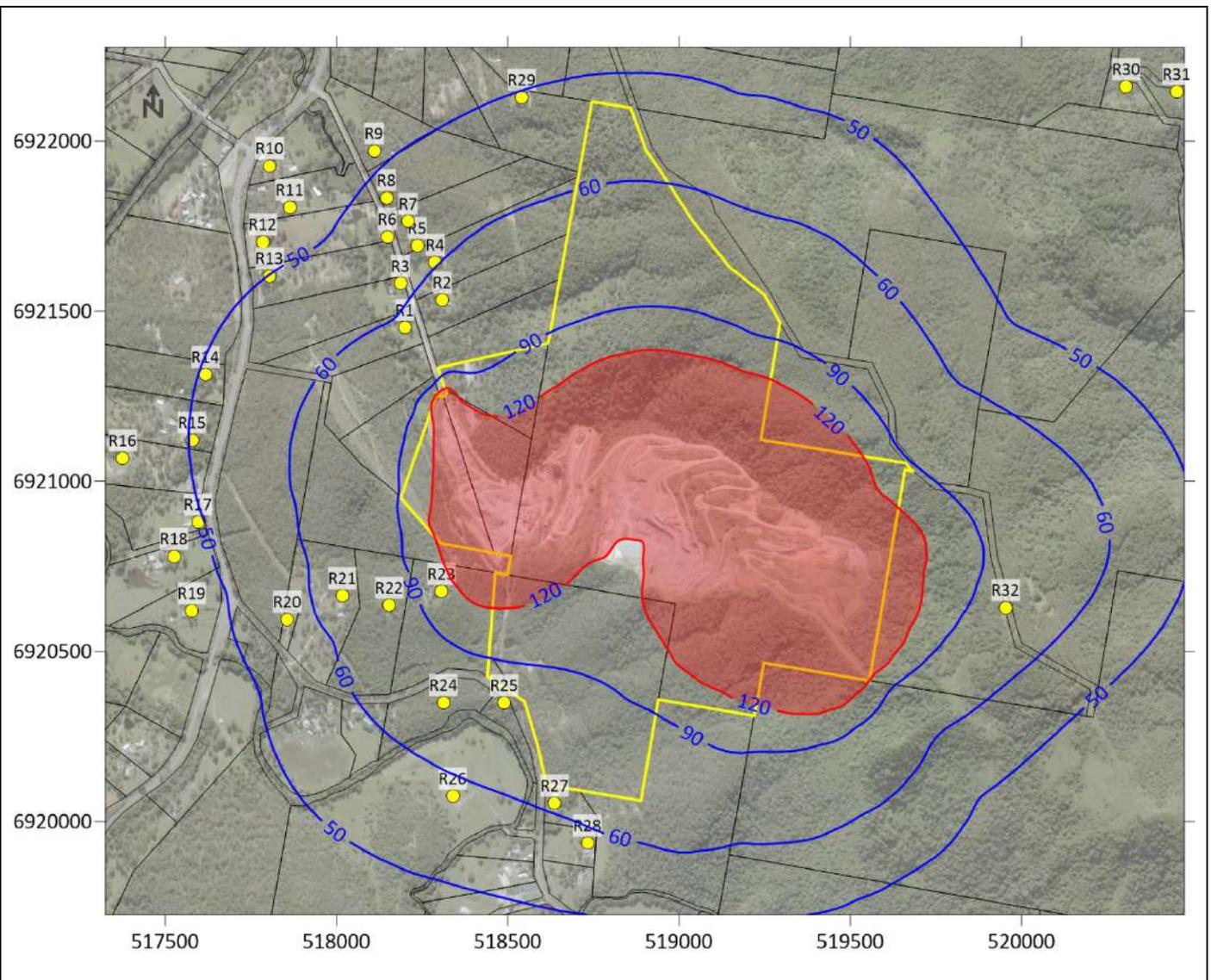
Figure A4.4	Pollutant	Averaging Period	Ambient Concentration	Air Quality Objective	Date
	PM _{2.5}	Annual Average	5.7 µg/m ³	8 µg/m ³	5-Aug-2022



Cedar Creek - 21-081

Predicted TSP annual average concentrations including ambient concentrations from the Fulton Hogan Blue Rock Quarry for a production rate of 1,600,000 tonnes per annum

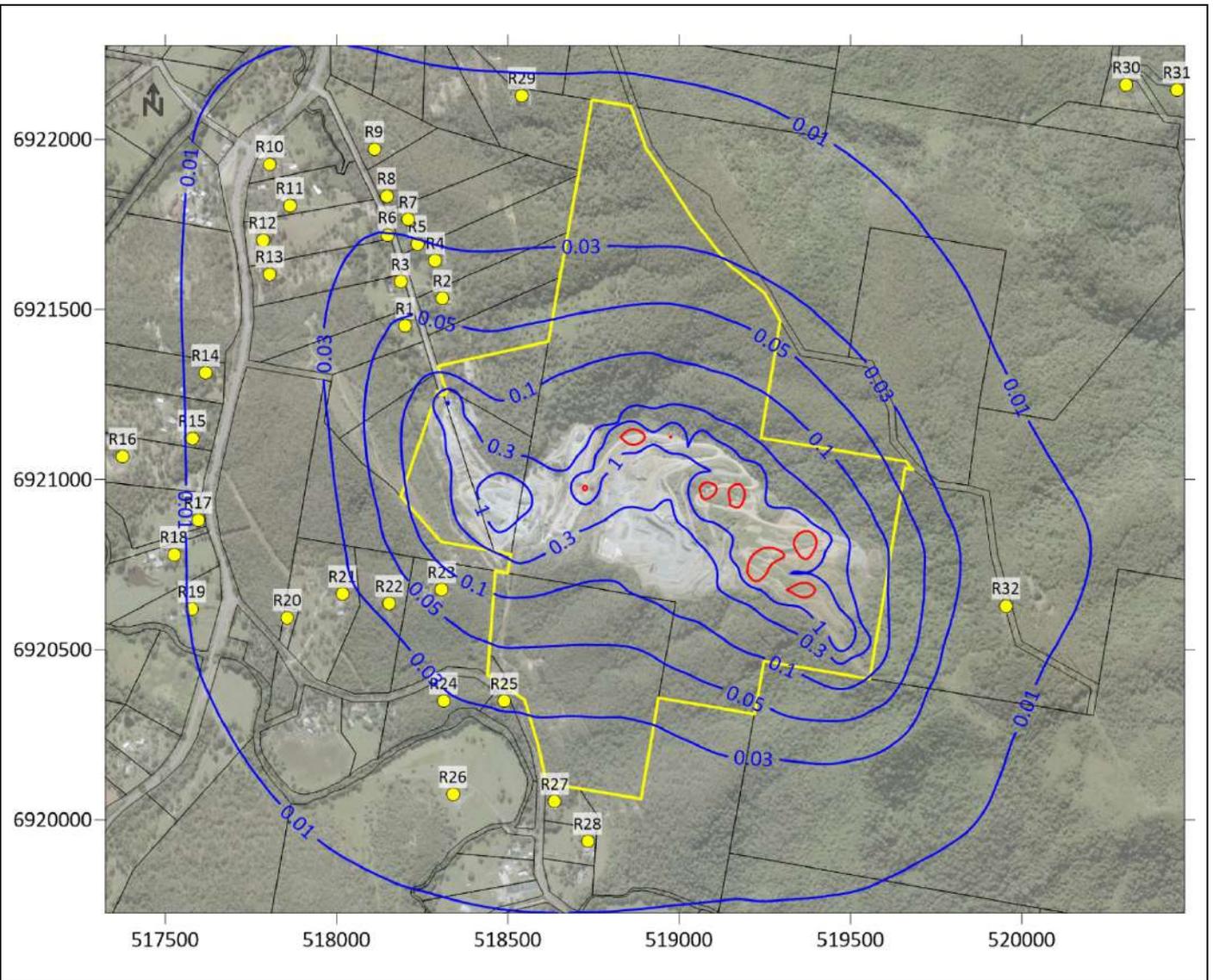
Figure A4.5	Pollutant	Averaging Period	Ambient Concentration	Air Quality Objective	Date
	TSP	Annual Average	26.4 µg/m ³	90 µg/m ³	5-Aug-2022



Cedar Creek - 21-081

Predicted Maximum Monthly Dust Deposition Rates including background deposition rates from the Fulton Hogan Blue Rock Quarry for a production rate of 1,600,000 tonnes per annum

Figure A4.6	Pollutant	Averaging Period	Background Deposition Rate	Environmental Authority Guideline	Date
	Dust Deposition	Maximum Monthly Average	40 mg/m ² /day	120 mg/m ² /day	5-Aug-2022



Cedar Creek - 21-081

Predicted Silica annual average concentrations from the Fulton Hogan Blue Rock Quarry for a production rate of 1,600,000 tonnes per annum

Figure A4.7	Pollutant	Averaging Period	Air Quality Objective	Date
	Silica	Annual Average	3 µg/m ³	5-Aug-2022

Attachment 2a – Environmental Approvals

Permit

Environmental Protection Act 1994

Environmental authority P-EA-100268669

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: P-EA-100268669

Environmental authority takes effect on 4 October 2022

The anniversary date of this environmental authority is the same day each year as the take effect date. The payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name(s)	Registered address
FULTON HOGAN QUARRIES PTY LTD	Level 1, Building 7 572 Swan Street RICHMOND VIC 3121

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
ERA 16 - Extraction and Screening - 3(c) - Screening, in a year, the following quantity of material - more than 1,000,000t	1/SP238024
ERA 16 - Extraction and Screening - 2(c) - Extracting, other than by dredging, in a year, the following quantity of material - more than 1,000,000t	1/SP238024
ERA 16 - Extraction and Screening - 3(c) - Screening, in a year, the following quantity of material - more than 1,000,000t	14/RP151378
ERA 16 - Extraction and Screening - 2(c) - Extracting, other than by dredging, in a year, the following quantity of material - more than 1,000,000t	14/RP151378
ERA 16 - Extraction and Screening - 3(c) - Screening, in a year, the following quantity of material - more than 1,000,000t	15/RP151378

Environmentally relevant activity/activities	Location(s)
ERA 16 - Extraction and Screening - 2(c) - Extracting, other than by dredging, in a year, the following quantity of material - more than 1,000,000t	15/RP151378
ERA 16 - Extraction and Screening - 2(c) - Extracting, other than by dredging, in a year, the following quantity of material - more than 1,000,000t	16/RP151378
ERA 16 - Extraction and Screening - 3(c) - Screening, in a year, the following quantity of material - more than 1,000,000t	16/RP151378
ERA 16 - Extraction and Screening - 3(c) - Screening, in a year, the following quantity of material - more than 1,000,000t	89/WD739
ERA 16 - Extraction and Screening - 2(c) - Extracting, other than by dredging, in a year, the following quantity of material - more than 1,000,000t	89/WD739

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days)

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority - on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
- c) otherwise on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

The anniversary day of this environmental authority is the same day each year as the original take effect date unless you apply to change the anniversary day. The payment of the annual fee will be due each year on this day. An annual return will be due each year on 01 April.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.



Signature

4 October 2022

Date

Clancy Mackaway
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Energy and Extractive Resources
GPO Box 2454, BRISBANE QLD 4001
Phone: (07) 3330 5737
Email: EnergyandExtractive@des.qld.gov.au

Privacy statement

Pursuant to section 540 of the EP Act, the Department is required to maintain a register of certain documents and information authorised under the EP Act. A copy of this document will be kept on the public register. The register is available for inspection by members of the public who are able take extracts, or copies of the documents from the register. Documents that are required to be kept on the register are published in their entirety, unless alteration is required by the EP Act. There is no general discretion allowing the Department to withhold documents or information required to be kept on the public register. For more information on the Department's public register, search 'public register' at www.qld.gov.au. For queries about privacy matters please email privacy@des.qld.gov.au or telephone 13 74 68.

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department and other State Government agencies prior to commencing any activity at the site. For example, this may include permits / approvals with your local Council (for planning approval), the Department of Transport and Main Roads (to access state controlled roads), the Department of Resources (to clear vegetation), and the Department of Agriculture and Fisheries (to clear marine plants or to obtain a quarry material allocation).

Obligations under the *Mining and Quarrying Safety and Health Act 1999*

If you are operating a quarry, other than a sand and gravel quarry where there is no crushing capability, you will be required to comply with the *Mining and Quarrying Safety and Health Act 1999*. For more information on your obligations under this legislation contact Mine Safety and Health at <https://www.rshq.qld.gov.au/>, or phone 13 QGOV (13 74 68) or your local Mines Inspectorate Office.

Development Approval

This permit is not a development approval under the *Planning Act 2016*. The conditions of this environmental authority are separate, and in addition to, any conditions that may be on the development approval. If a copy of this environmental authority is attached to a development approval, it is for information only, and may not be current. If you are unsure that you have the most current version of the environmental authority relating to this site please visit <https://apps.des.qld.gov.au/env-authorities/> to access all environmental authorities currently approved.

Conditions of environmental authority

Agency interest: General	
Condition number	Condition
G1	<p>Activities under this environmental authority must be conducted in accordance with the following limitations:</p> <ol style="list-style-type: none"> 1. Extraction must only occur within Lot 89 Plan WD739 and Lot 1 Plan SP238024. 2. The amount of material extracted from the site must not exceed 1,600,000 tonnes per year.
G2	All reasonable and practicable measures must be taken to prevent or minimise environmental harm caused by the activities.
G3	Any breach of a condition of this environmental authority must be reported to the administering authority as soon as practicable within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions taken.
G4	Other than as permitted by this environmental authority, the release of a contaminant into the environment must not occur.
G5	Environmental monitoring results must be kept until surrender of this environmental authority. All other information and records that are required by the conditions of this environmental authority must be kept for a minimum of five (5) years. All information and records required by the conditions of this environmental authority must be provided to the administering authority, or nominated delegate upon request, within the required timeframe and in the specified format.
G6	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.
G7	All analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses. The only exception to this condition is the in situ monitoring of turbidity, pH, electrical conductivity and dissolved oxygen.
G8	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority , to investigate a complaint of environmental nuisance arising from the activity . The monitoring results must be provided within 10 business days to the administering authority upon its request.
G9	<p>The activity must be undertaken in accordance with written procedures that:</p> <ol style="list-style-type: none"> 1. identify potential risks to the environment from the activity during routine operations, closure and an emergency 2. establish and maintain control measures that minimise the potential for environmental harm 3. ensure plant, equipment and measures are maintained in a proper and effective

	<p>condition</p> <ol style="list-style-type: none"> 4. ensure plant, equipment and measures are operated in a proper and effective manner 5. ensure that staff are trained and aware of their obligations under the <i>Environmental Protection Act 1994</i> 6. ensure that reviews of environmental performance are undertaken at least annually.
G10	Chemicals and fuels in containers of greater than 15 litres must be stored within a secondary containment system.
Agency interest: Waste	
Condition number	Condition
W1	All waste generated in carrying out the activity must be reused, recycled or removed to a facility that can lawfully accept the waste.
Agency interest: Air	
Condition number	Condition
A1	Other than as permitted within this environmental authority, odours or airborne contaminants must not cause environmental nuisance to any sensitive place or commercial place .
A2	<p>Dust and particulate matter emissions must not exceed the following concentrations at any sensitive place or commercial place:</p> <ol style="list-style-type: none"> a) dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 (or more recent editions), or b) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, when monitored in accordance with Australian Standard AS 3580.9.6 (or more recent editions) or any other method approved by the administering authority.
Agency interest: Land	
Condition number	Condition
L1	Contaminants must not be released to land.
L2	<p>Land that has been disturbed for activities conducted under this environmental authority must be rehabilitated in a manner such that:</p> <ol style="list-style-type: none"> 1. suitable native species of vegetation for the location are established and sustained for earthen surfaces; 2. potential for erosion is minimised;

	<ol style="list-style-type: none"> 3. the quality of water released from the site, including seepage, does not cause environmental harm; 4. potential for environmental nuisance caused by dust is minimised; 5. the water quality of any residual water body does not have potential to cause environmental harm; 6. the final landform is stable and protects public safety. 																														
L3	Rehabilitation of disturbed areas required under condition L2 must take place progressively as works are staged and new extraction areas are commenced.																														
Agency interest: Acoustic																															
Condition number	Condition																														
N1	Other than as permitted within this environmental authority, noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place.																														
N2	<p>Noise from the activity must not exceed the levels identified in <i>Table 1 - Noise limits</i> when measured in accordance with the associated monitoring requirements.</p> <p>Table 1 - Noise limits</p> <table border="1"> <thead> <tr> <th rowspan="2">Noise level dB(A) measured as</th> <th>6am – 7am</th> <th>7am – 6pm</th> <th>6pm – 10pm</th> <th>10pm – 6am</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">Noise measured at the sensitive place*</td> <td></td> </tr> <tr> <td>L_{Aeq}, adj, T</td> <td style="text-align: center;">35</td> <td style="text-align: center;">45</td> <td style="text-align: center;">35</td> <td style="text-align: center;">30</td> </tr> <tr> <td>Max L_{pA} T</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">49</td> </tr> <tr> <td colspan="4" style="text-align: center;">Noise measured at the commercial place</td> <td></td> </tr> <tr> <td>L_{Aeq}, adj, T</td> <td style="text-align: center;">40</td> <td style="text-align: center;">50</td> <td style="text-align: center;">40</td> <td style="text-align: center;">40</td> </tr> </tbody> </table> <p>* A residential dwelling at the location is not considered to be a sensitive place, so long as a contractual arrangement exists between you and the owner of the dwelling</p> <p>Associated monitoring requirements</p> <ol style="list-style-type: none"> 1. All monitoring devices must be calibrated and maintained according to the manufacturer's instruction manual. 2. Any monitoring must be in accordance with the most recent version of the administering authority's <i>Noise Measurement Manual</i>. 3. Any monitoring of noise emissions from the activity must be undertaken when the activity is in operation. 	Noise level dB(A) measured as	6am – 7am	7am – 6pm	6pm – 10pm	10pm – 6am	Noise measured at the sensitive place*					L _{Aeq} , adj, T	35	45	35	30	Max L _{pA} T	-	-	-	49	Noise measured at the commercial place					L _{Aeq} , adj, T	40	50	40	40
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Max L _{pA} T	-	-	-	49																											
Noise measured at the commercial place																															
L _{Aeq} , adj, T	40	50	40	40																											
N3	<p>When required by the administering authority, noise monitoring must be undertaken in accordance with the associated monitoring requirements of <i>Table 1 - Noise Limits</i>, and the results notified within 14 days to the administering authority. Monitoring must include:</p> <ol style="list-style-type: none"> 1. L_{Aeq}, adj, T 2. Background noise (Background) as LA 90, adj, T 																														

	<ol style="list-style-type: none"> 3. MaxLpA,T 4. the level and frequency of occurrence of any impulsive or tonal noise 5. atmospheric conditions including wind speed and direction 6. effects due to extraneous factors such as traffic noise 7. recording of location, date and time of measurements. 						
N4	Generation of substantial low frequency noise is not permitted.						
N5	<p>Blasting activities must not exceed the limits for peak particle velocity and air blast overpressure in <i>Table 2 – Blasting noise limits</i> when measured at any sensitive place or commercial place in accordance with the associated monitoring requirements.</p> <p>Table 2 - Blasting noise limits</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Blasting criteria</th> <th style="text-align: left;">Blasting limits</th> </tr> </thead> <tbody> <tr> <td>Airblast overpressure</td> <td>115 dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time.</td> </tr> <tr> <td>Ground vibration peak particle velocity</td> <td>5 mm/s peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/s peak particle velocity at any time.</td> </tr> </tbody> </table> <p>Associated monitoring requirements</p> <ol style="list-style-type: none"> 1. Monitoring must be performed in accordance with the most recent edition of the administering authority's <i>Noise and Vibration from Blasting guideline</i> and <i>Noise Measurement Manual</i> and any relevant <i>Australian Standard</i>. 2. All monitoring devices must be calibrated and maintained according to the manufacturer's instruction manual. 	Blasting criteria	Blasting limits	Airblast overpressure	115 dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time.	Ground vibration peak particle velocity	5 mm/s peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/s peak particle velocity at any time.
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Ground vibration peak particle velocity	5 mm/s peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/s peak particle velocity at any time.						
N6	Blasting must be carried out in accordance with the current edition of the administering authority's <i>Noise and vibration from blasting guideline</i> and with <i>Australian Standard 2187</i> .						
N7	<p>Unless prior approval is obtained from the administering authority:</p> <ol style="list-style-type: none"> 1. blasting is only permitted during the hours of 9 am to 3 pm Monday to Friday, and from 9 am to 1 pm on Saturdays. 2. blasting is not permitted at any time on Sundays or public holidays. 						
N8	When required by the administering authority , a blast monitoring program must be developed and implemented to monitor compliance with <i>Table 2 - Blasting noise limits</i> at any sensitive place or commercial place .						
Agency interest: Water							
Condition number	Condition						
WA1	Other than as permitted within this environmental authority, contaminants must not be released to any waters.						

WA2	<p>The only contaminants to be released to surface waters are settled treated stormwater runoff from areas of the site not likely to be contaminated with waste materials to waters described as Release Point B2 on Michie Creek in accordance with <i>Table 2 - Surface water release limits</i> and the associated monitoring requirements.</p> <p>Table 2 - Surface water release limits</p> <table border="1"> <thead> <tr> <th colspan="2">Release Point(s) Description (GDA2020 decimal degrees)</th> <th rowspan="2">Quality characteristic (units)</th> <th rowspan="2">Limit</th> <th rowspan="2">Limit Type</th> <th rowspan="2">Minimum Monitoring Frequency</th> </tr> <tr> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td rowspan="9">27.8343 S</td> <td rowspan="9">153.1852E</td> <td>pH (pH units)</td> <td>6.5 to 8.0</td> <td>range</td> <td rowspan="4">Monthly (event based monitoring) upon release</td> </tr> <tr> <td>Total Suspended Solids (mg/L)</td> <td>50.0*</td> <td>maximum</td> </tr> <tr> <td>Turbidity (ntu)</td> <td>60.0*</td> <td>maximum</td> </tr> <tr> <td>Dissolved Oxygen (mg/L)</td> <td>80 — 105% saturation</td> <td>range</td> </tr> <tr> <td></td> <td></td> <td>Litter / gross pollutants</td> <td>No release</td> <td></td> <td rowspan="2">Weekly (event based monitoring) upon release</td> </tr> <tr> <td></td> <td></td> <td>Visible Oil and Grease</td> <td>No release</td> <td>maximum</td> </tr> <tr> <td></td> <td></td> <td>Total Metals (µg/L)</td> <td>N/A</td> <td>maximum</td> <td rowspan="3">Upon request of the administering authority</td> </tr> <tr> <td></td> <td></td> <td>Phosphorus (mg/L)</td> <td>0.07</td> <td>maximum</td> </tr> <tr> <td></td> <td></td> <td>Total Nitrogen (mg/L)</td> <td>0.65</td> <td>maximum</td> </tr> </tbody> </table> <p>*limit applies to stormwater releases up to and including a 24-hour storm event with an average recurrence interval of 1 in 5 years.</p> <p>Associated monitoring requirements</p> <ol style="list-style-type: none"> Monitoring location and release points must be situated and maintained in accordance with plan titled 'Water Quality Sampling and Monitoring Locations' – document number 982.144 (Rev 1) – Groundwork Plus – 4 December 2012. Monitoring must be in accordance with the methods prescribed in the current edition of the administering authority's <i>Monitoring and Sampling Manual</i>. Water and sediment samples must be representative of the general condition of the water body or sediments. All determinations must employ analytical practical quantification limits of sufficient sensitivity to enable comparisons to be made against water quality objectives/triggers/limits relevant to the particular water or sediment quality characteristic. Monitoring must be undertaken during a release and at the frequency stated. All monitoring devices must be calibrated and maintained according to the manufacturer's instruction manual. 					Release Point(s) Description (GDA2020 decimal degrees)		Quality characteristic (units)	Limit	Limit Type	Minimum Monitoring Frequency	Latitude	Longitude	27.8343 S	153.1852E	pH (pH units)	6.5 to 8.0	range	Monthly (event based monitoring) upon release	Total Suspended Solids (mg/L)	50.0*	maximum	Turbidity (ntu)	60.0*	maximum	Dissolved Oxygen (mg/L)	80 — 105% saturation	range			Litter / gross pollutants	No release		Weekly (event based monitoring) upon release			Visible Oil and Grease	No release	maximum			Total Metals (µg/L)	N/A	maximum	Upon request of the administering authority			Phosphorus (mg/L)	0.07	maximum			Total Nitrogen (mg/L)	0.65	maximum
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WA3	The release to waters permitted under WA2 must not contain any other properties at a concentration capable of causing environmental harm.
WA4	The release to waters permitted under WA2 must not produce any slick or other visible evidence of oil or grease, scum, litter or other visually objectionable matter.
WA5	Stormwater that is not contaminated by the activity must be diverted away from areas where it may become contaminated by the activity.
WA6	The EA holder must construct, operate and maintain stormwater treatment infrastructure to: <ul style="list-style-type: none">a) capture and retain the stormwater from all disturbed areas during a 24-hour storm event with an average recurrence interval of 1 in 5 years (batch treatment); orb) achieve a 90% hydraulic efficiency to treat stormwater to achieve a maximum level of suspended solids of 50mg/L.

Definitions

Key terms and/or phrases used in this document are defined in this section. Where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

24 hour storm event with an average recurrence interval of 1 in 5 years means the maximum rainfall depth from a 24 hour duration precipitation event with an average recurrence interval of once in 5 years. *For example, an Intensity-Frequency-Duration table for a 24 hour duration event with an average recurrence interval of 1 in 5 years, identifies a rainfall intensity of 7.09mm/hour. The rainfall depth for this event is therefore 24 hour x 7.09mm/hour = 170.16mm.*

Activity means the environmentally relevant activities, whether resource activities or prescribed activities, to which the environmental authority relates.

Administering authority means the Department of Environment and Science or its successor or predecessors.

Airblast overpressure is the energy transmitted from the blast site within the atmosphere in the form of pressure waves. As these waves pass a given position, the pressure of the air rises very rapidly then falls more slowly then returns to the ambient value after a number of oscillations. The pressure wave consists of both audible (noise) and inaudible (concussion) energy. The maximum excess pressure in this wave is known as the peak air overpressure, generally measured in decibels using the linear frequency-weighting.

Appropriately qualified person(s) means a person or persons who has professional qualifications, training, skills or experience relevant to the EA requirement and can give authoritative assessment, advice and analysis in relation to the EA requirements using the relevant protocols, standards, methods or literature.

Background means noise, measured in the absence of the noise under investigation, as $L_{A 90, adj, T}$ being the A-weighted sound pressure level exceeded for 90 per cent of the time period of not less than 15 minutes, using Fast response.

Blasting is the use of explosives to fracture:

- rock, coal and other minerals for later recovery; or
- structural components or other items to facilitate removal from a site or for reuse.

Commercial place means a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

Disturbed areas includes areas:

1. that are susceptible to erosion;
2. that are contaminated by the activity; and/or
3. upon which stockpiles of soil or other materials are located.

Environmental nuisance as defined in Chapter 1 of the *Environmental Protection Act 1994*.

Environmental value –

- a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or
- another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

Groundwater means water that occurs naturally in, or is introduced artificially into, an aquifer.

Land means any land, whether above or below the ordinary high-water mark at spring tides (i.e. includes tidal land).

$L_{Aeq, adj, T}$ means the adjusted A weighted equivalent continuous sound pressure level measured on fast response, adjusted for tonality and impulsiveness, during the time period T, where T is measured for a period no

less than 15 minutes when the activity is causing a steady state noise, and no shorter than one hour when the approved activity is causing an intermittent noise.

Max_{L_{pA,T}} means the maximum A-weighted sound pressure level measured over a time period T of not less than 15 minutes, using Fast response.

Measures has the broadest interpretation and includes:

- Procedural measures such as standard operating procedures for dredging operations, environmental risk assessment, management actions, departmental direction and competency expectations under relevant guidelines
- Physical measures such as plant, equipment, physical objects (such as bunding, containment systems etc.), ecosystem monitoring and bathymetric surveys.

NATA means National Association of Testing Authorities.

Nominated delegate means another government agency that provides services to the administering authority.

Noxious means harmful or injurious to health or physical well-being.

Offensive means causing offence or displeasure; is unreasonably disagreeable to the senses; disgusting, nauseous or repulsive.

Records include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a condition of this authority.

Release of a contaminant into the environment means to:

1. deposit, discharge, emit or disturb the contaminant
2. cause or allow the contaminant to be deposited, discharged, emitted or disturbed
3. fail to prevent the contaminant from being deposited, discharged emitted or disturbed
4. allow the contaminant to escape
5. fail to prevent the contaminant from escaping.

Secondary containment system means a system designed, installed and operated to prevent any release of contaminants from the system, or containers within the system, to land, groundwater, or surface waters.

Sensitive place includes the following and includes a place within the curtilage of such a place reasonably used by persons at that place:

1. a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
2. a motel, hotel or hostel; or
3. a kindergarten, school, university or other educational institution; or
4. a medical centre or hospital; or
5. a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
6. a public park or garden; or
7. for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2019.

Stormwater that is not contaminated by the activity includes stormwater runoff from external or undisturbed catchments.

Substantial low frequency noise means a noise emission that has an unbalanced frequency spectrum shown in a one-third octave band measurement, with a predominant component within the frequency range 10 to 200 Hz. It includes any noise emission likely to cause an overall sound pressure level at a sensitive place exceeding 55 dB(Z).

Tidal land means land that is submerged at any time by tidal water.

Vibration is the oscillating or periodic motion of a particle, group of particles, or solid object about its equilibrium position.

Waters includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water, natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

You means the holder of the environmental authority.

Appendix 1 - Water Quality Sampling and Monitoring Locations



END OF ENVIRONMENTAL AUTHORITY

13 May 2014
Steven Brett
City Development
(07) 5582 8866

PN129492/01/DA2
MCU201400231

Fulton Hogan Construction Pty Ltd
C/- Urban Planning Services
PO BOX 2091
SURFERS PARADISE QLD 4217

Dear Sir/Madam,

REQUEST TO CHANGE AN EXISTING APPROVAL - NOTICE TO APPLICANT

Application type:

PERMISSIBLE CHANGE TO
DEVELOPMENT APPROVAL FOR
MATERIAL CHANGE OF USE (IMPACT
ASSESSMENT) FOR EXTRACTIVE
INDUSTRY (ANCILLARY ACTIVITIES –
STOCKPILING, WHEEL WASH,
WEIGHBRIDGE, CRIB ROOM AND SITE
OFFICE) AND ERA 16 – EXTRACTING AND
SCREENING (STOCKPILING OF
SCREENED PRODUCT)

Property situated at:

Cedar Creek Road, Cedar Creek

Property description:

Lot 14 on RP151378 , Lot 15 on RP151378 ,
Lot 16 on RP151378 , Lot 89 on WD739 , Lot
1 on SP238024

Date request for change was made:

19 March 2014

Details of original development:

MCU201100490

**Date of original development
application approval/court decision:**

19 August 2013

I wish to advise that on 9 May 2014, the request to change an existing approval was approved as outlined in the enclosed document.

Extracts from the [Sustainable Planning Act 2009](#), which detail your appeal rights, are enclosed for your information.

Contacting us

Should you wish to clarify any issues contained in this letter, please do not hesitate to contact Planning Assessment on telephone (07) 5582 8866.

Yours faithfully

Michael Moran
SUPERVISING TOWN PLANNER MCU COMPLEX
For the Chief Executive Officer

Council of the City of Gold Coast
This is an authorised version of the original document

Real property description	Lot 14 on RP151378 , Lot 15 on RP151378 , Lot 16 on RP151378 , Lot 89 on WD739 , Lot 1 on SP238024
Address of property	Cedar Creek Road Cedar Creek
Area of property	153.56ha.
Decision type	Permissible Change to Development Approval for a Material Change of Use (Impact Assessment) for Extractive Industry (Ancillary Activities – Stockpiling, Wheel Wash, Weighbridge, Crib Room and Site Office) and ERA 16 – Extracting and Screening (Stockpiling of Screened Product)
Further development permits	Operational Works, Building Works
Further compliance permits	Sewerage Works, Water Supply Plumbing Work
Compliance assessment required for documents or works	Nil

NATURE OF DECISION

REQUEST TO CHANGE DEVELOPMENT APPROVAL

- A** Under Delegated Authority the Manager of the City Development Branch decides the request to make a change to the development permit dated 19 August 2013, for material change of use for Extractive Industry (Ancillary Activities – Stockpiling, Wheel Wash, Weighbridge, Crib Room and Site Office) and ERA 16 – Extracting and Screening (Stockpiling of Screened Product) is set out below as follows:

Condition 1 which currently reads:

1 Development to be generally in accordance with specified plans/drawings

The development must be carried out generally in accordance with the approved plans/drawings listed below, stamped and returned to the applicant with this decision notice.

Plan No.	Rev.	Title	Date	Prepared by
Project ID 10513290	2	Blue Rock Quarry – Conceptual Layout Plan	8/12/2011	Aecom
Project ID 10513290	2	Blue Rock Quarry – Cribb Room, Weigh Bridge & Wheel Wash Concept Plan	8/12/2011	Aecom
3290.01	D	Blue Rock Quarry Landscape Strategy	19/1/2012	Aecom

is changed to read as follows:

1 Development to be generally in accordance with specified plans/drawings

The development must be carried out generally in accordance with the approved plans/drawings listed below, stamped and returned to the applicant with this decision notice.

Plan No.	Rev.	Title	Date	Prepared by
FS1689-S001	3	Blue Rock Quarry – Masterplan	28/1/14	FSA Consulting Engineers
FS1689-S003	2	Blue Rock Quarry – Workshop Site Plan	28/1/14	FSA Consulting Engineers

FS1689-S002	3	Blue Rock Quarry Weighbridge & Administration Building Option 2A	28/1/14	FSA Consulting Engineers
3290.01	D	Blue Rock Quarry Landscape	19/1/2012	Aecom

Condition 6 which currently reads:

6 Notice of commencement of use of new facilities

At least 10 business days prior to the commencement of use of the new facilities as detailed on the approved plan, being;

Project ID 10513290	2	Blue Rock Quarry – Conceptual Layout Plan	8/12/2011	Aecom
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the applicant must give Council written notice of the following:

- a Application number;
- b Site address;
- c Name and telephone number (work and after hours) of the a suitable contact person to arrange a site inspection;
- d The estimated commencement date for the use.

The notification is to be sent to Council’s Development Compliance Team Leader (fax: 07 5596 8080; phone: 07 5582 8184). This notification is in addition to any other notifications required by other conditions of this or other development approvals.

A form is available to assist in providing the information relating to Notice of Works/Commencement requirements. The form can be obtained at Council Offices (Nerang, Bundall and Coolangatta). It also can be found on Council's website at www.goldcoast.qld.gov.au/forms (Building & Development).

is changed to read as follows:

6 Notice of commencement of use of new facilities

At least 10 business days prior to the commencement of use of the new facilities as detailed on the approved plan, being;

FS1689-S001	3	Blue Rock Quarry – Masterplan	28/1/14	FSA Consulting Engineers
-------------	---	-------------------------------	---------	--------------------------

the applicant must give Council written notice of the following:

- a Application number;
- b Site address;
- c Name and telephone number (work and after hours) of the a suitable contact person to arrange a site inspection;
- d The estimated commencement date for the use.

The notification is to be sent to Council’s Development Compliance Team Leader (fax: 07 5596 8080; phone: 07 5582 8184). This notification is in addition to any other notifications required by other conditions of this or other development approvals.

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Condition 12 which currently reads:

12 Construction management plan

- a A construction management plan must be submitted to, and approved by, Council prior to the issue of any development permit for the carrying out of building work.
- b The construction management plan must be submitted in accordance with the Application for Construction Management Plan form and Guidelines for Construction Management Plans are available on Council's website.
- c The construction management plan must address all activities associated with construction (excluding noise and dust issues), including but not limited to:
 - i Vehicle access (including responsibility for maintenance of the defined cartage route) during hours of construction;
 - ii Traffic management (including loading and unloading);
 - iii Parking of vehicles (including on site employees and delivery vehicles);
 - iv Maintenance of safe pedestrian movement across the site's frontage/s (including by people with disabilities);
 - v Building waste / refuse disposal;
 - vi Presentation of hoarding to the street;
 - vii Tree management.
 - viii The construction management plan must demonstrate that:
 - ix the general public will be adequately protected from construction activities;
 - x the building site will be kept clean and tidy to maintain public safety and amenity; and
 - xi demand for occupation of the street and protection of Council assets will be well managed.
- d The approved construction management plan must be complied with and kept on-site at all times.

is cancelled.

Condition 17 which currently reads:

17 Report from registered soil evaluator to be submitted

In conjunction with the hydraulic design for the sewerage works within the property, the applicant must submit to Council (Plumbing and Drainage Services) a report from a registered soil evaluator demonstrating that the proposed on-site sewerage treatment facility and effluent land application complies with AS/NZS 1547 – *On-site domestic wastewater management*.

Information note:

The operation of the on-site sewerage facility must comply with Council's Local Law No. 42 (On-Site Sewerage Facility) 2002 and subordinate Local Law which, among other things impose obligations on the owner of premises on which an on-site sewerage is operated in relation to:

- *arranging servicing of the facility by a service contractor;*
- *periodic inspections, monitoring and maintenance; and*
- *inspections which may be carried out from time to time by Council's authorised persons.*

remains unchanged.

