Appendix 9

Flora and Fauna Management Plan

(Total No. of pages including blank pages = 28)

Note: This Appendix is only available on the digital version of this document

This page has intentionally been left blank

Walker Quarries

ABN: 82 003 061 890

FLORA AND FAUNA MANAGEMENT PLAN

for the

Wallerawang Quarry

September 2016

Prepared by:

R.W. CORKERY & CO. PTY. LIMITED

This page has intentionally been left blank

ABN: 82 003 061 890

FLORA AND FAUNA MANAGEMENT PLAN

for the

Wallerawang Quarry

Prepared for:

Walker Quarries Pty Ltd
ABN: 82 003 061 890
PO Box 307
LITHGOW NSW 2790
Lot 6, Great Western Highway
WALLERAWANG NSW 2845

Telephone: (02) 6351 2931
Email: walkerquarries@bigpond.com

Prepared by:

R.W. Corkery & Co. Pty. Limited
Geological & Environmental Consultants
ABN: 31 002 033 712

Brooklyn Office:
1st Floor, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083

Telephone: (02) 9985 8511
Facsimile: (02) 6361 3622
Email: brooklyn@rwcorkery.com

Orange Office:
62 Hill Street
ORANGE NSW 2800

Telephone: (02) 6362 5411
Facsimile: (02) 6361 3622
Email: orange@rwcorkery.com

Brisbane Office:
Suite 5, Building 3
Pine Rivers Office Park
205 Leitchs Road
BRENDALE QLD 4500

Telephone: (07) 3205 5400
Facsimile: (02) 6361 3622
Email: brisbane@rwcorkery.com

Ref No. 949/02e

September 2016

This Copyright is included for the protection of this document

CONTENTS

Page

CONTENTS

Page

FIGURES

TABLES

LIST OF ABBREVIATIONS

EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EPL	Environment Protection Licence
FFMP	Flora and Fauna Management Plan
MOP	Mining Operations Plan
OEH	Office of Environment & Heritage
RWC	R.W. Corkery & Co. Pty Limited

This page has intentionally been left blank

1. INTRODUCTION

This Flora and Fauna Management Plan (FFMP) for the Wallerawang Quarry ("the Quarry") has been prepared by R.W. Corkery & Co. Pty Limited (RWC) on behalf of Walker Quarries Pty Ltd (the Company) in accordance with *Condition 2.38* of Development Consent DA 344-11-2001 (DA 344-11-2001). The FFMP synthesises the recommendations made during the preparation of an *Environmental Impact Statement* (EIS) for development of the Quarry (Pacrim, 2001), and subsequent assessment and approval of DA 344-11-2001. It is intended to guide the management of vegetation clearing, remnant vegetation management and revegetation activities within the Quarry Site. Additional information concerning rehabilitation is provided in a Mining Operations Plan (MOP).

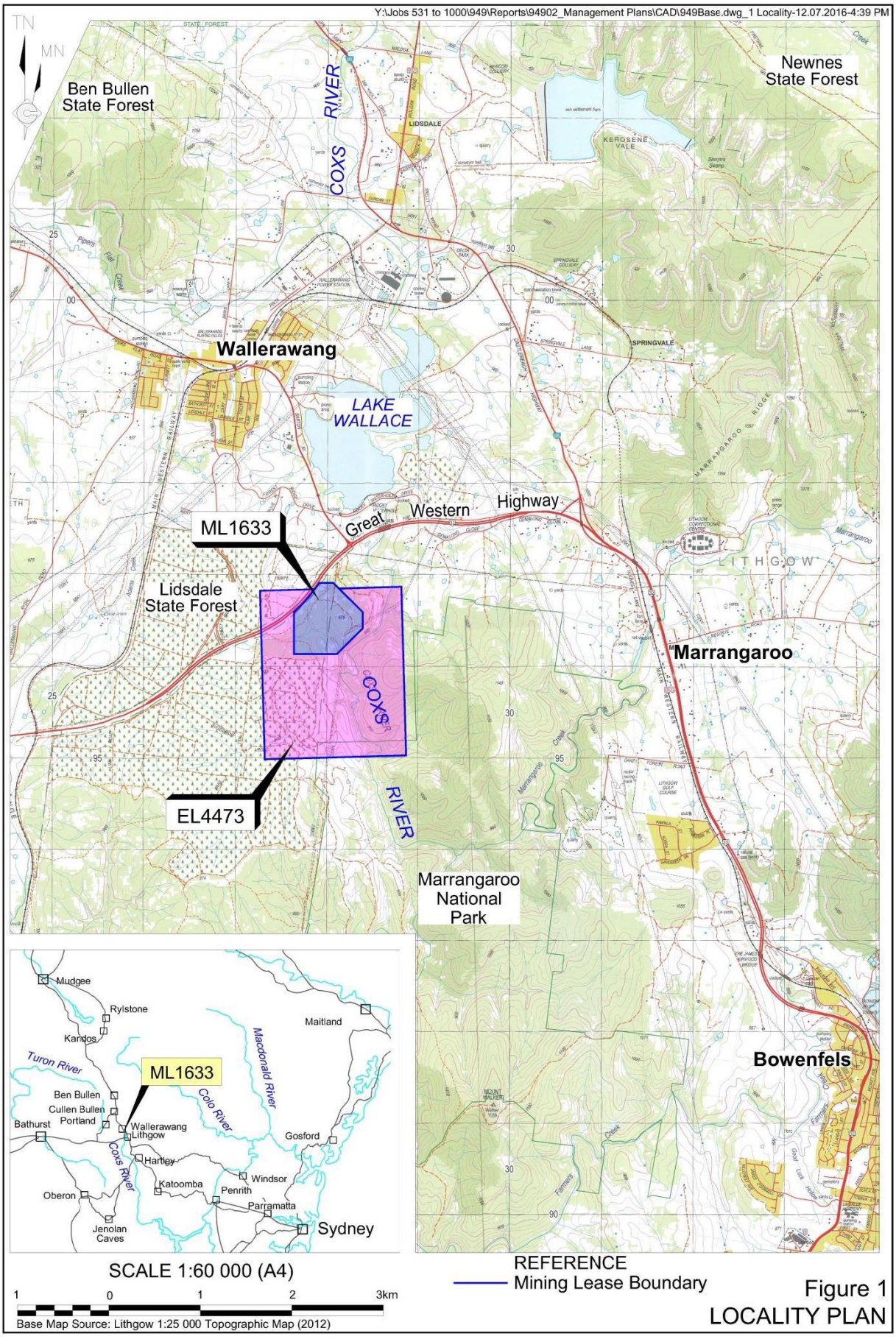
The Quarry is located approximately 8km northwest of Lithgow (see **Figure 1**) and comprises a total disturbed area of approximately 11ha (see **Figure 2**). The Quarry is approved to produce 500 000t per year of quartzite and rock aggregate material for use in the Wallerawang, Lithgow, Blue Mountains and Sydney regions.

Potential impacts to flora and fauna within the Quarry Site relate principally to removal of native flora and fauna habitat, direct incidents caused by traffic within the Quarry Site and indirect impacts associated with artificial light, blasting, noise and dust impacts resulting from operations.

2. LEGAL AND OTHER REGULATORY REQUIREMENTS

2.1 DEVELOPMENT CONSENT DA 344-11-2001

DA 344-11-2001 was granted on 19 October 2004 and requires the preparation of a *Flora and Fauna Management Plan* (*Condition 2.38*). **Table 1** identifies these conditional requirements and identifies the section of this FFMP where each is addressed.


Y:\Jobs 531 to 1000\949\Reports\94902_Management Plans\CAD\949Base.dwg_1 Locality-12.07.2016-4:39 PM
TN
MN
Ben Bullen State Forest
Newnes State Forest
COXS RIVER
LIDSDALE
KEROSENE VALE
Wallerawang
LAKE WALLACE
SPRINGVALE
MARRANGAROO RIDGE
Great Western Highway
ML1633
Lidsdale State Forest
LITHGOW
Marrangaroo
EL4473
Marrangaroo National Park
Bowenfels
Mudgee
Rylstone
Kandos
Maitland
Turon River
Macdonald River
Ben Bullen
Cullen Bullen
Portland
Bathurst
Wallerawang
Lithgow
Colo River
Gosford
Coxs River
Hartley
Windsor
Katoomba
Penrith
Oberon
Parramatta
Jenolan Caves
Sydney
SCALE 1:60 000 (A4)
1 0 1 2 3km
Base Map Source: Lithgow 1:25 000 Topographic Map (2012)
REFERENCE
Mining Lease Boundary
Figure 1
LOCALITY PLAN