Condition 21 which currently reads:

21 Geotechnical certification of long-term stability of the site

Prior to issuing any building works approval for the proposed buildings on Lot 14 on RP151378, Lot 15 on RP151378 and Lot 16 on RP151378, the applicant must submit to Council certification from a Registered Professional Engineer of Queensland (RPEQ) specialising in geotechnical engineering confirming that the proposed new buildings, weighbridge and other permanent structures' locations on the site will achieve a slope instability hazard rating of 'Low' or better, and that adequate geotechnical and drainage measures have been incorporated in the design to ensure long-term stability of these structures' locations on the site.

is changed to read as follows:

21 Geotechnical certification of long-term stability of the site

Prior to issuing any building works approval for the proposed buildings on Lot 14 on RP151378, Lot 15 on RP151378, Lot 16 on RP151378 and Lot 89 on WD739, the applicant must submit to Council certification from a Registered Professional Engineer of Queensland (RPEQ) specialising in geotechnical engineering confirming that the proposed new buildings, weighbridge and other permanent structures' locations on the site will achieve a slope instability hazard rating of 'Low' or better, and that adequate geotechnical and drainage measures have been incorporated in the design to ensure long-term stability of these structures' locations on the site.

Condition 24 which currently reads:

24 Vegetation management and retention

- a All works onsite must be undertaken in accordance with the following:
 - i Endorsed arborist report being 'Arborist Report, ASRIAS40112, dated 4th January 2012 and prepared by Independent Arboricultural Services' to ensure that trees identified as T42 and T46 are retained.
 - ii Vegetation removal, and hence future operational works applications for vegetation works must be in accordance with drawings titled 'Tree Survey and Retention Plan', inclusive of Drawings TRP00, TRP01, TRP02, TRP03, TRP04, TRP05, TRP06, TRP07 and TRP08, dated 1 February 2012 and prepared by Cardno Chenoweth.
- b Future operational works for road construction on Lot 14 must be planned, designed and constructed in accordance with the endorsed arborist report to ensure the healthy retention of trees identified as T42 and T46.
- c A revised or new arborist report must be submitted where works are proposed within the Tree Protection Zone of Trees identified as T73, T85 and T110, or where the applicant proposes to remove these trees. This report must be submitted in conjunction with operational works vegetation works and operational works civil or change to ground level.
- d An AQF level 5 project arborist must be engaged prior to and whilst undertaking any operational works on lot 14 RP151378, Lot 15RP151378 and Lot16 RP151378. The applicant must comply with any directions given by the project arborist in respect to vegetation management measures to be employed onsite to minimise any adverse environmental impacts.
- e Prior to the commencement of use of new facilities as detailed on plan being;

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the applicant must:

- i Arrange and attend an on-site meeting with relevant Council officers

(contact Environment & Landscape Assessment on (07) 5582 8866), and the Project Arborist for vegetation management required as a result of this approval. This meeting must be undertaken at the completion of all onsite works; and

- ii Provide a certification report from the project arborist detailing that all works were undertaken in accordance with Australian Standard AS4970 - 2009 *Protection of trees on development sites*, industry best standards and the approved vegetation management plan and/or arboricultural report. This report must be provided prior to the on-site meeting required as detailed above.

is changed to read as follows:

24 Vegetation management and retention

- a All works onsite must be undertaken in accordance with the following:
 - i Endorsed arborist report being 'Arborist Report, ASRIAS40112, dated 4th January 2012 and prepared by Independent Arboricultural Services' to ensure that trees identified as T42 and T46 are retained.
 - ii Vegetation removal, and hence future operational works applications for vegetation works must be in accordance with drawings titled 'Tree Survey and Retention Plan', inclusive of Drawings TRP00, TRP01, TRP02, TRP03, TRP04, TRP05, TRP06, TRP07 and TRP08, dated 1 February 2012 and prepared by Cardno Chenoweth.
- b Future operational works for road construction on Lot 14 must be planned, designed and constructed in accordance with the endorsed arborist report to ensure the healthy retention of trees identified as T42 and T46.
- c A revised or new arborist report must be submitted where works are proposed within the Tree Protection Zone of Trees identified as T73, T85 and T110, or where the applicant proposes to remove these trees. This report must be submitted in conjunction with operational works vegetation works and operational works civil or change to ground level.
- d An AQF level 5 project arborist must be engaged prior to and whilst undertaking any operational works on lot 14 RP151378, Lot 15RP151378 and Lot16 RP151378. The applicant must comply with any directions given by the project arborist in respect to vegetation management measures to be employed onsite to minimise any adverse environmental impacts.
- e Prior to the commencement of use of new facilities as detailed on plan being;

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the applicant must:

- i Arrange and attend an on-site meeting with relevant Council officers (contact Environment & Landscape Assessment on (07) 5582 8866), and the Project Arborist for vegetation management required as a result of this approval. This meeting must be undertaken at the completion of all onsite works; and
- ii Provide a certification report from the project arborist detailing that all works were undertaken in accordance with Australian Standard AS4970 - 2009 *Protection of trees on development sites*, industry best standards and the approved vegetation management plan and/or arboricultural report. This report must be provided prior to the on-site meeting required as detailed above.

Condition 25 which currently reads:

25 Vegetation works OPW application required

This approval does not approve vegetation clearing or damage. Prior to commencement of such works, a development application for operational work (vegetation works) must be made to and approved by Council for any works proposing clearing or damage to any Protected Vegetation. The application must be in accordance with condition 24 'Vegetation management and retention' and accompanied by a copy of each of the following plans (and, where a plan has already been approved, that plan must be accompanied by the corresponding approval documentation (ie. decision notice or letter of approval)):

- a The approved MCU / ROL layout plan.
- b The approved bushfire management plan being Fire management report FM1495 for Fulton Hogan Pty Ltd at Blue Rock Quarry Tamaree Road Cedar Creek dated 20th March 2012 and prepared by Eldon Botcher Architect Pty Ltd.
- c Plans clearly identifying which vegetation is proposed to be removed and which vegetation is proposed to be retained.
- d A letter from an EPA-approved spotter-catcher together with any necessary fauna management plan or a QPWS-endorsed fauna translocation management plan, as required by condition 27.
- e A vegetation management plan.
- f A sediment and erosion control and construction management plan.

For this condition '**Protected Vegetation**' is defined as vegetation that is:

- equal to, or in excess of, 40 centimetres in girth (circumference) measured at 1.3 metres above average ground level irrespective of the domain or LAP; or
- equal to, or in excess of, four metres in height in the Rural, Park Living or Emerging Communities Domains, Burleigh Ridge LAP, Coomera LAP (Precincts 7, 9 and 10), Coomera Town Centre (Precincts 8, 10 and 11), Currumbin Hill LAP, Eagleby LAP (Precinct 6), East Coomera/Yawalpah Conservation LAP, Guragunbah LAP, Hope Island LAP (Precinct 3), Mudgeeraba Village LAP, Nerang LAP (Precincts 9 and 10), South Stradbroke LAP, Uplands Dr and Woodlands Way LAP, West Burleigh Township LAP or Yatala Enterprise Area LAP.

is changed to read as follows:

25 Vegetation works OPW application required

This approval does not approve vegetation clearing or damage. Prior to commencement of such works, a development application for operational work (vegetation works) must be made to and approved by Council for any works proposing clearing or damage to any Protected Vegetation. The application must be in accordance with condition 24 'Vegetation management and retention' and accompanied by a copy of each of the following plans (and, where a plan has already been approved, that plan must be accompanied by the corresponding approval documentation (ie. decision notice or letter of approval)):

- a The approved MCU / ROL layout plan.
- b The most recently approved bushfire management plan.
- c Plans clearly identifying which vegetation is proposed to be removed and which vegetation is proposed to be retained.
- d A letter from an EPA-approved spotter-catcher together with any necessary fauna management plan or a QPWS-endorsed fauna translocation management plan, as required by condition 27.
- e A vegetation management plan.
- f A sediment and erosion control and construction management plan.

For this condition 'Protected Vegetation' is defined as vegetation that is:

- equal to, or in excess of, 40 centimetres in girth (circumference) measured at 1.3 metres above average ground level irrespective of the domain or LAP; or
- equal to, or in excess of, four metres in height in the Rural, Park Living or Emerging Communities Domains, Burleigh Ridge LAP, Coomera LAP (Precincts 7, 9 and 10), Coomera Town Centre (Precincts 8, 10 and 11), Currumbin Hill LAP, Eagleby LAP (Precinct 6), East Coomera/Yawalpah Conservation LAP, Guragunbah LAP, Hope Island LAP (Precinct 3), Mudgeeraba Village LAP, Nerang LAP (Precincts 9 and 10), South Stradbroke LAP, Uplands Dr and Woodlands Way LAP, West Burleigh Township LAP or Yatala Enterprise Area LAP.

Condition 29 which currently reads:

29 Preparation of fauna assessment / management documentation following assessment by spotter-catcher

- a Based on the outcome of the above assessment, the corresponding requirements for which ever one of the following assessment outcomes is applicable must be complied with:

Assessment outcome	Requirements
Spotter-catcher not required	If the spotter-catcher's assessment determines that no suitable habitat or protected wildlife or listed species have been identified, a letter from the spotter-catcher must be obtained, stating: <ol style="list-style-type: none"> 1 The spotter-catcher's credentials; 2 That no suitable habitat or species were identified in the assessment of the site; and 3 The spotter-catcher is of the opinion that it is not necessary for a spotter-catcher to be present during any clearing or damage to vegetation.
Spotter-catcher required – suitable habitat present adjacent to site	If the spotter-catcher's assessment determines that no protected wildlife or listed species are present but that native fauna may be present with suitable habitat existing adjacent to the site, the following requirements must be complied with: <ol style="list-style-type: none"> 1 A fauna management plan ('FMP') must be prepared by a suitably-qualified professional. 2 If the FMP proposes the capture and release and/or management of any fauna that is 'protected wildlife' as defined under the <i>Nature Conservation Act 1992</i>, the following must be provided: <ul style="list-style-type: none"> • evidence of DERM's endorsement of the proposed FMP prior to its submission to Council; or • a statement from DERM as to whether a species-specific Fauna Translocation Management Plan is required.
Spotter-catcher required – protected/listed species present and/or relocation of fauna required	If the spotter-catcher's assessment determines that any protected wildlife or listed species are present, and/or native fauna are to be relocated, the following requirements must be complied with: <ol style="list-style-type: none"> 1 A letter must be obtained from the spotter-catcher,

	stating the spotter-catcher's credentials.
	2 A fauna translocation management plan (' FTMP ') must be prepared. The proposed FTMP must be submitted to DERM for endorsement prior to the proposed FTMP being provided to Council.
	3 A letter must be obtained from DERM stating its endorsement of the proposed FTMP prior to the proposed FTMP being provided to Council.

b The applicable documentation required in accordance with the above must be prepared in accordance with the following requirements:

i If spotter-catcher not required:

The letter from the spotter-catcher must include the following information:

- Brief site description of the development proposal and clearing works.
- Site description including plans and supporting text providing a description of vegetation communities and fauna habitat values to be cleared and retained.
- Fauna known to occur at the site (based on the outcomes of the Ecological Assessment and any additional site inspections) and a brief habitat description/identification of locations that the species are known to occur.
- Fauna likely to occur at the site (based on outcomes on the Ecological Assessment and database searches such as WildNet) and a brief habitat description/identification of locations that the species are likely to occur.
- Information on why a spotter-catcher is not required.
- Contingency methods in the case that clearing works discover fauna at the site.

ii If spotter-catcher required – suitable habitat present adjacent to site:

The FMP must include the following information:

- Description of the development proposal and clearing works.
- Site description including plans and supporting text providing a description of vegetation communities and fauna habitat values to be cleared and retained.
- Fauna known to occur at the site (based on the outcomes of the Ecological Assessment and any additional site inspections) and a brief habitat description/identification of locations that the species are known to occur.
- Fauna likely to occur at the site (based on outcomes on the Ecological Assessment and database searches such as WildNet) and a brief habitat description/identification of locations that the species are likely to occur.
- Identification of significant fauna species known and likely to occur at the site.
- Identification of known and potential habitat trees (displaying values such as hollows, fissures, nests, drays, arboreal termitaria used as nests etc).
- Identification of general fauna habitat (including weed species that may offer fauna habitat, native vegetation, rivers, creeks, ground resources such as boulders and hollow logs).
- Details for demarking areas that are of high habitat value to be disturbed (e.g. habitat trees, disturbance in sensitive areas etc).

- Information on how the clearing will be undertaken including:
 - Whether the clearing will be undertaken in stages;
 - Special considerations for clearing (e.g. juvenile vegetation first);
 - Time periods between clearing of staged areas (where applicable) or immature vegetation;
 - Direction of clearing;
 - Staging of infrastructure (for example nest boxes, installation of fauna friendly crossings etc taking into consideration temporary movement corridors based on the impacts of construction works); and
 - Temporary methods required (e.g. barrier fencing to prevent fauna fleeing to roads).
 - Information on how trees are to be inspected for denning or nesting animals including constraints for inspecting trees (to provide acceptable alternative methods).
 - Considerations relating to time periods for when fauna is to be removed/flushed prior to clearing.
 - Methods for moving denning or nesting animals and/or capture or flushing of ground dwelling animals.
 - Summary of removal and relocation methods for each faunal group (including observed species and species likely to occur in the area to be disturbed). Faunal groups that have specialist habitats that differ from the general faunal group (for example ground dwelling birds) further descriptions are required.
 - Details of special equipment required (such as chainsaws, cameras etc).
 - Identification of general locations that wildlife will be relocated/translocated to if required (based on habitat requirements).
 - Information on how the animal is to be protected once relocated.
 - Methods to euthanise injured animals as well as contact details (including telephone number) and location of the closest vets (and others close by).
 - Detailed methods for the translocation and protection of significant fauna species known and likely to occur at the site.
 - Special considerations for nesting times are also to be included.
 - Responsibilities and briefing requirements.
- iii If spotter-catcher required – protected/listed species present and/or relocation of fauna required:

The FTMP must include the same information as set out in Item ii above

is changed to read as follows:

29 Preparation of fauna assessment / management documentation following assessment by spotter-catcher

- a Based on the outcome of the above assessment, the corresponding requirements for which ever one of the following assessment outcomes is applicable must be complied with:

Assessment outcome	Requirements
Spotter-catcher not required	If the spotter-catcher’s assessment determines that no suitable habitat or protected wildlife or listed species have been identified, a letter from the spotter-catcher must be obtained, stating: <ol style="list-style-type: none"> 1 The spotter-catcher’s credentials; 2 That no suitable habitat or species were identified in

	<p>the assessment of the site; and</p> <p>3 The spotter-catcher is of the opinion that it is not necessary for a spotter-catcher to be present during any clearing or damage to vegetation.</p>
<p>Spotter-catcher required – suitable habitat present adjacent to site</p>	<p>If the spotter-catcher's assessment determines that no protected wildlife or listed species are present but that native fauna may be present with suitable habitat existing adjacent to the site, the following requirements must be complied with:</p> <ol style="list-style-type: none"> 1 A fauna management plan ('FMP') must be prepared by a suitably-qualified professional. 2 If the FMP proposes the capture and release and/or management of any fauna that is 'protected wildlife' as defined under the <i>Nature Conservation Act 1992</i>, the following must be provided: <ul style="list-style-type: none"> • evidence of DEHP endorsement of the proposed FMP prior to its submission to Council; or • a statement from DEHP as to whether a species-specific Fauna Translocation Management Plan is required.
<p>Spotter-catcher required – protected/listed species present and/or relocation of fauna required</p>	<p>If the spotter-catcher's assessment determines that any protected wildlife or listed species are present, and/or native fauna are to be relocated, the following requirements must be complied with:</p> <ol style="list-style-type: none"> 1 A letter must be obtained from the spotter-catcher, stating the spotter-catcher's credentials. 2 A fauna translocation management plan ('FTMP') must be prepared. The proposed FTMP must be submitted to DEHP for endorsement prior to the proposed FTMP being provided to Council. 3 A letter must be obtained from DEHP stating its endorsement of the proposed FTMP prior to the proposed FTMP being provided to Council.

- b The applicable documentation required in accordance with the above must be prepared in accordance with the following requirements:
- i If spotter-catcher not required:

The letter from the spotter-catcher must include the following information:

 - Brief site description of the development proposal and clearing works.
 - Site description including plans and supporting text providing a description of vegetation communities and fauna habitat values to be cleared and retained.
 - Fauna known to occur at the site (based on the outcomes of the Ecological Assessment and any additional site inspections) and a brief habitat description/identification of locations that the species are known to occur.
 - Fauna likely to occur at the site (based on outcomes on the Ecological Assessment and database searches such as WildNet) and a brief habitat description/identification of locations that the species are likely to occur.
 - Information on why a spotter-catcher is not required.

- Contingency methods in the case that clearing works discover fauna at the site.
- ii If spotter-catcher required – suitable habitat present adjacent to site:
The FMP must include the following information:
- Description of the development proposal and clearing works.
 - Site description including plans and supporting text providing a description of vegetation communities and fauna habitat values to be cleared and retained.
 - Fauna known to occur at the site (based on the outcomes of the Ecological Assessment and any additional site inspections) and a brief habitat description/identification of locations that the species are known to occur.
 - Fauna likely to occur at the site (based on outcomes on the Ecological Assessment and database searches such as WildNet) and a brief habitat description/identification of locations that the species are likely to occur.
 - Identification of significant fauna species known and likely to occur at the site.
 - Identification of known and potential habitat trees (displaying values such as hollows, fissures, nests, drays, arboreal termitaria used as nests etc).
 - Identification of general fauna habitat (including weed species that may offer fauna habitat, native vegetation, rivers, creeks, ground resources such as boulders and hollow logs).
 - Details for demarking areas that are of high habitat value to be disturbed (e.g. habitat trees, disturbance in sensitive areas etc).
 - Information on how the clearing will be undertaken including:
 - Whether the clearing will be undertaken in stages;
 - Special considerations for clearing (e.g. juvenile vegetation first);
 - Time periods between clearing of staged areas (where applicable) or immature vegetation;
 - Direction of clearing;
 - Staging of infrastructure (for example nest boxes, installation of fauna friendly crossings etc taking into consideration temporary movement corridors based on the impacts of construction works); and
 - Temporary methods required (e.g. barrier fencing to prevent fauna fleeing to roads).
 - Information on how trees are to be inspected for denning or nesting animals including constraints for inspecting trees (to provide acceptable alternative methods).
 - Considerations relating to time periods for when fauna is to be removed/flushed prior to clearing.
 - Methods for moving denning or nesting animals and/or capture or flushing of ground dwelling animals.
 - Summary of removal and relocation methods for each faunal group (including observed species and species likely to occur in the area to be disturbed). Faunal groups that have specialist habitats that differ from the general faunal group (for example ground dwelling birds) further descriptions are required.
 - Details of special equipment required (such as chainsaws, cameras etc).
 - Identification of general locations that wildlife will be relocated/translocated to if required (based on habitat requirements).
 - Information on how the animal is to be protected once relocated.

- Methods to euthanise injured animals as well as contact details (including telephone number) and location of the closest vets (and others close by).
 - Detailed methods for the translocation and protection of significant fauna species known and likely to occur at the site.
 - Special considerations for nesting times are also to be included.
 - Responsibilities and briefing requirements.
- iii If spotter-catcher required – protected/listed species present and/or relocation of fauna required:
The FTMP must include the same information as set out in Item ii above

Condition 33 which currently reads:

33 Koala management

- a The Koala Management Plan, being 'Blue Rock Quarry Koala Management Plan with document reference 2012_01_01_Koala Management Plan, dated January 2012 and prepared by Cardno Chenoweth' is approved subject to the following amendments. The applicant must amend the document in accordance with the following and ensure that an amended copy is returned to Council.
- i The applicant must include a koala register which shall form part of a target item in Section 4 titled understanding current koala population, for example.
 - ii The register should be in the form of an appendix data sheet in order for the quarry to keep ongoing records on site.
- b The applicant must ensure that all construction and ongoing operations on Lots 14, 15 and 16 are undertaken in accordance with the approved amended Koala Management Plan.
- c A copy of the Koala Management Plan must be kept on site at all times and implemented into any existing or future Quarry Management Strategy Plan, including but not limited to the Quarry's Environmental Management Plan.

is changed to read as follows:

33 Koala management

- a The Koala Management Plan, being 'Blue Rock Quarry Koala Management Plan with document reference 2012_01_01_Koala Management Plan, dated January 2012 and prepared by Cardno Chenoweth' and Koala management plan addendum prepared by Fulton Hogan and dated March 2014 is approved.
- b The applicant must ensure that all construction and ongoing operations on Lots 14, 15 and 16 are undertaken in accordance with the approved plans.
- c A copy of the Koala Management Plan must be kept on site at all times and implemented into any existing or future Quarry Management Strategy Plan, including but not limited to the Quarry's Environmental Management Plan.

Condition 35 which currently reads:

35 Rehabilitation completion and certification

- a The rehabilitation management plan, being 'Blue Rock Quarry Rehabilitation Management Plan, document reference 2012_01_19_Rehab_09CH153B, dated January 2012 and prepared by Cardno Chenoweth' is approved subject to the following amendments. The applicant must amend the document in accordance with the following and ensure that an amended copy is returned to Council.
- i Zone B1 must be amended to include ephemeral wetland species to the ground cover layer to be in addition to the tree species currently provided.

Table 2, Table 3 and Table 7 must be amended with text and species accordingly. In accordance with the Stormwater management Plan (specifically page 17 to 20), being 'Blue Rock Quarry Stormwater Management Plan, Version 2, dated 2 February 2012 and prepared by Aecom', these plants are required to provide additional treatment and filtering of stormwater flows.

- ii Within Table 7 Species Schedule, B5 must include species listed under B4, to account for a scenario where assisted natural regeneration is not successful following year 1. These species may be notated to indicate the above objectives.
 - iii Similarly, within Table 7 Species Schedule, B6, C1, C2 and G, species must be included for planting in the event that assisted natural regeneration is not successful following year 1, or that programmed weed control results in bare areas exposed to the sunlight. Plants may be added to the existing table and notated, or placed in a separate table for assisted natural regeneration areas.
 - iv Table 3, Restoration Strategy and Performance Indicators must include comments in line with the above for Assisted Natural Regeneration areas B6, C1, C2 and G to describe when and why planting may be required, similar to section B5.
 - v Section 4 must be updated to reflect timeframes for checking the success of Assisted Natural Regeneration Areas and when further planting shall be undertaken if required.
 - vi Section 4 must be updated to ensure that ongoing maintenance is undertaken beyond the 24 month period by the quarry staff. The rehabilitation plan is a living document and as such, timeframes for ongoing maintenance and weeding works shall be included for long term management.
 - vii Include in Section 4 a timing schedule for the replacement of dead or lost stock ensuring that regular checks occur to ensure replacement need is identified.
 - viii Include within the plan a statement that ensures that the approved amended rehabilitation plan is to be incorporated into the ongoing quarry management for Lots 14, 15 and 16 and must therefore be implemented into any existing or future Quarry Management Strategy Plan, including but not limited to the Quarry's Environmental Management Plan.
- b The applicant must undertake the rehabilitation/revegetation works for the areas identified on Figure 1 Rehabilitation Zones within the rehabilitation management plan.
- c The applicant must provide to Council, prior to the commencement of the use of the new facilities as detailed on plan being;

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the following certification from a qualified professional that all works/measures in the approved rehabilitation management plan:

- i Certification that all planting works have been implemented on site; to be submitted no later than 6 months following commencement of planting works;
- ii Certification that all rehabilitation works have been implemented and maintained for the initial 12 month maintenance period. This certification must include an assessment of all areas of Assisted Natural Regeneration and the necessary course of action required; and
- iii Certification that all rehabilitation works have been implemented and maintained for the second 12 month maintenance period.

- d The following certification stages will be subject to a site inspection by the relevant Council officer following receipt of the above documentation.
- e A record of all rehabilitation maintenance activities must be kept on site or with the applicant to facilitate on going site management and assist the certification process. These documents may be available to the relevant Council officer at any time.
- f A copy of the Rehabilitation Management Plan must be kept on site at all times and implemented into any existing or future Quarry Management Strategy Plan, including but not limited to the Quarry’s Environmental Management Plan.

Is changed to read as follows:

35 Rehabilitation completion and certification

- a The rehabilitation management plan, being ‘Blue Rock Quarry Rehabilitation Management Plan, dated 10 march 2014, prepared by Cardno ’ is approved subject to the following;
 - i Additional rehabilitation must be undertaken in the area detailed as offset rehabilitation area approx. 4500m2 on plan being Rehabilitation Offset Plan 2 May 2014 (addendum to rehabilitation management plan, Cardno , 10 march 2014), prepared by Fulton Hogan.
 - ii The additional rehabilitation area as detailed in dot point i must be rehabilitated with the naturally occurring regional ecosystem with a strong focus on Glossy black feed trees.
 - iii 5 Glossy Black Cockatoo nest boxes must be installed in close proximity to the proposed feed tree rehabilitation area. These nest boxes are to be installed by a spotter catcher with GPS locations provided to council.
- b The applicant must amend the document in accordance with the following and ensure that an amended copy is returned to Council.
- c The applicant must undertake the rehabilitation/revegetation works for the areas identified on Figure 1 Rehabilitation Zones within the rehabilitation management plan.
- d The applicant must provide to Council, prior to the commencement of the use of the new facilities as detailed on plan being;

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the following certification from a qualified professional that all works/measures in the approved rehabilitation management plan:

- i Certification that all planting works have been implemented on site; to be submitted no later than 6 months following commencement of planting works;
- ii Certification of nest box installation and GPS location;
- iii Certification that all rehabilitation works have been implemented and maintained for the initial 12 month maintenance period. This certification must include an assessment of all areas of Assisted Natural Regeneration and the necessary course of action required; and
- iv Certification that all rehabilitation works have been implemented and maintained for the second 12 month maintenance period.
- e The following certification stages will be subject to a site inspection by the relevant Council officer following receipt of the above documentation.
- f A record of all rehabilitation maintenance activities must be kept on site or with the applicant to facilitate on going site management and assist the certification process. These documents may be available to the relevant Council officer at any time.

- g A copy of the Rehabilitation Management Plan must be kept on site at all times and implemented into any existing or future Quarry Management Strategy Plan, including but not limited to the Quarry’s Environmental Management Plan.

Condition 47 which currently reads:

- 47 The complete Bushfire Management Plan, the BMP being ‘Fire Management Report FM1495 for Fulton Hogan Pty Ltd at Blue Rock Quarry Tamaree Road Cedar Creek’, dated 20th March 2012 and prepared by Eldon Bottcher Architect Pty Ltd, shall consist of the plan submitted by the applicant, the QFRS Bushfire Planning Cover Sheet and any fire safety material included by the bushfire consultant or QFRS.

is changed to read as follows:

47 Bushfire Management Plan

The complete Bushfire Management Plan, the BMP being ‘Bushfire Management Plan, Lot 14, 15, 16 on RP151378 and Lot 89 on WD739 Tamaree Road, Cedar Creek’, dated February 2014 and prepared by Bushfire Risk Reducers, shall consist of the plan submitted by the applicant, the QFRS Bushfire Planning Cover Sheet and any fire safety material included by the bushfire consultant or QFRS.

- B For ease of reference only, a consolidated set of the conditions, incorporating the above changes, of the development permit dated 19 August 2013 for material change of use for Extractive Industry (Ancillary Activities – Stockpiling, Wheel Wash, Weighbridge, Crib Room and Site Office) and ERA 16 – Extracting and Screening (Stockpiling of Screened Product) is set out below.

APPROVED PLANS/DRAWINGS

1 Development to be generally in accordance with specified plans/drawings

The development must be carried out generally in accordance with the approved plans/drawings listed below, stamped and returned to the applicant with this decision notice.

Plan No.	Rev.	Title	Date	Prepared by
FS1689-S001	3	Blue Rock Quarry – Masterplan	28/1/14	FSA Consulting Engineers
FS1689-S003	2	Blue Rock Quarry – Workshop Site Plan	28/1/14	FSA Consulting Engineers
FS1689-S002	3	Blue Rock Quarry Weighbridge & Administration Building Option 2A	28/1/14	FSA Consulting Engineers
3290.01	D	Blue Rock Quarry Landscape	19/1/2012	Aecom

2 Changes requiring further approval

Changes to the approved design that are not generally in accordance with the approved plans/drawings require approval in accordance with the *Sustainable Planning Act 2009*.

Information note: The Sustainable Planning Act 2009 sets out the procedures for changing approvals where the change can be classified as a permissible change. If the change is not a permissible change, a new development approval is required.

3 Decision notice and approved plans/drawings to be submitted with subsequent application

A copy of this decision notice and accompanying stamped approved plans/drawings must be submitted with any operational works application relating to or arising from this development approval.

4 Decision notice and approved plans/drawings to be retained on-site

A copy of this decision notice and stamped approved plans/drawings must be retained on site at all times. This decision notice must be read in conjunction with the stamped approved plans to ensure consistency in construction, establishment and maintenance of approved works.

5 Any deviations require further approval

Any proposed deviation from the approved plans/drawings as a result of on-site or in-situ conditions must not be made unless amended plans/drawings are submitted and approved by Council. The development must be carried out in accordance with the approved amended plans/drawings.

6 Notice of commencement of use of new facilities

At least 10 business days prior to the commencement of use of the new facilities as detailed on the approved plan, being;

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the applicant must give Council written notice of the following:

- a Application number;
- b Site address;
- c Name and telephone number (work and after hours) of the a suitable contact person to arrange a site inspection;
- d The estimated commencement date for the use.
- e The notification is to be sent to Council’s Development Compliance Team Leader (fax: 07 5596 8080; phone: 07 5582 8184). This notification is in addition to any other notifications required by other conditions of this or other development approvals.

A form is available to assist in providing the information relating to Notice of Works/Commencement requirements. The form can be obtained at Council Offices (Nerang, Bundall and Coolangatta). It also can be found on Council's website at www.goldcoast.qld.gov.au/forms (Building & Development).

7 Resolution of conflict between conditions and plans

The conditions of this approval are to be read in conjunction with the attached stamped approved engineering drawings. Where a conflict occurs between the conditions of this approval and the stamped approved engineering drawings, the conditions of this approval shall take precedence, unless otherwise approved in writing.

8 Compliance with Land Development Guidelines and operational work development permits

Unless otherwise specified in the conditions of this development permit, all works the subject of this approval must:

- a Be designed, constructed and maintained in accordance with Planning Scheme Policy 11 – *Land Development Guidelines, Standard Specifications and Drawings*, as appropriate to extractive industry operations;
- b If a relevant Planning Scheme Standard is not specified/available, appropriate industry standard shall be applied as relevant to extractive industry operations.

- c In the case of assessable development, be approved by effective development permits for operational work prior to such works commencing, as this approval does not include approval of any operational work; and
- d Where any Standard and/or Specification and/or Code and/or Document as referred to or referenced in the *Land Development Guidelines* has been replaced or superseded, then the later or new Standard and/or Specification and/or Code and/or Documents are to be used. To be clear, the latest edition of any Standard, Specification, Code or Document is to take precedence.

AMENITY

9 No extraction of material

No extraction of material is to occur on Lot 14 on RP151378 , Lot 15 on RP151378 , Lot 16 on RP151378

10 Stockpiling

Stockpiling is only to occur in those locations shown on the approved plan; 'Blue Rock Quarry – Masterplan', Revision 3, dated 28/1/2014, and prepared by FSA Consulting Engineers. No stockpiling is to occur on Lot 14 RP 151378.

11 Internal Roads

Internal roadways on Lot 14 on RP151378 , Lot 15 on RP151378 , Lot 16 on RP151378 are to be sealed to a reasonable standard acceptable to a RPEQ Engineer.

CONSTRUCTION MANAGEMENT

12 Deleted

CAR PARKING AND ACCESS

13 Off-street car parking facilities

Off-street car parking facilities on Lot 14 on RP151378 , Lot 15 on RP151378 , and Lot 16 on RP151378 must be designed and constructed to the satisfaction of the Chief Executive Officer and at no cost to Council, the subject of the development approval, in accordance with the following:

- a The off-street car parking facilities (including landscaping) must be designed in accordance with:
 - i the plans/drawings referred to in this development approval;
 - ii Car Parking, Access and Transport Integration Constraints Code (Gold Coast City Council Planning Scheme 2003 Version 1.2 amended November 2011); and
 - iii Australian/New Zealand Standards AS/NZS 2890.1:2004 – Parking Facilities – Part 1: Off-Street Car Parking.
- b The off-street car parking facilities must only be used for vehicle parking.
- c The off-street car parking facilities must be drained and sealed to a reasonable standard acceptable to a RPEQ qualified Engineer.

14 Off-street commercial vehicle facilities

Off-street commercial vehicle facilities on Lot 14 on RP151378 , Lot 15 on RP151378, and Lot 16 on RP151378 must be designed and constructed to the satisfaction of the Chief Executive Officer and at no cost to Council, the subject of this development approval, in accordance with the following:

- a The off-street commercial vehicle facilities must be designed in accordance with:
 - i the plans/drawings referred to in this development approval;
 - ii G.C.C.C Planning Scheme (2003, v1.2) – Part 7: Codes – Divisions 3:

Constraints Code – Chapter 4: Car Parking, Access and Transport Integration; and

- iii AS2890.2-2002: Parking Facilities – Part 2: Off-Street Commercial Vehicle Facilities.
- b The off-street commercial vehicle facilities must only be used for short term loading and unloading of vehicles.
- c The off-street commercial vehicle facilities must be drained, sealed and line-marked to a reasonable standard acceptable to a RPEQ qualified Engineer.

15 Off-street commercial vehicle facilities – Loading and unloading

- a Loading and unloading operations must be conducted wholly within the site.
- b Vehicles waiting to be loaded and unloaded must stand entirely within the site, unless otherwise approved by the Chief Executive Officer.
- c Vehicles must enter and exit the site in a forward gear.

PLUMBING AND DRAINAGE

16 Application for compliance permit for sewerage works required

The applicant must make an application to Council (Plumbing and Drainage Services) for a compliance permit for any regulated sewerage works within the property. Without limiting the requirements of the *Plumbing and Drainage Act 2002* with which the works must comply, the application must:

- a be accompanied by a hydraulic design for all sewerage works within the property;

Information note:

Sewerage works must not be carried out until a compliance permit under the Plumbing and Drainage Act 2002 has been issued by Council for the works.

17 Report from registered soil evaluator to be submitted

In conjunction with the hydraulic design for the sewerage works within the property, the applicant must submit to Council (Plumbing and Drainage Services) a report from a registered soil evaluator demonstrating that the proposed on-site sewerage treatment facility and effluent land application complies with AS/NZS 1547 – *On-site domestic wastewater management*.

Information note:

The operation of the on-site sewerage facility must comply with Council's Local Law No. 42 (On-Site Sewerage Facility) 2002 and subordinate Local Law which, among other things impose obligations on the owner of premises on which an on-site sewerage is operated in relation to:

arranging servicing of the facility by a service contractor;

periodic inspections, monitoring and maintenance; and

inspections which may be carried out from time to time by Council's authorised persons.

18 Application for compliance permit for water supply plumbing work required

The applicant must make an application to Council (Plumbing and Drainage Services) for a compliance permit for any regulated water supply plumbing work within the property. Without limiting the requirements of the *Plumbing and Drainage Act 2002* with which the works must comply, the application must:

- a be accompanied by a hydraulic design for all water services within the property; and comply with Section 7 of Council's Land Development Guidelines.

Information note:

Water supply plumbing works must not be carried out until a compliance permit under the Plumbing and Drainage Act 2002 has been issued by Council for the works.

LANDSCAPE WORKS ON PRIVATE LAND

19 Detailed landscape plan to be submitted for approval

- a The applicant must submit to Council for approval a detailed landscape plan, by making a development application for operational work (landscape work). Approval of proposed landscape work must be obtained prior to the earlier of the commencement of operational works (landscaping) or the issue of a certificate of classification.
- b Without limiting the requirements of the planning scheme's *Landscape Work Specific Development Code*, the detailed landscape plan must:
 - i Be prepared by a qualified landscape architect or similar landscape design professional;
 - ii Be in general accordance with the Statement of Landscape Intent, being Dwg: 3290.01, Rev: D, Title: Blue Rock Quarry Landscape Strategy, Date: 19.01.2012, By: AECOM;
 - iii Reflect the approved layout (including any amendments to that layout required by these conditions) and the conditions of this approval; and
 - iv Comply with Planning Scheme Policy 13 – Landscape Strategy Part 2 – Landscape Works Documentation Manual.

20 The detailed landscape plan must also incorporate the following:

- a Where possible, species that occur naturally on site must be utilised in new plantings.

GEOTECHNICAL

21 Geotechnical certification of long-term stability of the site

Prior to issuing any building works approval for the proposed buildings on Lot 14 on RP151378, Lot 15 on RP151378, Lot 16 on RP151378 and Lot 89 on WD739, the applicant must submit to Council certification from a Registered Professional Engineer of Queensland (RPEQ) specialising in geotechnical engineering confirming that the proposed new buildings, weighbridge and other permanent structures' locations on the site will achieve a slope instability hazard rating of 'Low' or better, and that adequate geotechnical and drainage measures have been incorporated in the design to ensure long-term stability of these structures' locations on the site.

22 Certification of batters long-term factor of safety

The applicant must submit to Council:

- a With any future development application for operational works (change to ground level) if applicable, otherwise prior to commencement of any bulk earthworks on-site, certification from a Registered Professional Engineer of Queensland (RPEQ) specialising in geotechnical engineering confirming that all cut/fill batters associated with the proposed development have been adequately designed based on existing geotechnical conditions of the site taking into account all predicted surcharge loadings; and they will achieve a long-term factor of safety greater than or equal to 1.5 against geotechnical failures; and
- b Immediately after completion of all bulk earthworks, certification from a RPEQ specialising in geotechnical engineering confirming that all constructed cut/fill batters on the site have achieved adequate stability with a long-term factor of safety greater than or equal to 1.5 against geotechnical failures.