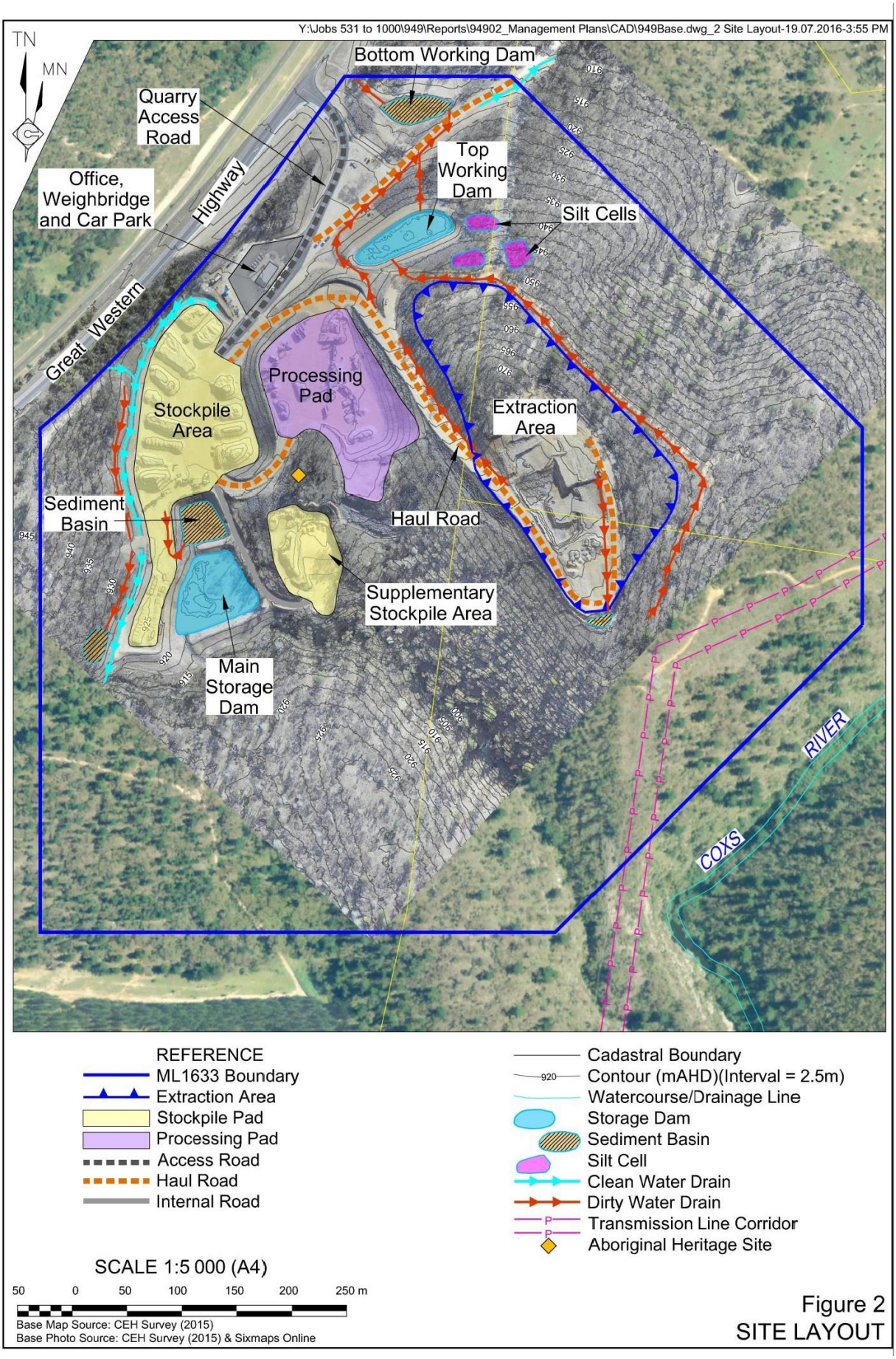


Figure 2
SITE LAYOUT

Table 1
Flora and Fauna Related Conditional Requirements of DA 344 – 11 – 2001

No	Condition	Section
Flora and Fauna Management Plan		
2.38	The Applicant shall prepare and implement a Flora and Fauna Management Plan for the development. This plan must:	
	a) Incorporate a protocol for effectively identifying any threatened species of flora and fauna and avoiding or minimizing the potential impact of the development on these species, including but not limited to the Yellow-bellied Sheathtail Bat and the Bathurst Copper Butterfly.	4.2.8, 5
	b) Describe the actions, measures and operating conditions to be implemented in order to:	
	– Ensure that the existing vegetation on the development site is properly identified and documented before the development commences;	4.1
	– Ensure that all natural bushland directly adjoining the development site and bushland to be conserved within the development site is not damaged or disturbed by its operations;	4.2
	– Protect, conserve, and where feasible improve the quality of existing vegetation on the development site, including land not actually disturbed by the development;	4.2
	– Re-vegetate land on the development site; and	4.2.12
	– Minimise the potential impacts of the development on flora and fauna.	4.2
	c) Describe the intended procedures to:	
	– Salvage, store and reuse material from the development site such as soil, seeds, tree hollows, rocks, logs etc.;	4.2.4
	– Clear vegetation on-site;	4.2.2
	– Control erosion and sediment flows;	4.2.6
	– Collect and propagate seeds from the local area;	4.2.7
	– Control weeds on the development site;	4.2.9
	– Control access to undisturbed land; and	4.2.11
	– Monitor the performance of the proposed actions, measures and operating conditions.	5
	d) Identify who would be responsible for monitoring, reviewing, and implementing the plan.	8
	The Applicant shall not carry out any development on the site before the Director-General has approved this plan.	

3. OBJECTIVES AND OUTCOMES

Table 2 presents the objectives and key performance outcomes relating to flora and fauna management for the FFMP and the Quarry.

Table 2
Flora and Fauna Management Objective and Key Performance Outcomes

Flora and Fauna	
(a) To ensure compliance with all relevant Quarry approval conditions, statements of commitment and reasonable community expectations.	(i) Compliance with all relevant criteria and reasonable community expectations, as determined in consultation with the relevant government agencies.
(b) To implement appropriate biodiversity management and mitigation measures during all stages of the Quarry.	(ii) All identified biodiversity management and mitigation measures implemented.
(c) Identify existing populations of threatened flora or fauna, including but not limited to the Yellow-bellied Sheathtail Bat and the Bathurst Copper Butterfly and establish measures to avoid or mitigate potential impacts to these species.	(iii) Existing populations of threatened flora and fauna are described and measures implemented to manage these and any potential populations of threatened species.
(d) To appropriately manage sections of the Quarry Site with remaining vegetation to achieve the approved final landform and land use.	(iv) Identified areas managed in a manner that does not result in off-site impacts and ensures that the identified final landform and land use is established.
(e) To implement an appropriate complaints handling and response protocol.	(v) Complaints (if any) handled and responded to in an appropriate manner.
(f) To implement appropriate corrective and preventative actions, if required.	(vi) Corrective and preventative actions implemented, if required.
(g) To implement an appropriate incident reporting program, if required.	(vii) Incidents (if any) reported in an appropriate manner.

4. MANAGEMENT OF BIODIVERSITY WITHIN THE QUARRY SITE

4.1 EXISTING FLORA AND FAUNA

4.1.1 Threatened Flora

Ecological field surveys undertaken by Wildthing Environmental Consultants for the original EIS (Pacrim, 2001) identified the native vegetation within the Quarry Site as sub-alpine woodlands with dominant species including the Ribbon Gum, Snow Gum, Mountain Gum and Black Sally. Additional canopy species included scattered, individual Radiata Pine. The canopy species were of varying ages with some containing hollows.

The understorey is sparse to non-existent and consists predominantly of younger specimens of the canopy species while the shrub layer consisted of Broom Heaths, Wattles, Finger Hakea, Narrow-leaved Geebung and Cherry Ballart. Groundcover is well established and included native grasses including Snow Grass, Three-awn Eargrass, Wallaby Grass, Forest Hedgehog Grass and Kangaroo Grass.

The Quarry Site is potential habitat for the threatened Silver-leaved Mountain Gum (*Eucaplyptus pulverulenta*)[1], however, the species was not identified with the Quarry Site during previous field surveys. No threatened flora species were identified within the Quarry Site and Wildthing Environmental Consultants considered that no threatened flora species were likely to exist (Pacrim, 2001).

4.1.2 Threatened Fauna

Field survey of the Quarry Site and surrounds undertaken by Wildthing Environmental Consultants for the original EIS (Pacrim, 2001) identified the Yellow-bellied Sheathtail-bat using echo-location monitoring techniques. No other threatened species were identified during the surveys, however, nearby records of the Koala and Purple Copper Butterfly (also referred to as the Bathurst Copper Butterfly) indicate that these species are potentially likely to use habitat within the Quarry Site. Other threatened species have the potential to occur, however, Wildthing Environmental Consultants did not consider these likely to be significantly affected by quarrying operations.

While Koala may occur locally due to the presence of the Ribbon Gum (*Eucalyptus viminalis*) which is a feed tree for the species, field surveys failed to identify a resident population of Koala or evidence of past habitation such as scats or scratches. In accordance with *State Environmental Planning Policy 44 – Koala Habitat Protection* the Quarry Site is considered to be 'potential' Koala habitat but does not contain 'core' Koala habitat. Targeted survey for the Koala is not required and does not form part of the monitoring program contained within the FFMP.

The Yellow-bellied Sheathtail-bat may use the vegetation within the Quarry Site for foraging and possibly for roosting and breeding behaviour. As a result of quarrying activities the bats may have to slightly extend their foraging ranges into the adjacent forest and use alternative roost sites to those that may be used within the potential disturbance area. Vegetation clearing during critical stages in the breeding cycle could also result in failed breeding attempts. The Yellow-bellied Sheathtail-bat is highly mobile with a large foraging range and is therefore unlikely to be significantly impacted by ongoing operations as long as habitat and life cycle management measures are adhered to. The FFMP outlines these measures (refer to Sections 4.2.2 to 4.2.4 in particular), however, due to the large home range of the species targeted surveys do not form part of the monitoring program of the FFMP.

[1] Listed under the schedules of both the NSW *Threatened Species Conservation Act 1995* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Previous surveys of the Quarry Site have failed to locate the Purple Copper Butterfly, however, several patches of potential habitat (the Blackthorn – *Bursaria spinosa ssp lasiophylla*) have been identified on the margins of the Quarry Site, i.e. outside disturbance areas:

- at the entrance to the processing pad; and
- adjacent to the haul road.

Section 4.2.8 presents specific management measures for this species with targeted surveys included as part of the monitoring program of the FFMP.