ON-SITE EFFLUENT DISPOSAL

23 Effluent disposal area/s

Any effluent disposal area/s, existing or proposed must not be located within the Tree Protection Zone (TPZ) of trees identified to be retained, within 30 metres of a watercourse or within areas proposed for rehabilitation.

VEGETATION MANAGEMENT

24 Vegetation management and retention

- a All works onsite must be undertaken in accordance with the following:
 - i Endorsed arborist report being 'Arborist Report, ASRIAS40112, dated 4th January 2012 and prepared by Independent Arboricultural Services' to ensure that trees identified as T42 and T46 are retained.
 - ii Vegetation removal, and hence future operational works applications for vegetation works must be in accordance with drawings titled 'Tree Survey and Retention Plan', inclusive of Drawings TRP00, TRP01, TRP02, TRP03, TRP04, TRP05, TRP06, TRP07 and TRP08, dated 1 February 2012 and prepared by Cardno Chenoweth.
- b Future operational works for road construction on Lot 14 must be planned, designed and constructed in accordance with the endorsed arborist report to ensure the healthy retention of trees identified as T42 and T46.
- c A revised or new arborist report must be submitted where works are proposed within the Tree Protection Zone of Trees identified as T73, T85 and T110, or where the applicant proposes to remove these trees. This report must be submitted in conjunction with operational works vegetation works and operational works civil or change to ground level.
- d An AQF level 5 project arborist must be engaged prior to and whilst undertaking any operational works on lot 14 RP151378, Lot 15RP151378 and Lot16 RP151378. The applicant must comply with any directions given by the project arborist in respect to vegetation management measures to be employed onsite to minimise any adverse environmental impacts.
- e Prior to the commencement of use of new facilities as detailed on plan being;

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the applicant must:

- i Arrange and attend an on-site meeting with relevant Council officers (contact Environment & Landscape Assessment on (07) 5582 8866), and the Project Arborist for vegetation management required as a result of this approval. This meeting must be undertaken at the completion of all onsite works; and
- ii Provide a certification report from the project arborist detailing that all works were undertaken in accordance with Australian Standard AS4970 - 2009 *Protection of trees on development sites*, industry best standards and the approved vegetation management plan and/or arboricultural report. This report must be provided prior to the on-site meeting required as detailed above.

25 Vegetation works OPW application required

This approval does not approve vegetation clearing or damage. Prior to commencement of such works, a development application for operational work (vegetation works) must be made to and approved by Council for any works proposing clearing or damage to any Protected Vegetation. The application must be in accordance with condition 24 'Vegetation management and retention' and accompanied by a copy of each of the following plans (and, where a plan has already

been approved, that plan must be accompanied by the corresponding approval documentation (ie. decision notice or letter of approval)):

- a The approved MCU / ROL layout plan.
- b The most recently approved bushfire management plan.
- c Plans clearly identifying which vegetation is proposed to be removed and which vegetation is proposed to be retained.
- d A letter from an EPA-approved spotter-catcher together with any necessary fauna management plan or a QPWS-endorsed fauna translocation management plan, as required by condition 27.
- e A vegetation management plan.
- f A sediment and erosion control and construction management plan.

For this condition '**Protected Vegetation**' is defined as vegetation that is:

- equal to, or in excess of, 40 centimetres in girth (circumference) measured at 1.3 metres above average ground level irrespective of the domain or LAP; or
- equal to, or in excess of, four metres in height in the Rural, Park Living or Emerging Communities Domains, Burleigh Ridge LAP, Coomera LAP (Precincts 7, 9 and 10), Coomera Town Centre (Precincts 8, 10 and 11), Currumbin Hill LAP, Eagleby LAP (Precinct 6), East Coomera/Yawalpah Conservation LAP, Guragunbah LAP, Hope Island LAP (Precinct 3), Mudgeeraba Village LAP, Nerang LAP (Precincts 9 and 10), South Stradbroke LAP, Uplands Dr and Woodlands Way LAP, West Burleigh Township LAP or Yatala Enterprise Area LAP.

26 Management of retained trees

The applicant must ensure:

- a The existing trees nominated for retention are to be managed during construction activities in accordance with the Final Tree Management Report and Australian Standard AS 4970 - 2009 *Protection of trees on development sites* to avoid any of the following:
 - i Structural damage to the tree including root damage;
 - ii Compaction of the root plate including parking of any vehicles;
 - iii Filling of soil within the Tree Protection Zone (TPZ) and/or drip zone;
 - iv Storage of any building materials within the drip zone; and
 - v Long-term harm to the health of the tree.

27 Deleted.

FAUNA MANAGEMENT

28 Engagement of and assessment by spotter-catcher

- a Prior to the making of a development application for operational work (vegetation clearing) the applicant must engage a **EHP -approved spotter-catcher** to assess the site for:
 - b The presence of native fauna and/or supporting habitat on-site;
 - c Available adjacent habitat;
 - d The presence of any fauna that is 'protected wildlife' as defined under the *Nature Conservation Act 1992* ('protected wildlife'); and
 - e The presence of any species that is a 'listed threatened species' under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) ('listed species').

For the purposes of this condition, a '**EHP -approved spotter-catcher**' is a person who holds a rehabilitation permit with an extended authority issued by the Department of

Environment and Resource Management specifying that the holder may take, keep or use an animal whose habitat is about to be destroyed by human activity.

29 Preparation of fauna assessment / management documentation following assessment by spotter-catcher

- a Based on the outcome of the above assessment, the corresponding requirements for which ever one of the following assessment outcomes is applicable must be complied with:

Assessment outcome	Requirements
Spotter-catcher not required	If the spotter-catcher’s assessment determines that no suitable habitat or protected wildlife or listed species have been identified, a letter from the spotter-catcher must be obtained, stating: <ol style="list-style-type: none"> 1 The spotter-catcher’s credentials; 2 That no suitable habitat or species were identified in the assessment of the site; and 3 The spotter-catcher is of the opinion that it is not necessary for a spotter-catcher to be present during any clearing or damage to vegetation.
Spotter-catcher required – suitable habitat present adjacent to site	If the spotter-catcher’s assessment determines that no protected wildlife or listed species are present but that native fauna may be present with suitable habitat existing adjacent to the site, the following requirements must be complied with: <ol style="list-style-type: none"> 1 A fauna management plan (‘FMP’) must be prepared by a suitably-qualified professional. 2 If the FMP proposes the capture and release and/or management of any fauna that is ‘protected wildlife’ as defined under the <i>Nature Conservation Act 1992</i>, the following must be provided: <ul style="list-style-type: none"> • evidence of DEHP endorsement of the proposed FMP prior to its submission to Council; or • a statement from DEHP as to whether a species-specific Fauna Translocation Management Plan is required.
Spotter-catcher required – protected/listed species present and/or relocation of fauna required	If the spotter-catcher’s assessment determines that any protected wildlife or listed species are present, and/or native fauna are to be relocated, the following requirements must be complied with: <ol style="list-style-type: none"> 1 A letter must be obtained from the spotter- catcher, stating the spotter-catcher’s credentials. 2 A fauna translocation management plan (‘FTMP’) must be prepared. The proposed FTMP must be submitted to DEHP for endorsement prior to the proposed FTMP being provided to Council. 3 A letter must be obtained from DEHP stating its endorsement of the proposed FTMP prior to the proposed FTMP being provided to Council.

- b The applicable documentation required in accordance with the above must be prepared in accordance with the following requirements:
- i If spotter-catcher not required:
- The letter from the spotter-catcher must include the following information:
- Brief site description of the development proposal and clearing works.
 - Site description including plans and supporting text providing a description of vegetation communities and fauna habitat values to be cleared and retained.
 - Fauna known to occur at the site (based on the outcomes of the Ecological Assessment and any additional site inspections) and a brief habitat description/identification of locations that the species are known to occur.
 - Fauna likely to occur at the site (based on outcomes on the Ecological Assessment and database searches such as WildNet) and a brief habitat description/identification of locations that the species are likely to occur.
 - Information on why a spotter-catcher is not required.
 - Contingency methods in the case that clearing works discover fauna at the site.
- ii If spotter-catcher required – suitable habitat present adjacent to site:
- The FMP must include the following information:
- Description of the development proposal and clearing works.
 - Site description including plans and supporting text providing a description of vegetation communities and fauna habitat values to be cleared and retained.
 - Fauna known to occur at the site (based on the outcomes of the Ecological Assessment and any additional site inspections) and a brief habitat description/identification of locations that the species are known to occur.
 - Fauna likely to occur at the site (based on outcomes on the Ecological Assessment and database searches such as WildNet) and a brief habitat description/identification of locations that the species are likely to occur.
 - Identification of significant fauna species known and likely to occur at the site.
 - Identification of known and potential habitat trees (displaying values such as hollows, fissures, nests, drays, arboreal termitaria used as nests etc).
 - Identification of general fauna habitat (including weed species that may offer fauna habitat, native vegetation, rivers, creeks, ground resources such as boulders and hollow logs).
 - Details for demarking areas that are of high habitat value to be disturbed (e.g. habitat trees, disturbance in sensitive areas etc).
 - Information on how the clearing will be undertaken including:
 - Whether the clearing will be undertaken in stages;
 - Special considerations for clearing (e.g. juvenile vegetation first);
 - Time periods between clearing of staged areas (where applicable) or immature vegetation;
 - Direction of clearing;
 - Staging of infrastructure (for example nest boxes, installation of fauna friendly crossings etc taking into consideration temporary movement corridors based on the impacts of construction works);
 - and
 -

- Temporary methods required (e.g. barrier fencing to prevent fauna fleeing to roads).
 - Information on how trees are to be inspected for denning or nesting animals including constraints for inspecting trees (to provide acceptable alternative methods).
 - Considerations relating to time periods for when fauna is to be removed/flushed prior to clearing.
 - Methods for moving denning or nesting animals and/or capture or flushing of ground dwelling animals.
 - Summary of removal and relocation methods for each faunal group (including observed species and species likely to occur in the area to be disturbed). Faunal groups that have specialist habitats that differ from the general faunal group (for example ground dwelling birds) further descriptions are required.
 - Details of special equipment required (such as chainsaws, cameras etc).
 - Identification of general locations that wildlife will be relocated/translocated to if required (based on habitat requirements).
 - Information on how the animal is to be protected once relocated.
 - Methods to euthanise injured animals as well as contact details (including telephone number) and location of the closest vets (and others close by).
 - Detailed methods for the translocation and protection of significant fauna species known and likely to occur at the site.
 - Special considerations for nesting times are also to be included.
 - Responsibilities and briefing requirements.
- iii If spotter-catcher required – protected/listed species present and/or relocation of fauna required:
The FTMP must include the same information as set out in Item ii above

30 Assessment of the required FMP / FTMP

- a If a FMP / FTMP is required, the fauna documentation must be provided with any future operational work (vegetation clearing) development application. A copy of the compliance certificate for the FMP / FTMP must be provided
- b If a FMP / FTMP is required, the fauna assessment / management documentation is not approved documentation until a vegetation works operational works permit has been issued in respect of it.

31 Compliance with FMP / FTMP

If a FMP / FTMP is required, all works must be conducted in accordance with the approved FMP or FTMP (as applicable) and any conditions imposed on the compliance certificate.

32 Currency of FMP / FTMP

If a FMP / FTMP is required, the currency period of any approval of an FMP or FTMP required by the above conditions will be six months from the date of the issue of the compliance certificate for the amended plan. A fresh plan must be submitted to Council for approval if works are not substantially started within the six-month period.

NATURE CONSERVATION (KOALA) MANAGEMENT

33 Koala management

- a The Koala Management Plan, being 'Blue Rock Quarry Koala Management Plan with document reference 2012_01_01_Koala Management Plan, dated January 2012 and prepared by Cardno Chenoweth' and Koala management plan addendum prepared by Fulton Hogan and dated March 2014 is approved.

- b The applicant must ensure that all construction and ongoing operations on Lots 14, 15 and 16 are undertaken in accordance with the approved plans.
- c A copy of the Koala Management Plan must be kept on site at all times and implemented into any existing or future Quarry Management Strategy Plan, including but not limited to the Quarry's Environmental Management Plan.

34 Koala conservation requirements

All clearing must be undertaken in accordance with Part 3 of the *Nature Conservation (Koala) Conservation Plan 2006* (Qld) (the '**Koala Plan**') which includes but is not limited to obligations in relation to:

- a Sequential clearing conditions in accordance with section 15 of the Koala Plan; and
- b The need for a Koala Spotter in accordance with section 16 of the Koala Plan.

*Information note: The Koala Plan is available at:
<http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/N/NatureConKP06.pdf>*

REHABILITATION / REVEGETATION

35 Rehabilitation completion and certification

- a The rehabilitation management plan, being 'Blue Rock Quarry Rehabilitation Management Plan, dated 10 march 2014, prepared by Cardno ' is approved subject to the following;
 - i Additional rehabilitation must be undertaken in the area detailed as offset rehabilitation area approx. 4500m2 on plan being Rehabilitation Offset Plan 2 May 2014 (addendum to rehabilitation management plan, Cardno , 10 march 2014), prepared by Fulton Hogan.
 - ii The additional rehabilitation area as detailed in dot point i must be rehabilitated with the naturally occurring regional ecosystem with a strong focus on Glossy black feed trees.
 - iii 5 Glossy Black Cockatoo nest boxes must be installed in close proximity to the proposed feed tree rehabilitation area. These nest boxes are to be installed by a spotter catcher with GPS locations provided to council.
- b The applicant must amend the document in accordance with the following and ensure that an amended copy is returned to Council.
- c The applicant must undertake the rehabilitation/revegetation works for the areas identified on Figure 1 Rehabilitation Zones within the rehabilitation management plan.
- d The applicant must provide to Council, prior to the commencement of the use of the new facilities as detailed on plan being;

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the following certification from a qualified professional that all works/measures in the approved rehabilitation management plan:

- i Certification that all planting works have been implemented on site; to be submitted no later than 6 months following commencement of planting works;
- ii Certification of nest box installation and GPS location;
- iii Certification that all rehabilitation works have been implemented and maintained for the initial 12 month maintenance period. This certification must include an assessment of all areas of Assisted Natural Regeneration

- and the necessary course of action required; and
- iv Certification that all rehabilitation works have been implemented and maintained for the second 12 month maintenance period.
- e The following certification stages will be subject to a site inspection by the relevant Council officer following receipt of the above documentation.
- f A record of all rehabilitation maintenance activities must be kept on site or with the applicant to facilitate on going site management and assist the certification process. These documents may be available to the relevant Council officer at any time.
- g A copy of the Rehabilitation Management Plan must be kept on site at all times and implemented into any existing or future Quarry Management Strategy Plan, including but not limited to the Quarry's Environmental Management Plan.

HYDRAULICS

36 No worsening of hydraulic conditions

The development must be designed and constructed so as to result in:

- a No increase in peak flow rates downstream from the site;
- b No increase in flood levels external to the site; and
- c No increase in duration of inundation external to the site that could cause loss or damage.

37 Alteration of overland flow paths

- a Overland flow paths on the site must not be altered in a way that inhibits or alters the characteristics of existing overland flows on other properties or that creates an increase in flood damage on other properties.
- b The subject site must not restrict or block the external catchment's runoff running through the site (Ref. Figure 3 – Catchment Delineation Plan; Drawing No 982.133/Revision 2 of Groundwork Plus dated 27 September 2012). The site must accept and manage the external catchment's runoff through the site.

38 Hydraulic certification to be submitted

In conjunction with the lodgement of future Operational Works application or prior to the commencement of work on-site, whichever occurs first, the applicant must submit certification from a qualified hydraulic engineer (RPEQ) stating that outflow from the proposed twin 525mm pipes will not cause any flooding nuisance on the Tamaree Road including road reserve, cul-de-sac and adjacent access road to the site. The certification must also confirm that any overflow on the Tamaree Road or the access road complies with the flood safety criteria of QUDM (2008) (i.e. depth < 0.25m and $d \times V < 0.4 \text{ sq. m/s}$) during the Q100 storm event.

STORMWATER QUANTITY MANAGEMENT

39 Stormwater management plan to be complied with

- a The applicant must submit certification from a Registered Professional Engineer Queensland (RPEQ) specialised in stormwater management confirming that all works have been carried out and completed generally in accordance with the approved stormwater report being "Stormwater Management Plan - Blue Rock Quarry, Cedar Creek (Ref. 982_611_001_SMP)" prepared by Groundwork Plus dated 6 November 2012.
- b The certification must be submitted at the completion of each stage of works proposed in the "Stormwater Management Plan - Blue Rock Quarry, Cedar Creek (Ref. 982_611_001_SMP)" prepared by Groundwork Plus dated 6 November 2012

40 Certification that engineering drawings reflect stormwater management treatment train

The applicant must provide to Council, in conjunction with any development application for operational work (works for infrastructure), certification from a Registered Professional Engineer Queensland (RPEQ) specialising in stormwater that the submitted engineering drawings accurately reflect the stormwater management measures contained within the approved stormwater management plan, unless alternative options are agreed in writing with Gold Coast City Council.

41 SQIDs engineering design drawings and supporting information

- a The applicant must submit to Council detailed engineering design drawings and supporting information for all stormwater quality improvement devices (eg. Sediment basin, wetlands, catch drain, diversion drain/channel, rock check dam, etc) identified in the approved stormwater management plan on Lot 14 on RP151378, Lot 15 on RP151378 and Lot 16 on RP151378.
- b Construction protection measures for the stormwater quality improvement devices on Lot 14 on RP151378, Lot 15 on RP151378 and Lot 16 on RP151378 are to be defined within the detailed engineering drawings (eg. geo fabric and grassed turf must be placed over the device during the construction phase) in accordance with Council's Water Sensitive Urban Design Guidelines (2007).
- c The applicant must submit the drawings and information at the same time and together with a development application for operational work (works for infrastructure).

42 SQID maintenance

All ongoing maintenance and monitoring of stormwater treatment devices (e.g. bio-retention) shall be undertaken in accordance with Appendix A of "Stormwater Management Plan - Blue Rock Quarry, Cedar Creek (Ref. 982_611_001_SMP)" prepared by Groundwork Plus dated 6 November 2012 and managed by the owner of the development, at no cost to Council to the satisfaction of Chief Executive Officer.

43 Stormwater headwalls, outlets and associated flow paths and channels

- a All stormwater headwalls/outlets and associated flow paths and channels must be:
 - i Treated in a manner appropriate to their proposed landscaped surrounds; and
 - ii Constructed in accordance with *Planning Scheme Policy 11 – Land Development Guidelines, Standard Specifications and Drawings* to avoid erosion and batter deterioration. For example, the channel from a stormwater outlet discharging into an area of revegetation must be constructed as a natural channel using site rock/stone and planted/revegetated as appropriate.
- b The aprons in front of stormwater headwalls must be constructed to ensure no under-scouring can occur.
- c The areas of cut surrounding the headwalls must be sufficiently stabilised to the satisfaction of the Chief Executive Officer to ensure that no erosion or destabilisation occurs.
- d All naturalised channels conveying or directing any stormwater from the catchment within which the site is located must connect with other existing stormwater infrastructure.

EROSION AND SEDIMENT CONTROL

44 Erosion and sediment control

- a Sediment, erosion and dust control measures must be implemented in

accordance with the approved plans/drawings and the Best Practice Erosion & Sediment Control (IECA Australasia, November 2008) and best industry practices as appropriate to an extractive industry. Additional sediment, erosion and dust control measures must be implemented as directed by Council officers upon site inspection.

- b Sediment control structures (eg sediment fence) must be placed at the base of all materials imported on-site to trap any sediment runoff.
- c To minimise unvegetated areas:
 - i Construction activities must be staged;
 - ii Filled areas must be seeded immediately on completion; and
 - iii No area should remain exposed (unvegetated) for more than 2 weeks unless construction work is being undertaken on that area.
- d All water from the site, including dewatering discharge, must be directed through a sediment pond (or other approved devices) prior to leaving the site.

45 Construction of sediment basin

- a The sediment basin(s) proposed for construction phase must be designed in accordance with Appendix B of the Best Practice Erosion and Sediment Control (IECA Australasia, November 2008).
- b Each construction sediment basin must have the capacity to treat flows to current best practice standards and as a minimum must be designed to contain all the stormwater runoff from the 85th percentile 5 day rainfall depth and in addition be designed to store 2 months sediment from the receiving catchment, as determined using the Revised Universal Soil Loss Equation.
- c Construction sediment basins must be dewatered as soon as practicable after each rainfall event.
- d Construction sediment basins and associated structures such as inlets, outlets and spillways are designed and constructed to be structurally sound for 10 year ARI rainfall event under normal circumstances.
- e A high-flow bypass system must be included (if necessary) to prevent any potential re-suspension of accumulated sediment from the basin during major storm events during construction.
- f Accumulated sediment from construction sediment basins and other controls must be removed and disposed of appropriately without causing water contamination.

46 Inspections and reporting

- a All erosion and sediment control measures must be inspected on a weekly basis and following runoff events until the site is fully rehabilitated.
- b All drainage control structures such as Diversion Banks, Diversion Channels and Temporary Culvert Protections must be inspected daily to ensure they have not been damaged by machinery and are serviceable in readiness for the next rainfall event.
- c Where inspection indicates a non-conformance, a Non-Conformance Report must be generated. This report must include but not limited to the following:
 - i Details of the nature and cause of non-conformance; and
 - ii Details of the required corrective actions.Corrective actions must be carried out within 24 hours where practicable or as agreed with the Construction Superintendent.
- d A monthly summary of Erosion and Sediment Control (ESC) performances must be compiled and retained at the site office and made available to Council's inspectors upon request. This report must include but not limited to the following:
 - i ESC Inspection Checklists;

- ii Description of any incidents of non-conformance;
- iii Results of corrective action; and
- iv Revisions to the ESCP.

BUSHFIRE MANAGEMENT

47 Bushfire Management Plan

The complete Bushfire Management Plan, the BMP being 'Bushfire Management Plan, Lot 14, 15, 16 on RP151378 and Lot 89 on WD739 Tamaree Road, Cedar Creek', dated February 2014 and prepared by Bushfire Risk Reducers, shall consist of the plan submitted by the applicant, the QFRS Bushfire Planning Cover Sheet and any fire safety material included by the bushfire consultant or QFRS.

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54 Safe access for fire appliances, throughout the quarry, is to be maintained at all times.

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ADVISORY NOTES TO APPLICANT

C Referral agencies

The referral agencies (and their addresses) for the application are listed below.

Any referral agency conditions are identified in the conditions of approval.

Referral agency	Address	Jurisdiction
Department of Environment and Heritage Protection	Permit and Licence Management GPO Box 2454 BRISBANE QLD 4001	ERA 16 'Extracting and Screening'
Department of Transport and Main Roads	South Coast Region Land Management PO Box 442 NERANG QLD 4211	Land not contiguous to a State-controlled road
Energex	GPO Box 1461 BRISBANE QLD 4014	Electricity infrastructure
Department of Natural Resource and Mines	Permit and Licence Management GPO Box 2454 BRISBANE QLD 4001	Contaminated Land.

Department of Environment and Heritage Protection	Permit and Licence Management GPO Box 2454 BRISBANE QLD 4001	Vegetation Clearing
Department of Environment and Heritage Protection	Permit and Licence Management GPO Box 2454 BRISBANE QLD 4001	Land in or near a wetland
Powerlink – Electricity Infrastructure	Powerlink Electricity PO Box 1193 VIRGINIA QLD 4014	Electricity infrastructure

D Properly made submissions

There were properly made submissions about the application. The name and address of the principal submitter for each properly made submission is attached to the decision notice.

E Rights of appeal

The applicant has a right of appeal to the Planning and Environment Court regarding this decision, pursuant to section 461 of the *Sustainable Planning Act 2009*. A copy of that section is attached to the decision notice.

For particular material changes of use, an appeal can also be made to a Building and Development Committee. Please refer to the prerequisites in sections 519 and 522 of the *Sustainable Planning Act 2009*, attached to this decision notice, to determine whether you have appeal rights to a Building and Development Committee.

Submitters who made properly made submissions have a right of appeal to the Planning and Environment Court regarding this decision, pursuant to section 462 of the *Sustainable Planning Act 2009*. A copy of that section is attached to the decision notice.

F Applicant responsibilities

The applicant is responsible for securing all necessary approvals and tenure, providing statutory notifications and complying with all relevant laws.

Nothing in this decision notice alleviates the need for the applicant to comply with all relevant local, State and Commonwealth laws and to ensure appropriate tenure arrangements have been made where the use of/reliance upon land other than that owned by the applicant is involved. Without limiting this obligation, the applicant is responsible for:

- a Obtaining all other/further necessary approvals, licences, permits, resource entitlements etc by whatever name called required by law before the development the subject of this approval can be lawfully commenced and to carry out the activity for its duration;
- b Providing any notifications required by law (by way of example only, to notify the administering authority pursuant to the *Environmental Protection Act 1994* of environmental harm being caused/threatened by the activity, and upon becoming aware the premises is being used for a 'notifiable activity');
- c Securing tenure/permission from the relevant owner to use private or public land not owned by the applicant (including for access required by conditions of approval);
- d Ensuring the correct siting of structures on the land. An identification survey demonstrating correct siting and setbacks of structures may be requested of the applicant to ensure compliance with this decision notice and applicable codes;

- e Providing Council with proof of payment of the Portable Long Service Leave building construction levy (or proof of appropriate exemption) where the value of the Operational Works exceeds \$80,000. Acceptable proof of payment is a Q.Leave – Notification and Payment Form approved by the Authority. Proof of payment must be provided before Council can issue a development permit for the Operational Works. This is a requirement of section 77(1) of the *Building and Construction Industry (Portable Long Service Leave) Act 1991*; and
- f Making payment of any outstanding Council rates and charges applicable to the development site prior to the lodgement of subdivision plans.

G Indigenous cultural heritage legislation and duty of care requirement

The *Aboriginal Cultural Heritage Act 2003* ('**AHCA**') is administered by the Department of Environment and Resource Management (DERM). The AHCA establishes a duty of care to take all reasonable and practicable measures to ensure any activity does not harm Aboriginal cultural heritage. This duty of care:

- a Is not negated by the issuing of this development approval;
- b Applies on all land and water, including freehold land;
- c Lies with the person or entity conducting an activity; and
- d If breached, is subject to criminal offence penalties.

Those proposing an activity involving surface disturbance beyond that which has already occurred at the proposed site must observe this duty of care.

Details of how to fulfil this duty of care are outlined in the duty of care guidelines gazetted with the AHCA.

The applicant should contact DERM's Cultural Heritage Coordination Unit on (07) 3238 3838 for further information on the responsibilities of developers under the AHCA.

H Greenhouse gas emissions

As part of Council's commitment to reducing greenhouse gas emissions Council is encouraging the expansion of the natural gas reticulation network. In particular, the use of natural gas hot water systems will result in significantly less greenhouse gas emissions than equivalent electric storage hot water systems.

The applicant should contact the local natural gas reticulator (APA Group) to arrange an assessment of the suitability of the proposed development for connection to the existing gas reticulation network. Please contact Ramon O'Keefe on 0438708798 or email: ramon.o'keefe@apa.com.au.

I Infrastructure charges

Infrastructure contribution policies for the Water, Wastewater, Recreation, Stormwater and Transport Networks are no longer applicable and therefore monetary contribution conditions for these networks are no longer included in the decision notice.

Infrastructure charges are now levied under an Adopted Infrastructure Charges Resolution by way of an infrastructure charges notice, which accompanies this decision notice.

J Obligation to ensure electrical safety

Under the *Electrical Safety Act 2002* you have an obligation to ensure your business or undertaking is conducted in an electrically safe way, whether or not it is electrical work.

If there is a reasonable likelihood that your work may cause a person, vehicle, operating plant or equipment to come into contact with an overhead electric line, you must consult with the person in control of powerlines.

Persons, vehicles, operating plant or equipment must stay outside the defined exclusion zone applicable to the powerline.

Information note:

An exclusion zone sets the minimum safe approach distance to the powerline. Guidance on exclusion zones can be found in the Code of Practice - Working Near Exposed Live Parts issued by the Electrical Safety Office.

For further information, including codes of practice and legislation, either check the Department of Employment and Industrial Relations' web site – www.deir.qld.gov.au, or contact the Electrical Safety Office Infoline – 1300 650 662.

K Water restrictions to be complied with

All persons and/or companies engaging in landscaping works must comply with current water restrictions. These restrictions detail specific times and methods for the watering of newly established gardens and turf for both residential and non-residential developments.

Any person or company found contravening current water restrictions may incur fines of up to 200 penalty units. [*Water Supply (Safety and Reliability) Act 2008* Section 43 (3)] (1 Penalty Unit = \$100.00).

L All of the recommendations, that are made in response to the performance criteria by the bushfire consultant or QFRS should be considered as requirements and conditions of approval for this application unless otherwise stated in writing by the Gold Coast City Council.

M The conditions and recommendations made are based on the lot layout, street layout and building envelopes in the BMP referred to above. Changes to these or other factors, such as areas of revegetation, conservation covenant, retained bushland etc, may affect the safety of the development and may void the recommendations contained in the report. Should any changes to the above occur, the applicant should advise the bushfire consultant to ensure that the BMP is not affected by these changes.

N In the event of such changes, an amended Bushfire Management Plan that takes into account the changes may be required. Any such amended plan may be subject to further assessment, which may or may not result in recommendation for approval.

O Where the BMP has triggered the requirements of AS3959.2009 – Construction of Dwellings in Bushfire Prone areas, QFRS only assesses that this performance criteria has been addressed. QFRS does not accept any responsibility for or give approval as to the accuracy of the Bushfire Attack Levels that are contained in this BMP

P The Gold Coast Planning Scheme Policy 9 “Guidelines for Preparing Fire Management Plans” Section 1.6 requires a copy of the final approved plan to be provided to the local fire brigade. A copy of the plan together with this cover sheet has been supplied to the Cedar Creek Rural Fire Brigade. Comment has been sought on the suitability of access for fire fighting, fire trails and the suitability of water supplies.

Q An alert should be placed on the Title or Council Rate searches that an approved Bushfire Management Plan is in existence, is made available to ensuing owners, and must be complied with, by ensuing owners.

R The applicant is to obtain a copy of the complete approved Bushfire management Plan as described above from council. This and only this is the plan that is to be complied with and distributed to all landowners.

Sustainable Planning Act 2009

APPEAL RIGHTS FOR APPROVAL OR REFUSAL OF PERMISSIBLE CHANGES FOR MATERIAL CHANGE OF USE, RECONFIGURATION OF A LOT OR OPERATIONAL WORKS APPLICATIONS.

466 Appeals about decisions relating to permissible changes

- (1) For a development approval given for a development application, the following persons may appeal to the court against a decision on a request to make a permissible change to the approval-
 - (a) if the responsible entity for making the change is the assessment manager for the application-
 - (i) the person who made the request: or
 - (ii) an entity that gave a notice under section 373 or a pre-request response notice about the request:
 - (b) if the responsible entity for making the change is a concurrence agency for the application – the person who made the request.
- (2) The appeal must be started within 20 business days after the day the person is given notice of the decision on the request under section 376.
- (3) Also, a person who has made a request under section 369 may appeal to the court against a deemed refusal of the request.
- (4) An appeal under subsection (3) may be started at any time after the last day the decision on the matter should have been made.

Sustainable Planning Act 2009

APPEAL RIGHTS FOR APPROVAL OR REFUSAL OF EXTENSIONS TO A RELEVANT PERIOD FOR MATERIAL CHANGE OF USE, RECONFIGURATION OF A LOT OR OPERATIONAL WORKS APPLICATIONS.

465 Appeals about decisions relating to extensions for approvals

- (1) For a development approval given for a development application, a person to whom a notice is given under section 389, other than a notice for a decision under section 386(2), may appeal to the court against the decision in the notice.
- (2) The appeal must be started within 20 business days after the day the notice of the decision is given to the person.
- (3) Also, a person who has made a request under section 383 may appeal to the court against a deemed refusal of the request.
- (4) An appeal under subsection (3) may be started at any time after the last day the decision on the matter should have been made.

Council of the City of Gold Coast
This is an authorised version of the original document

27/01 '93 12:56

ASTEC ADMIN QLD →→→ S. ROADS/JOY McD.

002

TELEPHONE:
AREA CODE: 073
GOLD COAST 58 0211
TELEX AA 42304

ADDRESS ALL COMMUNICATIONS TO
THE SHIRE CLERK
P.O. BOX 178
NERANG, QLD. 4211.
OFFICE, GAVEN WAY,
NERANG, QLD.



If Telephoning or Calling
Please ask for

Cockbain

Mr.

IN REPLY PLEASE QUOTE

AC:VG

306/3/248

Ref. No.

ALBERT SHIRE COUNCIL

22 MAY 1985

N.J. Breen,
Solicitor,
C/- Bennett & Assoc.,
P.O. Box 156,
UPPER MT. GRAVATT, QLD., 4122.

Dear Sir,

re: I.D.B. Application No. 500 & Rezoning Application No. 248
Sub 4, Portion 77 & Portion 89, Parish of Darlington
Blue Rock Quarries Pty. Ltd.
Tamaree Road, Cedar Creek.

With reference to the above, it is advised that the abovementioned lands were gazetted as Extractive Industry zoning on Saturday, 3rd September, 1977.

Copies of conditions issued in respect of the original Interim Development Bylaw Application Number 500 and Rezoning Application Number 248, together with a section of the Development Agreement relating to works to be done and payments to be made by the applicant are enclosed for your information.

Yours faithfully,

(T.R. Moore)
SHIRE CLERK.

ATT

it/so

Encl.

lot 15 on RP 151378, extractive
16 on RP 151378 Rural.

THE SECOND SCHEDULEWORKS TO BE DONE AND PAYMENTS TO BE MADE BY THE APPLICANT

1. The applicant shall at all times observe the requirements of the Town Planning Scheme and Bylaw 24 - Town Planning as attached, or as may be amended from time to time. The applicant shall ascertain the requirements of Council with regard to site operations prior to their commencement.
2. Tamaree Road shall be extended and constructed, at full cost to the applicant, to a standard suitable for the proposed traffic and to the satisfaction of the Shire Engineer prior to the Extractive Industry commencing.
3. The applicant shall apply for Town Planning Consent for each and every treatment or manufacturing process of the extracted material proposed to be established on the subject land.
4. The applicant shall purchase at full cost a block of land necessary for the extension of Tamaree Road to the Extractive Industry zone.
5. The following payments shall be made as offered by the applicant and accepted by the Council :-
 - (i) Because of works done on Tamaree Road no royalty payments to be paid before the 30th June, 1977. After 30th June, 1977 the applicant shall pay to the Council 10 cents per cubic metre of extractive material removed from the property for maintenance of roads in connection with Extractive Industry. The said sum is to be paid monthly without demand and the applicant shall maintain records to the reasonable satisfaction of the Shire Engineer of all material for the purpose of determining payments. The contribution to road maintenance offered by the applicant shall be subject to review after 2 years and then every 2 years thereafter and shall be adjusted by mutual agreement between the Council and the applicant. However should such parties be unable to agree upon the new contribution to be paid the same shall be determined by a single arbitrator appointed pursuant to the Arbitration Act, 1973, which arbitrator in making the variation shall adjust the same according to the Consumer Price Index All Groups Brisbane using as a guide the Consumer Price Index All Groups Brisbane as at the execution hereof, or alternately any Statute or Acts introduced by the Queensland Government. A certificate signed by the Shire Engineer certifying the number of cubic metres of material extracted in any period of time shall be prima facie evidence until the contrary is shown of the extraction shown therein.
 - (ii) The applicant shall submit to Council a bond as aforesaid prior to the rezoning being advertised of \$9,000 to secure the satisfactory operation of the terms of clause 6 of part 3 of Bylaw 24 - Town Planning and the satisfactory rehabilitation of the area during and upon completion of the Extractive Industry. The amount of this bond shall be reviewed by Council every 2nd year and may be increased if deemed necessary by Council whereupon a bond as aforesaid for the increased sum or for the total of all sums shall be lodged with the Council.
6. Mr. Powell to withdraw the existing Appeal and agree to the above conditions in writing.

OL / 57 / 135

Cockbain

Ex. TP3001306/3/248
AC.PK

-4. MAY 1976

R.W. & N.H. Powell & Sons,
6 River Crescent,
CYPRESS GARDENS. Q. 4217.

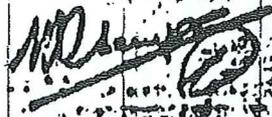
Dear Sirs,

re: Rezoning Application No. 248,
Extractive Industry, Cedar
Creek Road.

With reference to the above application, I am directed to advise that Council has resolved to initiate the rezoning procedure from Rural to Extractive Industry, subject to the signing of a satisfactory development agreement prior to advertising and incorporating the following conditions :-

1. Bank guarantee of \$9,000 to cover restoration.
2. Because of works done on road no royalty payable before end of June, 1977, then 10 cents per metre for every metre removed from quarry.
3. \$2,000 already paid to Cedar Creek Road to be refunded.
4. Applicant to withdraw appeal and agree to the above in writing.
5. Also subject to Extractive Industry provisions of the Town Plan.

Yours faithfully,



SHIRLEY OLIVER

22/500 ET.FT

12 OCT 1972

Jenkins

Ex. TP785

Mr. & Mrs. H.M. Powell,
 Cedar Creek,
VIA BERRINGHAM Q. 4207.

Dear Sir and Madam,

re: Interim Development Proposal Application No. 500
Quarrying (Blue Metal) - Sub 4 Portions 77 & 89,
Ward of Marlinton, Cedar Creek Road, Beerleigh.

With reference to the above application, I advise that Council intends granting approval, subject to the following conditions:-

1. Compliance with all Health, Building and Planning By-laws and regulations, including obtaining a Building Permit for all buildings.
2. Exact locations of all works and all plant, buildings etc. to be approved by the Shire Engineer and the C.C.A. It should be noted that no works, plant, buildings etc. of any description may be located closer than 100ft from the alignment of Cedar Creek Road.
 - (i) closer than 200ft from any transmission line tower.
 - (ii) within the C.C.A. easement.
3. No quarrying may be carried out within 20 chains of the transmission line.
4. All blasting operations must be carried out within relevant regulations, and to the requirements of the Shire Engineer.
5. Water spray equipment must be provided and used to minimise dust problem from crushing operations, to the requirements of the Shire Engineer.
6. Construction of bitumen sealed access from Cedar Creek Road to the property at a location approved by, and to the requirements of the Shire Engineer.
7. Contribution of an amount of \$1,000 to upgrade Cedar Creek Road from the site to Beerleigh-Tamboorine Road, to minimise possible traffic hazard resulting from the development.
8. This approval is for a period of five (5) years only, but may be extended at Council's discretion.
9. The applicant provides Council with full details of how the area is going to be restored after quarrying operations are completed.
10. A bond for \$1,000 must be lodged with Council, against satisfactory re-
 storation after quarrying operations are completed.

... by virtue of the provisions of "The Oaths Act, 1966"

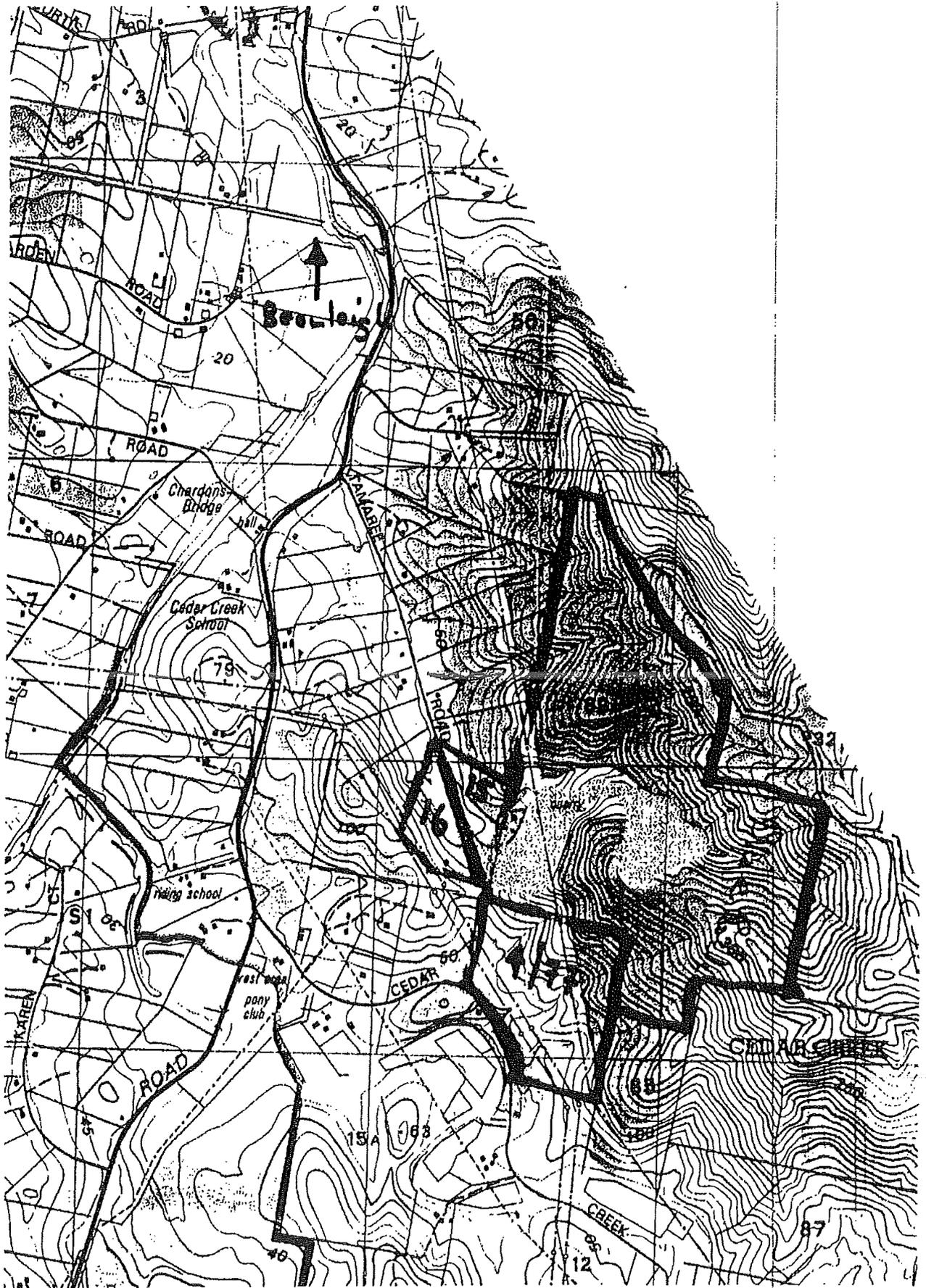
However, as objections have been received against the granting of this permit, and therefore formal approval cannot be given until thirty (30) days after hereof, or should an objector lodge an Appeal against this decision, then after the determination of the Court.

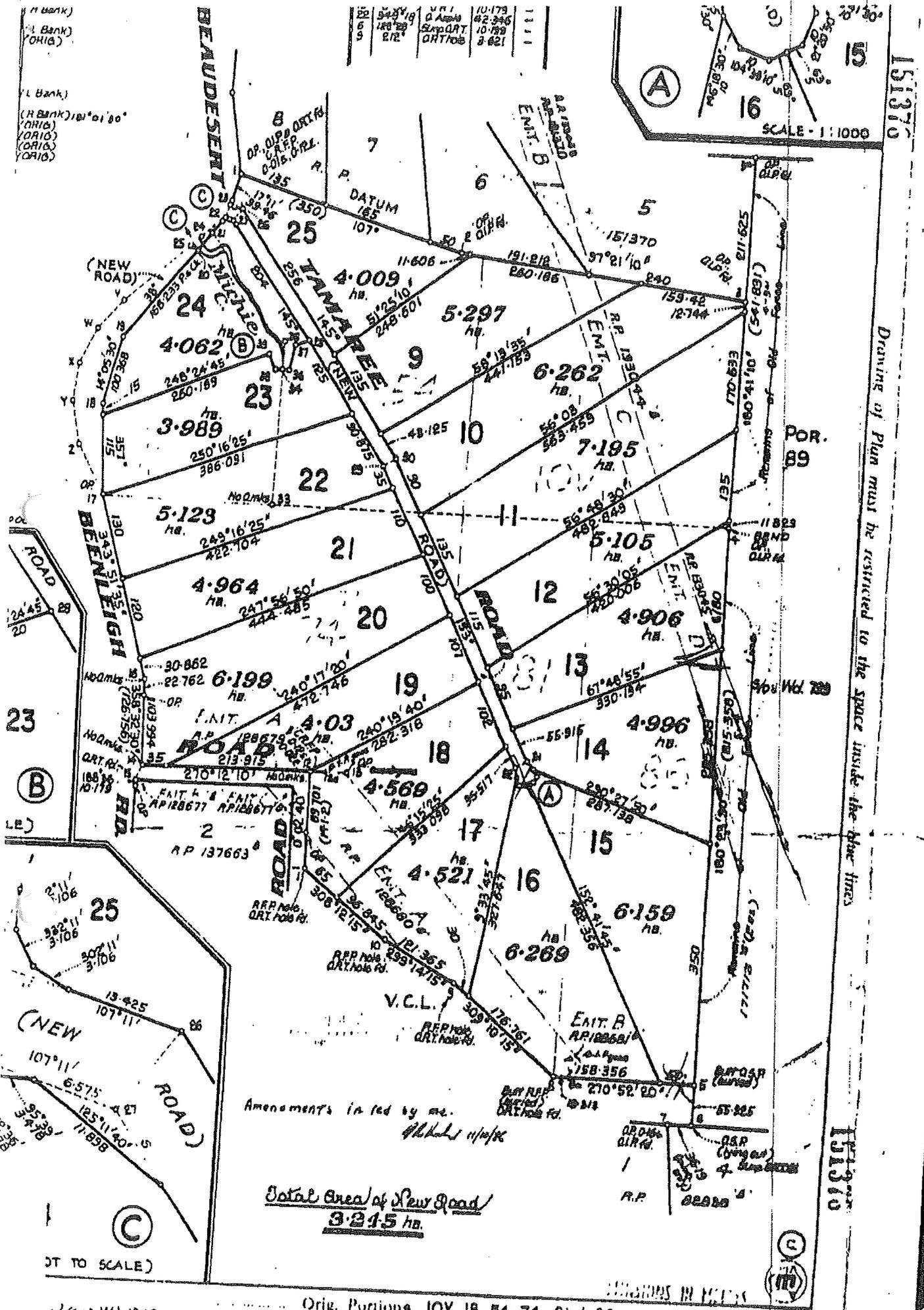
Yours faithfully,



SHIRE CLERK

DECLARED AND SIGNED before me at)
this 27th day of 1993)





Drawing of Plan must be restricted to the space inside the blue lines

Amendments in red by me.
Alfred 11/10/93

Total Area of New Road
3.245 hb.

Orig. Portions 10V, 1B, 54, 74, 81 & 86
 Orig. Grant 85244, 85288, 85362, 85390 & 79660
 County of Wand
 Parish of DARLINGTON Town of
 20/2/1976 W.31.2462

Attachment 2b – Environmental Approvals (Part 2)

Notice

Referral Agency Response

This notice is issued by the Department of Natural Resources and Mines (DNRM) pursuant to section 287 and section 292 of the Sustainable Planning Act 2009 ("the Act").

Chief Executive Officer
Gold Coast City Council
PO Box 5042
GOLD COAST MC QLD 9729

Attention: Tim Kitzelman

cc. Fulton Hogan Construction
C/- AECOM Australia Pty Ltd
PO Box 1307
FORTITUDE VALLEY QLD 4006

Attention: Melanie Neal-Reid and
Dylan Porter

Our reference: IC1011BEE0010_GOL2945_476759
Assessment Manager ref. MCU201100490

1. Application Details

Date referred to former Department of Environment and Resource Management (DERM):

11 October 2011

Development approval applied for: Development Permit

Development descriptions: Material Change of Use for Extractive Industry (Ancillary Activities – stockpiling, wheel wash, weighbridge, crib room and site office) and Environmentally Relevant Activity 16 (Extracting and Screening – stockpiling of screened product)

Aspects of Development: Material Change of Use - Clearing vegetation - *Sustainable Planning Regulation 2009* - Schedule 7, Table 3, Item 10

Material Change of Use – Environmentally Relevant Activity - *Sustainable Planning Regulation 2009* - Schedule 7, Table 2, Item 1

Material Change of Use – Land in or near a wetland - *Sustainable Planning Regulation 2009* - Schedule 7, Table 3, Item 21

Property/Location description: 89, 98 and 101 Tamaree Road, Schmidt Road and Cedar Creek Road, Cedar Creek (Lots 14, 15 and 16 on RP151378, Lot 89 on WD739 and Lot 1 on SP238024)

2. The Chief Executive, Department of Natural Resources and Mines (DNRM), as a referral agency for the application, advises that a response for each of the referral agency jurisdictions has been made and is attached.

2.1 Concurrence Jurisdiction 2.1.1 Clearing Vegetation

(Sustainable Planning Regulation 2009 – Schedule 7, Table 3, Item 10)

- Conditions must attach to any development approval, and those conditions are attached to this Notice.

3. The Chief Executive, administering the *Environmental Protection Act 1994*, as a referral agency for the application, advises that a response for each of the referral agency jurisdictions has been made and is attached.

3.1 Concurrence Jurisdiction

3.1.1 Environmentally Relevant Activity

(Sustainable Planning Regulation 2009 – Schedule 7, Table 2, Item 1)

- Conditions must attach to any development approval, and those conditions are attached to this Notice.

3.2 Advice Jurisdiction

3.2.1 Land in or Near a Wetland

(Sustainable Planning Regulation 2009 – Schedule 7, Table 3, Item 21)

- Recommendations have been made to the Assessment Manager and those recommendations are attached to this Notice.

4. General advice to assessment manager

Pursuant to sections 334 and 363 of the Act, a copy of a decision notice or negotiated decision notice issued by the assessment manager must be forwarded to DNRM as a referral agency for the relevant application at PO Box 1164, BEENLEIGH QLD 4207 and an electronic copy to palm@ehp.qld.gov.au.

The State's Native Title Work Procedures provide that responsibility for assessment of native title issues for an IDAS application rests with the assessment manager. Therefore, DNRM as a referral agency for the relevant application has not provided notification to native title parties.



Delegate
Jillyan Kelly
A/Senior Planning Officer
Regional Planning and Coordination
Land Services, South Region

15 November 2012

Enquiries:

Kelly Stewart
Natural Resource Officer
South Region, Land Services
Department of Natural Resources and Mines
32 Tansey Street, BEENLEIGH QLD 4207
PO Box 1164, BEENLEIGH QLD 4207

Phone: 07 3884 8028

Fax: 07 3884 8024

Email: DACoordinationSEQSouth@dnrm.qld.gov.au

Attachments

- Concurrence Agency Response – Clearing Vegetation – Ref: 2011/006373
- Concurrence Agency Response – Environmentally Relevant Activity – Ref: SPCE03112711
- Advice Agency Response – Land in or Near a Wetland – Ref: IC1011BEE0010

DNRM Permit ¹ number: Elvas 2011/006373 Trackjob:IC1011BEE0010

Assessment manager reference (if any):	MCU201100490
Date application received:	11 October 2011
Permit type:	Concurrence Agency Response
Date of decision:	13 November 2012
Decision	DNRM recommends approval with conditions. The conditions included in this Notice must attach to any development approval given by the Assessment Manager.
Relevant laws and policies:	<ul style="list-style-type: none"> ▪ <i>Sustainable Planning Act 2009.</i> ▪ <i>Vegetation Management Act 1999.</i> ▪ Concurrence Agency Policy for Material Change of Use, dated 21 October 2009. ▪ Regional Vegetation Management Code for Southeast Queensland Bioregion, dated 6 November 2009. ▪ State Policy for Vegetation Management.
Jurisdiction(s):	<p>DNRM referral agency jurisdictions:</p> <p>Material Change of Use - Clearing vegetation under the <i>Sustainable Planning Regulation 2009</i> - Schedule 7, table 3, item 10.</p>

Development Description(s)

Property/Location		Development
89, 98 & 101 Tamaree Road, Schmidt Road & Cedar Creek Road, Cedar Creek.	Lots 14 RP151378, 15 RP151378, 16 RP151378, 89 WD739 & 1 SP238024.	Material Change of Use for Extractive Industry (Ancillary Activities – Stockpiling, Wheel Wash, Weighbridge, Crib Room and Site Office) and ERA 16 – Extracting and Screening (Stockpiling of Screened Product)

¹ Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation administered by the Department of Natural Resources and Mines.

Reason(s) for inclusion of conditions

In accordance with section 289 of the *Sustainable Planning Act 2009*, the reason(s) for inclusion of conditions stated in this permit required by the concurrence agency response for the application are as follows:

The conditions are included pursuant to section 287 of the *Sustainable Planning Act 2009*.

Words underlined in the conditions are defined in the section entitled Dictionary.

CONDITIONS

1. Clearing of remnant vegetation is permitted in Area A (A1 to A3) identified on Referral Agency Response (Vegetation) Plan RARP 2011/006373.
2. No clearing of remnant vegetation is permitted in Area B (B1 to B4) identified on RARP 2011/006373 to ensure biological diversity loss is prevented and ecological processes are maintained.
3. Clearing of vegetation must be staged in line with operational needs to restrict clearing to current operational areas.
4. Any clearing or activity associated with clearing in Area A must only commence once the clearing area has been clearly defined.
5. Any clearing or activities associated with clearing in Area A must not adversely impact on vegetation not approved to be cleared.
6. Where excavation is undertaken adjacent to areas not approved to be cleared the edge of excavation must be stabilised to ensure soil levels in areas not approved to be cleared are maintained.
7. Measures used to stabilise excavation areas must not encroach into areas not approved to be cleared.
8. Measures used to stabilise excavation areas must be of sufficient depth and/or lateral distance from areas not approved to be cleared to ensure root systems of vegetation in these areas are not adversely impacted.
9. Any clearing activities, or activities associated with clearing must be undertaken in accordance with the following documents, except where inconsistent with the conditions of this permit, to ensure biological diversity loss is prevented, land degradation does not occur, and ecological processes are maintained:
 - 9.1.1. *Environmental Management Plan – Blue Rock Quarry Queensland – Fulton Hogan*, including sub plans contained therein, received by the Department 8 March 2012, and any future updates that are consistent with best practice.
 - 9.1.2. *'Best Practice Erosion and Sediment Control. International Erosion Control Association (Australasia), November 2008'*, and any updated version, if such standards and specifications are not contained within the environmental management plan.
10. To ensure loss of biological diversity is prevented, land degradation does not occur and ecological processes are maintained, all measures used to manage erosion, sediment and stormwater quantity/quality control must be designed, installed, operated and maintained to the standards and specifications in the following documents:

- 10.1.1. *Environmental Management Plan – Blue Rock Quarry Queensland – Fulton Hogan*, including sub plans contained therein, received by the Department 8 March 2012, and any future updates that are consistent with best practice.
- 10.1.2. *'Best Practice Erosion and Sediment Control. International Erosion Control Association (Australasia), November 2008'*, and any updated version, if such standards and specifications are not contained in the environmental management plan.
11. All erosion, sediment and stormwater quantity/quality controls must be installed and working prior to any site disturbance, vegetation clearance and grubbing, and services installation to ensure land degradation does not occur and ecological processes are maintained.
12. Any surface water or groundwater accumulated must be managed to prevent waterlogging or the increase of waterlogging within the landscape, or an increase in salinity or the salinisation of ground and surface water.
13. Any soil disturbance must be scheduled where possible for the least erosive periods of the year i.e. during periods of low rainfall volume and intensity to prevent soil erosion, maintain water quality and protect adjacent habitat.
14. All disturbed soil and excavated soil must either be contained within the construction boundary or alternatively securely stockpiled or respread in a location where its placement will not result in the clearing of vegetation that is regulated under the *Vegetation Management Act 1999*.
15. Land clearing debris must not be pushed into gullies, watercourses, other drainage lines or waterlogged areas.
16. The Applicant must ensure a copy of the development approval conditions, development permit, erosion and sediment control plan, stormwater management plan and any other documents required for the management of soil erosion and sediment control and stormwater quantity and quality, are provided to the principal contractor prior to the commencement of land-disturbing activities.
17. The Applicant must ensure that any and all employees, contractors, subcontractors, agents or any other person engaged or employed to carry out the clearing of any vegetation under this permit comply at all times with the requirements of this permit and do not clear any vegetation that is not approved to be cleared under this permit.

–END OF CONDITIONS–

Definitions

- **“Clear”, “cleared”, or “clearing”** for vegetation means clear as defined under the *Vegetation Management Act 1999* and as amended from time to time.
- **“Clearing as a result of the MCU”** means clearing as a result of the MCU as defined in the Concurrence Policy for Material Change of Use.
- **“Remnant vegetation”** means remnant vegetation as defined under the *Vegetation Management Act 1999* and as amended from time to time.

- “Vegetation” means vegetation as defined under the *Vegetation Management Act 1999* and as amended from time to time.

Statement of Reasons

The following Statement of Reasons is provided pursuant to section 289(1) of the *Sustainable Planning Act 2009*.

1. INTRODUCTION

- 1.1 The Department of Natural Resources and Mines (formerly Department of Environment and Resource Management) received a MCU application from Fulton Constructions Pty Ltd C/- AECOM Australia Pty Ltd on 22 September 2011.
- 1.2 The application was properly made 11 October 2011.
- 1.3 The application is for a MCU for an extension of a quarry on freehold Lots 14, 15 and 16 RP151378, 89 WD739 and 1 SP238024.
- 1.4 Delegate determined the RAR for *Vegetation Management Act 1999* matters on 13 November 2012.

2. EVIDENCE

- 2.1 Application and common material included therein.
- 2.2 Smartmap.
- 2.3 Vegetation Information Network (VIN).
- 2.4 Electronic Land & Vegetation Administration System (eLVAS).
- 2.5 *Vegetation Management Act 1999* (VMA).
- 2.6 *Sustainable Planning Act 2009* (SPA).
- 2.7 *Sustainable Planning Regulation 2009* (SPR).
- 2.8 Concurrence Agency Policy for Material Change of Use, dated 21 October 2009 (the policy).
- 2.9 Regional Vegetation Management Code for Southeast Queensland Bioregion, dated 6 November 2009 (the Code).
- 2.10 Natural Resource (SPA) Delegation (No. 2) 2011.
- 2.11 Certified Regional Ecosystem (RE) mapping Version 6.1.
- 2.12 RE descriptions database.
- 2.13 Gold Coast City Council Planning Scheme.
- 2.14 State Planning Policy SPP 2/07 – Key Resource Areas – Maps of Key Resource Areas.
- 2.15 DNRM datasets.

- 2.16 GIS Layers for proposed clearing area received 3 November 2011.
- 2.17 Additional application information provided by the applicant 8 March 2012.
- 2.18 Amended GIS layers for proposed clearing area received 5 November 2012.

3. FINDINGS OF FACT

- 3.1 The application indicates clearing of mapped remnant vegetation is required for stormwater quantity and quality management purposes.
- 3.2 Smartmap indicates the land tenure for Lots 14 RP151378, 15 RP151378, 16 RP151378, 89 WD739 and 1 SP238024 is Freehold.
- 3.3 VIN and eLVAAS indicate a PMAV (2008/008614) has been certified on Lots 14 RP151378, 15 RP151378, 16 RP151378, 89 WD739 and 1 SP238024.
- 3.4 RE mapping indicates the proposed clearing area contains the following:
 - 3.4.1 Of Concern RE12.3.11;
 - 3.4.2 Least concern RE12.11.5e;
 - 3.4.3 Category X area shown on a PMAV;
- 3.5 State Planning Policy 2/07 identifies the area as Key Resource Area 62 – Blue Rock Quarry.
- 3.6 RE Mapping overlayed with the submitted site plan indicates clearing of a mapped remnant of concern RE with essential habitat and a least concern RE will occur as a result of the MCU.
- 3.7 The Gold Coast City Council planning scheme indicates the subject land is zoned as Extractive and Rural.
- 3.8 The application was assessed against Criteria Table D of the Department's *Concurrence Agency Policy for Material Change of Use*, dated 21 October 2009 (the policy), and **PART P** of the *Regional Vegetation Management Code for Southeast Queensland Bioregion*, dated 6 November 2009 (the code), based on the following reasons:
 - 3.8.1 State Planning Policy 2/07 Guideline – Protection of Extractive Resources, 2007 indicates the application area is located within area identified as the Blue Rock Key Resource Area – KRA 62.
 - 3.8.2 Assessment Table 1, Columns 1(b) 2(d) of the policy directs that an application for a MCU for an extractive industry in a Key Resource Area must be assessed against Criteria Table D.
 - 3.8.3 For clearing as a result of the MCU to be approved, Criteria Table D of the policy directs that an application must meet Performance Requirements (PR) 2 to 10 of PART Xa of the code.
- 3.9 Based on the information provided in the application, the applicant's response to the information request, and DNRM's internal datasets, the assessing officer finds clearing as a result of the MCU **complies with the PRs** of the code and subsequently the policy based on the following:
 - 3.9.1 The application, common material, and application for an Environmental Relevant Activity approval indicate clearing of vegetation will be limited to the extent that is necessary for

carrying out work that is the natural and ordinary consequence of carrying out work for extracting and screening greenstone and greywacke (PR Xa.1).

- 3.9.2 The proposed development will not cause land degradation and will maintain diversity and ecological processes (PR Xa.2).
- a) The necessary permits pursuant to the *Environmental Protection Act 1994* for an Environmentally Relevant Activity are being obtained simultaneously from Environmental Services, Department of Environment and Heritage Protection (PR Xa.2).
 - b) The application and common material indicate clearing will be staged in line with operational needs that restrict clearing to the current operational area (PR Xa.2).
 - c) Clearing will be undertaken in accordance with the Blue Rock Environmental Management Plan (EMP), and any updates that are consistent with best practice.
 - i. Management sub plans of particular note in the EMP include the Stormwater Management Plan, Fauna and Vegetation Management Plan, and Quarry Rehabilitation Strategy.
- 3.9.3 Proposed clearing will not occur in or within an RE listed in Table 11 of the code (REs that contain a wetland (PR Xa.3)).
- a) Clearing will occur within an area mapped as Of Concern RE12.3.11, which is an RE that may contain a wetland. Further, the application material identifies some of this area as an ephemeral wetland area. However clearing of RE12.3.11 is restricted to approximately 0.01ha on-ground.
 - b) Clearing will be undertaken in accordance with the Blue Rock Environmental Management Plan (EMP), and any updates that are consistent with best practice.
 - i. Management sub plans of particular note in the EMP include the Stormwater Management Plan, Fauna and Vegetation Management Plan, and Quarry Rehabilitation Strategy.
 - c) The Blue Rock Quarry Stormwater Management Plan identifies the ephemeral wetland area will be extended relative to its role as a sediment basin, with rehabilitation/supplementary plantings of fast growing species such as *Melaleuca sp.* and possibly marsh species such as rushes.
- 3.9.4 Datasets held by DNRM and overlaid with applicant's proposed plan of development indicate clearing of assessable vegetation will not occur in or within 10m of the stream order one (1) watercourse located near the clearing area (PR Xa.4).
- 3.9.5 Areas of mapped remnant vegetation retained as a result of the MCU will maintain ecosystem functioning (PR Xa.5) based on the following:
- a) Area of clearing of mapped remnant vegetation is restricted to approximately (~) 0.5ha.
 - b) The clearing is on the periphery of a polygon of mapped remnant vegetation.
 - c) The clearing of mapped Of Concern RE12.3.11 is restricted to ~0.01ha.

- d) The clearing area is already highly disturbed.
 - e) The proposed clearing area is separated from the main polygon by a vehicular track. The proposed clearing area removes the vegetation up to the boundary of an existing vehicular track. As such, clearing will not cause a significant disturbance to the on-ground remnant polygon.
 - f) The area of clearing equates to ~ 5% of the immediate remnant polygon and ~1% of the total remnant vegetation (~48ha) on the subject lots.
 - g) The Blue Rock Quarry Stormwater Management Plan identifies the ephemeral wetland area will be extended relative to its role as a sediment basin, with rehabilitation/supplementary plantings of fast growing species such as *Melaleuca sp.* and possibly marsh species such as rushes.
 - h) Section 2.11 of the Blue Rock Quarry MCU Planning Report received 8 March 2012 states that *"a significant portion of the existing cleared areas of Lots 14 and 16 RP151378 (excluding the power line easement) will be rehabilitated and revegetation with native species, with a particular emphasis on koala feed species"*.
 - i) There will be some local disturbance initially; however this will be mitigated by the implementation of the environmental management plan, in particular, the stormwater management plan and fauna and vegetation management plan.
- 3.9.6 The proposed clearing will not contribute to waterlogging or salinisation of groundwater, surface water or soil (PR Xa.6).
- a) The landzone of the subject area is landzone 11, which is not usually subject to waterlogging.
 - b) Clearing is restricted to approximately 0.01ha on-ground.
 - c) The Blue Rock Quarry Stormwater Management Plan identifies the ephemeral wetland area will be extended relative to its role as a sediment basin, with rehabilitation/supplementary plantings of fast growing species such as *Melaleuca sp.* and possibly marsh species such as rushes.
 - d) The combination of water being directed to storage dams, staging clearing and progressive rehabilitation will ensure extraction will not contribute to waterlogging
 - e) DERM bore data indicates the groundwater is at a depth of 27m, distance 1.58km, 64m distance 1.98m and 42m, distance 1.36km. Groundwater levels greater than 6 metres are considered to represent a low salinity hazard.
- 3.9.7 The proposed development will maintain the current extent of essential habitat by maintaining the structure and function of RE12.3.11 (PR Xa.8).
- a) Approximately (~) 0.01ha of essential habitat will be cleared as a result of the MCU.
 - b) Most of the on-ground vegetation that comprises the EH is highly disturbed and in all likelihood, very little, if any, EH is being cleared.
 - c) The Blue Rock Quarry Stormwater Management Plan identifies the ephemeral wetland area will be extended relative to its role as a sediment basin, with rehabilitation/supplementary plantings of fast growing species such as *Melaleuca sp.*

and possibly marsh species such as rushes.

- d) The Blue Rock Quarry MCU Planning Report received 8 March 2012 states that "a significant portion of the existing cleared areas of Lots 14 and 16 RP151378 (excluding the power line easement) will be rehabilitated and revegetation with native species, with a particular emphasis on koala feed species". Also refer section 2.11 of said report.

3.9.8 There will be no clearing of vegetation mapped as a remnant endangered or of concern RE (PR Xa.7), or an RE listed in Table 2 of the Code (PR Xa.9).

3.9.9 Clearing of mapped remnant vegetation will not occur in landzone 1, 2 or 3 below 5 AHD (PR Xa.10).

3.9.10 The proposed development is subject to the conditions detailed elsewhere in this permit.

3.10 The Assessing officer finds the application (with conditions) complies with the *Concurrence Agency Policy for Material Change of Use, dated 21 October 2009*, and as such achieves the purposes of the *Vegetation Management Act 1999*.

3.11 Based on the above findings DNRM recommends approval.



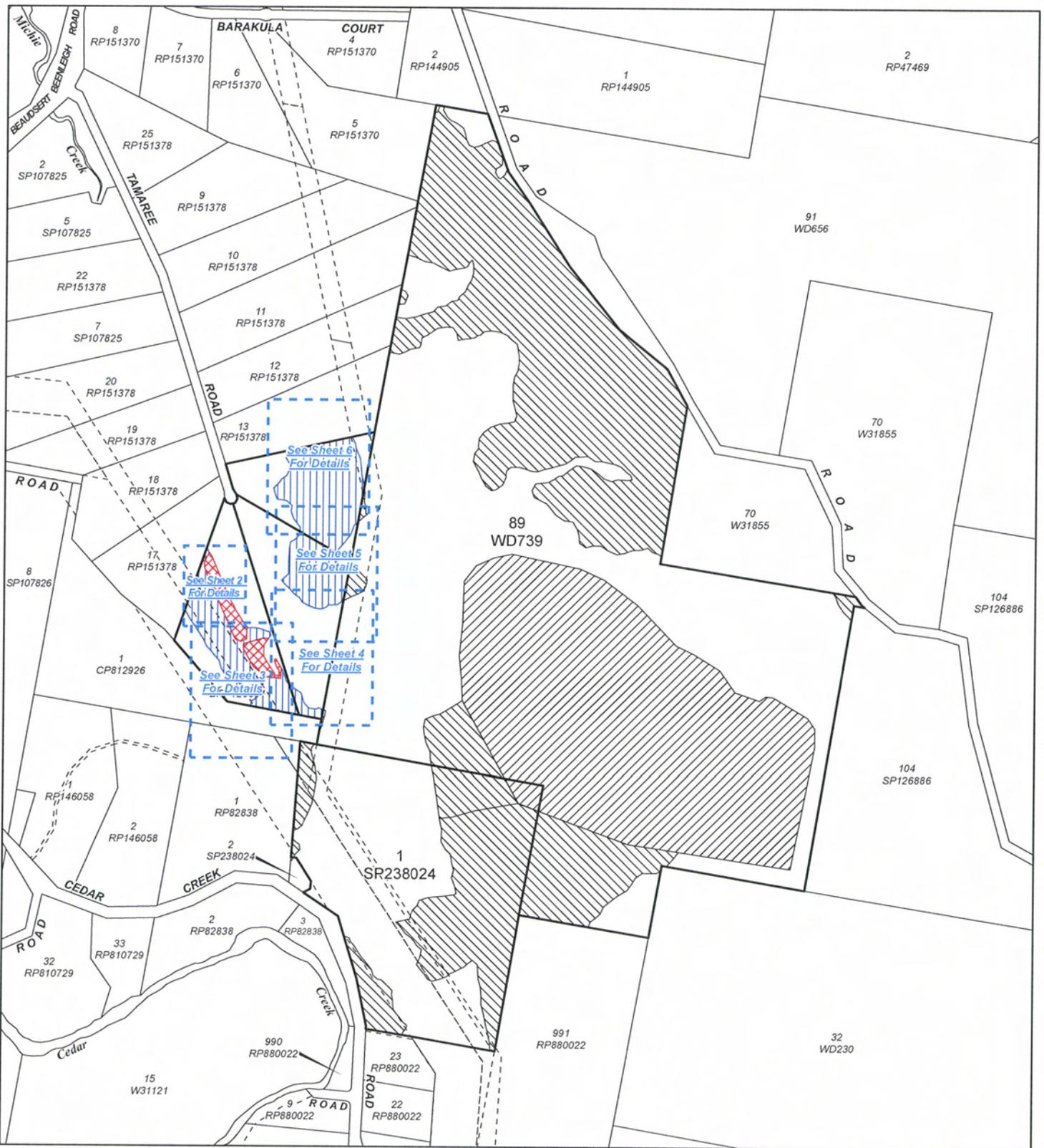
Patrina Birt

Vegetation Management Officer (VM2)

Delegate, Chief Executive administering the *Vegetation Management Act 1999*.

Department of Natural Resources and Mines

13 November 2012



Scale 1:8000 at A3 paper size



Projection: UTM (MGA Zone 56)

Datum: GDA94

Note: The property boundaries shown on this plan are APPROXIMATE ONLY. They are NOT an accurate representation of the legal boundaries.

Note: Derived Coordinate Points are provided to aid in the location of the Referral Agency Response boundaries. Responsibility for locating these boundaries lies solely with the landholder and delegated clearing contractor(s). All Derived Coordinate Points continue sequentially when labels are missing.

Note: This is a colour plan and should only be reproduced in colour.

Note: This plan must be read in conjunction with Referral Agency Response 2011/006373.

LEGEND • Derived Coordinate Point. Subject Lots. Area A - Specific Conditions Apply. See Referral Agency Response 2011/006373 for Details. Area B - Specific Conditions Apply. See Referral Agency Response 2011/006373 for Details. Specific Conditions Apply. See Existing Decision Notice 2005/101762 for Details. Specific Conditions Apply. See Existing Decision Notice 2009/008426 for Details.	Referral Agency Response (Vegetation) Plan Plan of Areas A and B in Lots 14 to 16 on RP151378		 Queensland Government
	Trackjob No. IC1011BEE0010		
	CENTRE: IPSWICH LOCALITY: CEDAR CREEK	REGION: SOUTH EAST LGA: CITY OF GOLD COAST	
	Map Reference: 9542 Keeper Reference: SER/082364	For data compilation sources see SER/082364/GIS Prepared by: NWF	Date: 14 November 2012

RARP 2011/006373

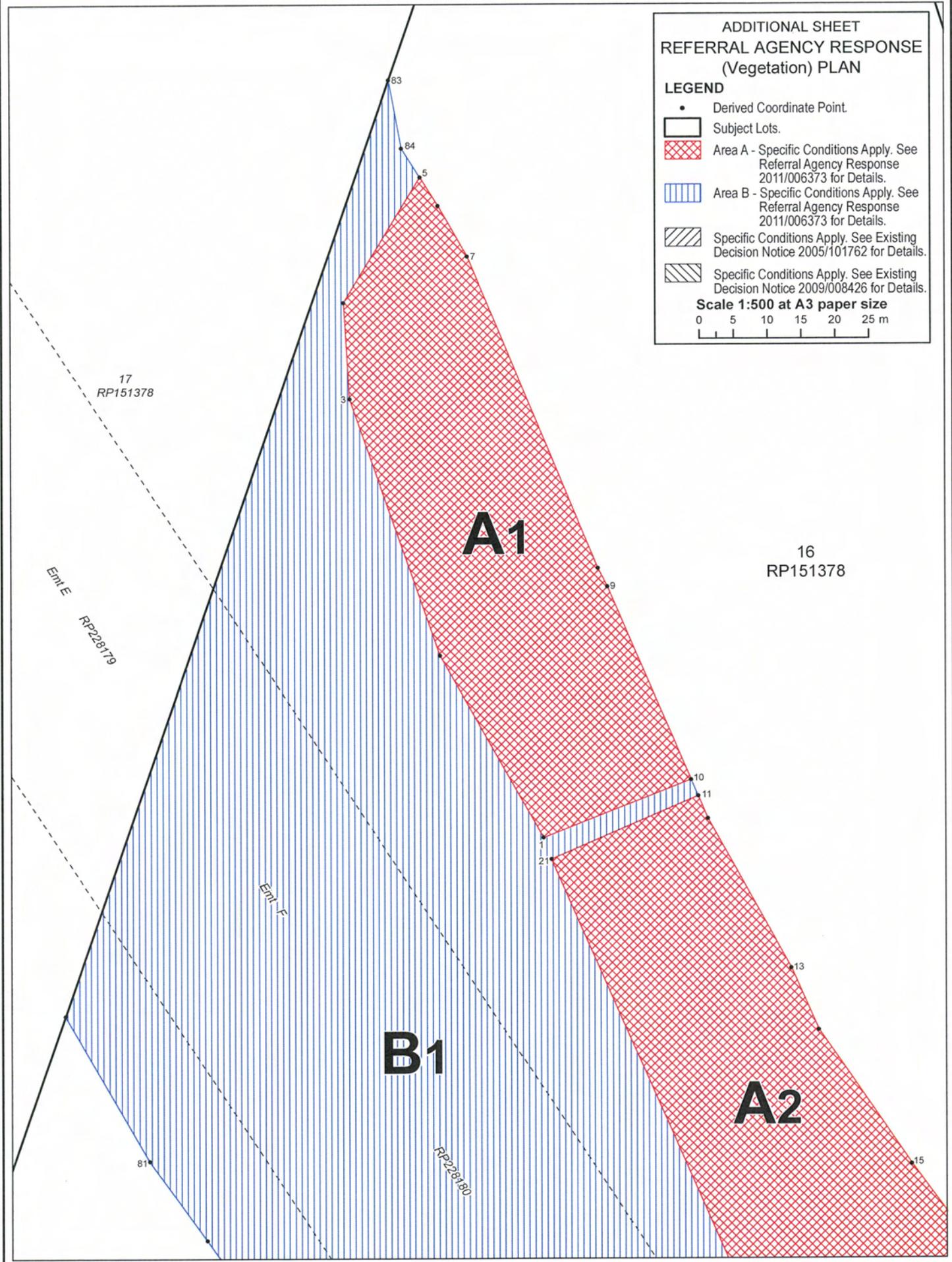
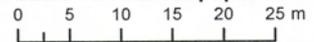
Sheet 1 of 7 Sheets

ADDITIONAL SHEET
REFERRAL AGENCY RESPONSE
(Vegetation) PLAN

LEGEND

- Derived Coordinate Point.
- ◻ Subject Lots.
- ▨ Area A - Specific Conditions Apply. See Referral Agency Response 2011/006373 for Details.
- ▨ Area B - Specific Conditions Apply. See Referral Agency Response 2011/006373 for Details.
- ▨ Specific Conditions Apply. See Existing Decision Notice 2005/101762 for Details.
- ▨ Specific Conditions Apply. See Existing Decision Notice 2009/008426 for Details.