4.2 BIODIVERSITY MANAGEMENT MEASURES

4.2.1 Introduction

In accordance with *Condition 2.38* of DA 344-11-2001, the following subsections describe the management measures that will be implemented to:

- ensure that remnant vegetation within the Quarry Site is documented and suitably protected and maintained;
- reduce risks to bushland adjacent to the Quarry Site, as much as practically possible;
- guide revegetation of disturbed areas no longer required for operations; and
- minimise potential impacts to native flora and fauna as a result of quarry operations.

4.2.2 Vegetation Clearing Protocol

Vegetation clearing within the Quarry Site will be undertaken as the extraction area is progressively developed to its full extent and the establishment of surface infrastructure.

Clearing will be limited to approved areas only, with areas to be minimised to avoid impacts to native vegetation. Progressive clearing will ensure that vegetation is retained for as long as possible and only removed immediately before an area is required for operations.

Clearing campaigns will be scheduled to avoid spring to reduce the potential impact to roosting or breeding fauna species.

Vegetation clearing within the Quarry Site will occur in accordance with the following protocols.

- Areas to be cleared will be subject to a pre-clearing survey, including survey of individual trees specifically directed towards detecting any roosting or nesting fauna.
- Investigation of trees will be conducted on the day that they are to be cleared, to detect any individual animals present at the time.

- Where arboreal species are detected, a 10m buffer will be established around the tree and it will be left overnight to allow to animal to vacate the tree.
- Large habitat trees and those in which species have previously been identified will be carefully felled and any hollows checked at the end of the process for wildlife.
- Where fauna remains or is captured during vegetation clearing the animal will be released into nearby native vegetation where it is considered that doing so does not put the species at risk of injury.
- Should clearing activities result in injury to any native fauna species, the local WIRES organisation or a suitable alternative will be contacted immediately for assistance.

4.2.3 Hollow-bearing Tree Management

Tree-hollows are an important resource for many native fauna species, and are vital for some species. The retention and protection of hollow-bearing trees is an important element in the maintenance of biodiversity and in the execution of an environmentally sound development. The following specific protocols relating to hollow-bearing trees will be implemented.

- Hollow-bearing trees that have been felled will be placed in rehabilitation areas or undisturbed areas of the Quarry Site.
- A controlled felling technique will be used for clearing of hollowing-bearing trees that includes the following.
  - Initially nudging the tree to induce any fauna to vacate. This process should progressively increase in force.
  - Wait a period of five minutes to allow the fauna to vacate the tree. Repeat this step if necessary.
  - Select the preferred direction of fall and push the tree from a high point along the trunk towards the preferred direction of fall.
  - If the tree is too strong to be pushed with all roots intact, some of the roots on the restraining side will be cut and/or excavated.
  - The speed of fall and ground impact will be reduced where possible.

4.2.4 Salvage, Storage and Reuse of Materials

Large landscape features such as boulders, major tree trunks, major tree limbs and if possible minor branches will be salvaged and used directly in progressive rehabilitation activities or moved to undisturbed areas of the Quarry Site for temporary storage. This activity will create habitat with structural complexity and encourage many species into the rehabilitated areas.

Where possible, leafy materials will also be placed on rehabilitation areas or stockpiled in order to retain any existing seed bank.

Salvaged and stored material would selectively be placed on progressive or final rehabilitation areas.

4.2.5 Topsoil Stripping and Management

While it is expected that topsoil within the Quarry Site will be shallow, the topsoil that can be salvaged will be stockpiled and retained for use in progressive or final rehabilitation activities.

Care will be taken during topsoil stripping to avoid loss of structure or compaction. The following management measures will be implemented as far as practically possible.

- Care will be taken to ensure that subsoil clays are not removed with the topsoil (as this material is dispersive and will reduce the quality of material available for rehabilitation activities).
- Vegetation clearing will avoid contamination of the topsoil with large quantities of green material as this promotes biological degradation (composting) of this material (which would otherwise be a source of regrowth when the topsoil is respread).
- Topsoil is to be loaded into trucks and either transported directly to areas being rehabilitated or to the stockpile area.
- Care will be taken when forming stockpiles that the material is not overly compacted through the manual application process or by equipment driving over the stockpiles.
- All topsoil stockpiles will be no higher than 2m with a side slope of 3:1 (H:V).
- Where the topsoil is not expected to be utilised for some time, the surface will be revegetated with a groundcover species to stabilise the surface and limit erosion from the stockpiles.
- Timber, logs, rocks and other vegetative matter which will interfere with respreading applications or surface stability will be removed.

4.2.6 Erosion and Sediment Controls

Erosion and sediment controls for the Quarry Site are described in the *Water Management Plan*. In summary, water management within the Quarry Site involves implementation and maintenance of the following.

- Temporary and permanent water management infrastructure such as sediment basins, storage dams and water diversions or drains.
- A stormwater management program that includes water discharge protocols.
- Other erosion and sediment controls, to be implemented as required, such as sediment fencing, rock armouring and strategic groundcover establishment.

4.2.7 Collecting or Purchase of Seed

Options for revegetation from seed include the following.