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Projection UTM (MGA94 Zone 56) Datum - GDA94

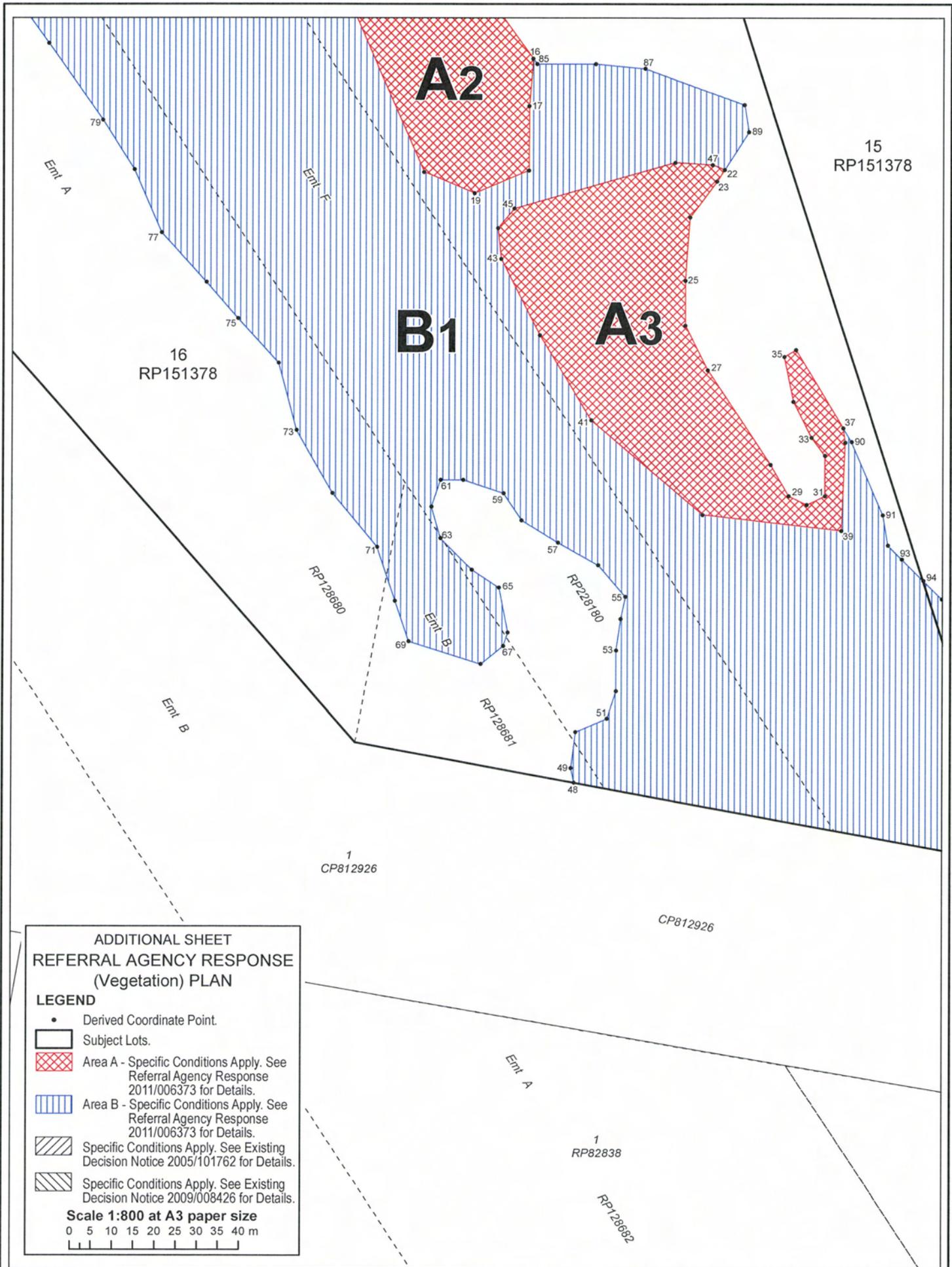
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RARP 2011/006373

Sheet 2 of 7 Sheets



**ADDITIONAL SHEET
REFERRAL AGENCY RESPONSE
(Vegetation) PLAN**

LEGEND

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- Subject Lots.
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- ▩ Specific Conditions Apply. See Existing Decision Notice 2009/008426 for Details.

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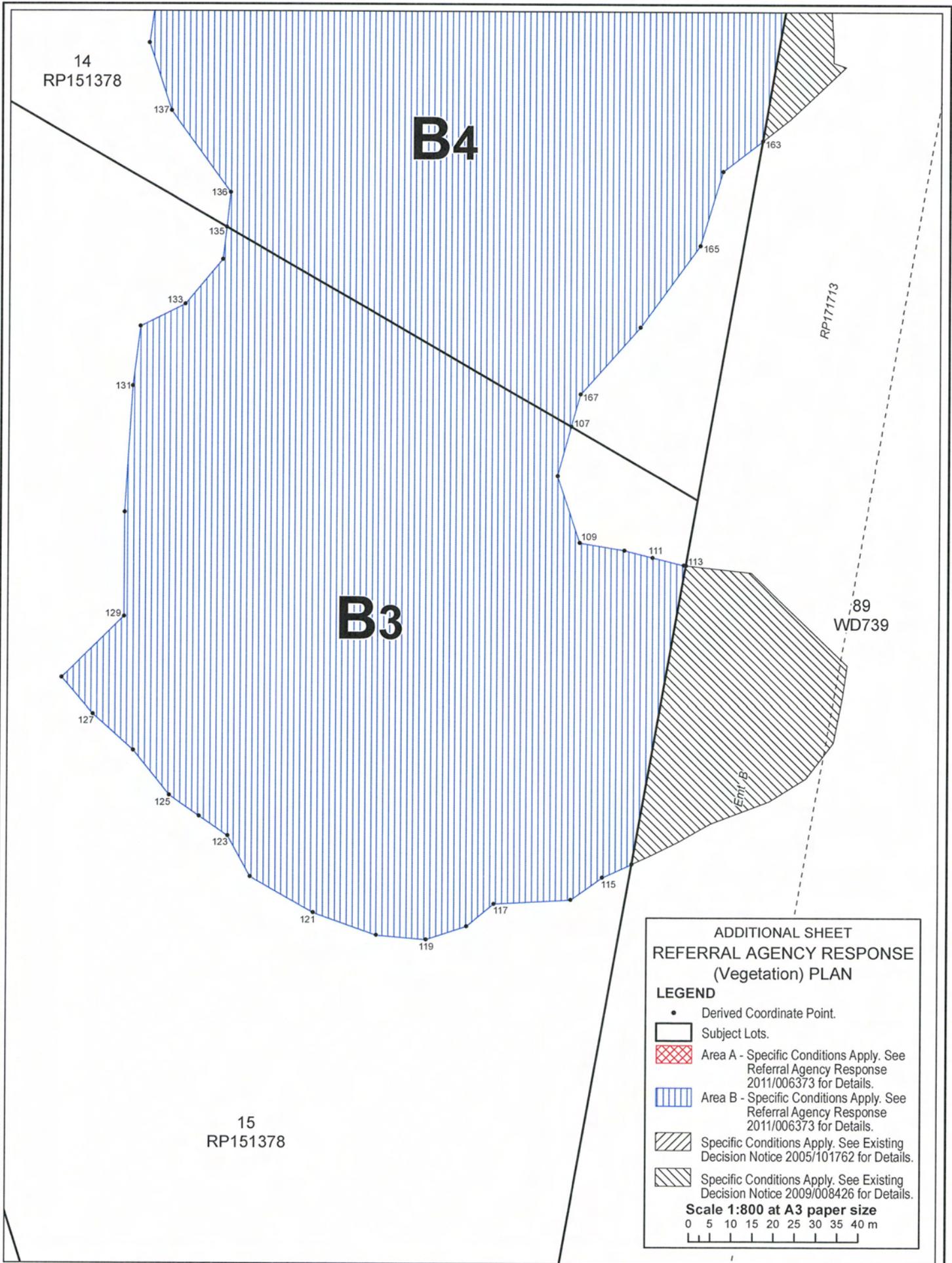
Projection UTM (MGA94 Zone 56) Datum - GDA94

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RARP 2011/006373
 Sheet 3 of 7 Sheets



**ADDITIONAL SHEET
REFERRAL AGENCY RESPONSE
(Vegetation) PLAN**

LEGEND

- Derived Coordinate Point.
- Subject Lots.
- ▨ Area A - Specific Conditions Apply. See Referral Agency Response 2011/006373 for Details.
- ▨ Area B - Specific Conditions Apply. See Referral Agency Response 2011/006373 for Details.
- ▨ Specific Conditions Apply. See Existing Decision Notice 2005/101762 for Details.
- ▨ Specific Conditions Apply. See Existing Decision Notice 2009/008426 for Details.

Scale 1:800 at A3 paper size
0 5 10 15 20 25 30 35 40 m

Projection UTM (MGA94 Zone 56) Datum - GDA94

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RARP 2011/006373
Sheet 5 of 7 Sheets

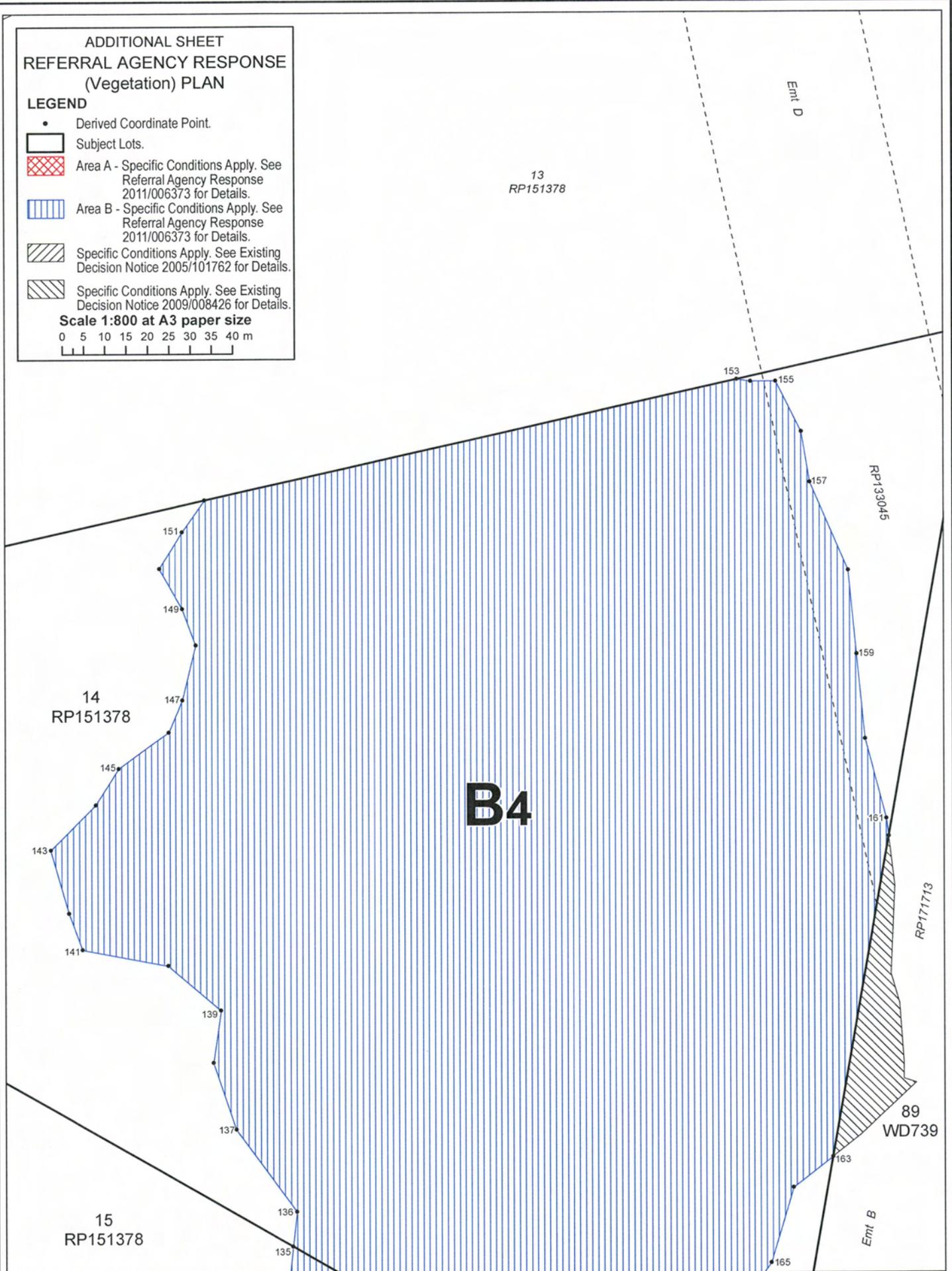
ADDITIONAL SHEET
 REFERRAL AGENCY RESPONSE
 (Vegetation) PLAN

LEGEND

- Derived Coordinate Point.
- Subject Lots.
- ▨ Area A - Specific Conditions Apply. See Referral Agency Response 2011/006373 for Details.
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Scale 1:800 at A3 paper size

0 5 10 15 20 25 30 35 40 m



Projection UTM (MGA94 Zone 56) Datum - GDA94

Note: Derived Coordinate Points are provided to aid in the location of the Referral Agency Response boundaries. Responsibility for locating these boundaries lies solely with the landholder and delegated clearing contractor(s). All Derived Coordinate Points continue sequentially when labels are missing.

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Note: This plan must be read in conjunction with Referral Agency Response 2011/006373.

RARP 2011/006373

Sheet 6 of 7 Sheets

ADDITIONAL SHEET
REFERRAL AGENCY RESPONSE
(Vegetation) PLAN

Derived Coordinate Points

Parcel	Point	Easting	Northing	Parcel	Point	Easting	Northing	Parcel	Point	Easting	Northing
A1	1	518280	6921041	B1	57	518351	6920863	B3	113	518566	6921107
A1	2	518265	6921068	B1	58	518342	6920869	B3	114	518553	6921037
A1	3	518251	6921106	B1	59	518338	6920875	B3	115	518546	6921034
A1	4	518251	6921121	B1	60	518329	6920878	B3	116	518539	6921028
A1	5	518262	6921139	B1	61	518323	6920878	B3	117	518521	6921027
A1	6	518265	6921135	B1	62	518321	6920872	B3	118	518514	6921022
A1	7	518269	6921128	B1	63	518323	6920864	B3	119	518505	6921019
A1	8	518288	6921081	B1	64	518331	6920857	B3	120	518493	6921020
A1	9	518289	6921079	B1	65	518337	6920853	B3	121	518478	6921025
A1	10	518302	6921050	B1	66	518339	6920842	B3	122	518463	6921034
A2	11	518303	6921048	B1	67	518338	6920839	B3	123	518458	6921043
A2	12	518304	6921044	B1	68	518333	6920835	B3	124	518451	6921048
A2	13	518316	6921022	B1	69	518316	6920840	B3	125	518444	6921053
A2	14	518320	6921013	B1	70	518312	6920850	B3	126	518435	6921063
A2	15	518334	6920993	B1	71	518308	6920862	B3	127	518426	6921072
A2	16	518345	6920978	B1	72	518298	6920875	B3	128	518418	6921081
A2	17	518344	6920967	B1	73	518289	6920890	B3	129	518433	6921095
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A3	40	518385	6920870	B2	96	518454	6920841	B4	152	518436	6921363
A3	41	518359	6920893	B2	97	518462	6920836	B4	153	518561	6921391
A3	42	518347	6920913	B2	98	518466	6920823	B4	154	518564	6921391
A3	43	518337	6920931	B2	99	518470	6920815	B4	155	518570	6921391
A3	44	518337	6920938	B2	100	518472	6920812	B4	156	518576	6921379
A3	45	518340	6920943	B2	101	518480	6920803	B4	157	518578	6921367
A3	46	518379	6920954	B2	102	518488	6920802	B4	158	518587	6921346
A3	47	518387	6920953	B2	103	518498	6920801	B4	159	518589	6921327
B1	48	518355	6920807	B2	104	518500	6920804	B4	160	518591	6921307
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B1	55	518367	6920851	B3	111	518558	6921109	B4	167	518541	6921148
B1	56	518361	6920858	B3	112	518565	6921108				

Projection UTM (MGA94 Zone 56) Datum - GDA94

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Responsibility for locating these boundaries lies solely with the landholder and delegated clearing contractor(s).

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Note: This plan must be read in conjunction with Referral Agency Response 2011/006373.

RARP 2011/006373

Sheet 7 of 7 Sheets

RECLASS



From: DACoordinationSEQSouth [DACoordinationSEQSouth@dnrm.qld.gov.au]
Sent: Thursday, 15 November 2012 4:22 PM
To: GCCC Mail
Cc: [REDACTED]
Subject: IC1011BEE0010 - GOL2945 - DA for MCU at Cedar Creek - Former DERM RAR
Attachments: IC1011BEE0010_GOL2945_121115_Combined_RAR.pdf
Attention: Tim Kitzelman (GCCC)
Attention: Melanie Neal-Reid and Dylan Porter (Aecom)

Good afternoon,

Please find the attached Referral Agency Response for former DERM jurisdictions for the Development Application for Material Change of Use at 89, 98 and 101 Tamaree Road, Schmidt Road and Cedar Creek Road, Cedar Creek (Lots 14, 15 and 16 on RP151378, Lot 89 on WD739 and Lot 1 on SP238024).

If there is a problem with the attachment, or you require a hard copy of the document, please contact the Beenleigh Regional Planning and Coordination Unit.

Thank you

Kind regards

Jillyan Kelly
A/Senior Planning Officer, Regional Planning and Coordination
Department of Natural Resources and Mines



Department of Natural Resources and Mines
32 Tansey Street, Beenleigh Qld 4207
PO Box 1164, Beenleigh Qld 4207

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3342264

Attachment 3 – Environmental Policy



Environmental Policy

Fulton Hogan Group Policy June 2022

Protect our planet

We care for the planet, not only for ourselves, but also for future generations. We seek to reduce our impact on the environment and partner with others to lift the standards of our industry.

We will:

- Reduce our carbon emissions
- Minimise our impact on the environmental footprint through innovation and being energy and resource efficient
- Always consider how to reduce, reuse and recycle
- Respect and care for our environment, encompassing diverse aspects including flora, fauna, water, community and cultural interests
- Work with our subcontractors and suppliers to help them meet our expectations
- Consider the environment when we design, plan and deliver our work
- Make proactive use of our environmental management systems
- Set measurable objectives and targets to ensure continual improvement
- Meet or exceed relevant standards and legal requirements

C W Bruyn
Managing Director

Attachment 4 – Stormwater Management Plan

BLUE ROCK QUARRY, CEDAR CREEK

STORMWATER MANAGEMENT PLAN

Prepared for:
Fulton Hogan Construction Pty Ltd

Date:
6 November 2012

File Ref:
documents / 982_611_001_SMP

ABN:80 829 145 906

Level 2, 15 Lang Parade, Milton Qld 4064

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Document Control

Job Details

Ref no.:	982_611_001_SMP
Document Title:	Stormwater Management Plan
Principal Author:	Prasanna Rao
Client:	Fulton Hogan Construction Pty Ltd

Document Status

Version	Description	Date	Author	Reviewer
1	Stormwater Management Plan	6 November 2012	Prasanna Rao	Clayton Hill

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Zoe Helyer Department of Environment and Heritage Protection	1								
Gold Coast City Council	1								

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APPENDICES

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1. Introduction

1.1 General

Groundwork Plus has been commissioned by Fulton Hogan Construction Pty Ltd (Fulton Hogan) to prepare a Stormwater Management Plan (SMP) for their extractive industry operations at Blue Rock Quarry on Tamaree Road, Cedar Creek (the subject 'Site'). See Figure 1 – Site Location Plan for the location of the quarry.

This report has been prepared to respond to Item 13 of the Department of Environment and Heritage Protection (EHP) Information Request (dated 8 November 2011) issued in relation to a Material Change of Use (MCU) application (Reference No. MCU201100490). This report will replace the previous SMPs prepared for the quarry which are listed below:

- Stormwater Management Plan, AECOM, 2012;
- Hydrological and Hydraulic Assessment, Golder Associates, 2009; and
- Stormwater Management Plan, Ecoroc Pty Ltd, 2009.

The aim of this SMP is to develop stormwater management strategies that ensure statutory requirements and leading industry practices are achieved.

1.2 Scope

It is our understanding that Fulton Hogan is preparing a submission to EHP to demonstrate reporting and approval compliance with the MCU condition requirements. One of the key requirements of the EHP conditions of approval is that the SMP is to achieve one of the following:

- Capture and retain a 24 hour storm event with an average recurrence interval of 1 in 5 years; or
- Achieve a 90% hydraulic efficiency.

The scope of works includes the following processes:

- Review background information including existing site layout plans, stormwater management plans, hydraulic modelling and erosion and sediment control (ESC) plans;
- Review conditions of approval and previous EHP correspondence;
- Attend site inspections and detailed briefing session with Fulton Hogan;
- Prepare a preliminary assessment, concept designs (options) and preliminary recommendations to meet the 1 in 5 year design condition;
- Attend a workshop with Fulton Hogan to determine most feasible option for the SMP including ESC measures;
- Liaise with EHP to ascertain realistic water quality criteria and discuss other key requirements;
- Develop the detailed SMP based on the outcomes of the workshop; and
- Documentation and lodgement of SMP with EHP.

This report provides strategies to control stormwater runoff from disturbed areas of the quarry and prevent or mitigate contamination of stormwater with pollutants such as silts and chemical residues (oils, greases and fuels). The measures proposed are broad-ranging and include processes, procedures and structural controls.

This report sets out to:

- describe the Site and identify possible impacts on the surrounding environment;
- identify legislation, impacts and issues associated with operations;
- set practical and environmentally sound strategies and methods for the design, construction and management of stormwater runoff and erosion and sediment controls;
- describe audit and review processes;
- identify means of assessing whether failures occur; and
- detail actions to be taken if objectives are not met.

Specifically, the SMP details the following:

- Catchment delineation and segregation of disturbed areas of the quarry from the undisturbed areas surrounding the quarry;
- Catchment hydrology and stormwater conveyance;
- Estimation of sediment transport from the disturbed areas of the quarry;
- Operational phase stormwater management and erosion and sediment control measures for the disturbed areas of the quarry;
- Water quality objectives of the receiving waters; and
- Maintenance and Monitoring Program.

To minimise the impact of the development on the external environment, the proponent shall implement this SMP. To avoid significant and/or sustained deterioration in downstream water quality, this SMP shall be amended as required, in response to the Monitoring and Maintenance Program described herein.

1.3 Objective

The principal objectives of the SMP are:

- to segregate stormwater catchments with similar uses, levels of disturbance and risk of pollution as undisturbed and disturbed catchments;
- to ensure adequate control measures are implemented to manage runoff from disturbed areas of the existing quarry;
- to implement appropriate measures to eliminate or reduce pollutant and sediment loading in stormwater discharges from disturbed areas of the existing quarry;
- to preserve downstream water quality and ensure water leaving disturbed areas of the existing quarry is not degraded to a significant extent;
- to reduce the potential for erosion on Site and subsequent sedimentation of natural waterways downstream of the quarry;
- to prevent the release of untreated contaminated stormwater from disturbed areas of the existing quarry;
- to provide a framework for the surveillance, response and reporting of incidents which may impact on stormwater quality; and
- to provide a basis for the training of quarry personnel in the management of stormwater and minimise the potential for stormwater contamination.

These objectives will be achieved through the implementation of the following measures:

- Management strategies designed to minimise water pollution from the development;
- Specific operational phase controls to minimise sediment and nutrient export from the subject Site;
- Optimising the volume of stormwater discharged from the quarry having regard to the mass and concentration of contaminants expected to reach the receiving waters;
- Specific operational phase runoff management and diversion controls that can be converted to water harvesting structures with minimal redesign;
- Segregating stormwater by quality or source;
- Reducing contaminant concentrations by the use of appropriate treatment methods; and
- Applying appropriate risk assessment methods in the sizing and design of sediment ponds/dams.

Proposed stormwater runoff management controls for the disturbed areas of the existing quarry will be designed in accordance with the *Queensland Urban Drainage Manual (QUDM)* (EHP, 2008). Proposed erosion and sediment control measures will be designed in accordance with *Book 2 and Book 4 of Best Practice Erosion and Sediment Control* (IECA, 2008).

1.4 Site Details

The quarry is situated on Tamaree Road in Cedar Creek, Queensland, approximately 13 km south of Beenleigh. The quarry comprises the following lots:

- Lot 14, 15 and 16 on RP151378;
- Lot 89 on W739; and
- Lot 1 on SP238024.

The quarry is located in a rural setting and has been used for quarrying since 1971. Historically, prior to quarrying, the Site has been used mainly for agricultural purposes, including cattle grazing. The Site is located in a Key Resource Area and is surrounded by rural residential developments. See Figure 1 – Site Location Plan for details.

The quarry is worked using conventional drill and blast open cut quarrying methods and consists of the following principal components or activities:

- Quarry workings;
- Overburden stockpiles;
- Internal haul roads;
- Crushing and screening plant;
- Aggregate and other finished product stockpiles;
- Pre-coat aggregate plant and product storage bays;
- Equipment workshops;
- Office and employee amenity buildings;
- Fuel storage; and
- Water supply dam and stormwater and sediment management controls.

See Figure 2 – Site Layout Plan for details.

1.5 Topography and Receiving Environment

The quarry is located in the upper reaches of the Albert River catchment. The receiving water for the Blue Rock Quarry Site is Michie Creek, an ephemeral watercourse which runs parallel to Tamaree Road and joins the Albert River approximately 1.5 km from the quarry entrance and 5 km upstream of the Luscombe Weir. Michie Creek has not been identified as a watercourse and has been designated as a drainage feature, as determined by EHP.

Current quarrying and related activities extend over 40 ha within the Site and have significantly altered over time, the topography, vegetation and drainage of the area. Steep upper slopes beyond the limit of quarry workings support regrowth vegetation and some woodland. Site levels vary from approximately RL 280 m AHD along the Site's north-eastern boundary to approximately RL 45 m AHD near the Site's entrance along the north-western boundary.

1.6 Environmental Values

In accordance with the Environmental Protection (Water) Policy 2009, EPP (Water), environmental values for the Lower Albert River (estuarine) including tributaries have been identified to include:

- Aquatic ecosystems wildlife habitat;
- Irrigation, stockwater and farm use;
- Primary, secondary and visual recreation;
- Cultural heritage;
- Industrial use; and
- Aquaculture.

The following Water Quality Objectives have been considered in the development of the SMP for the quarry:

- pH – 6.5 to 8.0;
- Dissolved Oxygen – 80% to 105% saturation;
- Turbidity – 50 NTU;
- Suspended Solids or correlated turbidity vs. suspended solids – 50 mg/L;
- Total Phosphorous – 0.07 mg/L;
- Total Nitrogen – 0.65 mg/L;
- Litter/gross pollutants – No man made material greater than 5 mm; and
- Oil/grease – no visible films or odours.

These Water Quality Objectives are based on the Queensland Water Quality Guidelines (EHP, 2009) and ANZECC Guidelines (NWQMS, 2000). The Queensland Water Quality Guidelines specify a water quality objective of 6 mg/L for suspended solids for Lowland Streams in South East Queensland (SEQ); however, the water quality objective of 50 mg/L has been specified for the site since this is considered to be typical of background values in the SEQ region.

2. Catchment Delineation and Hydrological Analysis

2.1 Catchment Delineation

Based on existing topography, the Site has been divided into thirteen (13) catchments. The Site catchment areas are presented in Table 1 – Site Catchment Areas.

Table 1 – Site Catchment Areas

Catchment	Catchment Type	Catchment Area (ha)
A	Disturbed	6.7
B	Disturbed	6.4
C	Disturbed	3.1
D	Disturbed	10.2
E	Disturbed	7.3
F	Undisturbed	4.7
G	Disturbed	1.9
H	Undisturbed	8.8
I	Undisturbed	23.9
J	Undisturbed	67.9
K	Undisturbed	25.1
L	Undisturbed	15.5
M	Undisturbed	11.1

Catchments A to E and G mainly comprise the working areas, haul roads, stockpile areas, processing, treatment, administrative and office areas of the quarry. These areas have been cleared of vegetation in the past and have been progressively developed, resulting in the generation of sediment laden runoff during storm events. As such, these areas have been classified to be disturbed areas.

Catchments F and H to M mainly comprise dense bushland and rehabilitated areas of the quarry. These have been classified as clean undisturbed areas.

Horton's 'n' value of 0.02 has been assumed for disturbed catchment areas (Catchments A to E and G), in accordance with QUDM. Horton's 'n' values ranging between 0.055 and 0.06 have been assumed for undisturbed catchments (Catchments F and H to M). These values have been used to calculate the Time of Concentration (t_c) and peak flow rates for all events up to and including the Q_{100} storm event, using the Rational Method in accordance with QUDM.

The times of concentration, peak flow rates and peak runoff volumes for each catchment are summarised in subsequent sections of this report.

Refer Figure 3 – Catchment Delineation Plan for the catchment areas.

2.2 Catchment Hydrology

2.2.1 Intensity – Frequency – Duration

Rainfall intensities for various storm durations are shown in Table 2 – Rainfall Intensities for Various Storm Durations, Blue Rock Quarry.

Table 2 – Rainfall Intensities for Various Storm Durations, Blue Rock Quarry

Duration of Rainfall	Average Recurrence Interval (1:n years)						
	1	2	5	10	20	50	100
5 mins	120	152	187	206	234	269	296
6 mins	113	143	175	194	220	253	278
10 mins	92.2	117	144	159	181	208	230
20 mins	67.6	85.9	106	118	134	154	170
30 mins	55.1	70.1	86.8	96.4	110	127	140
1 hour	37.2	47.5	59.1	65.8	75	87	96.2
2 hours	23.9	30.5	38.2	42.7	48.7	56.7	62.8
3 hours	18.2	23.2	29.1	32.6	37.3	43.4	48.2
6 hours	11.3	14.5	18.3	20.5	23.5	27.4	30.5
12 hours	7.18	9.23	11.7	13.2	15.2	17.8	19.9
24 hours	4.75	6.14	7.91	8.97	10.4	12.3	13.7
48 hours	3.17	4.12	5.41	6.18	7.21	8.59	9.67
72 hours	2.4	3.13	4.15	4.77	5.59	6.7	7.56

NB: All rainfall intensities in mm/hr.

2.2.2 Runoff Calculations

The peak runoff generated by the catchments of the quarry for various design storm events has been estimated using the following equation in accordance with *Book 2 – Appendices A-G, Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008)*.

$$V = (Cv \cdot R \cdot A) / 1000$$

where:

V = Runoff volume (m³)

Cv = Volumetric runoff coefficient

A = Area (hectares)

R = Total rainfall (mm)

The 24 hour storm intensities and peak runoff volumes for storm events for Catchments A to M are summarised in Table 3 – Peak Runoff Volumes below. A volumetric runoff co-efficient of 0.83 has been assumed for the Site. This assumption has been made for the peak 24 hours 1 in 5 year design rainfall depth of 189.8 mm in accordance with Table B7 of Book 2 of the IECA Guidelines.

Table 3 – Peak Runoff Volumes

Catchment	Description	Catchment Area (ha)	24 hr Rainfall Intensity (mm/hr)	24 hr Rainfall Depth (mm)	Runoff Volume (m ³)
A	1 in 1, 24 hour	6.7	4.75	114.0	6,340
	1 in 2, 24 hour		6.14	147.4	8,195
	1 in 5, 24 hour		7.91	189.8	10,557
	1 in 10, 24 hour		8.97	215.3	11,972
	1 in 20, 24 hour		10.4	249.6	13,880
	1 in 50, 24 hour		12.3	295.2	16,416
	1 in 100, 24 hour		13.7	328.8	18,285
B	1 in 1, 24 hour	6.4	4.75	114.0	6,056
	1 in 2, 24 hour		6.14	147.4	7,828
	1 in 5, 24 hour		7.91	189.8	10,084
	1 in 10, 24 hour		8.97	215.3	11,436
	1 in 20, 24 hour		10.4	249.6	13,259
	1 in 50, 24 hour		12.3	295.2	15,681
	1 in 100, 24 hour		13.7	328.8	17,466

Catchment	Description	Catchment Area (ha)	24 hr Rainfall Intensity (mm/hr)	24 hr Rainfall Depth (mm)	Runoff Volume (m ³)
C	1 in 1, 24 hour	3.1	4.75	114.0	2,933
	1 in 2, 24 hour		6.14	147.4	3,792
	1 in 5, 24 hour		7.91	189.8	4,885
	1 in 10, 24 hour		8.97	215.3	5,539
	1 in 20, 24 hour		10.4	249.6	6,422
	1 in 50, 24 hour		12.3	295.2	7,595
	1 in 100, 24 hour		13.7	328.8	8,460
D	1 in 1, 24 hour	10.2	4.75	114.0	9,613
	1 in 2, 24 hour		6.14	147.4	12,427
	1 in 5, 24 hour		7.91	189.8	16,009
	1 in 10, 24 hour		8.97	215.3	18,154
	1 in 20, 24 hour		10.4	249.6	21,048
	1 in 50, 24 hour		12.3	295.2	24,894
	1 in 100, 24 hour		13.7	328.8	27,727
E	1 in 1, 24 hour	7.3	4.75	114.0	6,945
	1 in 2, 24 hour		6.14	147.4	8,977
	1 in 5, 24 hour		7.91	189.8	11,565
	1 in 10, 24 hour		8.97	215.3	13,115
	1 in 20, 24 hour		10.4	249.6	15,206
	1 in 50, 24 hour		12.3	295.2	17,984
	1 in 100, 24 hour		13.7	328.8	20,031
F	1 in 1, 24 hour	4.7	4.75	114.0	4,447
	1 in 2, 24 hour		6.14	147.4	5,749
	1 in 5, 24 hour		7.91	189.8	7,406
	1 in 10, 24 hour		8.97	215.3	8,398
	1 in 20, 24 hour		10.4	249.6	9,737
	1 in 50, 24 hour		12.3	295.2	11,516
	1 in 100, 24 hour		13.7	328.8	12,826
G	1 in 1, 24 hour	1.9	4.75	114.0	1,748
	1 in 2, 24 hour		6.14	147.4	2,259
	1 in 5, 24 hour		7.91	189.8	2,910
	1 in 10, 24 hour		8.97	215.3	3,300
	1 in 20, 24 hour		10.4	249.6	3,826
	1 in 50, 24 hour		12.3	295.2	4,525
	1 in 100, 24 hour		13.7	328.8	5,041
H	1 in 1, 24 hour	8.8	4.75	114.0	8,336
	1 in 2, 24 hour		6.14	147.4	10,775
	1 in 5, 24 hour		7.91	189.8	13,882
	1 in 10, 24 hour		8.97	215.3	15,742
	1 in 20, 24 hour		10.4	249.6	18,252
	1 in 50, 24 hour		12.3	295.2	21,586
	1 in 100, 24 hour		13.7	328.8	24,043
I	1 in 1, 24 hour	23.9	4.75	114.0	22,586
	1 in 2, 24 hour		6.14	147.4	29,195
	1 in 5, 24 hour		7.91	189.8	37,611
	1 in 10, 24 hour		8.97	215.3	42,651
	1 in 20, 24 hour		10.4	249.6	49,451
	1 in 50, 24 hour		12.3	295.2	58,485
	1 in 100, 24 hour		13.7	328.8	65,142
J	1 in 1, 24 hour	67.9	4.75	114.0	64,304

Catchment	Description	Catchment Area (ha)	24 hr Rainfall Intensity (mm/hr)	24 hr Rainfall Depth (mm)	Runoff Volume (m ³)
	1 in 2, 24 hour		6.14	147.4	83,121
	1 in 5, 24 hour		7.91	189.8	107,083
	1 in 10, 24 hour		8.97	215.3	121,433
	1 in 20, 24 hour		10.4	249.6	140,791
	1 in 50, 24 hour		12.3	295.2	166,513
	1 in 100, 24 hour		13.7	328.8	185,466
K	1 in 1, 24 hour	25.1	4.75	114.0	23,759
	1 in 2, 24 hour		6.14	147.4	30,712
	1 in 5, 24 hour		7.91	189.8	39,565
	1 in 10, 24 hour		8.97	215.3	44,867
	1 in 20, 24 hour		10.4	249.6	52,020
	1 in 50, 24 hour		12.3	295.2	61,524
	1 in 100, 24 hour		13.7	328.8	68,526
L	1 in 1, 24 hour	15.5	4.75	114.0	14,628
	1 in 2, 24 hour		6.14	147.4	18,909
	1 in 5, 24 hour		7.91	189.8	24,360
	1 in 10, 24 hour		8.97	215.3	27,624
	1 in 20, 24 hour		10.4	249.6	32,028
	1 in 50, 24 hour		12.3	295.2	37,879
	1 in 100, 24 hour		13.7	328.8	42,191
M	1 in 1, 24 hour	11.1	4.75	114.0	10,456
	1 in 2, 24 hour		6.14	147.4	13,515
	1 in 5, 24 hour		7.91	189.8	17,411
	1 in 10, 24 hour		8.97	215.3	19,744
	1 in 20, 24 hour		10.4	249.6	22,892
	1 in 50, 24 hour		12.3	295.2	27,074
	1 in 100, 24 hour		13.7	328.8	30,156

2.2.3 Time of Concentration and Rational Method Calculations

The natural hydrology of the quarry and its catchments has been assessed in accordance with QUDM and Gold Coast City Council Planning Scheme 2003 Policy 11 – Land Development Guidelines. The quarry catchments have been considered to be predominantly piped or channelized urban catchments less than 500 ha with the top of the catchment being bushland or grassed park.

The time of concentration for all catchments has been determined using Friend's Equation as per QUDM Table 4.06.3, combined with a channel time flow calculation. Friend's Equation is defined as follows:

Friend's Equation

$$t_c = (107 \times n \times L^{0.333}) / S^{0.2}$$

where

t_c = overland sheet flow travel time (minutes)

L = overland sheet flow path length (m)

n = Horton's surface roughness factor (-)

S = slope of surface (%)

Table 4 – Time of Concentration presents a summary of catchment parameters used within Friend's Equation and the calculated time of concentration for the existing scenario.

Table 4 – Time of Concentration

Catchment	A	B	C	D	E	F	G	H	I	J	K	L	M
Overland Flow Component													
Estimated L length of sheet flow (m)	50	50	20	200	100	20	100	20	20	200	200	200	20
Horton's Roughness Value	0.02	0.02	0.02	0.02	0.02	0.055	0.02	0.05	0.05	0.06	0.06	0.06	0.06
Slope (%)	12.3	10.9	13.9	11	9	15.4	4.4	31.8	29	9	30.2	30.3	28.1
t_c (minutes)	4.77	4.88	3.43	7.73	6.39	9.24	7.37	7.26	7.40	20.13	18.96	18.94	8.93
Channel/Creek Flow Component													
Length of Channel Flow (m)	480	640	160	1070	472	370	125	420	563	1804	760	675	490
Velocity (m/s) – assume 1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
t_c (minutes)	5.33	7.11	1.78	11.89	5.24	4.11	1.39	4.67	6.26	20.04	8.44	7.50	5.44
TOTAL t_c	10.1	12.0	5.2	19.6	11.6	13.4	8.8	12.0	13.7	40.2	27.4	26.4	14.4

Design storm events across the catchments were derived using the Rational Method as per QUDM. This involved:

- Determination of a C_{10} value (derived in accordance with Table 3.5A of the GCCC Land Development Guidelines). A C_{10} value of 0.95 has been applied to Catchments A to E, while a C_{10} value of 0.75 has been applied to Catchments F to L;
- Derivation of design rainfall using BoM Intensity Frequency Duration (IFD) data for the Blue Rock Quarry; and
- Calculation of design flows through the catchments for the Q_{100} , Q_{50} , Q_{20} , Q_{10} , Q_5 , Q_2 and $Q_{3\text{month}}$ rainfall events where $Q_{3\text{month}}$ is deemed to be 50% of the Q_1 rainfall event.

A summary of the hydrologic calculations are presented in Table 5 – Catchment Hydrology below.

Table 5 – Catchment Hydrology

Catchment	Area	t _c	I ₁₀₀	C	Q ₁₀₀	I ₅₀	C	Q ₅₀	I ₂₀	C	Q ₂₀	I ₁₀	C	Q ₁₀	I ₅	C	Q ₅	I ₂	C	Q ₂	I ₁	C	Q _{3month}
ID	(ha)	(min)	(mm/hr)		(m ³ /s)	(mm/hr)		(m ³ /s)	(mm/hr)		(m ³ /s)	(mm/hr)		(m ³ /s)	(mm/hr)		(m ³ /s)	(mm/hr)		(m ³ /s)	(mm/hr)		(m ³ /s)
A	6.7	10.10	229.40	1.00	4.27	207.46	1.00	3.86	180.53	1.00	3.35	158.59	0.95	2.80	143.62	0.90	2.41	116.69	0.81	1.75	91.95	0.76	0.65
B	6.4	11.99	218.00	1.00	3.88	197.20	1.00	3.51	171.60	1.00	3.04	150.80	0.95	2.55	136.40	0.90	2.19	110.78	0.81	1.59	87.28	0.76	0.59
C	3.1	5.21	210.20	1.00	1.81	265.80	1.00	2.29	231.20	1.00	1.99	203.60	0.95	1.67	184.60	0.90	1.43	150.20	0.81	1.04	118.60	0.76	0.39
D	10.2	19.62	172.40	1.00	4.87	156.16	1.00	4.41	135.88	1.00	3.83	119.64	0.95	3.21	107.52	0.90	2.74	87.14	0.81	1.99	68.58	0.76	0.74
E	7.3	11.64	220.40	1.00	4.49	199.36	1.00	4.06	173.48	1.00	3.53	152.44	0.95	2.95	137.92	0.90	2.54	112.02	0.81	1.84	88.26	0.76	0.68
F	4.7	13.35	210.20	0.90	2.47	190.18	0.86	2.14	165.49	0.79	1.70	145.47	0.75	1.42	131.46	0.71	1.22	106.74	0.64	0.89	84.08	0.60	0.33
G	1.9	8.76	244.40	1.00	1.25	221.50	1.00	1.14	192.70	1.00	0.99	169.50	0.95	0.83	153.30	0.90	0.71	124.80	0.81	0.52	98.44	0.76	0.19
H	8.8	11.93	218.60	0.90	4.81	197.74	0.86	4.17	172.07	0.79	3.32	151.21	0.75	2.78	136.78	0.71	2.38	111.09	0.64	1.73	87.53	0.60	0.64
I	23.9	13.65	207.80	0.90	12.40	188.02	0.86	10.75	163.61	0.79	8.54	143.83	0.75	7.15	129.94	0.71	6.14	105.49	0.64	4.46	83.10	0.60	1.65
J	67.9	40.17	125.11	0.90	21.26	113.40	0.86	18.46	98.10	0.79	14.58	86.00	0.75	12.18	77.38	0.71	10.41	62.42	0.64	7.51	49.01	0.60	2.78
K	25.1	27.40	147.80	0.90	9.28	134.02	0.86	8.06	116.24	0.79	6.38	102.02	0.75	5.34	91.79	0.71	4.56	74.21	0.64	3.30	58.35	0.60	1.22
L	15.5	26.44	150.80	0.90	5.83	136.72	0.86	5.06	118.64	0.79	4.01	104.18	0.75	3.36	93.71	0.71	2.87	75.79	0.64	2.07	59.60	0.60	0.77
M	11.1	14.38	203.60	0.90	5.62	184.24	0.86	4.88	160.32	0.79	3.88	140.96	0.75	3.25	127.28	0.71	2.78	103.32	0.64	2.02	81.38	0.60	0.75

The selection and assessment of appropriate best management practices required to address erosion and sediment runoff from the quarry catchments are presented in the following sections. All proposed stormwater conveyance structures on Site have been designed using the Q₁₀ peak flow rate summarised in Table 5. Catch drains and drainage channels have been designed to convey the Q₁₀ peak flow rate. Flows from upstream undisturbed areas are proposed to be diverted to Michie Creek through an appropriately sized stormwater pipe network to be located near the stockpile area and has been sized to convey the peak Q₁₀ flow rate.

Catchments F and H to M have been designated as undisturbed areas and therefore, in accordance with best practice, no treatment has been proposed for these areas.

3. Stormwater Management Strategy

3.1 Principles of Stormwater Management

The following is a summary of the principles which are the basis of this SMP:

- The SMP will be reviewed periodically and will be updated as necessary to include revised quarry development layout, topographic plans and development plans, control device designs, specifications and design parameters;
- Drainage systems and flow control devices are designed to control stormwater for a design Average Recurrence Interval (ARI) of 10 years. Designs are based on calculated water discharge rates and velocities;
- Wherever practicable, clean water will be diverted around the site and into drainage structures and watercourses in a non-erosive manner;
- Existing catch drains, diversion drains and pipes are used to the maximum practicable extent;
- Land disturbance will be minimised to the maximum practicable extent;
- Ground cover will be maximised through agronomic soil testing, amelioration and the use of suitable plant selection;
- Sediment treatment structures will be sized according to the requirements and where this is not practicable, their performance will be improved through the use of chemical flocculation;
- Proposed stormwater drainage controls and structures (catch drains, check dams, diversion drains, diversion bunds, sediment basins, sumps etc.) will be installed as soon as practicable;
- Proposed diversion drains, drainage channels and catch drains will be riprapped and/or grass lined unless otherwise stated. Drains will be excavated to twice the design depth and backfilled with coarse rock materials to the design depth;
- Rock check dams will be constructed at regular intervals in accordance with the IECA Guidelines within all existing and proposed catch drains, including roadside drains along haul roads;
- Any mobile equipment used on Site will be restricted to designated roads or hardstand areas;
- A monitoring program will be undertaken to program maintenance and assess the effectiveness of erosion and sediment control methods and devices;
- Stormwater treatment systems comprising sediment ponds will be constructed to remove sediment. Monitoring and maintenance of the stormwater treatment systems will ensure that sediment trapping capacity remains effective; and
- Water collected in the sediment treatment and storage devices will be recycled to the maximum practicable extent. This water will be available for dust suppression, processing and/or the irrigation of rehabilitated areas.

3.2 Proposed Stormwater Management Strategies

Conceptual stormwater management strategies and controls for the quarry are shown on Figure 4 – Stormwater Management Controls while sectional details of these controls and structures have been presented on Figure 5 – Stormwater Management Details. These specific stormwater management measures and controls have been developed in accordance with QUDM and the IECA guidelines for Catchments A to E and Catchment G only as part of this assessment. Catchments F and H to M are undisturbed catchments and therefore have been excluded from this assessment.

Standard specification drawings of stormwater management controls and measures have been prepared in accordance with the IECA Guidelines and are included in Appendix A.

3.2.1 Sizing of Existing and Proposed Catch Drains

Existing and proposed catch drains have been sized using Channel Flow Equations 4.08 and 4.09 from QUDM Section 4.06.10. The catch drains are proposed to be rock lined/riprapped to assist in the removal of sediment and reduce velocity of peak flow.

Rock check dams will be constructed within all existing and proposed catch drains on the quarry Site in accordance with the IECA Guidelines. The construction of these catch drains is expected to help reduce the velocity of flow within the catch drains and reduce scouring at the receiving end.

Details of catch drains are summarised in Table 6 below.

Table 6 – Catch Drain Sizing Calculations

Catch Drain ID	Lining Type	Manning's (n)	Grade (S)	Base Width (m)	Batter Slope	Depth (m)	Velocity (m/s)	Peak Flow Conveyance Capacity (m ³ /s)	Depth and Velocity Product (D*V)
CD1	Rock lined/rip rap	0.02	0.02	1.0	1 in 4	0.25	2.1	1.1	0.5
CD2	Rock lined/rip rap	0.02	0.11	2.5	1 in 4	0.25	4.8	3.2	1.2
CD3	Rock lined/rip rap	0.02	0.13	2.5	1 in 4	0.2	5.2	3.4	1.0
CD4	Rock lined/rip rap	0.02	0.12	2.0	1 in 4	0.2	5.0	2.8	1.0
CD5	Rock lined/rip rap	0.02	0.03	0.5	1 in 4	0.25	2.2	0.8	0.5

Refer Figure 4 – Stormwater Management Controls for the location of catch drains CD1 to CD5.

3.2.2 Sizing of Proposed Sumps

The proposed sumps in Catchments A, B and C have been designed to capture and treat the 24 hour, 1 in 5 year rainfall runoff. The location of these sumps is shown on Figure 4 – Stormwater Management Controls.

Table 7 below summarises the volume and dimensions of the proposed sumps including batter requirements.

Table 7 – Sump Sizing Calculations

Sediment Basin ID	Catchment ID	Design Rainfall event	Volumetric Runoff Coefficient	Design Rainfall Depth (mm)	Sediment Settling Volume (m ³)	Sediment Storage Volume (m ³)	Total Volume (m ³)	Depth (m)	Batter Slope/Angle	Area (m ²)
A	A	24 hour, 1 in 5 years	0.83	189.8	10,557	5,278	15,835	7	80°	2,262
B	B				10,084	5,042	15,126	5	80°	3,025
C	C				4,884	2,442	7,326	5	80°	1,465

Due to the limited space available in the working area for establishing the proposed sumps, the volume of holding capacity of Sumps A, B and C have been restricted to 11 ML, 13 ML and 5 ML holding capacity respectively. The remainder of the runoff from the design storm event will be contained within the drop cut where Sump C is located. This will result in the flooding of the working area during the design rainfall periods. The extent of flooding within this drop cut is shown on Figure 4 – Stormwater Management Controls and the average depth of flooding has been calculated to be 1.54 m.

3.2.3 Sizing of Proposed Sediment Basins

Sediment basins are required on Site to treat dirty runoff from disturbed catchments D, E and G of the quarry. The proposed sediment basins have been designed as Type F basins in accordance with the IECA Guidelines. The following formula from the IECA Guidelines has been used to calculate the settling and sediment storage volumes of proposed sediment basins on Site. The sediment storage volume has been assumed to be 50% of the settling volume in accordance with the IECA Guidelines.

$$V_{set} = 10.C_v.A.R_{y\%ile, x-days}$$

where:

V_{set} = Settling Volume (m³)

V_{stor} = Sediment storage Volume (m³)

C_v = the volumetric runoff coefficient (dimensionless)

A = Area (hectares)

$R_{y\%ile, x-days}$ = Design rainfall event (mm)

The sediment basins have been designed to treat peak runoff generated by the 24 hour, 1 in 5 year storm event. The design rainfall depth from the 24 hour, 1 in 5 year storm event has been calculated to be 189.8 mm for the Blue Rock Quarry. The sediment basin calculations are summarised in Table 8 below.

Table 8 – Sediment Basin Sizing Calculations

Sediment Basin ID	Catchment ID	Design Rainfall event	Volumetric Runoff Coefficient	Design Rainfall Depth (mm)	Sediment Settling Volume (m ³)	Sediment Storage Volume (m ³)	Total Volume (m ³)	Depth (m)	Batter Slope/Angle	Area (m ²)
D	D	24 hour, 1 in 5 years	0.83	189.8	16,008	8,004	24,012	6	1:1/45°	4,830
E	E				11,565	5,782	17,347	6	1:1/45°	3,598
G	G				2,910	1,455	4,365	4	1:1/45°	1,381

Refer Figure 4 – Stormwater Management Controls for the location of the proposed sediment basins.

3.2.4 Emergency Spillway Calculations

Emergency spillways for the proposed sediment basins have been designed to convey any flows in excess of the Q5 flow rate to the downstream receiving environment. The location of the spillways is shown on Figure 4 – Stormwater Management Controls. The spillway calculations are summarised in Table 9 below.

Table 9 – Emergency Spillway Sizing Calculations

Sediment Basin/SUMP ID	Catchment	Design ARI	Time of concentration (minutes)	Intensity (mm)	Co-efficient of Runoff	Discharge Rate (m ³ /s)	Bottom Width of Spillway (m)	Depth of water over weir (m)	Freeboard over water level to Crest (m)
Sump B	B	50	12.0	197.2	1.00	3.5	8	0.36	0.39
Sediment Basin D	D	50	19.6	156.16	1.00	4.5	10	0.37	0.38
Sediment Basin E	E	50	11.6	199.36	1.00	4.2	9	0.38	0.37
Sediment Basin G	G	50	8.8	221.5	1.00	1.4	3.5	0.34	0.41

3.2.5 Diversion of Clean Flows from Upstream Undisturbed Catchments to Michie Creek

The stormwater pipe infrastructure at the entrance to the Site will need to be upgraded to divert flows from upstream undisturbed catchments. The current infrastructure includes a 375 mm diameter pipe which is currently conveying flows from Catchment H (refer Figure 3 – Catchment Delineation Plan). A secondary 525 mm diameter pipe currently discharges flows from Catchment J (refer Figure 3 – Catchment Delineation Plan) to the existing ephemeral wetland area. The existing 375 mm diameter pipe and 525 mm diameter pipe have been found to be grossly undersized to convey the Q₁₀ flow rate from the upstream catchments and hence will need to be upgraded to convey the peak Q₁₀ flow rate. An overland flow path will be provided to convey flows in excess of Q₁₀ to the Site's legal point of discharge.

Preliminary calculations have indicated that, in order to convey the peak Q₁₀ flow rate from Catchment H, the existing 375 mm diameter pipe will need to be replaced with twin 525 mm diameter pipes with the construction of a head wall to prevent scouring and buoyancy during peak flow conditions. An end wall will be constructed at the downstream end of the twin 525 mm diameter pipes and outlet scour protection will be provided to aid in energy dissipation.

The existing 525 mm diameter pipe will be retained in its original location, in addition, twin 1,500 mm diameter pipes will be constructed upstream of the existing 525 mm diameter pipe to convey flows from Catchment J to the wetland area. In order to dissipate energy, a stormwater pit with a surface area of 130 m² and depth of 2.5 m will be constructed at the upstream end of the twin 1,500 mm diameter pipes. Baffles with low flow orifices will be constructed within the pit which will help dissipate energy and reduce velocity of flow within the proposed pipes and at the outlet. An end wall and scour protection will be provided at the downstream end of the pipes to further aid in energy dissipation and the reduction of velocity at the outlet. In addition, rock check dams may also be constructed within the diversion channel at regular intervals in accordance with the IECA Guidelines.

Refer Figure 4 – Stormwater Management Controls and Figure 5 – Stormwater Management Details for details of the proposed measures.

3.2.6 Rehabilitation/Revegetation of Exposed Areas of the Quarry

Certain areas of the upper reaches of the quarry are currently bare and exposed to the elements resulting in the transport of sediment laden runoff to the clean water diversion drain during periods of rainfall. These areas (refer Figure 4 – Stormwater Management Controls) will be progressively revegetated by grass seeding using a suitable grass species. Mulch berms/sediment fences will be installed along the edge of the proposed rehabilitation area and maintained with the aim of maximising ground cover through soil remediation and the use of suitable vegetation.

Stormwater runoff from these areas will be diverted to the existing clean water diversion channel by the construction of a catch drain and diversion bund along the edge of the rehabilitated areas. Refer Figure 4 – Stormwater Management Controls for the location of the diversion structures.

3.2.7 Stabilisation and Rehabilitation of Exposed Stockpile Embankments in the Upper Reaches of the Quarry

The steep embankments of the stockpile areas abutting the clean water diversion channel in the upper reaches of the quarry currently pose a high erodibility risk and subsequent contamination of the clean water diversion channel. In order to stabilise these stockpile embankments and prevent the runoff of sediment laden water into the clean water diversion channel, it is proposed that these slopes be stabilised via soil rendering with the use of suitable soil conditioning agents/chemicals. In addition, geofabric material will be installed over these slopes and sediment fencing erected at the base of these banks until the slopes have been stabilised and vegetative cover has been established.

Refer Figure 4 – Stormwater Management Controls for details.

3.2.8 Maintenance of the Existing Ephemeral Wetland Area

A man made ephemeral wetland area is present downstream of the existing sediment basin in the lower part of the quarry, adjacent to the existing stockpile area. This wetland area will need to be reconstructed in order to provide for the final treatment of stormwater discharged from the Site. Fine sediments and nutrients will be removed from the pre-treated stormwater in the wetland area via sedimentation, fine filtration and biological uptake. The vegetated wetland area, over time, will also provide habitat and improved landscape amenity.

Refer Figure 4 – Stormwater Management Controls for the location and footprint of the wetland area.

3.2.9 Treatment of Sediment Laden Stormwater and Feasibility of an Automatic Flocculation System

Water and soil sampling and analysis will be required to determine the soil characteristics and particle size distribution in order to select the most appropriate flocculating chemical/agent to be used on Site. The use of flocculants and/or coagulants is likely to significantly improve the quality of water discharging from the site. Flocculants/coagulants should be applied to the sediment basins immediately following a rain event in appropriate doses as recommended by the manufacturer.

The feasibility of using an automatic flocculation system on Site was investigated as part of this assessment. Preliminary investigations of a rainfall activated Desiltation Unit manufactured by LandLoch Pty Ltd has revealed that the use of such a system or similar on Site will help reduce the volume and footprint of the required sediment basins for the design storm event by approximately 50% while achieving water quality objectives at the same time. Further investigations including a comparative analysis will be required during the detailed design stage and formal discussions and approvals from EHP will be required before using such a system on Site.

4. Maintenance and Monitoring

4.1 Maintenance

Stormwater conveyance and treatment infrastructure such as catch drains, sediment basins and wetlands require inspection and maintenance to ensure they operate in accordance with the design intent. Maintenance of these systems will typically involve:

- Routine inspection to identify damage to vegetation, scouring or litter and sediment build up;
- Routine inspection of inlet and outlet points to identify any areas of scour, blockages and sediment build up;
- Removal and management of invasive weeds;
- Periodic desilting of sediment basins and conveyance structures including sediment fences; and
- Vegetation pest monitoring and control.

4.2 Monitoring

The following Water Quality Objectives have been considered in the development of the SMP for the quarry:

- pH – 6.5 to 8.0;
- Dissolved Oxygen – 80% to 105% saturation;
- Turbidity – 50 NTU;
- Suspended Solids or correlated turbidity vs. suspended solids – 50 mg/L;
- Total Phosphorous – 0.07 mg/L;
- Total Nitrogen – 0.65 mg/L;
- Litter/gross pollutants – No man made material greater than 5 mm; and
- Oil/grease – no visible films or odours.

Water quality monitoring will need to be undertaken to ensure that the proposed management controls are working. Fulton Hogan currently undertakes periodic water quality monitoring and the results of monitoring are reported annually to EHP.

Water quality monitoring undertaken on Site should meet the water quality objectives listed above in addition to the water quality objectives of receiving waters and/or any other requirements set by the conditions of approval by EHP. As a minimum, water quality monitoring should be undertaken immediately following a storm event and during events of discharge from Sediment Basins D, E and G at the legal points of discharge from the site as specified in the environmental authority.

5. Conclusion

This study has investigated potential impacts of the existing extractive industry activities of Blue Rock Quarry on downstream receiving watercourses. Based on this study, the following conclusions have been drawn:

- Stormwater and sediment management controls and measures have been developed for the disturbed areas of the quarry.
- The proposed sediment basins have been designed to capture and retain a 24 hour storm event with an average recurrence interval of 1 in 5 years in accordance with Item 13 of the Department of Environment and Heritage Protection (EHP) Information Request (dated 8 November 2011).
- Runoff from the upstream undisturbed areas is diverted to Michie Creek, around the disturbed areas of the quarry.
- The sediment basins have been designed to capture and treat the runoff from a 24 hour, 1 in 5 year storm event.
- Preliminary investigations have revealed that the use of such a rainfall activated desiltation unit or similar on Site will help reduce the volume and footprint of the required sediment basins for the design storm event by approximately 50% while achieving water quality objectives at the same time.

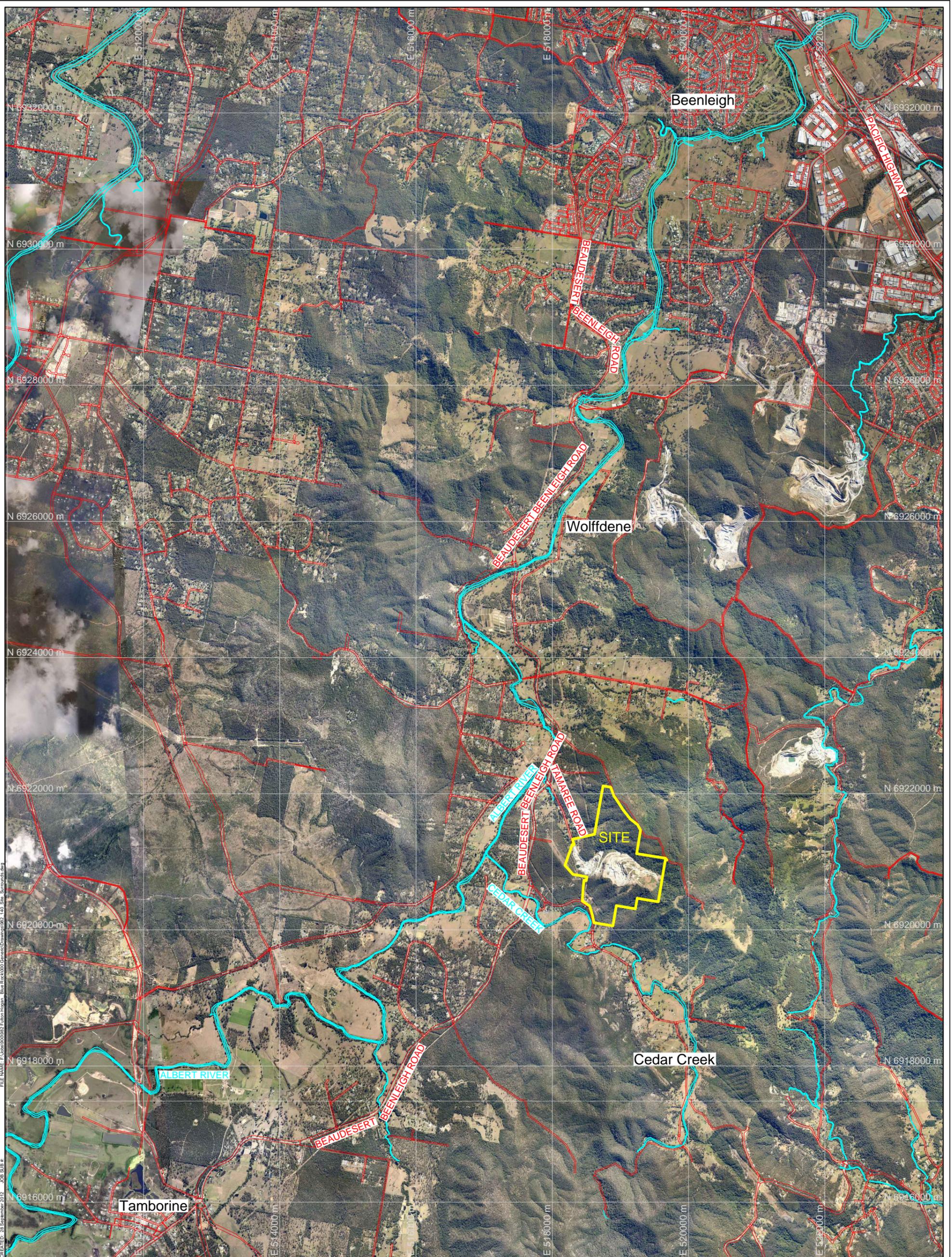
In summary, the integrity of receiving water bodies will not be adversely impacted as a result of the ongoing activities on Site provided the mitigation measures described herein are implemented and maintained.

6. Reference

The information presented herein has been prepared with reference to the following:

- Stormwater Management Plan, Ecoroc Pty Ltd, December 2009.
- Hydrological and Hydraulic Assessment, Golder Associates, November 2009.
- Queensland Urban Drainage Manual, Department of Environment and Heritage Protection, 2008.
- Stormwater Management Plan, AECOM, August 2012.
- Environmental Protection Policy (Water), Department of Environment and Heritage Protection, 2010.
- Urban Stormwater Quality Planning Guidelines 2010, Department of Environment and Heritage Protection, 2010.
- Monitoring and Sampling Manual, 2009. Department of Environment and Heritage Protection, 2009.

fi gures



REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Nearmap, Image date: 2012-08-05
 Cadastre:
 Ecosystem:
 Other:

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Legend:

- Site Boundary
- Cadastral Boundary - Road
- Cadastral Boundary - Watercourse



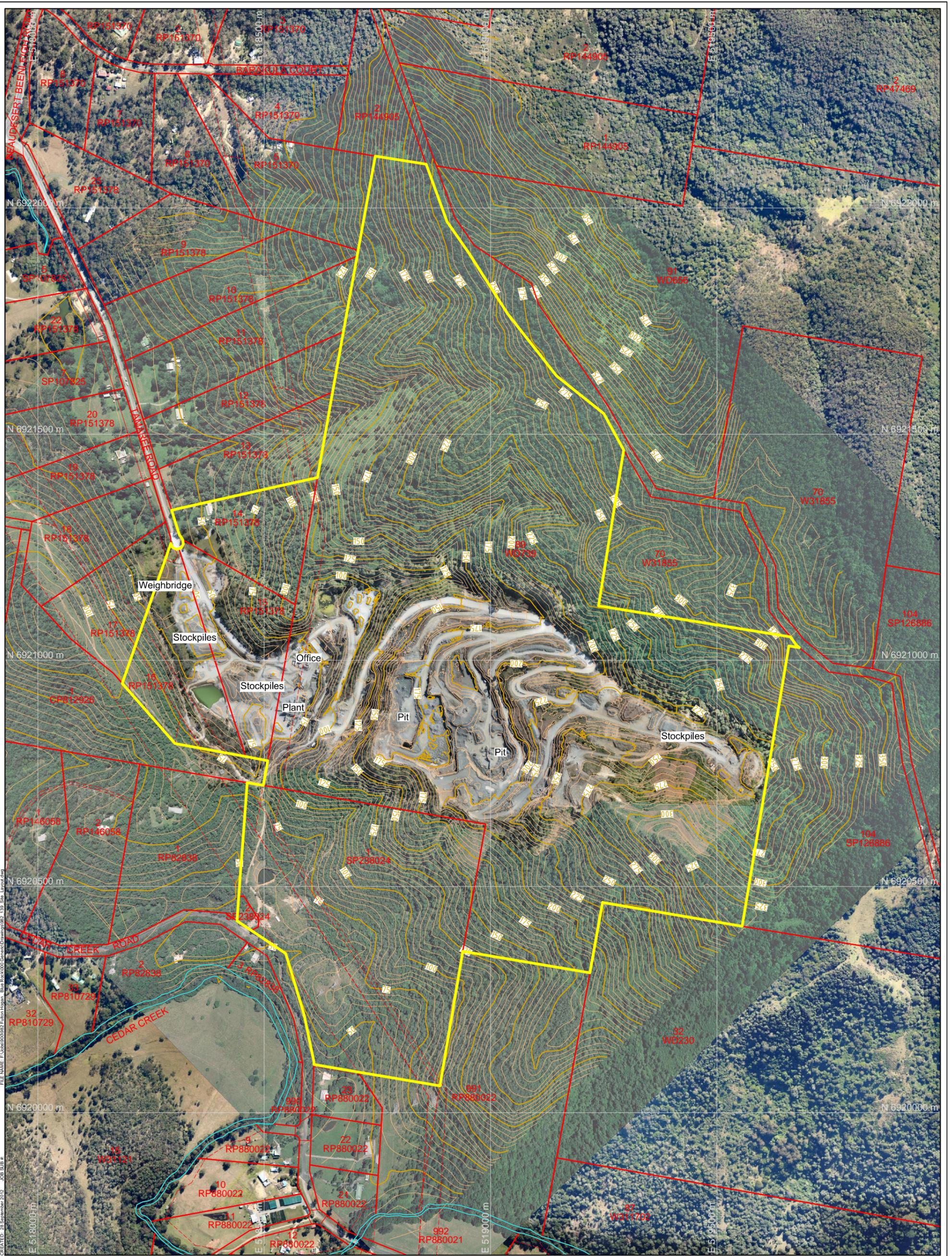
PROJECT: **Blue Rock Quarry**

CLIENT: **Fulton Hogan**

TITLE: **Figure 1 - Site Location Plan**


 SCALE: 1:50,000
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 DATE: 28 September 2012
 PRINTED: 28 September 2012

DRAWING NUMBER: **982.140**
 REVISION:
 DATUM: HORIZONTAL / VERTICAL / ZONE
 MGA / / 56



REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Fulton Hogan, 2012-09-03; Vektia 2011-03-23; Nearamap 2012-08-05
 Topography: Fulton Hogan, 2012-09-03; Vektia 2011-03-23
 Cadastre: Ecosystem:
 Other:

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Legend:

- Site Boundary
- Cadastral Boundary
- - - Easement Boundary



PROJECT: **Blue Rock Quarry**

CLIENT: **Fulton Hogan**

TITLE: **Figure 2 - Site Layout Plan**

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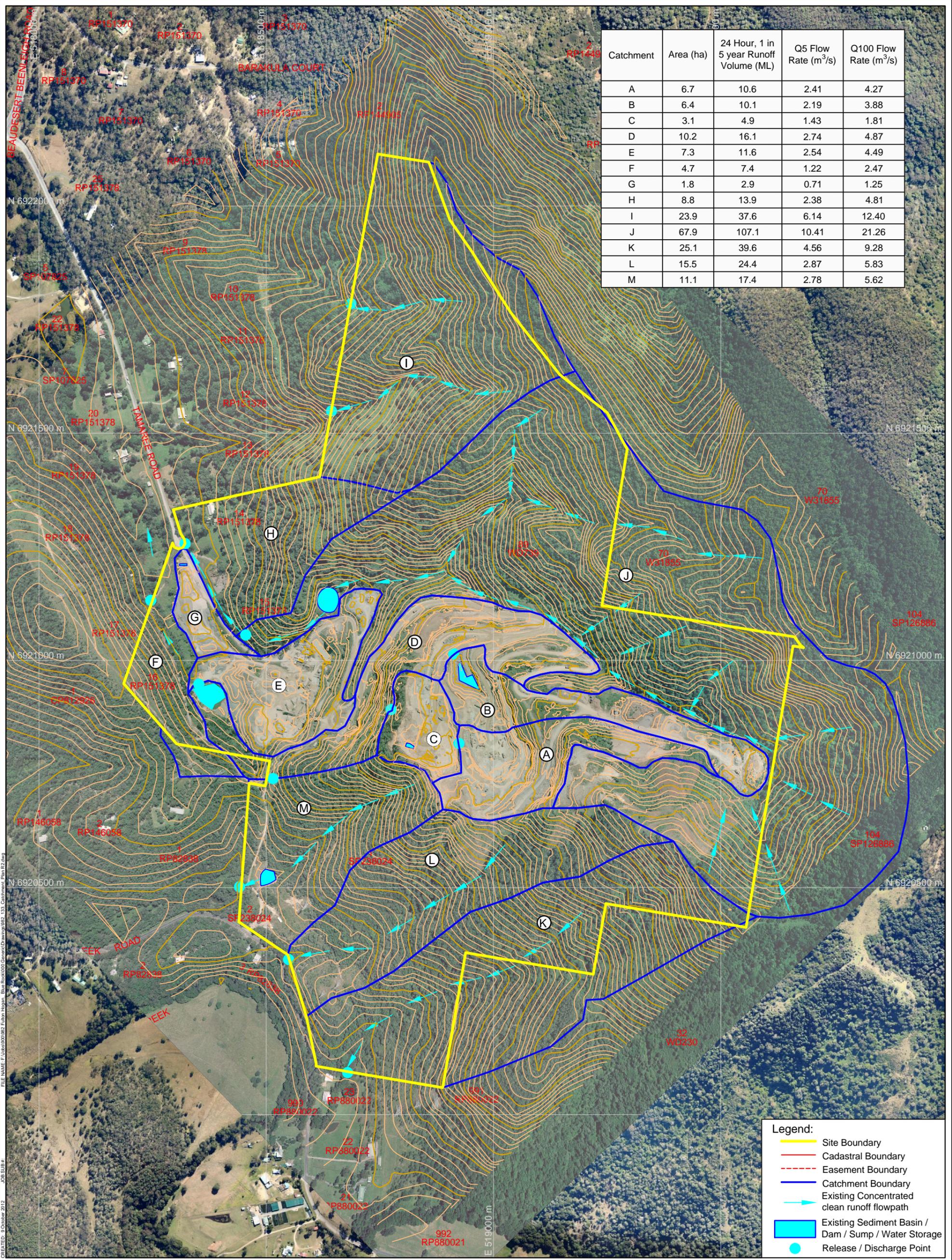
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 When Printed On A3