- Unassisted revegetation. This method ensures only endemic species, able to withstand the harsh climate of the area, will succeed. In this scenario only weed control and feral and overabundant animal control would be required.
- Assisted revegetation. This method includes collecting or purchasing seed. Collecting and propagation of naturally occurring seed produces plant material of local provenance and genetic suitability that can be used in revegetation programs.

Unassisted revegetation has been successful within the Quarry Site to date, and is expected to continue. If assisted revegetation is undertaken, seed will be collected prior to clearing of vegetation if possible. If this is not possible, seed will be collected form desired species alongside the cleared vegetation or purchased from suitable dealers.

Seeds can also be stored until sowing by being placed in labelled zip-lock bags and stored in a refrigerator until required (to reduce humidity or warmth that may cause seed to deteriorate or die from fungal disease or rotting). Most seed will remain viable in this way for many years.

4.2.8 Purple Copper Butterfly Management

Several targeted surveys have been undertaken within the Quarry Site to locate potential resident populations of the Purple (or Bathurst) Copper Butterfly (*Paralucia spinifera*). No examples of the species have been identified to date, however, some examples of the Blackthorn plant (*Bursaria spinosa ssp lasiophylla*) have been identified. Purple Copper Butterfly is known to be dependent on this plant as a food source and has developed a symbiotic relationship with the ant species *Anonychomyrma nitidiceps* which are thought to offer the butterfly larvae some protection while they feed on the Blackthorn in return for nutritional secretions from the larvae (CSIRO 2002; Dexter & Kitching 1991a).

Management of the species will be directed towards protection of the Blackthorn. The following measures will be implemented to protect, conserve and re-establish Blackthorn within the Quarry Site.

- Operations will, where possible, be designed to avoid the removal of Blackthorn.
- Natural vegetation screenings will be developed for the existing Blackthorn populations within the Quarry Site to minimise dust impacts from operations.
- Existing Blackthorn populations will be marked so the site personnel will be able easily identify the species and avoid contact or unnecessary removal.

- Targeted monitoring of the Blackthorn and Purple Copper Butterfly will be undertaken by a qualified ecologist on an annual basis. Monitoring is described in more detail in Section 5.
- Blackthorn populations will be included in revegetation activities associated with progressive rehabilitation of the Quarry Site. A suitably qualified person will be commissioned to provide advice on establishment of the Blackthorn to encourage development of suitable habitat for the Purple Copper Butterfly.

4.2.9 Weed Management

All noxious weeds will be managed and controlled in accordance with the requirements of the *Noxious Weeds Act 1993*.

Weed control within the Quarry Site will focuses upon the removal of Weeds of National Significance (WoNS), noxious weeds and reducing the risk of further weed invasion. This is will be achieved by deterring the growth of weeds in recently disturbed areas, and preventing the transportation of weeds into the Quarry Site.

A list of declared weed species, their classification and suitable management approach for each species that is relevant to the Quarry is maintained by the Department of Primary Industries – Agriculture for the Upper Macquarie County Council (this Local Control Authority area includes the local council areas of Bathurst Regional Council, Blayney Shire Council, City of Lithgow Council and Oberon Council).

As cleared areas are removed from operations, they will be revegetated with a suitable groundcover to stabilise the surface and limit the potential for weed growth. An annual weed spraying and, where necessary, manual removal or slashing campaign will be continued to address any weeds that are evident. Any weed removal campaign will need to consider the weather conditions, soil conditions and time available for spraying. All herbicides will be handled and applied generally in accordance with the manufacturer's instructions.

4.2.10 Bushfire Management

Bushfire management is described in the *Bushfire Management Plan* for the Quarry. In summary the principle management measures include the following.

- Provision of fire extinguishers and other infrastructure.
- Management of hazardous and flammable material such that the potential for ignition is limited.
- Limiting smoking to specific areas within the Quarry Site.
- Ensuring a suitable supply of water is available for site and public use for firefighting purposes.
- Establishment of suitable fire breaks along the perimeter of the Quarry Site.

There are no recently recorded fire events within the Quarry Site. Any requirements for mosaic burning will be undertaken in accordance with directions from the NSW Rural Fire Service.

4.2.11 Access and Site Security

The following will be implemented to ensure access to the Quarry Site is restricted, as much as practically possible.

- Inspection and maintenance of fencing as required (after high wind / storm events).
- Gates installed and maintained.
- Installation of appropriate signage.
- Awareness training for site personnel, contractors and neighbours.

4.2.12 Progressive and Final Rehabilitation

Progressive rehabilitation within the Quarry Site will occur in accordance with the *Mining Operations Plan* (RME, 2016) and involve progressive revegetation of previously disturbed areas no longer required for ongoing operations.

The post-mining land use goal for the Quarry Site is to establish a safe, stable and non-polluting landform and to re-establish native vegetation consistent with the surrounding remnant vegetation that is self-sustaining.

The rehabilitation objectives for the Quarry Site are as follows.