DATE: 28 September 2012
 PRINTED: 28 September 2012

DRAWING NUMBER: **982.139**

REVISION:

DATUM: HORIZONTAL / VERTICAL / ZONE
 MGA / AHD / 56



Legend:

- Site Boundary
- Cadastral Boundary
- - - Easement Boundary
- Catchment Boundary
- Existing Concentrated clean runoff flowpath
- Existing Sediment Basin / Dam / Sump / Water Storage
- Release / Discharge Point

REV	DESCRIPTION	DATE	BY
1	Catchment Delineation Plan	27/5/12	LT
2	Amendments to Catchment Areas	30/10/12	LT/PR

Data Sources:
 Photography: Fulton Hogan, 2012-09-03; Vekta 2011-03-23; Nearmap 2012-08-05
 Topography: Fulton Hogan, 2012-09-03; Vekta 2011-03-23
 Cadastre: Other
 Ecosystem: Other

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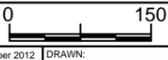
PROJECT: Blue Rock Quarry

CLIENT: Fulton Hogan



TITLE: Figure 3 - Catchment Delineation Plan

SCALE: 1:7,500



DRAWING NUMBER: 982.133

REVISION: 2

DATE: 5 November 2012

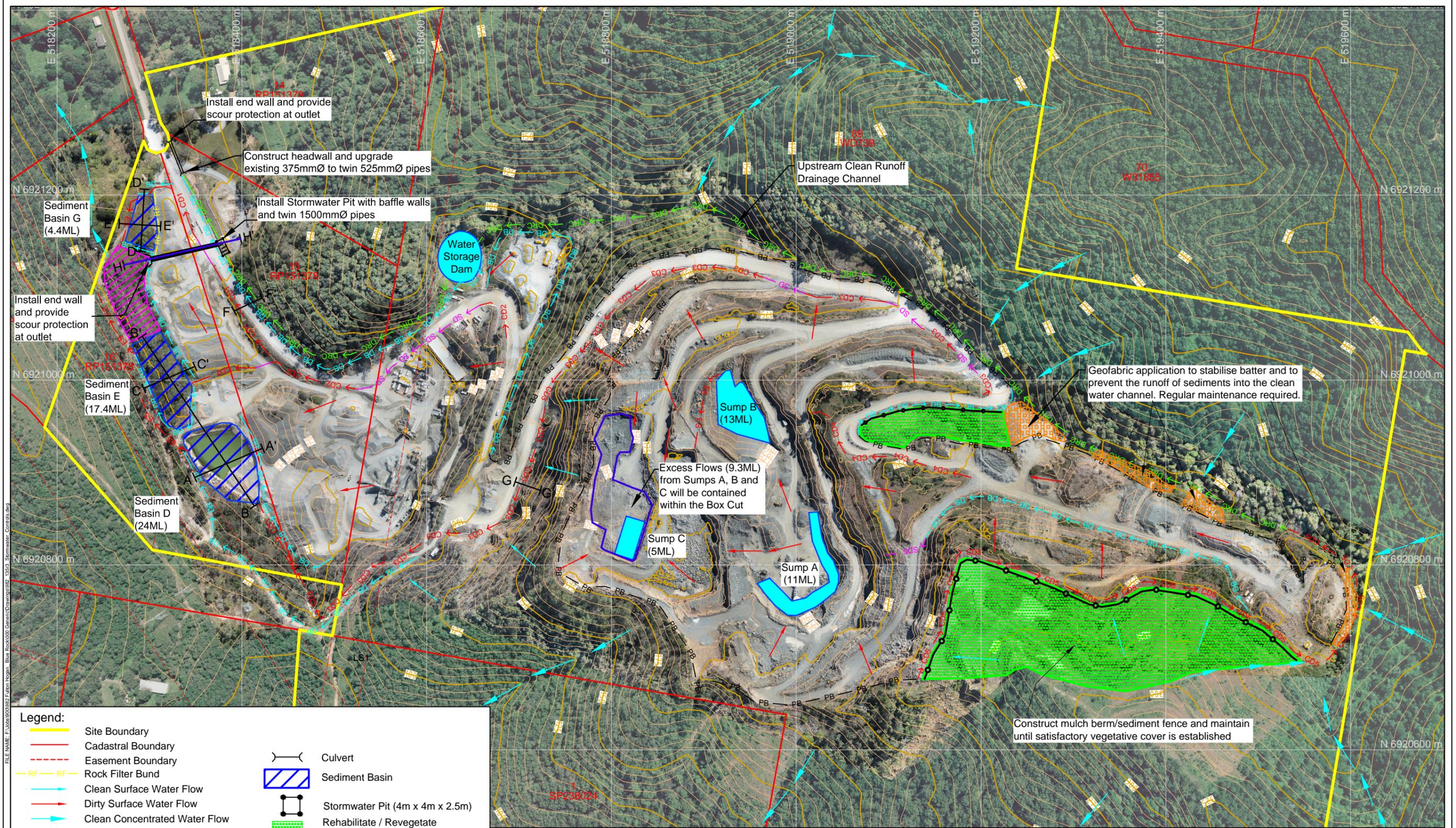
PRINTED: 5 November 2012

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DATUM: HORIZONTAL / VERTICAL / ZONE

MGA / AHD / 56

FILE NAME: F:\un\000982\Fulton Hogan - Blue Rock Quarry\Generic\Drawings\982_133_Catchment Plan.rvt.dwg
 JOB SUB B.F.
 CREATED: 9 October 2012



Legend:

- Site Boundary
- Cadastral Boundary
- - - Easement Boundary
- RF — Rock Filter Bund
- Clean Surface Water Flow
- Dirty Surface Water Flow
- Clean Concentrated Water Flow
- DB → Diversion Bund - Clean Water
- CD → Catch Drain - Dirty Water
- DRC → Drainage Channel
- SD → Spoon Drain
- PB — Perimeter Bund
- RF — Rock Filter Bund
- ES → Emergency Spillway
- Mulch Berm
- Culvert
- Sediment Basin
- Stormwater Pit (4m x 4m x 2.5m)
- Rehabilitate / Revegetate by grass seeding
- Existing Ephemeral Wetland area
- Geofabric Application for Batter Stabilisation
- Q5 Flood Inundation Area (Depth =1.54m)
- A — A' Cross Section (refer Drg 982.137)
- Water storage and Sumps

- Notes:**
- Sediment basins D, E and G have been designed as Type F basins in accordance with the IECA (2008) guidelines.
 - Sediment basins have been designed to treat the runoff generated by the 24 hours, 1 in 5 year storm event.
 - Construct rock check dams, in accordance with the IECA Guidelines, within all conveyance structures including catch drains. Rock check dams are to be constructed at 50m intervals except in steep sections where the maximum separation distance between rock check dams should be 25m.
 - Vegetate using a suitable grass species, the batters of all existing and proposed diversion structures including diversion bunds, perimeter bunds, and the batters of all sediment basins.
 - Refer Figure 5 - Stormwater Management Details for sectional details and dimensions of stormwater management structures.

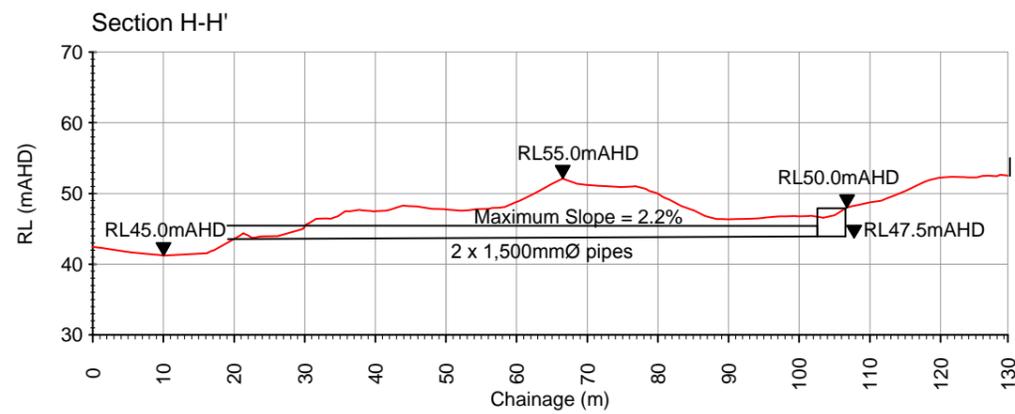
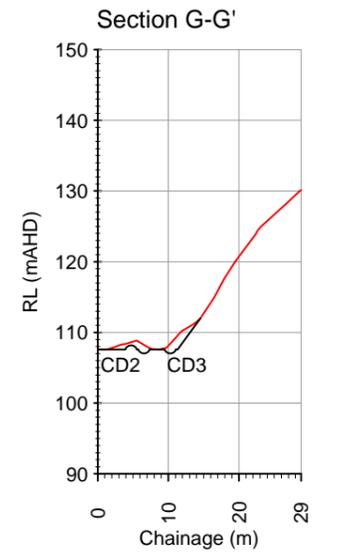
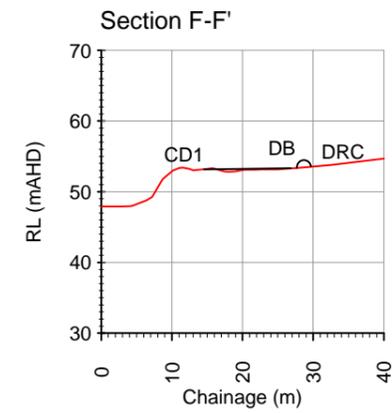
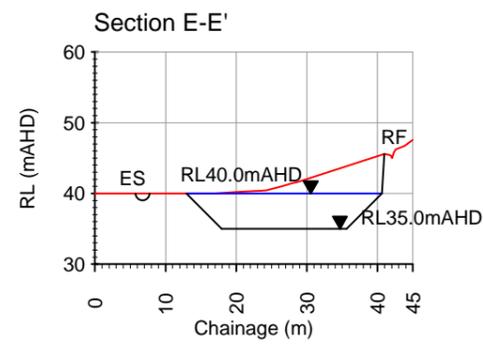
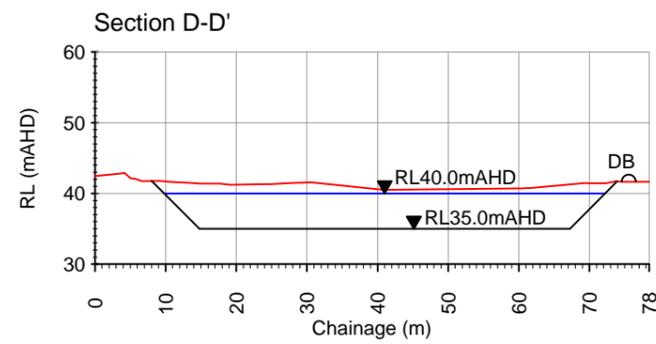
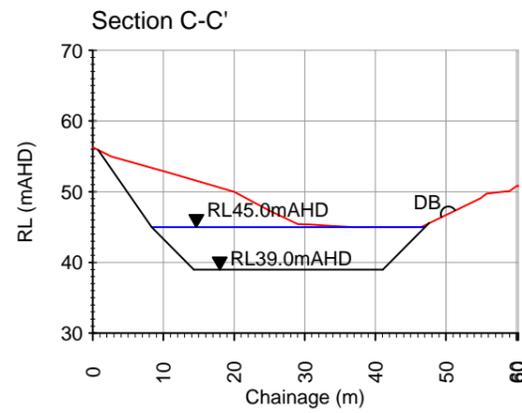
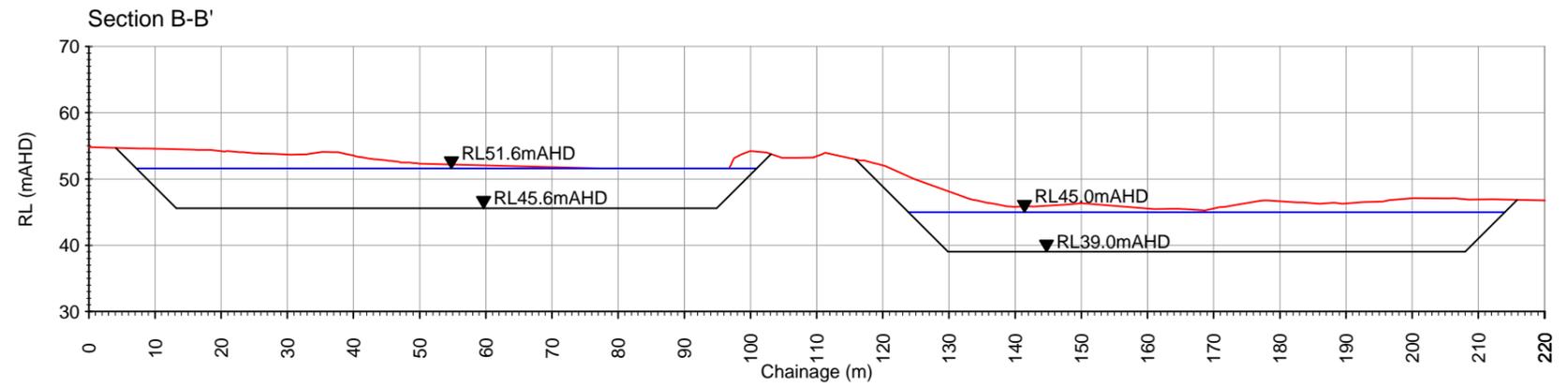
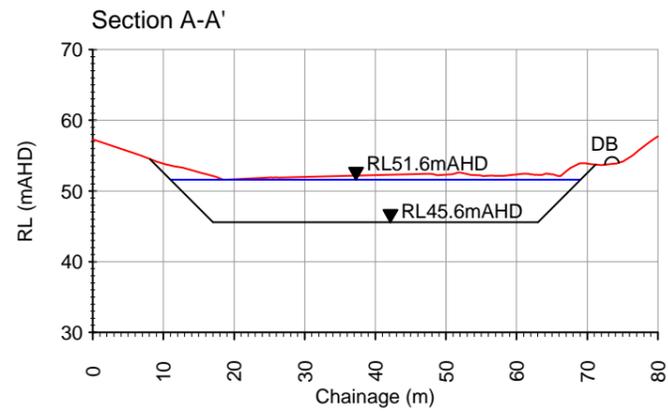
REV	DESCRIPTION	DATE	BY
1	Updated design	8/10/12	PR
2	Updated design and Q5 flood level	30/10/12	LT/PR
3	Text and presentation changes	05/11/12	MH

Data Sources:
 Photography: Fulton Hogan, 2012-09-03; Vekta 2011-03-23
 Topography: Fulton Hogan, 2012-09-03; Vekta 2011-03-23
 Cadastre:
 Ecosystem:
 Other:

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PROJECT: Blue Rock Quarry	TITLE: Figure 4 - Stormwater Management Controls
CLIENT: Fulton Hogan	GROUNDWORK plus SCALE: 1:4,000 DATE: 6 November 2012 PRINTED: 6 November 2012 DRAWING NUMBER: 982.135 REVISION: 3
DRAWING NUMBER: 982.135 REVISION: 3 DATE: 6 November 2012 PRINTED: 6 November 2012 DRAWN: LT CHECKED: DATUM: HORIZONTAL / VERTICAL / ZONE MGA / AHD / 56	



Sediment Basin Sizing				
Basin ID	Catchment	Surface Area (m ²)	Depth (m)	Volume (ML)
D	D	4,830	6	24.1
E	E	3,600	6	17.4
G	G	1,380	4	4.4

Emergency Spillway Calculations						
Sediment Basin / Sump ID	Sub-catchment	Design ARI	Discharge rate (m ³ /s)	Bottom width of spillway (m)	Depth of water over weir (m)	Freeboard over water level to crest (m)
Sump B	B	50	3.5	8	0.36	0.39
Sediment Basin D	D	50	4.5	10	0.37	0.38
Sediment Basin E	E	50	4.2	9	0.38	0.37
Sediment Basin G	G	50	1.4	3.5	0.34	0.41

Catch Drain Calculations								
Channel ID	Channel Type	Manning n	Grade S	Base Width (m)	Depth (m)	Velocity (m/s)	Flow (m ³ /s)	Depth & Velocity Product
CD1	Rock lined/Rip Rapped	0.02	0.02	1.0	0.25	2.1	1.1	0.5
CD2	Rock lined/Rip Rapped	0.02	0.11	2.5	0.25	4.8	3.2	1.2
CD3	Rock lined/Rip Rapped	0.02	0.13	2.5	0.2	5.2	3.4	1.0
CD4	Rock lined/Rip Rapped	0.02	0.12	2.0	0.2	5.0	2.8	1.0
CD5	Rock lined/Rip Rapped	0.02	0.03	0.5	0.25	2.2	0.8	0.5

FILE NAME: F:\Jobs\982137\Fulton Hogan - Blue Rock Quarry - Stormwater - details.dwg

REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Fulton Hogan, 2012-09-03; Vekta 2011-03-23
 Cadastre:
 Ecosystem:
 Other:

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Legend:
 — Existing Ground
 — Proposed Finished Level
 — Sediment Basin



PROJECT: Blue Rock Quarry CLIENT: Fulton Hogan	TITLE: Figure 5 - Stormwater Management Details SCALE: 1:1,000 DRAWING NUMBER: 982.137 REVISION: 2
GROUNDWORK PLUS PH: +61 7 3871 0411 WWW.GROUNDWORK.COM.AU	DATE: 1 November 2012 PRINTED: 1 November 2012 DRAWN: LT CHECKED: MGA / AHD / 56 DATUM: HORIZONTAL / VERTICAL / ZONE

appendices

Appendix A

Standard Specification Drawings of Stormwater Management Controls and Devices

Catch Drain - Grass Lined CD

→ CD →

Installation

1. Ensure all necessary soil testing (e.g. soil pH, nutrient levels) and analysis has been completed, and required soil adjustments performed prior to planting.
2. Clear the location for the catch drain, clearing only what is needed to provide access for personnel and equipment for installation.
3. Remove roots, stumps, and other debris and dispose of them properly. Do not use debris to build the bank.
4. Grade the drain to the specified slope and form the associated embankment with compacted fill. Note that the drain invert must fall 10cm every 10m for each 1% of channel gradient.
5. Ensure the sides of the cut drain are no steeper than a 1.5:1 (H:V) slope and the embankment fill slopes no steeper than 2:1.
6. Ensure the completed drain has sufficient deep (as specified for the type of drain) measured from the drain invert to the top of the embankment. Where necessary, cut the drain slightly deeper such that the correct channel dimensions are achieved following placement of the turf.
7. Ensure the drain has a constant fall in the desired direction free of obstructions.
8. Turf should be used within 12-hours of delivery, otherwise ensure the turf is stored in conditions appropriate for the weather conditions (e.g. a shaded area).
9. Moistening the turf after it is unrolled will help maintain its viability.
10. Turf should be laid on a minimum 75mm bed of adequately fertilised topsoil. Rake the soil surface to break the crust just before laying the turf.
11. During the warmer months, lightly irrigate the soil immediately before laying the turf.
12. Ensure the turf is not laid on gravel, heavily compacted soils, or soils that have been recently treated with herbicides.
13. For wide drains and high velocity chutes, lay the first row of turf in a straight line diagonal to the direction of flow. Stagger subsequent rows in a brick-like (stretcher bond) pattern. The turf should not be stretched or overlapped. Use a knife or sharp spade to trim and fit irregularly shaped areas.
14. For narrow drains, lay the turf along the direction of the drain, ensuring, wherever practicable, that a longitudinal joint between two strips of turf is not positioned along the invert of the drain.
15. Ensure the turf extends up the sides of the drain at least 100mm above the elevation of the channel invert, or at least to a sufficient elevation to fully contain expected channel flow.
16. On channel gradients of 3:1(H:V) or steeper, or in situations where high flow velocities (i.e. velocity >1.5m/s) are likely within the first 2-weeks following placement, secure the individual turf strips with wooden or plastic pegs.
17. Ensure that intimate contact is achieved and maintained between the turf and the soil such that seepage flow beneath the turf is avoided.
18. Water until the soil is wet 100mm below the turf. Thereafter, watering should be sufficient to maintain and promote healthy growth.
19. Ensure the drain discharges to a stable outlet such that down-slope soil erosion will be prevented from occurring. Ensure the drain does not discharge to an unstable fill slope.

Maintenance

1. Inspect all catch drains at least weekly and after runoff-producing storm events and repair any slumps, bank damage, or loss of freeboard.
2. Ensure fill material or sediment is not partially blocking the drain. Where necessary, remove any deposited material to allow free drainage.
3. Dispose of any sediment or fill in a manner that will not create an erosion or pollution hazard.

Removal

1. When the soil disturbance above the catch drain is finished and the area is stabilised, the drain and any associated banks should be removed, unless it is to remain as a permanent drainage feature.
2. Dispose of any sediment or earth in a manner that will not create an erosion or pollution hazard.
3. Grade the area and smooth it out in preparation for stabilisation.
4. Stabilise the area by grassing or as specified within the approved plan.

FILE NAME: P:\Admin\AurCAD\Temp\AurSWMP_AurCAD-CD-3_Catch_Drain - Grass Lined.dwg
12 October 2011
PRINTED: 12 October 2011

Reference: Witheridge 2010, *Erosion and Sediment Control - A field Guide for Construction Site Managers*. Catchments & Creeks Pty Ltd., Brisbane, Queensland

Catch Drain - Rock Lined CD

→ CD →

Materials

Rock:

- * All rock must be hard, weather resistant, and durable against disintegration under conditions to be met in handling, placement and operation.
- * All rock must have its greatest dimension not greater than 3 times its least dimensions.
- * The rock used in formation of the drain must be evenly graded with 50% by weight larger than the specified nominal rock size and have sufficient small rock to fill the voids between the larger rock. Dirt, fines, and smaller rock must not exceed 5% by weight.
- * The diameter of the largest rock size should be no larger than 1.5 times the nominal rock size. Specific gravity to be at least 2.5.

Filter cloth:

- * Geotextile fabric: heavy-duty, needle-punched, non-woven filter cloth, minimum 'bidim' A24 or equivalent.

Installation

1. Prior to placement, all rocks must be visually checked for size, elongation, cracks, deterioration and other visible defects. The degree and thoroughness of such checking must be appropriate for the potential consequences associated with failure of the structure or purpose for which the material will be used.
2. Clear the location for the catch drain, clearing only what is needed to provide access for personnel and equipment for installation.
3. Remove roots, stumps, and other debris and dispose of them properly. Do not use debris to build the bank.
4. Remove all soft, yielding material; replace with suitable on-site material; compact to smooth firm surface.
5. Excavate the drain to the lines and grades shown on the approved plans. Over-cut the drain to a depth equal to the specified depth of rock placement such that the finished top surface will be at the elevation of the surrounding land. Placement of the rock lining must not reduce the drain's top width and depth as specified within the approved plans.
6. Grade the drain to the specified slope and form the associated embankment with compacted fill. Note that the drain invert must fall 10cm every 10m for each 1% of channel gradient.
7. Ensure the sides of the cut drain are no steeper than a 1.5:1 (H:V) slope and the embankment fill slopes no steeper than 2:1.
8. If the drain is cut into a dispersive (sodic) soil, then prior to placing filter cloth, the exposed dispersive soil must be covered with a minimum 200mm thick layer of non-dispersive soil prior to placement of filter cloth or rocks.
9. If a filter cloth underlay is specified, place the filter fabric directly on the prepared foundation. If more than one sheet of filter cloth is required to cover the area, overlap the edge of each sheet at least 300mm, and secure anchor pins at minimum 1m spacing along the overlap.
10. Ensure the filter cloth is protected from punching or tearing during installation of the fabric and the rock. Repair any damage by removing the rock and placing with another piece of filter cloth over the damaged area overlapping the existing fabric a minimum of 300mm.
11. Placement of rock should follow immediately after placement of the filter layer. Place rock so that it forms a dense, well-graded mass of rock with a minimum of voids.
12. Place rock lining to the extent and depth indicated within the approved plans.
13. Ensure the rock is placed in an appropriate manner to avoid displacing underlying materials or placing undue impact force on the bedding materials.
14. Ensure the rock is placed with a minimum thickness of 1.5 times the nominal rock size (d50).
15. Ensure materials that are d50 and larger are positioned flush with the top surface with faces and shapes matched to minimise voids.
16. Ensure projections above or depressions under the specified top surface are less than 20% of the rock layer thickness. The average surface plane of the finished rock is defined as the plane where 50% of the tops of rocks would contact.
17. Ensure the completed drain has sufficient depth (as specified for the type of drain) measured from the drain invert (average surface plane along channel invert) to the top of the embankment. The average surface plane of the finished rock is defined as the plane where 50% of the tops of rocks would contact.
18. To the maximum degree practicable, the material between larger rock must not be loose or easily displaced by the expected flow.
19. After placement of the rock lining, ensure the drain has a constant fall in the desired direction free of obstructions.
20. Ensure the drain discharges to a stable outlet such that soil erosion will be prevented from occurring. Ensure the drain does not discharge to an unstable fill slope.

Maintenance

1. Inspect all catch drains at least weekly and after runoff-producing storm events and repair any slumps, bank damage, or loss of freeboard.
2. Closely inspect the outer edges of the rock protection. Ensure water entry into the rock-lined area is not causing erosion along the edge of the rock protection.
3. Carefully check the stability of the rock looking for indications of piping, scour holes, or bank failures.
4. Replace or reposition the surface rock such that the drain functions as required and the drain's required hydraulic capacity is not reduced.
5. Replace any displaced rock with rock of a significantly (minimum 110%) larger size than the displaced rock.
6. Ensure sediment is not partially blocking the drain. Where necessary, remove any deposited material to allow free drainage.
7. Dispose of any sediment or fill in a manner that will not create an erosion or pollution hazard.

Removal

1. When the soil disturbance above the catch drain is finished and the area is stabilised, the drain and any associated banks should be removed, unless it is to remain as a permanent drainage feature.
2. Dispose of any sediment or earth in a manner that will not create an erosion or pollution hazard.
3. Grade the area and smooth it out in preparation for stabilisation.
4. Stabilise the area by grassing.

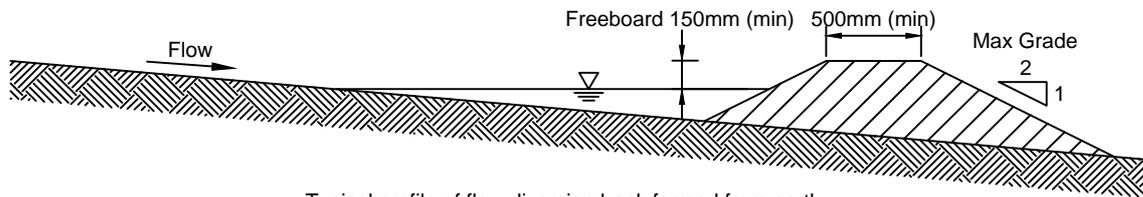
Reference: Witheridge 2010, *Erosion and Sediment Control - A Field Guide for Construction Site Managers*. Catchments & Creeks Pty Ltd., Brisbane, Queensland

FILE NAME: F:\Admin\AurCAD\Templates\SWMP_Aurplus-CD-5_Catch Drain - Rock Lined.dwg
PRINTED: 13 October 2011
CREATED: 12 October 2011

Flow Diversion Bank / Perimeter Bund DB / PB

→ DB →

→ PB →



Typical profile of flow diversion bank formed from earth

Installation

1. Clear the location for the bank, clearing only the area that is needed to provide access for personnel and equipment.
2. Remove roots, stumps, and other debris and dispose of them properly. Do not use debris to build the bank.
3. Form the bank from the topsoil and overburden material from the extraction area.
4. If earth is used, then ensure the sides of the bank are no steeper than a 2:1 (H:V) slope, and the completed bank must be at least 500mm high.
5. Check the bank alignment to ensure positive drainage in the desired direction.
6. The bank should be vegetated (turfed, seeded and mulched), or otherwise stabilised immediately, unless it will operate for less than 30 days or if significant rainfall is not expected during the life of the bank.
7. Ensure the embankment drains to a stable outlet, and does not discharge to an unstable slope.

Maintenance

1. Inspect flow diversion banks at least weekly and after runoff-producing rainfall.
2. Inspect the bank for any slumps, wheel track damage or loss of freeboard. Make repairs as necessary.
3. Check that fill material or sediment has not partially blocked the drainage path up-slope of the embankment. Where necessary, remove any deposited material to allow free drainage.
4. Dispose of any collected sediment or fill in a manner that will not create an erosion or pollution hazard.
5. Repair any places in the bank that are weakened or in risk of failure.

Removal

1. When the soil disturbance above the bank is finished and the area is stabilised, the flow diversion bank should be removed, unless it is to remain as a permanent drainage feature.
2. Dispose of any sediment or earth in a manner that will not create an erosion or pollution hazard.
3. Grade the area and smooth it out in preparation for stabilisation.
4. Stabilise the area by grassing or as specified in the approved plan.

Recommended dimensions of flow diversion banks

Parameter	Earth Banks	Vegetated Banks
Height (min)	500mm	500mm
Top Width (min)	500mm	500mm
Base Width (min)	2500mm	2500mm
Side Slope (max)	2:1 (H:V)	2:1 (H:V)
Freeboard	300mm	150mm

Diversion Channel DC

→ DC →

Installation

1. Ensure all necessary soil testing (e.g. soil pH, nutrient levels) and analysis has been completed, and required soil adjustments performed prior to planting.
2. Clear the location for the channel, clearing only what is needed to provide access for personnel and construction equipment.
3. Remove roots, stumps, and other debris and dispose of them properly. Do not use debris to build any associated embankments.
4. Excavate the diversion channel to the specified shape, elevation and gradient. The sides of the channel should be no steeper than a 2:1 (H:V) if constructed in earth, unless specifically directed within the approved plans.
5. Stabilise the channel and banks immediately unless it will operate for less than 30 days. In either case, temporary erosion protection (matting, rock, etc.) will be required as specified within the approved plans or as directed.
6. Ensure the channel discharges to a stable area.

Additional requirements for turf placement:

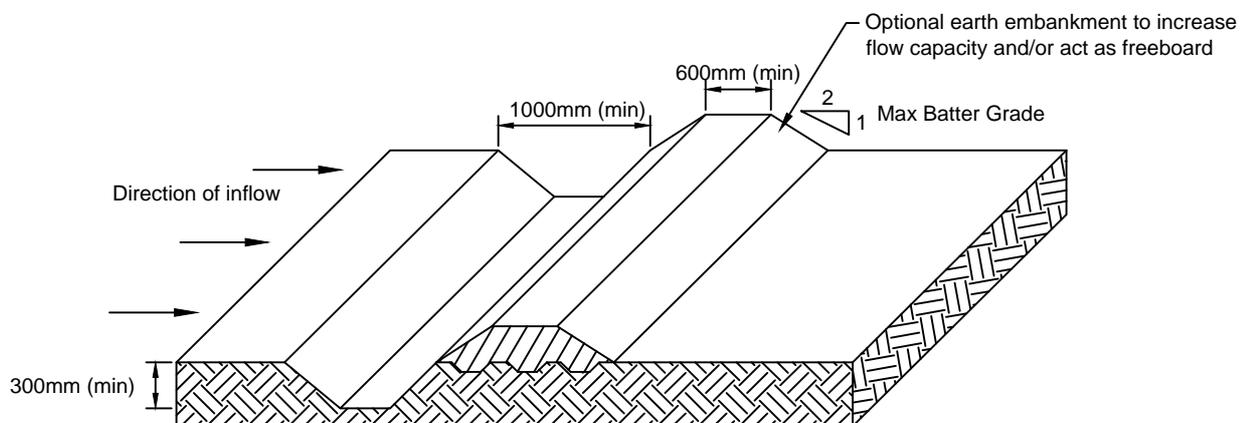
1. Turf should be used within 12 hours of delivery, otherwise ensure the turf is stored in conditions appropriate for the weather conditions (e.g. a shaded area).
2. Moistening the turf after it is unrolled will help maintain its viability.
3. Turf should be laid on a minimum 75mm bed of adequately fertilised topsoil. Rake the soil surface to break the crust just before laying the turf.
4. During the warmer months, lightly irrigate the soil immediately before laying the turf.
5. Ensure the turf is not laid on gravel, heavily compacted soils, or soils that have been recently treated with herbicides.
6. Ensure the turf extends up the sides of the drain at least 100mm above the elevation of the channel invert, or at least to a sufficient elevation to fully contain expected channel flow.
7. On channel gradients of 3:1(H:V) or steeper, or in situations where high flow velocities (i.e. velocity >1.5m/s) are likely within the first two week following placement, secure the individual turf strips with wooden or plastic pegs.
8. Ensure that intimate contact is achieved and maintained between the turf and the soil such that seepage flow beneath the turf is avoided.
9. Water until the soil is wet 100mm below the turf. Thereafter, watering should be sufficient to maintain and promote healthy growth

Maintenance

1. During the site's construction period, inspect the diversion channel weekly and after any increase in flows within the channel. Repair any slumps, wheel track damage or loss of freeboard.
2. Ensure fill material or sediment is not partially blocking the channel. Where necessary, remove any deposited material to allow free drainage.
3. Dispose of any collected sediment or fill in a manner that will not create an erosion or pollution hazard.

Removal

1. When the construction work above a temporary diversion channel is finished and the area is stabilised, the area should be appropriately rehabilitated.
2. Dispose of any collected sediment or fill in a manner that will not create an erosion or pollution hazard.
3. Grade the area and smooth it out in preparation for stabilisation.
4. Stabilise the area.



(a) Typical profile of diversion channel with bank

Construction

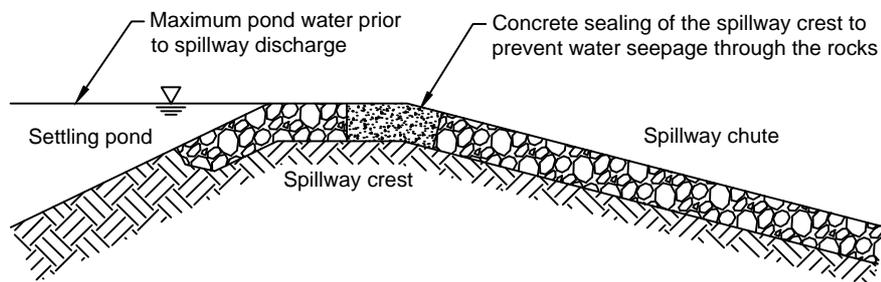
1. The spillway must be excavated, and the excavated material if classified as suitable, must be used in the embankment, and if not suitable it must be disposed of into spoil heaps.
2. Ensure excavated dimensions allow adequate boxing-out such that the specified elevations, grades, chute width, and entrance and exit slopes for the emergency spillway will be achieved after placement of the rock or other scour protection measures.
3. Place specified scour protection measures on the emergency spillway. Ensure the finished grade blends with the surrounding area to allow a smooth flow transition from spillway to downstream channel.
4. If a synthetic filter fabric underlay is specified, place the filter fabric directly on the prepared foundation. If more than 1 sheet of filter fabric is required, overlap the edges by at least 300mm and place anchor pins at minimum 1m spacing along the overlap. Bury the upstream end of the fabric a minimum 300mm below ground and where necessary, bury the lower end of the fabric or overlap a minimum 300mm over the next downstream section as required. Ensure the filter fabric extends at least 1000mm upstream of the spillway crest.
5. Take care not to damage the fabric during or after placement. If damage occurs, remove the rock and repair the sheet by adding another layer of fabric with a minimum overlap of 300mm around the damaged area. If extensive damage is suspected, remove and replace the entire sheet.
6. Where large rock is used, or machine placement is difficult, a minimum 100mm layer of fine gravel, aggregate, or sand may be needed to protect the fabric.
7. Placement of rock should follow immediately after placement of the filter fabric. Place rock so that it forms a dense, well-graded mass of rock with a minimum of voids. The desired distribution of rock throughout the mass may be obtained by selective loading at the quarry and controlled dumping during final placement.
8. The finished slope should be free of pockets of small rock or clusters of large rocks. Hand placing may be necessary to achieve the proper distribution of rock sizes to produce a relatively smooth, uniform surface. The finished grade of the rock should blend with the surrounding area. No overfall or protrusion of rock should be apparent.
9. Ensure that the final arrangement of the spillway crest will not promote excessive flow through the rock such that the water can be retained within the settling basin an elevation no less than 50mm above or below the nominated spillway crest elevation.

Maintenance

1. During the construction period, inspect the spillway prior to forecast rainfall, daily during extended periods of rainfall, after significant runoff producing storm events, or otherwise on a weekly basis. Make repairs as necessary.
2. Check for movement of, or damage to, the spillway's lining, including surface cracking.
3. Check for soil scour adjacent the spillway. Investigate the cause of any scour, and repair as necessary.
4. When making repairs, always restore the spillway to its original configuration unless an amended layout is required.

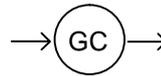
Removal

1. Temporary spillways should be removed when an alternative, stable, drainage system is available.
2. Remove all materials and deposited sediment, and dispose of in a suitable manner that will not cause an erosion or pollution hazard.
3. Grade the area in preparation for stabilisation, then stabilise the area.



(a) Example of seepage control on the spillway crest

Grass Channel Linings GC



Installation

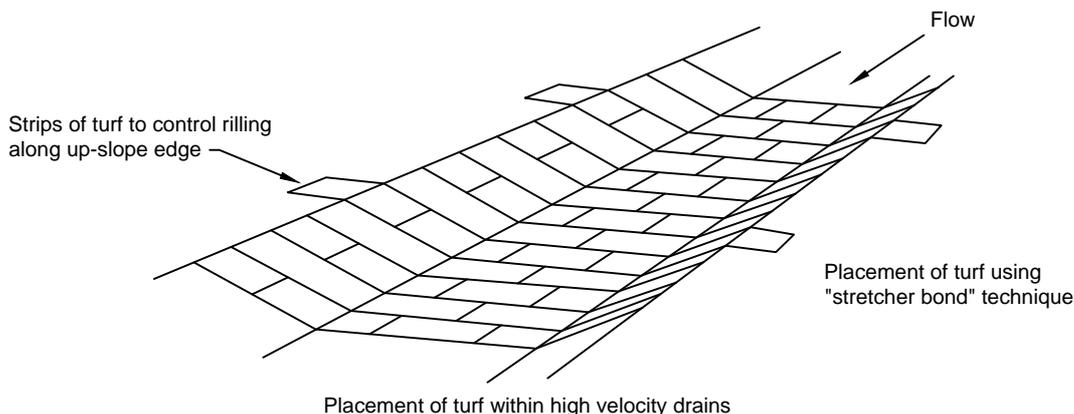
1. Ensure all necessary soil testing (e.g. soil pH, nutrient levels) and analysis has been completed, and required soil adjustments performed prior to planting.
2. Remove all trees, brush, stumps, and other objectionable material from the channel footprint and dispose of properly.
3. Excavate the channel and shape it to neat lines and dimensions shown on the approved plan. Ensure an adequate allowance in the excavated dimensions, typically 75mm, for the placement topsoil and turfing.
4. Remove and properly dispose of all excess soil so that surface water may enter the channel freely.
5. The procedures used to establish grass within the channel will depend upon the expected weather conditions, the type of grass, and the likely flow conditions within the channel during and immediately after planting. Ensure the adopted planting procedures are consistent with the approved plans or the recommendations of the landscape designers.

Additional requirements when laying turf within a drainage channel:

1. Turf should be used within 12-hours of delivery, otherwise ensure the turf is stored in conditions appropriate for the weather conditions (e.g. a shaded area).
2. Moistening the turf after it is unrolled will help maintain its viability.
3. Turf should be laid on a minimum 75mm bed of adequately fertilised topsoil. Rake the soil surface to break the crust just before laying the turf.
4. During the warmer months, lightly irrigate the soil immediately before laying the turf.
5. Ensure the turf is not laid on gravel, heavily compacted soils, or soils that have been recently treated with herbicides.
6. Lay the first row of turf in a straight line diagonal to the direction of flow. Stagger subsequent rows in a brick-like (stretcher bond) pattern. The turf should not be stretched or overlapped. Use a knife or sharp spade to trim and fit irregularly shaped areas.
7. Ensure the turf extends up the sides of the channel at least 100mm above the elevation of the channel bed, or at least to a sufficient elevation to fully contain the expected channel flow that is considered likely to occur within the first month after placement.
8. On channel gradients of 3:1(H:V) or steeper, or wherever erosion may be a problem, or in situations where high flow velocities (i.e. velocity > 1.5m/s) are likely within the first 2-weeks following placement, secure the individual turf strips with wooden pegs.
9. Ensure that intimate contact is achieved and maintained between the turf and the soil such that seepage flow beneath the turf is avoided.
10. Where practicable, once fixed in place, the turf should be rolled with a roller weighing 60 to 90kg/m width, then watered.
11. After rolling, lightly spread screened topsoil to replace topsoil lost from the turf and to fill any gaps between the rows.
12. Water until the soil is wet 100mm below the turf. Thereafter, watering should be sufficient to maintain and promote healthy growth.

Maintenance

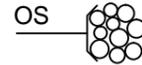
1. During the initial root establishment period, check grassed channels after every rainfall.
2. After grass is established, periodically check the channel including after significant storm events.
3. Check for erosion along the edge of the turfed area. If erosion is occurring, take appropriate measures to avoid further erosion.
4. If damage has occurred, immediately initiate repairs with turf or by seeding as appropriate.
5. Remove excessive sediment deposition or debris from the channel to maintain the channel's required hydraulic capacity.
6. Maintain a healthy and vigorous grass condition whenever and wherever possible, including watering and fertilising as needed.
7. Ensure a minimum grass leaf blade length of 50mm is maintained in areas subject to medium to high flow velocities, and 20 to 50mm in low velocity areas.
8. Mowing should not be attempted until the turf is firmly rooted, usually 2 to 3 weeks after laying.
9. All reasonable measures shall be taken to collect grass clippings immediately after mowing if their removal by subsequent channel flows would contaminate sensitive downstream waterways or otherwise cause undesirable environmental harm.



Reference: Witheridge 2010, *Erosion and Sediment Control - A field Guide for Construction Site Managers*. Catchments & Creeks Pty Ltd., Brisbane, Queensland

FILE NAME: Irrigation Tools\SWMP - Jarvis\SD-GC-1 Grass Channel Linings.dwg
PRINTED: 12 October 2011

Outlet Structure OS



Materials (Rock pads)

* Rock: hard, angular, durable, weather resistant and evenly graded with 50% by weight larger than the specified nominal rock size and sufficient small rock to fill the voids between the larger rock. The diameter of the largest rock size should be no larger than 1.5 times the nominal rock size. Specific gravity to be at least 2.5.

* Geotextile fabric: heavy-duty, needle-punched, non-woven filter cloth, minimum 'bidim' A24 or equivalent.

Installation (Rock pads)

1. The dimensions of the outlet structure must align with the dominant flow direction.
2. Excavate the outlet pad footprint to the specified dimension such that when the rock is placed in the excavated pit the top of the rocks will be level with the surrounding ground, unless otherwise directed.
3. If the excavated soils are dispersive, over-excavate the rock pad by at least 300mm and backfill with stable, non-dispersive material.
4. Line the excavated pit with geotextile filter cloth, preferably using a single sheet. If joints are required, overlap the fabric at least 300mm.
5. Ensure the filter cloth is protected from punching or tearing during installation of the fabric and the rock. Repair any damage by removing the rock and placing with another piece of filter cloth over the damaged area overlapping the existing fabric a minimum of 300mm.
6. Ensure there are at least two layers of rocks. Where necessary, reposition the larger rocks to ensure two layers of rocks are achieved without elevating the upper surface above the pipe invert.
7. Ensure the rock is placed in a manner that will allow water to discharge freely from the pipe.
8. Ensure the upper surface of the rock pad does not cause water to be deflected around the edge of the rock pad.
9. Immediately after construction, appropriately stabilise all disturbed areas.

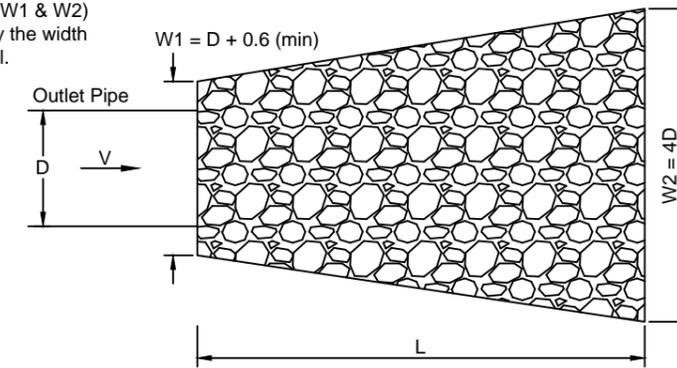
Maintenance

1. While construction works continue on the site, inspect the outlet structure prior to forecast rainfall, daily during extended periods of rainfall, after significant runoff producing rainfall, and on at least a weekly basis.
2. Replace any displaced rock with rock of a significantly (minimum 110%) larger size than the displaced rock.

Removal

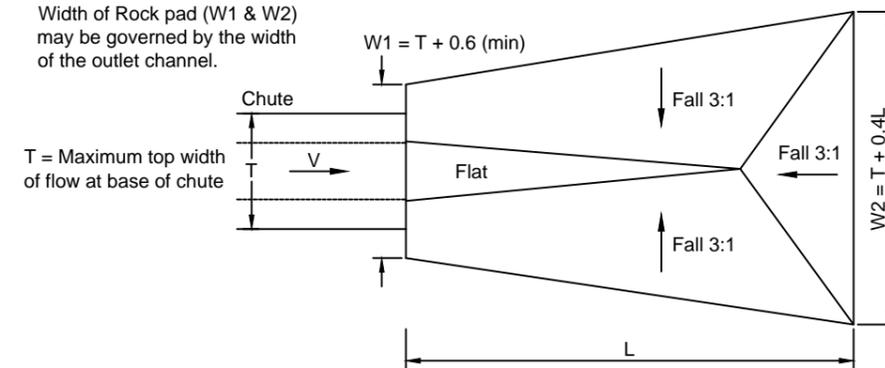
1. Temporary outlet structures should be completely removed, or where appropriate, rehabilitated so as not to cause ongoing environmental nuisance or harm.
2. Following removal of the device, the disturbed area must be appropriately rehabilitated so as not to cause ongoing environmental nuisance or harm.
3. Remove materials and collected sediment and dispose of in a suitable manner that will not cause an erosion or pollution hazard.

Width of Rock pad (W1 & W2) may be governed by the width of the outlet channel.



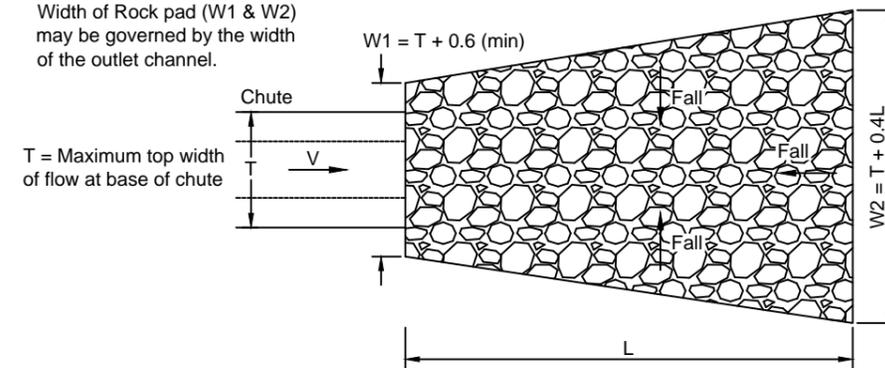
(a) Typical layout of rock pad outlet structure for pipe outlet

Width of Rock pad (W1 & W2) may be governed by the width of the outlet channel.

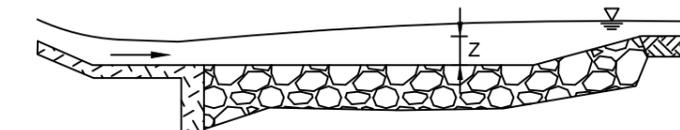


(b) Typical form of a rock pad outlet structure for a drainage chute

Width of Rock pad (W1 & W2) may be governed by the width of the outlet channel.



(c) Typical layout of a rock pad outlet structure for a drainage chute



(d) Typical profile of a rock pad outlet structure for a drainage chute

Notes:

1. Drawings applicable to temporary drainage chutes and slope drains.
2. Rock pad outlet structures for slope drains usually are not required to be recessed below natural ground level as is the case for chute outlets (see figure b).

Revegetation - General R



Specifications for site revegetation vary considerably from site to site. Site supervisors should obtain site specific planting specifications.

Installation

1. Ensure all necessary soil testing (e.g. soil pH, nutrient levels) and analysis has been completed, and required soil adjustments performed prior to planting.
2. Apply soil conditioners and fertiliser as specified on the approved plans. Rip the soil 100 to 150mm to mix the components into the soil and to loosen and roughen the soil surface before seeding.
3. Where possible, there should be sufficient soil depth to provide an adequate root zone. The depth to rock or impermeable layers such as hardpans should be 300mm or more, except on slopes steeper than 2:1(H:V) where such soil depth may not be feasible.
4. Ensure the soil pH is within the specified range.
5. Apply seed uniformly by hand or with a cyclone seeder, drop-type spreader, drill, hydroseeder, hydromulcher, or other suitable equipment as specified.
6. When using broadcast-seeding methods, subdivide the area into workable sections and apply one-half the specified quantity of seed while moving back and forth across the area, making a uniform pattern. Then apply the second half in the same way, but moving at right angles to the first pass. Cover broadcast seed by raking or chain dragging; then firm the surface with a roller to provide good seed contact.
7. Apply seed at the recommended rate, and disc or otherwise mechanically treat the surface to bring the seed into contact with the soil.
8. The seeded area should be mulched as specified in the approved plan.

Maintenance

1. During the construction phase, inspect the treated area fortnightly and after runoff-producing rainfall. Make repairs as needed.
2. Watering the vegetation periodically is essential, especially in the first 7 days after establishment. Use low-pressure sprays because high-pressure jets can wash away the seed and mulch cover.
3. Watering should start immediately after planting. Watering should comply with specifications provided with the approved plans. Generally watering should vary according to weather and soil conditions. A typical watering schedule may consist of the following:
 - * 25mm every second day for the first three waterings;
 - * 25mm twice a week for the next three weeks; and
 - * 25mm once weekly for a further two weeks.
4. Monitor site revegetation, particularly after rainfall, and appropriate maintenance and/or amendment to ensure that the revegetation is controlling erosion and stabilising soil slopes as required.
5. Where practicable, fill in, or level out, any rill erosion between plants. If excessive erosion occurs, then consider increasing the planting density, applying appropriate erosion control measures, or introducing alternative, non-clumping plant species.
6. Areas must be re-seeded and mulched if the vegetation fails to establish or is damaged by runoff or construction activities.
7. If the temporary vegetation cover or erosion control measure (e.g. mulch cover) should fail for any reason before establishment of the permanent vegetation cover, then it must be replaced with an appropriate type of cover sufficient to control soil erosion.
8. If the permanent vegetation should fail to establish or to adequately restrain erosion for any reason during the construction or maintenance period, the area should be revegetated or protected with other erosion control measures as appropriate.
9. In areas where the obtained vegetation cover is considered inadequate for erosion control, the affected area should be over-seeded and fertilised using half the originally specified rates, or as directed.
10. Maintain grass blade length at a minimum 50mm height within medium to high velocity drainage areas, and 20 to 50mm within low velocity flow paths.
11. Where necessary, or as directed by the site supervisor, slash the temporary crop/grass cover to allow the successful growth of the underlying permanent vegetation cover.
12. Control weed growth within 1m of immature trees for 6 to 12 months for fast growing species, and 18 to 20 months for slower growing species, or until the end of the specified maintenance period.
13. Where mulch is used to control weed growth, inspect and where necessary, renew at maintenance periods not exceeding 4 to 6 months.
14. Apply additional seed, mulch and/or soil conditioning as required. Mulches usually need to be maintained or renewed (as necessary) 2 to 3 times a year.
15. Inspect and where necessary repair protective fencing at maintenance periods not exceeding 1 month.
16. Re-firm plants loosened by wind-rock, livestock or wildlife.
17. Replace dead or severely retarded plants.
18. Prune any plants of dead or diseased parts. Cut off all damaged tree limbs above the tree collar at the trunk or main branch. Use several cuts including undercutting to avoid peeling bark from the healthy areas of the tree.
19. Dispose of cleared vegetation in an appropriate manner such as chipping or mulching, on-site burial, or off-site disposal. Cleared vegetation should not be dumped near a watercourse or on a floodplain where it could be removed by floodwaters. Vegetation should not be burnt on-site without specific approval from the local authority.
20. Repair damaged tree roots by cutting off the damaged areas and sealing them with an approved product. Spread moist topsoil over exposed roots.

Reference: Witheridge 2010, *Erosion and Sediment Control - A field Guide for Construction Site Managers*. Catchments & Creeks Pty Ltd., Brisbane, Queensland

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Rock Check Dam RCD



Materials

- * Rock: 150 to 300mm nominal diameter, hard, erosion resistant rock. Smaller rock may be used if suitable large rock is not available.
- * Sandbags: geotextile bags (woven synthetic, or non-woven biodegradable) filled with clean coarse sand, clean aggregate, straw or compost.

Installation

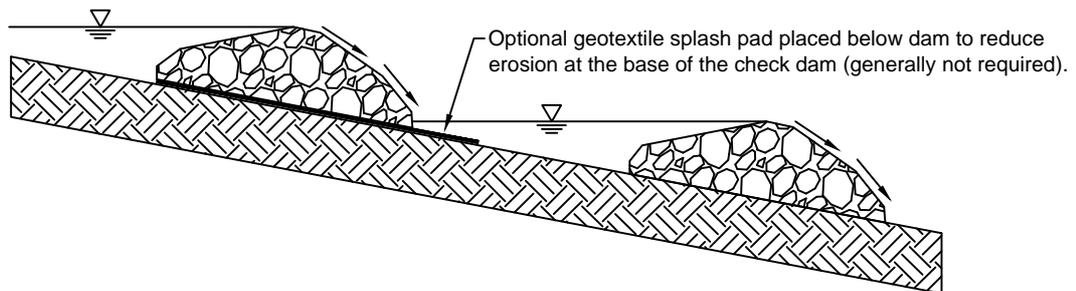
1. Prior to placement of the check dams, ensure the type and size of each check dam will not cause a safety hazard or cause water to spill out of the drain.
2. Locate the first check dam at the downstream end of the section of channel being protected. Locate each successive check dam such that the crest of the immediate downstream dam is level with the toe of the check dam being installed.
3. Ensure the channel slope is no steeper than 10:1 (H:V). Otherwise consider the use of a suitable channel liner instead of the check dams.
4. Construct the check dam to the dimensions and profile shown within the approved plan.
5. Where specified, the check dams shall be constructed on a sheet of geotextile fabric used as a downstream splash pad.
6. Each check dam shall be extended up the channel bank (where practicable) to an elevation at least 150mm above the crest level of the dam.

Maintenance

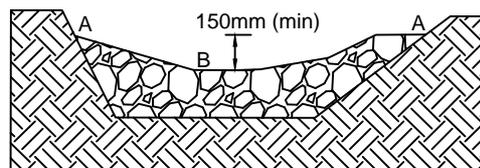
1. Inspect each check dam and the drainage channel at least weekly and after runoff-producing rainfall.
2. Correct all damage immediately. If significant erosion occurs between any of the check dams, then check the spacing of dams and where necessary install intermediate check dams or a suitable channel liner.
3. Check for displacement of the check dams
4. Check for soil scour around the ends of each check dam. If such erosion is occurring, consider extending the width of the check dam to avoid such problems.
5. If severe soil erosion occurs either under or around the check dams, then seek expert advice on an alternative treatment measure.
6. Remove any sediment accumulated by the check dams, unless it is intended that this sediment will remain within the channel.
7. Dispose of collected sediment in a suitable manner that will not cause an erosion or pollution hazard.

Removal

1. When construction work within the drainage area above the check dams has been completed, and the disturbed areas and the drainage channel are sufficiently stabilised to restrain erosion, all temporary check dams must be removed.
2. Remove the check dams and associated sediment and dispose of in a suitable manner that will not cause an erosion or pollution hazard.



(a) Layout of check dams (rock check dams shown)



Outer wing points A to be at least 150mm above crest level B

(b) Profile of check dams (rock check dams shown)

Rock Linings RR



Materials

* Rock: hard, angular, durable, weather resistant and evenly graded with 50% by weight larger than the specified nominal rock size and sufficient small rock to fill the voids between the larger rock. The diameter of the largest rock size should be no larger than 1.5 times the nominal rock size. Specific gravity to be at least 2.5.

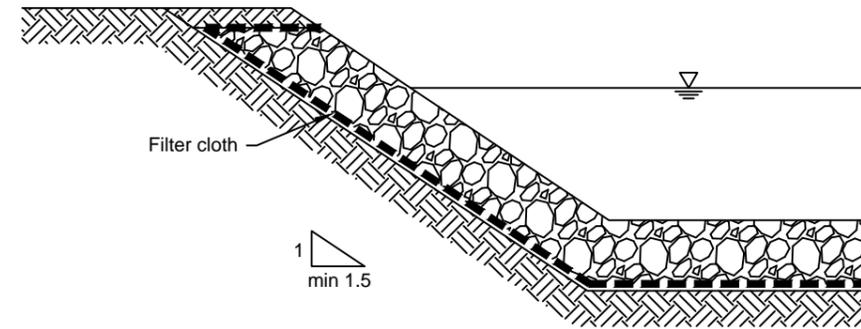
* Geotextile fabric: heavy-duty, needle-punched, non-woven filter cloth, minimum 'bidim' A24 or equivalent.

Installation

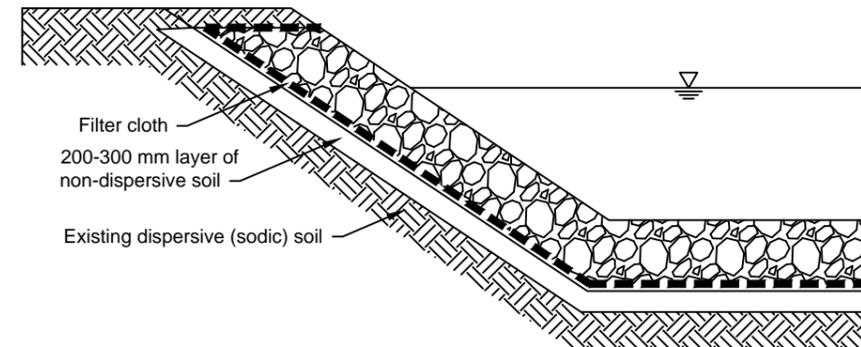
1. Clear the proposed channel area of trees, stumps, roots, loose rock, and other objectionable materials.
2. Excavate the channel to the lines and grades as shown on the plans. Over-cut the channel to a depth equal to the specified depth of rock placement such that the finished rock surface will be at the elevation of the surrounding land.
3. Rock must be placed within the channel, including the placement of any specified filter layer.
4. If details are not provided on the rock placement, then the primary armour rock must be either placed on:
 - * a filter bed formed from a layer of specified smaller rock (rock filter layer);
 - * an earth bed lined with filter cloth;
 - * an earth bed not lined in filter cloth, but only if all voids between the armour rock are to be filled with soil and pocket planted immediately after placement of the rock.
5. If a rock/aggregate filter layer is specified, then place the filter layer immediately after the foundations are prepared. Spread the filter rock in a uniform layer to the specified depth but a minimum of 150mm. Where more than one layer of filter material has been specified, spread each layer such that minimal mixing occurs between each layer of rock.
6. If a geotextile (filter cloth) underlay is specified, place the fabric directly on the prepared foundation. If more than one sheet of fabric is required to cover the area, overlap the edge of each sheet at least 300mm and place anchor pins at minimum one metre spacing along the overlap.
7. Ensure the geotextile fabric is protected from punching or tearing during installation of the fabric and the rock. Repair any damage by removing the rock and placing with another piece of filter cloth over the damaged area overlapping the existing fabric a minimum of 300mm.
8. Where necessary, a minimum 100mm layer of fine gravel, aggregate or sand should be placed over the fabric to protect it from damage.
9. Placement of rock should follow immediately after placement of the filter layer. Place rock so that it forms a dense, well-graded mass of rock with a minimum of voids.
10. Place rock to its full thickness in one operation. Do not place rock by dumping through chutes or other methods that cause segregation of rock sizes.
11. The finished surface should be free of pockets of small rock or clusters of large rocks. Hand placing may be necessary to achieve the proper distribution of rock sizes to produce a relatively smooth, uniform surface. The finished grade of the rock should blend with the surrounding area. No overfall or protrusion of rock should be apparent.
12. Immediately upon completion of the channel, vegetate all disturbed areas or otherwise protect them against soil erosion.
13. Where specified, fill all voids with soil and vegetate the rock surface.

Maintenance

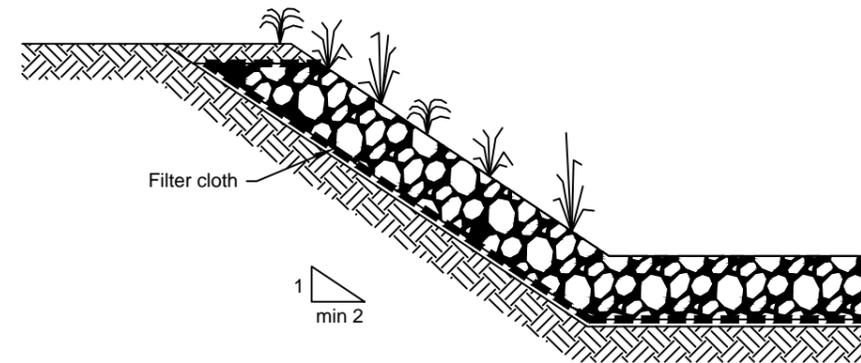
1. Rock-lined channels should be inspected periodically and after significant storm events. Check for scour or dislodged rock. Repair damaged areas immediately.
2. Closely inspect the outer edges of the rock protection. Ensure water entry into the channel or chute is not causing erosion along the edge of the rock protection.
3. Carefully check the stability of the rock looking for indications of piping, scour holes, or bank failures.
4. Replace any displaced rock with rock of a significantly (minimum 110%) larger size than the displaced rock.



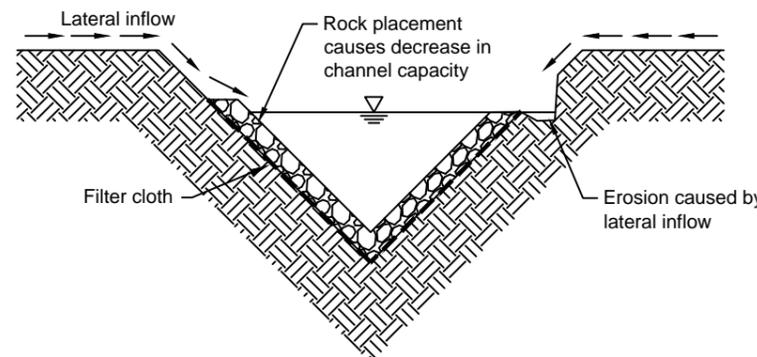
(a) Placement of rock with open voids



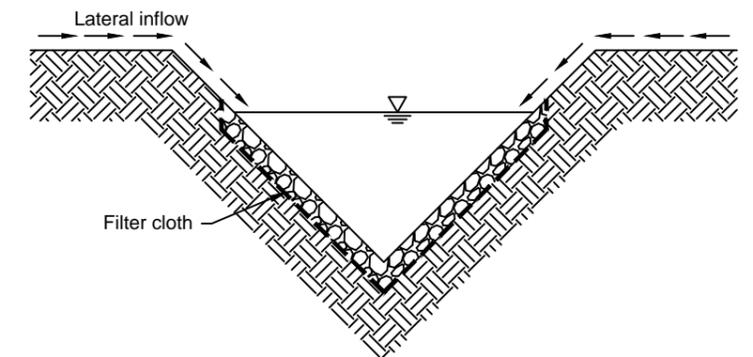
(b) Placement of rock within a channel cut into dispersive soils



(c) Placement of rock with voids filled with soil and vegetated



(d) Poor placement of rock along channel invert

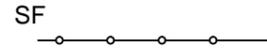


(e) Good placement of rock along channel invert

FILE NAME: H:\Milling\1\0815\SWAMP_dwg\SD-RR-1_Rock Linings.dwg
 PRINTED: 12 October 2011
 CREATED: 12 October 2011

Reference: Witheridge 2010. Erosion and Sediment Control - A field Guide for Construction Site Managers. Catchments & Creeks Pty Ltd., Brisbane, Queensland

Sediment Fence SF



Materials

* Fabric: polypropylene, polyamide, nylon, polyester, or polyethylene woven or non-woven fabric, at least 700mm in width and a minimum unit weight of 140GSM. All fabrics to contain ultraviolet inhibitors and stabilisers to provide a minimum of 6 months of useable construction life (ultraviolet stability exceeding 70%).

* Fabric reinforcement: wire or steel mesh minimum 14-gauge with a maximum mesh spacing of 200mm.

* Support posts/stakes: 1500mm² (min) hardwood, 2500mm² (min) softwood, or 1.5kg/m (min) steel star pickets suitable for attaching fabric.

Installation

- To the maximum degree practical, and where the plans allow, ensure the fence is located:
 - totally within the property boundaries;
 - along a line of constant elevation wherever practical;
 - at least 2m from the toe of any filling operations that may result in shifting soil/fill damaging the fence.
- Install returns within the fence at maximum 20m intervals if the fence is installed along the contour, or 5 to 10m maximum spacing (depending on slope) if the fence is installed at an angle to the contour. The 'returns' shall consist of either:
 - V-shaped section extending at least 1.5m up the slope; or
 - sandbag or rock/aggregate check dam a minimum 1/3 and maximum 1/2 fence height, and extending at least 1.5m up the slope.
- Ensure the extreme ends of the fence are turned up the slope at least 1.5m, or as necessary, to minimise water bypassing around the fence.
- Ensure the sediment fence is installed in a manner that avoids the concentration of flow along the fence, and the undesirable discharge of water around the ends of the fence.
- If the sediment fence is to be installed along the edge of existing trees, ensure care is taken to protect the trees and their root systems during installation of the fence. Do not attach the fabric to the trees.
- Unless directed by the site supervisor, excavate a 200mm wide by 200mm deep trench along the proposed fence line, placing the excavated material on the up-slope side of the trench.
- Along the lower side of the trench, appropriately secure the stakes into the ground spaced no greater than 3m if supported by a top support wire or weir mesh backing, otherwise no greater than 2m.
- If specified, securely attach the support wire or mesh to the up-slope side of the stakes with the mesh extending at least 200mm into the excavated trench. Ensure the mesh and fabric is attached to the up-slope side of the stakes even when directing a fence around a corner or sharp change-of-direction.
- Wherever possible, construct the sediment fence from a continuous roll of fabric. To join fabric either:
 - attach each end to two overlapping stakes with the fabric folding around the associated stake one turn, and with the two stakes tied together with wire (Method 1); or
 - overlap the fabric to the next adjacent support post (Method 2).
- Securely attach the fabric to the support posts using 25 x 12.5mm staples, or tie wire at maximum 150mm spacing.
- Securely attach the fabric to the support wire/mesh (if any) at a maximum spacing of 1m.
- Ensure the completed sediment fence is at least 450mm, but not more than 700mm high. If a spill-through weir is installed, ensure the crest of the weir is at least 300mm above ground level.
- Backfill the trench and tamp the fill to firmly anchor the bottom of the fabric and mesh to prevent water from flowing under the fence.
- If it is not possible to anchor the fabric in an excavated trench, then use a continuous layer of sand or aggregate to hold the fabric firmly on the ground.

Additional requirements for the installation of a spill-through weir

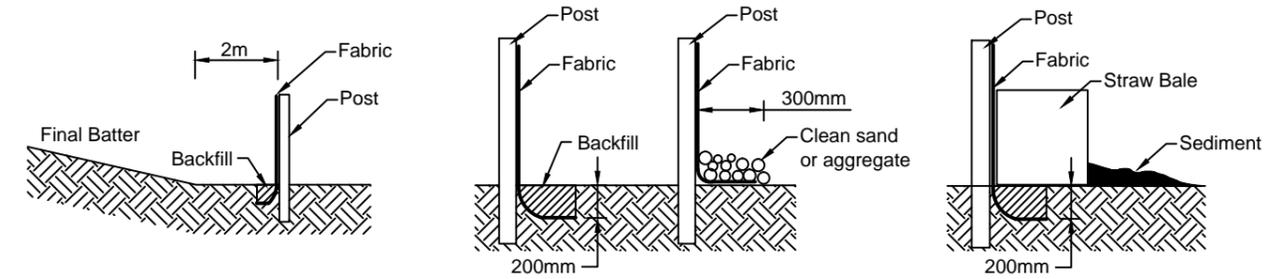
- Locate the spill-through weir such that the weir crest will be lower than the ground level at each end of the fence.
- Ensure the crest of the spill-through weir is at least 300mm the ground elevation.
- Securely tie a horizontal cross member (weir) to the support posts/stakes each side of the weir. Cut the fabric down the side of each post and fold the fabric over the cross member and appropriately secure the fabric.
- Install a suitable splash pad and/or chute immediately down-slope of the spill-through weir to control soil erosion and appropriately discharge the concentrated flow passing over the weir.

Maintenance

- Inspect the sediment fence at least weekly and after any significant rain. Make necessary repairs immediately.
- Repair any torn sections with a continuous piece of fabric from post to post.
- When making repairs, always restore the system to its original configuration unless an amended layout is required or specified.
- If the fence is sagging between stakes, install additional support posts.
- Remove accumulated sediment if the sediment deposit exceeds a depth of 1/3 the height of the fence.
- Dispose of sediment in a suitable manner that will not cause an erosion or pollution hazard.
- Replace the fabric if the service life of the existing fabric exceeds 6-months.

Removal

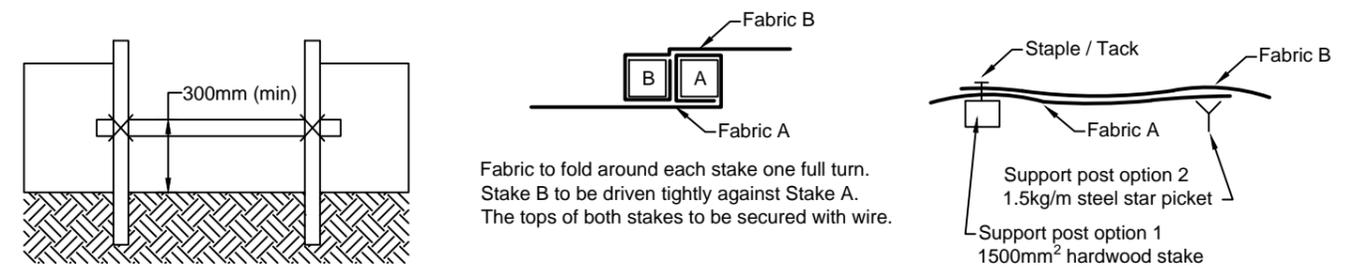
- When disturbed areas up-slope of the sediment fence are sufficiently stabilised to restrain erosion, the fence must be removed.
- Remove materials and collected sediment and dispose of in a suitable manner that will not cause an erosion or pollution hazard.
- Rehabilitate/revegetate the disturbed ground as necessary to minimise the erosion hazard.



(a) Location of fence relative to base of slope

(b) Anchoring base of fabric

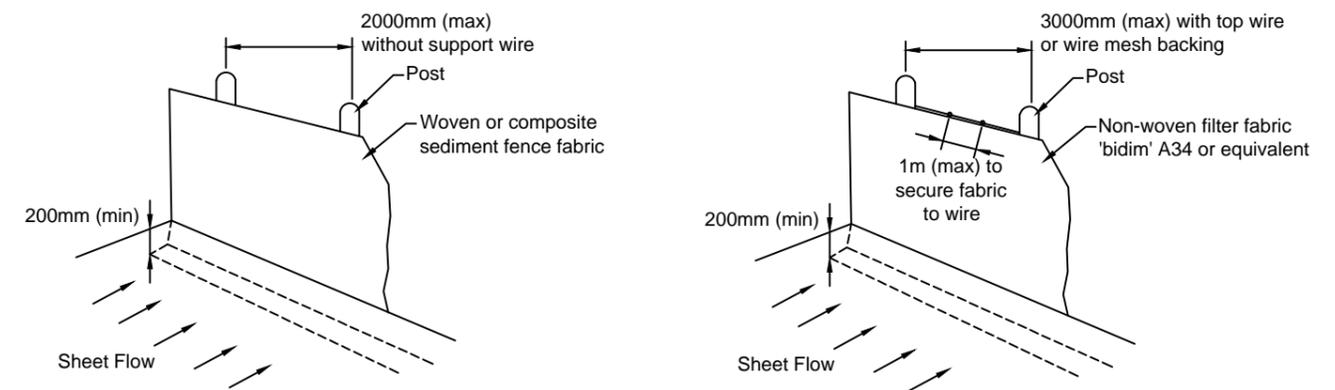
(c) Placement of up-slope straw bale



(d) Spill-through weir

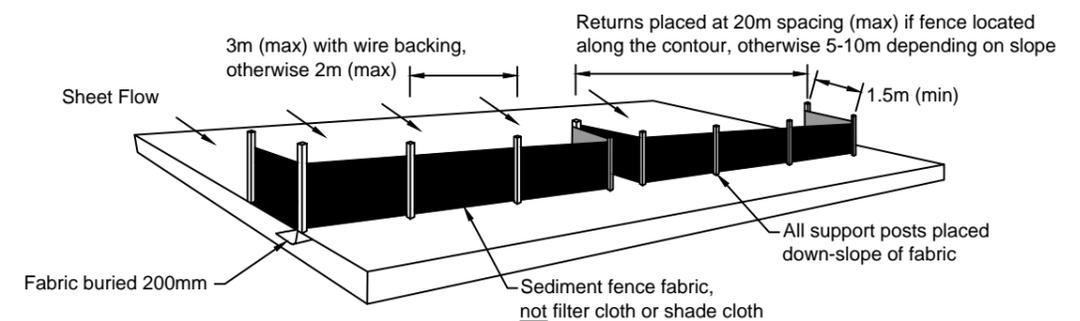
(e) Joining fabric - Method 1

(f) Joining fabric - Method 2



(g) Installation without backing support

(h) Installation with top wire support



(i) Installation of sediment fence

PRINTED: 23 November 2011
CREATED: 10 November 2011
FILE NAME: F:\Admin\AuscCAD\Templates\SWMP_Amp\SD-SF-1_Sediment Fence.dwg

Reference: Witheridge 2010, Erosion and Sediment Control - A field Guide for Construction Site Managers. Catchments & Creeks Pty Ltd., Brisbane, Queensland

Attachment 5 – Ramsar Context Plan