- Stabilisation of the land to minimise environmental impacts.
- Reshaping the processing pad and stockpile areas to resemble, as much as possible, the original landform.
- Establishing a native ecosystem over the entire site (excluding the access tracks to be retained and the water management features) to develop a landform that is self-sustaining, low maintenance, and closely resembling the ecosystem surrounding the Quarry Site, i.e. sub-alpine Eucalypt woodland.
- Modifying the final void to make it safe and stable.
- Removing all buildings and equipment.
- Removing the bitumen road within the Quarry Site area.
- Retaining all water management features, including drains and dams that are not being retained in the final landform.
- Ongoing consultation with landholders regarding the final rehabilitation (as the quarry expands).

The long term objective is to establish a landform that is consistent with the surrounding vegetation and which does not require management input greater than that required for the surrounding landscape, that is, that native vegetation is successfully regenerating.

5. BIODIVERSITY MONITORING PROGRAM

5.1 INTRODUCTION

This section provides detail on the ecological and rehabilitation monitoring program for the Quarry. The monitoring is designed to assess the adequacy of the ecological management strategies to be undertaken as part of the FFMP.

5.2 OBJECTIVES OF THE MONITORING PROGRAM

The objectives of the monitoring program are to:

- evaluate the success of flora and fauna management strategies;
- facilitate continuous improvement in rehabilitation and revegetation practices;
- record and document changes in retained vegetation within the Quarry Site, and allow for comparison with previous records;
- record and document fauna population changes and identify any breeding and critical habitat; and
- ensure the ecological significance of the remnant vegetation or rehabilitated areas are maintained or improved as a result of ongoing management practices.

5.3 MONITORING LOCATIONS, FREQUENCY AND PROCEDURES

5.3.1 Purple Copper Butterfly

Rehabilitated areas and remnant vegetation of the Quarry Site will be monitored annually by a qualified ecologist who will measure / monitor for evidence of Purple Copper Butterfly and the health and distribution of Blackthorn.

A formal monitoring procedure is currently in preparation, however, will involve at least the following:

- pedestrian survey of the Quarry Site where targeted survey will be undertaken within known and potential butterfly habitat;
- mapping of Blackthorn distribution and density; and
- opportunistic sightings during general flora and fauna surveys.

Ecological surveys will be undertaken in September to coincide with the adult flying season of the Purple Copper Butterfly (August to November).

5.3.2 Local Flora and Fauna

The qualified ecologist engaged by the Company will also complete monitoring of local vegetation to assess the level of impact, if any, of the Quarry on the local ecological setting.

Four monitoring plots will be established to survey the range of topographical conditions present. Each plot would be 20m x 20m and marked with a star post at its northwestern corner. Once established, the FFMP will be updated to provide the GPS coordinates.

A photo of each plot will be taken from the northwestern corner with survey completed to identify:

- the abundance of all vascular plant species;
- the dominant species; and
- foliage cover in each stratum (e.g. canopy, shrub, groundcover).

At half-metre intervals along two 5m transects the height at which plant species touch a 4m Levy pole would be recorded. Soil condition, weed species and fauna presence would also be noted.

On completion of the initial monitoring in September 2016, a formal monitoring procedure will be prepared and appended to the FFMP. The FFMP will be updated to identify the established quadrats and transects.

As rehabilitation of the Quarry Site is completed, additional quadrats will be established to allow for comparison of the vegetation of rehabilitated landform to the surrounding landforms.

5.3.3 General Observations

Site personnel will undertake general inspections of rehabilitated areas and remnant vegetation on a monthly basis or following more than 25mm of rainfall. The inspection will include a visual survey of vegetation condition and any evidence of erosion.

Site-based observations will be recorded on a monthly basis in the environmental monitoring database. A report summarising the results of the ecological surveys and reviewing any trends in monitoring results will be prepared following the annual ecological monitoring surveys.

5.4 ANANLYSIS OF RESULTS AND CONTINGENCY MANAGEMENT

The results of the annual Purple Copper Butterfly and local flora and fauna monitoring will be reviewed by the ecologist to assess whether there are any observable or significant trends in the occurrence of specific species or quality / quantity of available habitat. Recommendations of the ecologist engaged to undertake the monitoring will be sought and these implemented, potentially in consultation with the NSW Office of Environment and Heritage, if deemed reasonable and feasible.

Should annual monitoring identify additional threatened species not previously identified by Wildthing Environmental Consultants, further advice from the ecologist and/or OEH will be sought. Additional monitoring or alternative management measures may be developed in response to the identification of additional threatened species.

6. INCIDENT MANAGEMENT, NOTIFICATION AND REPORTING

6.1 INCIDENT MANAGEMENT AND NOTIFICATION

Condition R2 of EPL 13172 requires that the Company must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident.

In accordance with the definition provided by Section 147 of the POEO Act, harm to the environment is deemed to be material if:

i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial; or

ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations).

An incident which causes or threatens to cause material harm to the environment is referred to as a **Pollution Incident**.

An incident which represents a contravention of criteria of the development consent is referred to as a **Non-compliance Incident**.

Pollution Incident

An incident involving flora and fauna will not be classified as a pollution incident. It is however possible that a pollution incident may involve impacts to native flora and fauna. In these instances the pollution incident will be managed in accordance with the management measures specific to the cause of the incident and, where relevant, the requirements of the *Pollution Incident Response Management Plan*.

Non-Compliance Incident

On identification of non-compliance against *Condition 2.38* of DA 344-11-2001, which may follow receipt of a complaint, the Quarry Manager will be notified and an investigation into the source of the non-compliance or complaint commenced in accordance with the response and corrective actions described in *Sections 6.2* and *6.3* of the Quarry *Environmental Management Strategy*.

6.2 INCIDENT REPORTING

Following implementation and review of the corrective measures, a short description of the incident, actions taken and results of the corrective actions will be documented by the Quarry Manager.

A summary of all incidents, including dates of occurrence, corrective measures taken and success of these measures will be compiled and reported in the Annual Return to the EPA and the Annual Environmental Management Report to DPE.

7. DATA MANAGEMENT AND REPORTING

7.1 REVIEW AND RECORDING OF MONITORING DATA

The Company will retain records of ecological monitoring for a minimum period of four years. Monitoring records will be made available to relevant government authorities following a written request.

7.2 REPORTING AND PUBLICATION OF MONITORING DATA

The Company will include all ecological monitoring reports as appendices to the Annual Environmental Management Report. That document, once approved by the relevant government agencies, would be published on the Company's website.

8. PLAN IMPLEMENTATION

8.1 ROLES AND RESPONSIBILITIES

Table 3 outlines the roles and responsibilities of personnel with reference to management of flora and fauna.

Table 3
Roles and Responsibilities of Personnel with Respect to Management of Flora and Fauna

Role	Responsibilities
Managing Director	Ensure compliance with the Flora and Fauna Management Plan. Ensure adequate resources are available to implement the Flora and Fauna Management Plan. Ensure suitably trained personnel are available to implement the responsibilities of the Quarry Manager during any time of the Quarry Manager's absence from site.
Quarry Manager, or his/her nominee	Ensure the implementation of the Flora and Fauna Management Plan. Commission a qualified ecological consultant to undertake monitoring surveys on an annual basis. Ensure ecological monitoring results are regularly reviewed/evaluated and entered into the environmental database. Implementation of the Biodiversity Management Measures (see Section 4). Provide primary contact for complaints and supply follow-up information to any complainant. Initiate investigations of complaints as received from the public or government agency. Inform the Managing Director of identified causes of flora and fauna related incidents and any alterations to site operations that could affect biodiversity. Ensure employees are competent through training and awareness programs. Coordinate the review of the Flora and Fauna Management Plan (see Section 8.3).
All On-site Personnel	Operate in a manner that minimises risks of incidents to themselves, fellow workers or the surrounding environment. Fully implement the relevant management measures within the Flora and Fauna Management Plan, where relevant. Report any anomalous extraordinary events to the Quarry Manager. Follow any instructions provided by the Quarry Manager.

8.2 COMPETENCE TRAINING AND AWARENESS

All personnel and contractors working at the Quarry undergo an induction. This induction includes information on the management of flora and fauna while working on site.

After completing the induction, workers will sign a statement of attendance and records of this are kept in the administration office.

Regular toolbox meetings are held to discuss whole-of-site production, management, safety and environmental issues. This will include a review of information and obligations relating to the Purple Copper Butterfly and host Blackthorn plant in August (to coincide with the adult flying season) and October (following the completion of annual monitoring). Personnel will be made aware as to the location(s) of Blackthorn plants and/or observed butterfly and the need for their protection.

8.3 PLAN REVIEW AND CONTINUAL IMPROVEMENT PROTOCOL

In accordance with the *Environmental Management Strategy*, this Plan will be reviewed within three months of any significant modifications to operations that may influence flora and fauna management, any internal or external audits undertaken of the Quarry and following any notifiable incident.

A comprehensive review of all management plans will take place to coincide with an Independent Environmental Audit, required annually (next scheduled for February 2017). This review will consider all management measures to ensure these remain within best practice management. This will ensure the adequacy of the FFMP and allow for opportunities of adaptive management and continual improvement. Each review will also evaluate the effectiveness of the overall ecological monitoring program and whether it should be modified or scaled back.

9. REFERENCES

CSIRO (2002). *Conservation Genetics of Paralucia spinifera, Bathurst Copper Butterfly*.

Dexter & Kitching (1991a). *Nomination for the Register of the National Estate*.

Pacrim Environmental (Pacrim) (2001). *Environmental Impact Statement Proposed Wallerawang Quarry*. Prepared for Sitegoal Pty. Limited, November 2001 (report 01/206.1).

This page has intentionally been left blank